11-Feb-2022

Josh Teeter
GRSD Sewer Authority
10831 Kruger Rd
New Buffalo, MI 49117

Re: **Biosolids PFAS** Work Order: **22011925**

Dear Josh, Revision: **1**

ALS Environmental received 1 sample on 31-Jan-2022 02:00 PM for the analyses presented in the following report.

The analytical data provided relates directly to the samples received by ALS Environmental - Holland and for only the analyses requested.

Sample results are compliant with industry accepted practices and Quality Control results achieved laboratory specifications. Any exceptions are noted in the Case Narrative, or noted with qualifiers in the report or QC batch information. Should this laboratory report need to be reproduced, it should be reproduced in full unless written approval has been obtained from ALS Environmental. Samples will be disposed in 30 days unless storage arrangements are made.

The total number of pages in this report is 17.

If you have any questions regarding this report, please feel free to contact me:

ADDRESS: 3352 128th Avenue, Holland, MI, USA
PHONE: +1 (616) 399-6070 FAX: +1 (616) 399-6185

Sincerely,

Electronically approved by: Bill Carey

Bill Carey
Project Manager

Report of Laboratory Analysis

Certificate No: MN 026-999-449

ALS Group, USA

Date: 11-Feb-22

Client: GRSD Sewer Authority
Project: Biosolids PFAS
Work Order: **22011925**

Work Order Sample Summary

Lab Samp ID	Client Sample ID	Matrix	Tag Number	Collection Date	Date Received	Hold
22011925-01	Biosolids	Sludge		1/26/2022 08:00	1/31/2022 14:00	☐

Revision: 1

Client: GRSD Sewer Authority
Project: Biosolids PFAS
WorkOrder: **22011925**

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
% of sample	Percent of Sample
µg/Kg-dry	Micrograms per Kilogram Dry Weight

Client: GRSD Sewer Authority
Project: Biosolids PFAS
Work Order: 22011925

Case Narrative

The attached "Sample Receipt Checklist" documents the date of receipt, status of custody seals, container integrity, preservation, and temperature compliance.

Samples were analyzed according to the analytical methodology previously transmitted in the "Work Order Acknowledgement". Methodologies are also documented in the "Analytical Result" section for each sample. Quality control results are listed in the "QC Report" section. A copy of the laboratory's scope of accreditation is available upon request.

Sample association for the reported quality control is located at the end of each batch summary. If applicable, results are appropriately qualified in the Analytical Result and QC Report sections. The "Qualifiers" section documents the various qualifiers, units, and acronyms utilized in reporting.

Any flags on MS/MSD samples not addressed in this narrative are unrelated to samples in this report.

With the following exceptions, all sample analyses achieved analytical criteria.

Batch 191415, Method E537 Mod, Sample Biosolids (22011925-01A): The Continuing Calibration Verification did not meet method acceptance criteria for the following analytes, results are to be considered estimated: DONA

Batch 191415, Method E537 Mod, Sample Biosolids (22011925-01A): The Continuing Calibration Verification did not meet acceptance criteria with high bias, however, the sample results were non-detect for the following analytes: 10:2-FTS

Batch 191415, Method E537 Mod, Sample Biosolids (22011925-01A): One or more surrogate recoveries were above the upper control limits. The sample was non-detect, therefore, no qualification is needed. 13C2-FtS 4:2, 13C2-FtS 6:2, 13C2-FtS 8:2

ALS Group, USA

Date: *11-Feb-22*

Client: GRSD Sewer Authority
Project: Biosolids PFAS

Work Order: 22011925

Lab ID: 22011925-01A
Client Sample ID: Biosolids

Collection Date: 1/26/2022 8:00:00 AM
Matrix: SLUDGE

Analyses	Result	Qual	Report Limit	Units	Dilution Factor	Date Analyzed
PFAS BY EPA 537 MODIFIED			**E537 MOD**	Prep: E537 Mod 2/7/22 17:45		Analyst: **ENS**
Fluorotelomer Sulphonic Acid 4:2 (FtS 4:2)	ND		35	µg/Kg-dry	1	2/9/2022 02:11 AM
Fluorotelomer Sulphonic Acid 6:2 (FtS 6:2)	ND		35	µg/Kg-dry	1	2/9/2022 02:11 AM
Fluorotelomer Sulphonic Acid 8:2 (FtS 8:2)	ND		35	µg/Kg-dry	1	2/9/2022 02:11 AM
Fluorotelomer Sulphonic Acid 10:2 (FtS 10:2)	ND		35	µg/Kg-dry	1	2/9/2022 02:11 AM
Perfluorobutanesulfonic Acid (PFBS)	ND		35	µg/Kg-dry	1	2/9/2022 02:11 AM
Perfluorobutanoic Acid (PFBA)	ND		35	µg/Kg-dry	1	2/9/2022 02:11 AM
Perfluorodecanesulfonic Acid (PFDS)	ND		35	µg/Kg-dry	1	2/9/2022 02:11 AM
Perfluorodecanoic Acid (PFDA)	ND		35	µg/Kg-dry	1	2/9/2022 02:11 AM
Perfluorododecanesulfonic Acid (PFDoS)	ND		35	µg/Kg-dry	1	2/9/2022 02:11 AM
Perfluorododecanoic Acid (PFDoA)	ND		35	µg/Kg-dry	1	2/9/2022 02:11 AM
Perfluoroheptanesulfonic Acid (PFHpS)	ND		35	µg/Kg-dry	1	2/9/2022 02:11 AM
Perfluoroheptanoic Acid (PFHpA)	ND		35	µg/Kg-dry	1	2/9/2022 02:11 AM
Perfluorohexadecanoic Acid (PFHxDA)	ND		35	µg/Kg-dry	1	2/9/2022 02:11 AM
Perfluorohexanesulfonic Acid (PFHxS)	ND		35	µg/Kg-dry	1	2/9/2022 02:11 AM
Perfluorohexanoic Acid (PFHxA)	ND		35	µg/Kg-dry	1	2/9/2022 02:11 AM
Perfluorononanesulfonic Acid (PFNS)	ND		35	µg/Kg-dry	1	2/9/2022 02:11 AM
Perfluorononanoic Acid (PFNA)	ND		35	µg/Kg-dry	1	2/9/2022 02:11 AM
Perfluorooctadecanoic Acid (PFODA)	ND		35	µg/Kg-dry	1	2/9/2022 02:11 AM
Perfluorooctanesulfonamide (PFOSA)	ND		35	µg/Kg-dry	1	2/9/2022 02:11 AM
Perfluorooctanesulfonic Acid (PFOS)	ND		35	µg/Kg-dry	1	2/9/2022 02:11 AM
Perfluorooctanoic Acid (PFOA)	ND		35	µg/Kg-dry	1	2/9/2022 02:11 AM
Perfluoropentanesulfonic Acid (PFPeS)	ND		35	µg/Kg-dry	1	2/9/2022 02:11 AM
Perfluoropentanoic Acid (PFPeA)	ND		35	µg/Kg-dry	1	2/9/2022 02:11 AM
Perfluorotetradecanoic Acid (PFTeA)	ND		35	µg/Kg-dry	1	2/9/2022 02:11 AM
Perfluorotridecanoic Acid (PFTriA)	ND		35	µg/Kg-dry	1	2/9/2022 02:11 AM
Perfluoroundecanoic Acid (PFUnA)	ND		35	µg/Kg-dry	1	2/9/2022 02:11 AM
N-ethylperfluoro-1-octanesulfonamide	ND		35	µg/Kg-dry	1	2/9/2022 02:11 AM
N-Ethylperfluorooctanesulfonamidoacetic Acid	ND		35	µg/Kg-dry	1	2/9/2022 02:11 AM
N-Ethylperfluorooctanesulfonamidoethanol	ND		35	µg/Kg-dry	1	2/9/2022 02:11 AM
N-methylperfluoro-1-octanesulfonamide	ND		35	µg/Kg-dry	1	2/9/2022 02:11 AM
N-Methylperfluorooctanesulfonamidoacetic Acid	ND		35	µg/Kg-dry	1	2/9/2022 02:11 AM
N-Methylperfluorooctanesulfonamidoethanol	ND		35	µg/Kg-dry	1	2/9/2022 02:11 AM
Hexafluoropropylene oxide dimer acid (HFPO-DA)	ND		35	µg/Kg-dry	1	2/9/2022 02:11 AM
4,8-Dioxa-3H-perfluorononanoic Acid (DONA)	ND		35	µg/Kg-dry	1	2/9/2022 02:11 AM

Note: See Qualifiers page for a list of qualifiers and their definitions.

Revision: 1

11Cl-Pf3OUdS	ND	35	µg/Kg-dry	1	2/9/2022 02:11 AM
9Cl-PF3ONS	ND	35	µg/Kg-dry	1	2/9/2022 02:11 AM
MOISTURE		**SW3550C**			Analyst: **ALG**
Moisture	**97**	**0.10**	**% of sample**	1	2/1/2022 01:40 PM

Note: See Qualifiers page for a list of qualifiers and their definitions.

Revision: 1

Batch ID: **191415** Instrument ID **LCMS1** Method: **E537 Mod**

MBLK Sample ID: **MBLK-191415-191415** Units: **µg/Kg** Analysis Date: **2/9/2022 12:49 AM**

Client ID: Run ID: **LCMS1_220208B** SeqNo: **8164453** Prep Date: **2/7/2022** DF: **1**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Fluorotelomer Sulphonic Acid 4:2 (FtS	ND	1.0								
Fluorotelomer Sulphonic Acid 6:2 (FtS	ND	1.0								
Fluorotelomer Sulphonic Acid 8:2 (FtS	ND	1.0								
Fluorotelomer Sulphonic Acid 10:2 (Ft	ND	1.0								
Perfluorobutanesulfonic Acid (PFBS)	ND	1.0								
Perfluorobutanoic Acid (PFBA)	ND	1.0								
Perfluorodecanesulfonic Acid (PFDS)	ND	1.0								
Perfluorodecanoic Acid (PFDA)	ND	1.0								
Perfluorododecanesulfonic Acid (PFDc	ND	1.0								
Perfluorododecanoic Acid (PFDoA)	ND	1.0								
Perfluoroheptanesulfonic Acid (PFHpS	ND	1.0								
Perfluoroheptanoic Acid (PFHpA)	ND	1.0								
Perfluorohexadecanoic Acid (PFHxDA	ND	1.0								
Perfluorohexanesulfonic Acid (PFHxS)	ND	1.0								
Perfluorohexanoic Acid (PFHxA)	ND	1.0								
Perfluorononanesulfonic Acid (PFNS)	ND	1.0								
Perfluorononanoic Acid (PFNA)	ND	1.0								
Perfluorooctadecanoic Acid (PFODA)	ND	1.0								
Perfluorooctanesulfonamide (PFOSA)	ND	1.0								
Perfluorooctanesulfonic Acid (PFOS)	ND	1.0								
Perfluorooctanoic Acid (PFOA)	ND	1.0								
Perfluoropentanesulfonic Acid (PFPeS	ND	1.0								
Perfluoropentanoic Acid (PFPeA)	ND	1.0								
Perfluorotetradecanoic Acid (PFTeA)	ND	1.0								
Perfluorotridecanoic Acid (PFTriA)	ND	1.0								
Perfluoroundecanoic Acid (PFUnA)	ND	1.0								
N-ethylperfluoro-1-octanesulfonamide	ND	1.0								
N-Ethylperfluorooctanesulfonamidoace	ND	1.0								
N-Ethylperfluorooctanesulfonamidoeth	ND	1.0								
N-methylperfluoro-1-octanesulfonamid	ND	1.0								
N-Methylperfluorooctanesulfonamidoa	ND	1.0								
N-Methylperfluorooctanesulfonamidoe	ND	1.0								
Hexafluoropropylene oxide dimer acid	ND	1.0								
4,8-Dioxa-3H-perfluorononanoic Acid (	ND	1.0								
11Cl-Pf3OUdS	ND	1.0								
9Cl-PF3ONS	ND	1.0								
Surr: 13C2-FtS 4:2	*21.49*	0	*18.68*	0	*115*	*50-150*	0			
Surr: 13C2-FtS 6:2	*23.33*	0	*19*	0	*123*	*50-150*	0			
Surr: 13C2-FtS 8:2	*23.52*	0	*19.16*	0	*123*	*50-150*	0			
Surr: 13C2-PFDA	*28.21*	0	*20*	0	*141*	*50-150*	0			
Surr: 13C2-PFDoA	*28.76*	0	*20*	0	*144*	*50-150*	0			

Note: See Qualifiers Page for a list of Qualifiers and their explanation.

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QC BATCH REPORT

Batch ID: **191415** Instrument ID **LCMS1** Method: **E537 Mod**

Surr: 13C2-PFHxA	*26.77*	0	*20*	0	*134*	*50-150*	0
Surr: 13C2-PFHxDA	*25.78*	0	*20*	0	*129*	*50-150*	0
Surr: 13C2-PFTeA	*21.64*	0	*20*	0	*108*	*50-150*	0
Surr: 13C2-PFUnA	*22.62*	0	*20*	0	*113*	*50-150*	0
Surr: 13C3-HFPO-DA	*21.4*	0	*20*	0	*107*	*50-150*	0
Surr: 13C3-PFBS	*21.2*	0	*18.6*	0	*114*	*50-150*	0
Surr: 13C4-PFBA	*25.49*	0	*20*	0	*127*	*50-150*	0
Surr: 13C4-PFHpA	*22.79*	0	*20*	0	*114*	*50-150*	0
Surr: 13C4-PFOA	*27.51*	0	*20*	0	*138*	*50-150*	0
Surr: 13C4-PFOS	*23.32*	0	*19.1*	0	*122*	*50-150*	0
Surr: 13C5-PFNA	*27.43*	0	*20*	0	*137*	*50-150*	0
Surr: 13C5-PFPeA	*22.89*	0	*20*	0	*114*	*50-150*	0
Surr: 13C8-FOSA	*22.98*	0	*20*	0	*115*	*50-150*	0
Surr: 18O2-PFHxS	*22.65*	0	*18.9*	0	*120*	*50-150*	0
Surr: d5-N-EtFOSA	*22.44*	0	*20*	0	*112*	*50-150*	0
Surr: d5-N-EtFOSAA	*19.73*	0	*20*	0	*98.7*	*50-150*	0
Surr: d9-N-EtFOSE	*20.62*	0	*20*	0	*103*	*50-150*	0
Surr: d3-N-MeFOSA	*25.04*	0	*20*	0	*125*	*50-150*	0
Surr: d3-N-MeFOSAA	*18.82*	0	*20*	0	*94.1*	*50-150*	0
Surr: d7-N-MeFOSE	*21.58*	0	*20*	0	*108*	*50-150*	0

Note: See Qualifiers Page for a list of Qualifiers and their explanation.

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Client: GRSD Sewer Authority
Work Order: 22011925
Project: Biosolids PFAS

QC BATCH REPORT

Batch ID: **191415** Instrument ID **LCMS1** Method: **E537 Mod**

LCS	Sample ID: **LCS-191415-191415**				Units: **µg/Kg**		Analysis Date: **2/9/2022 12:57 AM**			
Client ID:		Run ID: **LCMS1_220208B**			SeqNo: **8164454**		Prep Date: **2/7/2022**		DF: **1**	
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Fluorotelomer Sulphonic Acid 4:2 (FtS	3.916	1.0	3.736	0	105	62-145	0			
Fluorotelomer Sulphonic Acid 6:2 (FtS	4.656	1.0	3.792	0	123	64-140	0			
Fluorotelomer Sulphonic Acid 8:2 (FtS	4.236	1.0	3.832	0	111	65-137	0			
Fluorotelomer Sulphonic Acid 10:2 (Ft	4.482	1.0	3.856	0	116	40-160	0			
Perfluorobutanesulfonic Acid (PFBS)	3.65	1.0	3.536	0	103	72-128	0			
Perfluorodecanesulfonic Acid (PFDS)	3.968	1.0	3.856	0	103	59-134	0			
Perfluorodecanoic Acid (PFDA)	3.794	1.0	4	0	94.8	69-133	0			
Perfluorododecanesulfonic Acid (PFDc	3.439	1.0	3.872	0	88.8	69-134	0			
Perfluorododecanoic Acid (PFDoA)	3.955	1.0	4	0	98.9	69-135	0			
Perfluoroheptanesulfonic Acid (PFHpS	3.039	1.0	3.808	0	79.8	70-132	0			
Perfluoroheptanoic Acid (PFHpA)	3.99	1.0	4	0	99.7	71-131	0			
Perfluorohexadecanoic Acid (PFHxDA	3.706	1.0	4	0	92.7	70-130	0			
Perfluorohexanesulfonic Acid (PFHxS)	3.199	1.0	3.64	0	87.9	67-130	0			
Perfluorohexanoic Acid (PFHxA)	3.643	1.0	4	0	91.1	70-132	0			
Perfluorononanesulfonic Acid (PFNS)	3.679	1.0	3.84	0	95.8	69-125	0			
Perfluorononanoic Acid (PFNA)	3.696	1.0	4	0	92.4	72-129	0			
Perfluorooctadecanoic Acid (PFODA)	4.151	1.0	4	0	104	70-130	0			
Perfluorooctanesulfonamide (PFOSA)	4.054	1.0	4	0	101	67-137	0			
Perfluorooctanesulfonic Acid (PFOS)	3.904	1.0	3.712	0	105	68-136	0			
Perfluorooctanoic Acid (PFOA)	3.867	1.0	4	0	96.7	69-133	0			
Perfluoropentanesulfonic Acid (PFPeS	3.17	1.0	3.752	0	84.5	73-123	0			
Perfluoropentanoic Acid (PFPeA)	4.102	1.0	4	0	103	69-132	0			
Perfluorotetradecanoic Acid (PFTeA)	4.336	1.0	4	0	108	69-133	0			
Perfluorotridecanoic Acid (PFTriA)	4.085	1.0	4	0	102	66-139	0			
Perfluoroundecanoic Acid (PFUnA)	3.829	1.0	4	0	95.7	64-136	0			
N-ethylperfluoro-1-octanesulfonamide	3.679	1.0	4	0	92	70-130	0			
N-Ethylperfluorooctanesulfonamidoace	4.814	1.0	4	0	120	61-139	0			
N-Ethylperfluorooctanesulfonamidoeth	4.311	1.0	4	0	108	70-130	0			
N-methylperfluoro-1-octanesulfonamid	4.234	1.0	4	0	106	70-130	0			
N-Methylperfluorooctanesulfonamidoa	4.034	1.0	4	0	101	63-144	0			
N-Methylperfluorooctanesulfonamidoe	3.272	1.0	4	0	81.8	68-141	0			
Hexafluoropropylene oxide dimer acid	4.2	1.0	4	0	105	70-130	0			
4,8-Dioxa-3H-perfluorononanoic Acid (	2.856	1.0	3.768	0	75.8	70-130	0			
11Cl-Pf3OUdS	3.509	1.0	3.768	0	93.1	70-130	0			
9Cl-PF3ONS	3.57	1.0	3.728	0	95.8	70-130	0			
Surr: 13C2-FtS 4:2	*19.51*	0	*18.68*	0	*104*	*50-150*	0			
Surr: 13C2-FtS 6:2	*23.92*	0	*19*	0	*126*	*50-150*	0			
Surr: 13C2-FtS 8:2	*24.18*	0	*19.16*	0	*126*	*50-150*	0			
Surr: 13C2-PFDA	*24.34*	0	*20*	0	*122*	*50-150*	0			
Surr: 13C2-PFDoA	*25.76*	0	*20*	0	*129*	*50-150*	0			
Surr: 13C2-PFHxA	*24.05*	0	*20*	0	*120*	*50-150*	0			
Surr: 13C2-PFHxDA	*24.53*	0	*20*	0	*123*	*50-150*	0			

Note: See Qualifiers Page for a list of Qualifiers and their explanation.

Revision: 1

Batch ID: **191415** Instrument ID **LCMS1** Method: **E537 Mod**

Surr: 13C2-PFTeA	*21.75*	0	*20*	0	*109*	*50-150*	0
Surr: 13C2-PFUnA	*22.9*	0	*20*	0	*115*	*50-150*	0
Surr: 13C3-HFPO-DA	*22.35*	0	*20*	0	*112*	*50-150*	0
Surr: 13C3-PFBS	*19.41*	0	*18.6*	0	*104*	*50-150*	0
Surr: 13C4-PFBA	*22.05*	0	*20*	0	*110*	*50-150*	0
Surr: 13C4-PFHpA	*27.04*	0	*20*	0	*135*	*50-150*	0
Surr: 13C4-PFOA	*25.62*	0	*20*	0	*128*	*50-150*	0
Surr: 13C4-PFOS	*21.83*	0	*19.1*	0	*114*	*50-150*	0
Surr: 13C5-PFNA	*25.73*	0	*20*	0	*129*	*50-150*	0
Surr: 13C5-PFPeA	*21.33*	0	*20*	0	*107*	*50-150*	0
Surr: 13C8-FOSA	*22.35*	0	*20*	0	*112*	*50-150*	0
Surr: 18O2-PFHxS	*24.82*	0	*18.9*	0	*131*	*50-150*	0
Surr: d5-N-EtFOSA	*23.17*	0	*20*	0	*116*	*50-150*	0
Surr: d5-N-EtFOSAA	*20.68*	0	*20*	0	*103*	*50-150*	0
Surr: d9-N-EtFOSE	*19.75*	0	*20*	0	*98.8*	*50-150*	0
Surr: d3-N-MeFOSA	*22.01*	0	*20*	0	*110*	*50-150*	0
Surr: d3-N-MeFOSAA	*21.13*	0	*20*	0	*106*	*50-150*	0
Surr: d7-N-MeFOSE	*21.38*	0	*20*	0	*107*	*50-150*	0

LCS Sample ID: **LCS-191415-191415** Units: **µg/Kg** Analysis Date: **2/10/2022 12:30 PM**

Client ID: Run ID: **LCMS1_220210B** SeqNo: **8165197** Prep Date: **2/7/2022** DF: **1**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Perfluorobutanoic Acid (PFBA)	3.084	1.0	4	0	77.1	71-135	0			

Client: GRSD Sewer Authority
Work Order: 22011925
Project: Biosolids PFAS

QC BATCH REPORT

Batch ID: **191415** Instrument ID **LCMS1** Method: **E537 Mod**

MS Sample ID: **22020059-02A MS** Units: **µg/Kg** Analysis Date: **2/9/2022 01:06 AM**
Client ID: Run ID: **LCMS1_220208B** SeqNo: **8164455** Prep Date: **2/7/2022** DF: **1**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Fluorotelomer Sulphonic Acid 4:2 (FtS	3.996	1.0	3.736	0	107	62-145	0			
Fluorotelomer Sulphonic Acid 6:2 (FtS	4.436	1.0	3.792	0	117	64-140	0			
Fluorotelomer Sulphonic Acid 8:2 (FtS	4.298	1.0	3.832	0	112	65-137	0			
Fluorotelomer Sulphonic Acid 10:2 (Ft	4.806	1.0	3.856	0	125	40-160	0			
Perfluorobutanesulfonic Acid (PFBS)	3.553	1.0	3.536	0	100	72-128	0			
Perfluorobutanoic Acid (PFBA)	3.944	1.0	4	0.1456	95	71-135	0			
Perfluorodecanesulfonic Acid (PFDS)	3.95	1.0	3.856	0	102	59-134	0			
Perfluorodecanoic Acid (PFDA)	3.871	1.0	4	0.0504	95.5	69-133	0			
Perfluorododecanesulfonic Acid (PFDc	3.982	1.0	3.872	0	103	69-134	0			
Perfluorododecanoic Acid (PFDoA)	3.909	1.0	4	0	97.7	69-135	0			
Perfluoroheptanesulfonic Acid (PFHpS	4.526	1.0	3.808	0	119	70-132	0			
Perfluoroheptanoic Acid (PFHpA)	4.515	1.0	4	0	113	71-131	0			
Perfluorohexadecanoic Acid (PFHxDA	3.866	1.0	4	0	96.6	70-130	0			
Perfluorohexanesulfonic Acid (PFHxS)	3.87	1.0	3.64	0.1896	101	67-130	0			
Perfluorohexanoic Acid (PFHxA)	3.756	1.0	4	0.0604	92.4	70-132	0			
Perfluorononanesulfonic Acid (PFNS)	4.237	1.0	3.84	0	110	69-125	0			
Perfluorononanoic Acid (PFNA)	4.015	1.0	4	0.046	99.2	72-129	0			
Perfluorooctadecanoic Acid (PFODA)	4.375	1.0	4	0	109	70-130	0			
Perfluorooctanesulfonamide (PFOSA)	4.688	1.0	4	0	117	67-137	0			
Perfluorooctanesulfonic Acid (PFOS)	5.22	1.0	3.712	1.509	100	68-136	0			
Perfluorooctanoic Acid (PFOA)	4.473	1.0	4	0.2444	106	69-133	0			
Perfluoropentanesulfonic Acid (PFPeS	3.675	1.0	3.752	0	98	73-123	0			
Perfluoropentanoic Acid (PFPeA)	4.159	1.0	4	0.0424	103	69-132	0			
Perfluorotetradecanoic Acid (PFTeA)	4.473	1.0	4	0.0488	111	69-133	0			
Perfluorotridecanoic Acid (PFTriA)	3.729	1.0	4	0	93.2	66-139	0			
Perfluoroundecanoic Acid (PFUnA)	4.418	1.0	4	0	110	64-136	0			
N-ethylperfluoro-1-octanesulfonamide	3.765	1.0	4	0	94.1	70-130	0			
N-Ethylperfluorooctanesulfonamidoace	4.018	1.0	4	0	100	61-139	0			
N-Ethylperfluorooctanesulfonamidoeth	4.508	1.0	4	0	113	70-130	0			
N-methylperfluoro-1-octanesulfonamid	5.297	1.0	4	0	132	70-130	0			S
N-Methylperfluorooctanesulfonamidoa	3.382	1.0	4	0.0532	83.2	63-144	0			
N-Methylperfluorooctanesulfonamidoe	3.293	1.0	4	0	82.3	68-141	0			
Hexafluoropropylene oxide dimer acid	3.784	1.0	4	0	94.6	70-130	0			
4,8-Dioxa-3H-perfluorononanoic Acid (	3.504	1.0	3.768	0	93	70-130	0			
11Cl-Pf3OUdS	3.384	1.0	3.768	0	89.8	70-130	0			
9Cl-PF3ONS	3.711	1.0	3.728	0	99.5	70-130	0			
Surr: 13C2-FtS 4:2	*23.11*	0	*18.68*	0	*124*	*50-150*	0			
Surr: 13C2-FtS 6:2	*22.09*	0	*19*	0	*116*	*50-150*	0			
Surr: 13C2-FtS 8:2	*25.55*	0	*19.16*	0	*133*	*50-150*	0			
Surr: 13C2-PFDA	*25.89*	0	*20*	0	*129*	*50-150*	0			
Surr: 13C2-PFDoA	*35.32*	0	*20*	0	*177*	*50-150*	0			*S*
Surr: 13C2-PFHxA	*26.6*	0	*20*	0	*133*	*50-150*	0			

Note: See Qualifiers Page for a list of Qualifiers and their explanation.

Revision: 1

QC BATCH REPORT

Batch ID: **191415** Instrument ID **LCMS1** Method: **E537 Mod**

Surr: 13C2-PFHxDA	*27.24*	0	*20*	0	*136*	*50-150*	0
Surr: 13C2-PFTeA	*26.91*	0	*20*	0	*135*	*50-150*	0
Surr: 13C2-PFUnA	*22.21*	0	*20*	0	*111*	*50-150*	0
Surr: 13C3-HFPO-DA	*26.49*	0	*20*	0	*132*	*50-150*	0
Surr: 13C3-PFBS	*23.78*	0	*18.6*	0	*128*	*50-150*	0
Surr: 13C4-PFBA	*26.5*	0	*20*	0	*133*	*50-150*	0
Surr: 13C4-PFHpA	*21.13*	0	*20*	0	*106*	*50-150*	0
Surr: 13C4-PFOA	*24.06*	0	*20*	0	*120*	*50-150*	0
Surr: 13C4-PFOS	*24.91*	0	*19.1*	0	*130*	*50-150*	0
Surr: 13C5-PFNA	*24.72*	0	*20*	0	*124*	*50-150*	0
Surr: 13C5-PFPeA	*24.48*	0	*20*	0	*122*	*50-150*	0
Surr: 13C8-FOSA	*25.25*	0	*20*	0	*126*	*50-150*	0
Surr: 18O2-PFHxS	*20.87*	0	*18.9*	0	*110*	*50-150*	0
Surr: d5-N-EtFOSA	*27.91*	0	*20*	0	*140*	*50-150*	0
Surr: d5-N-EtFOSAA	*13.31*	0	*20*	0	*66.5*	*50-150*	0
Surr: d9-N-EtFOSE	*22.88*	0	*20*	0	*114*	*50-150*	0
Surr: d3-N-MeFOSA	*25.24*	0	*20*	0	*126*	*50-150*	0
Surr: d3-N-MeFOSAA	*13*	0	*20*	0	*65*	*50-150*	0
Surr: d7-N-MeFOSE	*25.63*	0	*20*	0	*128*	*50-150*	0

Note: See Qualifiers Page for a list of Qualifiers and their explanation.

Revision: 1

Client: GRSD Sewer Authority
Work Order: 22011925
Project: Biosolids PFAS

QC BATCH REPORT

Batch ID: **191415** Instrument ID **LCMS1** Method: **E537 Mod**

DUP Sample ID: **22020059-01A DUP** Units: **µg/Kg** Analysis Date: **2/9/2022 01:30 AM**
Client ID: Run ID: **LCMS1_220208B** SeqNo: **8164458** Prep Date: **2/7/2022** DF: **1**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Fluorotelomer Sulphonic Acid 4:2 (FtS	ND	1.0	0	0	0	0-0	0	0	30	
Fluorotelomer Sulphonic Acid 6:2 (FtS	ND	1.0	0	0	0	0-0	0	0	30	
Fluorotelomer Sulphonic Acid 8:2 (FtS	ND	1.0	0	0	0	0-0	0.116	0	30	
Fluorotelomer Sulphonic Acid 10:2 (Ft	ND	1.0	0	0	0	0-0	0	0	30	
Perfluorobutanesulfonic Acid (PFBS)	ND	1.0	0	0	0	0-0	0	0	30	
Perfluorobutanoic Acid (PFBA)	ND	1.0	0	0	0	0-0	0.1024	0	30	
Perfluorodecanesulfonic Acid (PFDS)	ND	1.0	0	0	0	0-0	0	0	30	
Perfluorodecanoic Acid (PFDA)	ND	1.0	0	0	0	0-0	0	0	30	
Perfluorododecanesulfonic Acid (PFDc	ND	1.0	0	0	0	0-0	0	0	30	
Perfluorododecanoic Acid (PFDoA)	ND	1.0	0	0	0	0-0	0	0	30	
Perfluoroheptanesulfonic Acid (PFHpS	ND	1.0	0	0	0	0-0	0	0	30	
Perfluoroheptanoic Acid (PFHpA)	ND	1.0	0	0	0	0-0	0	0	30	
Perfluorohexadecanoic Acid (PFHxDA	ND	1.0	0	0	0	0-0	0	0	30	
Perfluorohexanesulfonic Acid (PFHxS)	ND	1.0	0	0	0	0-0	0.0504	0	30	
Perfluorohexanoic Acid (PFHxA)	ND	1.0	0	0	0	0-0	0	0	30	
Perfluorononanesulfonic Acid (PFNS)	ND	1.0	0	0	0	0-0	0	0	30	
Perfluorononanoic Acid (PFNA)	ND	1.0	0	0	0	0-0	0	0	30	
Perfluorooctadecanoic Acid (PFODA)	ND	1.0	0	0	0	0-0	0	0	30	
Perfluorooctanesulfonamide (PFOSA)	ND	1.0	0	0	0	0-0	0	0	30	
Perfluorooctanesulfonic Acid (PFOS)	ND	1.0	0	0	0	0-0	0	0	30	
Perfluorooctanoic Acid (PFOA)	ND	1.0	0	0	0	0-0	0	0	30	
Perfluoropentanesulfonic Acid (PFPeS	ND	1.0	0	0	0	0-0	0	0	30	
Perfluoropentanoic Acid (PFPeA)	ND	1.0	0	0	0	0-0	0	0	30	
Perfluorotetradecanoic Acid (PFTeA)	ND	1.0	0	0	0	0-0	0	0	30	
Perfluorotridecanoic Acid (PFTriA)	ND	1.0	0	0	0	0-0	0	0	30	
Perfluoroundecanoic Acid (PFUnA)	ND	1.0	0	0	0	0-0	0	0	30	
N-ethylperfluoro-1-octanesulfonamide	ND	1.0	0	0	0	0-0	0	0	30	
N-Ethylperfluorooctanesulfonamidoace	ND	1.0	0	0	0	0-0	0	0	30	
N-Ethylperfluorooctanesulfonamidoeth	ND	1.0	0	0	0	0-0	0	0	30	
N-methylperfluoro-1-octanesulfonamid	ND	1.0	0	0	0	0-0	0	0	30	
N-Methylperfluorooctanesulfonamidoa	ND	1.0	0	0	0	0-0	0	0	30	
N-Methylperfluorooctanesulfonamidoe	ND	1.0	0	0	0	0-0	0	0	30	
Hexafluoropropylene oxide dimer acid	ND	1.0	0	0	0	0-0	0	0	30	
4,8-Dioxa-3H-perfluorononanoic Acid (	ND	1.0	0	0	0	0-0	0	0	30	
11Cl-Pf3OUdS	ND	1.0	0	0	0	0-0	0	0	30	
9Cl-PF3ONS	ND	1.0	0	0	0	0-0	0	0	30	
Surr: 13C2-FtS 4:2	*22.6*	0	*18.68*	0	*121*	*50-150*	21.14	*6.71*	*30*	
Surr: 13C2-FtS 6:2	*24.33*	0	*19*	0	*128*	*50-150*	21.63	*11.8*	*30*	
Surr: 13C2-FtS 8:2	*25.38*	0	*19.16*	0	*132*	*50-150*	25.17	*0.837*	*30*	
Surr: 13C2-PFDA	*25.38*	0	*20*	0	*127*	*50-150*	23.95	*5.82*	*30*	
Surr: 13C2-PFDoA	*28.44*	0	*20*	0	*142*	*50-150*	22.72	*22.4*	*30*	
Surr: 13C2-PFHxA	*27.09*	0	*20*	0	*135*	*50-150*	25.95	*4.33*	*30*	

Note: See Qualifiers Page for a list of Qualifiers and their explanation.

Revision: 1

Client: GRSD Sewer Authority
Work Order: 22011925
Project: Biosolids PFAS

QC BATCH REPORT

Batch ID: **191415** Instrument ID **LCMS1** Method: **E537 Mod**

Surr: 13C2-PFHxDA	*31.14*	0	*20*	0	*156*	*50-150*	26.51	*16.1*	*30*	*S*
Surr: 13C2-PFTeA	*25.61*	0	*20*	0	*128*	*50-150*	24.8	*3.2*	*30*	
Surr: 13C2-PFUnA	*25.78*	0	*20*	0	*129*	*50-150*	27.04	*4.8*	*30*	
Surr: 13C3-HFPO-DA	*30.21*	0	*20*	0	*151*	*50-150*	26.46	*13.2*	*30*	*S*
Surr: 13C3-PFBS	*24.8*	0	*18.6*	0	*133*	*50-150*	23.15	*6.87*	*30*	
Surr: 13C4-PFBA	*28.05*	0	*20*	0	*140*	*50-150*	26.1	*7.21*	*30*	
Surr: 13C4-PFHpA	*19.89*	0	*20*	0	*99.5*	*50-150*	25.41	*24.3*	*30*	
Surr: 13C4-PFOA	*22.57*	0	*20*	0	*113*	*50-150*	25.22	*11.1*	*30*	
Surr: 13C4-PFOS	*24.09*	0	*19.1*	0	*126*	*50-150*	22.65	*6.17*	*30*	
Surr: 13C5-PFNA	*26.75*	0	*20*	0	*134*	*50-150*	25.8	*3.63*	*30*	
Surr: 13C5-PFPeA	*27.47*	0	*20*	0	*137*	*50-150*	24.43	*11.7*	*30*	
Surr: 13C8-FOSA	*29.95*	0	*20*	0	*150*	*50-150*	27.56	*8.3*	*30*	
Surr: 18O2-PFHxS	*17.73*	0	*18.9*	0	*93.8*	*50-150*	24.76	*33.1*	*30*	*R*
Surr: d5-N-EtFOSA	*27.08*	0	*20*	0	*135*	*50-150*	26.67	*1.51*	*30*	
Surr: d5-N-EtFOSAA	*21.35*	0	*20*	0	*107*	*50-150*	24.87	*15.2*	*30*	
Surr: d9-N-EtFOSE	*23.09*	0	*20*	0	*115*	*50-150*	22.14	*4.17*	*30*	
Surr: d3-N-MeFOSA	*30.25*	0	*20*	0	*151*	*50-150*	24.01	*23*	*30*	*S*
Surr: d3-N-MeFOSAA	*21.49*	0	*20*	0	*107*	*50-150*	21.16	*1.56*	*30*	
Surr: d7-N-MeFOSE	*34.71*	0	*20*	0	*174*	*50-150*	28.28	*20.4*	*30*	*S*

The following samples were analyzed in this batch: 22011925-01A

Note: See Qualifiers Page for a list of Qualifiers and their explanation.

Revision: 1

Client: GRSD Sewer Authority
Work Order: 22011925
Project: Biosolids PFAS

QC BATCH REPORT

Batch ID: **R337404** Instrument ID **MOIST** Method: **SW3550C**

MBLK Sample ID: **WBLKS-R337404** Units: **% of sample** Analysis Date: **2/1/2022 01:40 PM**
Client ID: Run ID: **MOIST_220201A** SeqNo: **8145553** Prep Date: DF: **1**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Moisture	ND	0.10								

LCS Sample ID: **LCS-R337404** Units: **% of sample** Analysis Date: **2/1/2022 01:40 PM**
Client ID: Run ID: **MOIST_220201A** SeqNo: **8145552** Prep Date: DF: **1**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Moisture	99.99	0.10	100	0	100	98-102	0			

DUP Sample ID: **22020012-01B DUP** Units: **% of sample** Analysis Date: **2/1/2022 01:40 PM**
Client ID: Run ID: **MOIST_220201A** SeqNo: **8145532** Prep Date: DF: **1**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Moisture	8.9	0.10	0	0	0	0-0	8.84	0.676	10	

DUP Sample ID: **22020012-11B DUP** Units: **% of sample** Analysis Date: **2/1/2022 01:40 PM**
Client ID: Run ID: **MOIST_220201A** SeqNo: **8145545** Prep Date: DF: **1**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Moisture	12.94	0.10	0	0	0	0-0	14.49	11.3	10	R

The following samples were analyzed in this batch: 22011925-01A

Note: See Qualifiers Page for a list of Qualifiers and their explanation.

Revision: 1

5484269

Cincinnati, OH +1 513 733 5336
Fort Collins, CO +1 970 490 1511
Everett, WA +1 425 356 2600
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Houston, TX +1 281 530 5656
Spring City, PA +1 610 948 4903
South Charleston, WV +1 304 356 3168
Middletown, PA
Salt Lake City, UT
York, PA

Chain of Custody Form

Page ____ of ____

COC ID: 40372

ALS Environmental

ALS Project Manager: | ALS Work Order #: 2201925

Customer Information		Project Information		Parameter/Method Request for Analysis	
Purchase Order	106	Project Name	Biosolids PFAS	A	PFAS/Biosolids 537 MOD
Work Order		Project Number		B	
Company Name	GRSD Sewer Authority	Bill To Company	GRSD Sewer Authority	C	
Send Report To	Bob Zboril	Invoice Attn	Accounts Payable	D	
Address	10831 Kruger Rd	Address	10831 Kruger Rd	E	
				F	
City/State/Zip	New Buffalo, MI 49117	City/State/Zip	New Buffalo, MI 49117	G	
Phone	(269) 469-3434	Phone	(269) 469-3434	H	
Fax	(269) 469-0058	Fax	(269) 469-0058	I	
e-Mail Address		e-Mail Address		J	

No.	Sample Description	Date	Time	Matrix	Pres.	# Bottles	A	B	C	D	E	F	G	H	I	J	Hold
1	Biosolids	1/26/22	8am	Sludge	NO	1	✓										
2																	
3																	
4																	
5																	
6																	
7																	
8																	
9																	
10																	

Sampler(s) Please Print & Sign: Josh Feeter

Shipment Method:

Turnaround Time in Business Days (BD): ☐ 10 BD ☐ 5 BD ☐ 3 BD ☐ 2 BD ☐ 1 BD ☐ Other ____

Results Due Date:

	Date:	Time:		
Relinquished by:	1-26-22	10am	Received by: USPS	
Relinquished by: USPS	1/31/22	1400	Received by (Laboratory):	
Logged by (Laboratory):	1/31/22	1644	Checked by (Laboratory):	

Notes:

Cooler ID	Cooler Temp
1R3	20.4°C

QC Package: (Check One Box Below)
☐ Level II Std QC ☐ TRRP Checklist
☐ Level III Std QC/Raw Data ☐ TRRP Level IV
☐ Level IV SW846/CLP
☐ Other ____

Preservative Key: 1-HCl 2-HNO_3 3-H_2SO_4 4-NaOH 5-$Na_2S_2O_3$ 6-$NaHSO_4$ 7-Other 8-4°C 9-5035

ALS Group, USA

Sample Receipt Checklist

Client Name: **GALIEN** Date/Time Received: **31-Jan-22 14:00**

Work Order: **22011925** Received by: **LYS**

Checklist completed by Lydia Sweet (eSignature) 31-Jan-22 (Date) Reviewed by: Bill Carey (eSignature) 01-Feb-22 (Date)

Matrices: Sludge

Carrier name: Std US Mail

Shipping container/cooler in good condition?	Yes ☑	No ☐	Not Present ☐
Custody seals intact on shipping container/cooler?	Yes ☐	No ☐	Not Present ☑
Custody seals intact on sample bottles?	Yes ☐	No ☐	Not Present ☑
Chain of custody present?	Yes ☑	No ☐	
Chain of custody signed when relinquished and received?	Yes ☑	No ☐	
Chain of custody agrees with sample labels?	Yes ☑	No ☐	
Samples in proper container/bottle?	Yes ☑	No ☐	
Sample containers intact?	Yes ☑	No ☐	
Sufficient sample volume for indicated test?	Yes ☑	No ☐	
All samples received within holding time?	Yes ☑	No ☐	
Container/Temp Blank temperature in compliance?	Yes ☐	No ☑	
Sample(s) received on ice?	Yes ☐	No ☑	
Temperature(s)/Thermometer(s):	20.4/21.4c	IR3	
Cooler(s)/Kit(s):			
Date/Time sample(s) sent to storage:	1/31/2022 4:47:19 PM		
Water - VOA vials have zero headspace?	Yes ☐	No ☐	No VOA vials submitted ☑
Water - pH acceptable upon receipt?	Yes ☐	No ☐	N/A ☑
pH adjusted?	Yes ☐	No ☐	N/A ☑
pH adjusted by:	_		

Login Notes:

Client Contacted: Date Contacted: Person Contacted:

Contacted By: Regarding:

Comments:

CorrectiveAction: