24-Mar-2022

Mark Earl
Genesee County WWS
9290 Farrand Rd
Montrose, MI 48457

Re: **Liden Biosolids** Work Order: **22030496**

Dear Mark,

ALS Environmental received 1 sample on 04-Mar-2022 11:00 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,

Julian Johnson

Electronically approved by: Julian Johnson

Julian Johnson

Report of Laboratory Analysis

Certificate No: MN 026-999-449

ALS Group, USA

Date: 24-Mar-22

Client: Genesee County WWS
Project: Liden Biosolids
Work Order: **22030496**

Work Order Sample Summary

Lab Samp ID	Client Sample ID	Matrix	Tag Number	Collection Date	Date Received	Hold
22030496-01	Linden Biosolids	Sludge		3/2/2022 08:19	3/4/2022 23:00	☐

Client: Genesee County WWS
Project: Liden Biosolids
Work Order: 22030496

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.

ALS Group, USA

Date: 24-Mar-22

Client: Genesee County WWS
Project: Liden Biosolids
WorkOrder: **22030496**

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

ALS Group, USA

Date: *24-Mar-22*

Client: Genesee County WWS
Project: Liden Biosolids
Sample ID: Linden Biosolids
Collection Date: 3/2/2022 08:19 AM

Work Order: 22030496
Lab ID: 22030496-01
Matrix: SLUDGE

Analyses	Result	Qual	MDL	Report Limit	Units	Dilution Factor	Date Analyzed
PFAS BY EPA 537 MODIFIED		Method: **E537 MOD**			Prep: E537 Mod / 3/23/22		Analyst: **ENS**
Fluorotelomer Sulphonic Acid 4:2 (FtS 4:2)	U		9.6	33	µg/Kg-dry	1	3/23/2022 14:18
Fluorotelomer Sulphonic Acid 6:2 (FtS 6:2)	U		9.2	33	µg/Kg-dry	1	3/23/2022 14:18
Fluorotelomer Sulphonic Acid 8:2 (FtS 8:2)	U		17	33	µg/Kg-dry	1	3/23/2022 14:18
Perfluorobutanesulfonic Acid (PFBS)	U		4.0	33	µg/Kg-dry	1	3/23/2022 14:18
Perfluorobutanoic Acid (PFBA)	U		9.0	33	µg/Kg-dry	1	3/23/2022 14:18
Perfluorodecanesulfonic Acid (PFDS)	U		19	33	µg/Kg-dry	1	3/23/2022 14:18
Perfluorodecanoic Acid (PFDA)	U		5.4	33	µg/Kg-dry	1	3/23/2022 14:18
Perfluorododecanoic Acid (PFDoA)	U		10	33	µg/Kg-dry	1	3/23/2022 14:18
Perfluoroheptanesulfonic Acid (PFHpS)	U		18	33	µg/Kg-dry	1	3/23/2022 14:18
Perfluoroheptanoic Acid (PFHpA)	U		7.6	33	µg/Kg-dry	1	3/23/2022 14:18
Perfluorohexanesulfonic Acid (PFHxS)	U		7.1	33	µg/Kg-dry	1	3/23/2022 14:18
Perfluorohexanoic Acid (PFHxA)	U		5.0	33	µg/Kg-dry	1	3/23/2022 14:18
Perfluorononanesulfonic Acid (PFNS)	U		5.6	33	µg/Kg-dry	1	3/23/2022 14:18
Perfluorononanoic Acid (PFNA)	U		4.8	33	µg/Kg-dry	1	3/23/2022 14:18
Perfluorooctanesulfonamide (PFOSA)	U		7.9	33	µg/Kg-dry	1	3/23/2022 14:18
Perfluorooctanesulfonic Acid (PFOS)	**9.3**	J	**6.4**	**33**	**µg/Kg-dry**	1	3/23/2022 14:18
Perfluorooctanoic Acid (PFOA)	U		5.5	33	µg/Kg-dry	1	3/23/2022 14:18
Perfluoropentanesulfonic Acid (PFPeS)	U		14	33	µg/Kg-dry	1	3/23/2022 14:18
Perfluoropentanoic Acid (PFPeA)	U		3.9	33	µg/Kg-dry	1	3/23/2022 14:18
Perfluorotetradecanoic Acid (PFTeA)	U		7.2	33	µg/Kg-dry	1	3/23/2022 14:18
Perfluorotridecanoic Acid (PFTriA)	U		22	33	µg/Kg-dry	1	3/23/2022 14:18
Perfluoroundecanoic Acid (PFUnA)	U		10	33	µg/Kg-dry	1	3/23/2022 14:18
N-Ethylperfluorooctanesulfonamidoacetic Acid	U		21	33	µg/Kg-dry	1	3/23/2022 14:18
N-Methylperfluorooctanesulfonamidoacetic Acid	U		21	33	µg/Kg-dry	1	3/23/2022 14:18
Hexafluoropropylene oxide dimer acid (HFPO-DA)	U		12	33	µg/Kg-dry	1	3/23/2022 14:18
4,8-Dioxa-3H-perfluorononanoic Acid (DONA)	U		20	33	µg/Kg-dry	1	3/23/2022 14:18
11Cl-Pf3OUdS	U		7.9	33	µg/Kg-dry	1	3/23/2022 14:18
9Cl-PF3ONS	U		4.8	33	µg/Kg-dry	1	3/23/2022 14:18
Surr: 13C2-FtS 4:2	*101*			*50-150*	*%REC*	1	3/23/2022 14:18
Surr: 13C2-FtS 6:2	*148*			*50-150*	*%REC*	1	3/23/2022 14:18
Surr: 13C2-FtS 8:2	*105*			*50-150*	*%REC*	1	3/23/2022 14:18
Surr: 13C2-PFDA	*79.4*			*50-150*	*%REC*	1	3/23/2022 14:18

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

ALS Group, USA

Date: *24-Mar-22*

Client: Genesee County WWS
Project: Liden Biosolids
Sample ID: Linden Biosolids
Collection Date: 3/2/2022 08:19 AM

Work Order: 22030496
Lab ID: 22030496-01
Matrix: SLUDGE

Analyses	Result	Qual	MDL	Report Limit	Units	Dilution Factor	Date Analyzed
Surr: 13C2-PFDoA	*57.2*			*50-150*	*%REC*	1	3/23/2022 14:18
Surr: 13C2-PFHxA	*64.1*			*50-150*	*%REC*	1	3/23/2022 14:18
Surr: 13C2-PFHxDA	*77.8*			*50-150*	*%REC*	1	3/23/2022 14:18
Surr: 13C2-PFTeA	*76.2*			*50-150*	*%REC*	1	3/23/2022 14:18
Surr: 13C2-PFUnA	*82.9*			*50-150*	*%REC*	1	3/23/2022 14:18
Surr: 13C3-HFPO-DA	*68.4*			*50-150*	*%REC*	1	3/23/2022 14:18
Surr: 13C3-PFBS	*56.1*			*50-150*	*%REC*	1	3/23/2022 14:18
Surr: 13C4-PFBA	*67.2*			*50-150*	*%REC*	1	3/23/2022 14:18
Surr: 13C4-PFHpA	*70.2*			*50-150*	*%REC*	1	3/23/2022 14:18
Surr: 13C4-PFOA	*79.0*			*50-150*	*%REC*	1	3/23/2022 14:18
Surr: 13C4-PFOS	*65.8*			*50-150*	*%REC*	1	3/23/2022 14:18
Surr: 13C5-PFNA	*74.4*			*50-150*	*%REC*	1	3/23/2022 14:18
Surr: 13C5-PFPeA	*64.9*			*50-150*	*%REC*	1	3/23/2022 14:18
Surr: 13C8-FOSA	*58.9*			*50-150*	*%REC*	1	3/23/2022 14:18
Surr: 18O2-PFHxS	*63.5*			*50-150*	*%REC*	1	3/23/2022 14:18
Surr: d5-N-EtFOSA	*57.8*			*50-150*	*%REC*	1	3/23/2022 14:18
Surr: d5-N-EtFOSAA	*86.8*			*50-150*	*%REC*	1	3/23/2022 14:18
Surr: d9-N-EtFOSE	*54.1*			*50-150*	*%REC*	1	3/23/2022 14:18
Surr: d3-N-MeFOSA	*57.4*			*50-150*	*%REC*	1	3/23/2022 14:18
Surr: d3-N-MeFOSAA	*71.4*			*50-150*	*%REC*	1	3/23/2022 14:18
Surr: d7-N-MeFOSE	*55.2*			*50-150*	*%REC*	1	3/23/2022 14:18
MOISTURE			Method: **SW3550C**				Analyst: **ALG**
Moisture	**97**		**0.10**	**0.10**	**% of sample**	1	3/8/2022 12:38

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

Batch ID: **192797** Instrument ID **LCMS1** Method: **E537 Mod**

MS Sample ID: **22030449-02A MS** Units: **µg/Kg** Analysis Date: **3/10/2022 04:07 AM**

Client ID: Run ID: **LCMS1_220309C** SeqNo: **8233543** Prep Date: **3/8/2022** 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	5.997	0.99	3.699	0	162	62-145	0			S
Fluorotelomer Sulphonic Acid 6:2 (FtS	37.11	0.99	3.754	32.07	134	64-140	0			O
Fluorotelomer Sulphonic Acid 8:2 (FtS	6.272	0.99	3.794	0	165	65-137	0			S
Perfluorobutanesulfonic Acid (PFBS)	5.415	0.99	3.501	0.4104	143	72-128	0			S
Perfluorobutanoic Acid (PFBA)	13.97	0.99	3.96	6.46	190	71-135	0			S
Perfluorodecanesulfonic Acid (PFDS)	5.387	0.99	3.818	0	141	59-134	0			S
Perfluorodecanoic Acid (PFDA)	5.973	0.99	3.96	0	151	69-133	0			S
Perfluorododecanoic Acid (PFDoA)	5.198	0.99	3.96	0	131	69-135	0			
Perfluoroheptanesulfonic Acid (PFHpS	3.33	0.99	3.77	0.1011	85.6	70-132	0			
Perfluoroheptanoic Acid (PFHpA)	17.98	0.99	3.96	10.05	200	71-131	0			S
Perfluorohexanesulfonic Acid (PFHxS)	5.585	0.99	3.604	0.8576	131	67-130	0			S
Perfluorohexanoic Acid (PFHxA)	38.87	0.99	3.96	24.7	358	70-132	0			SO
Perfluorononanesulfonic Acid (PFNS)	5.064	0.99	3.802	0	133	69-125	0			S
Perfluorononanoic Acid (PFNA)	5.875	0.99	3.96	0.3121	140	72-129	0			S
Perfluorooctanesulfonamide (PFOSA)	4.855	0.99	3.96	0	123	67-137	0			
Perfluorooctanesulfonic Acid (PFOS)	5.138	0.99	3.675	0.1016	137	68-136	0			S
Perfluorooctanoic Acid (PFOA)	5.759	0.99	3.96	0.2964	138	69-133	0			S
Perfluoropentanesulfonic Acid (PFPeS	3.574	0.99	3.715	0.1621	91.8	73-123	0			
Perfluorotetradecanoic Acid (PFTeA)	5.378	0.99	3.96	0.03648	135	69-133	0			S
Perfluorotridecanoic Acid (PFTriA)	7.048	0.99	3.96	0	178	66-139	0			S
Perfluoroundecanoic Acid (PFUnA)	5.303	0.99	3.96	0.04767	133	64-136	0			
N-Ethylperfluorooctanesulfonamidoace	7.191	0.99	3.96	0	182	61-139	0			S
N-Methylperfluorooctanesulfonamidoa	4.981	0.99	3.96	0.05845	124	63-144	0			
4,8-Dioxa-3H-perfluorononanoic Acid (	4.66	0.99	3.731	0.007461	125	70-130	0			
11Cl-Pf3OUdS	4.831	0.99	3.731	0	130	70-130	0			
9Cl-PF3ONS	4.757	0.99	3.691	0.003731	129	70-130	0			
Surr: 13C2-FtS 4:2	*12.63*	0	*18.5*	0	*68.3*	*50-150*	0			
Surr: 13C2-FtS 6:2	*14.52*	0	*18.81*	0	*77.2*	*50-150*	0			
Surr: 13C2-FtS 8:2	*13.33*	0	*18.97*	0	*70.3*	*50-150*	0			
Surr: 13C2-PFDA	*14.24*	0	*19.8*	0	*71.9*	*50-150*	0			
Surr: 13C2-PFDoA	*22.89*	0	*19.8*	0	*116*	*50-150*	0			
Surr: 13C2-PFHxA	*13.78*	0	*19.8*	0	*69.6*	*50-150*	0			
Surr: 13C2-PFHxDA	*14.87*	0	*19.8*	0	*75.1*	*50-150*	0			
Surr: 13C2-PFTeA	*16.04*	0	*19.8*	0	*81*	*50-150*	0			
Surr: 13C2-PFUnA	*13.14*	0	*19.8*	0	*66.3*	*50-150*	0			
Surr: 13C3-HFPO-DA	*13.31*	0	*19.8*	0	*67.2*	*50-150*	0			
Surr: 13C3-PFBS	*13.78*	0	*18.42*	0	*74.8*	*50-150*	0			
Surr: 13C4-PFBA	*15.03*	0	*19.8*	0	*75.9*	*50-150*	0			
Surr: 13C4-PFHpA	*17.71*	0	*19.8*	0	*89.4*	*50-150*	0			
Surr: 13C4-PFOA	*18.13*	0	*19.8*	0	*91.6*	*50-150*	0			
Surr: 13C4-PFOS	*15.28*	0	*18.91*	0	*80.8*	*50-150*	0			

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

Client: Genesee County WWS
Work Order: 22030496
Project: Liden Biosolids

QC BATCH REPORT

Batch ID: **192797** Instrument ID **LCMS1** Method: **E537 Mod**

Surr: 13C5-PFNA	*15.42*	0	*19.8*	0	*77.9*	*50-150*	0
Surr: 13C5-PFPeA	*13.19*	0	*19.8*	0	*66.6*	*50-150*	0
Surr: 13C8-FOSA	*17.95*	0	*19.8*	0	*90.6*	*50-150*	0
Surr: 18O2-PFHxS	*19.48*	0	*18.71*	0	*104*	*50-150*	0
Surr: d5-N-EtFOSA	*14.68*	0	*19.8*	0	*74.1*	*50-150*	0
Surr: d5-N-EtFOSAA	*13.89*	0	*19.8*	0	*70.1*	*50-150*	0
Surr: d9-N-EtFOSE	*14.4*	0	*19.8*	0	*72.7*	*50-150*	0
Surr: d3-N-MeFOSA	*15.69*	0	*19.8*	0	*79.2*	*50-150*	0
Surr: d3-N-MeFOSAA	*16.16*	0	*19.8*	0	*81.6*	*50-150*	0
Surr: d7-N-MeFOSE	*16.64*	0	*19.8*	0	*84*	*50-150*	0

The following samples were analyzed in this batch: 22030496-01A

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

Client: Genesee County WWS
Work Order: 22030496
Project: Liden Biosolids

QC BATCH REPORT

Batch ID: **193320** Instrument ID **LCMS1** Method: **E537 Mod**

MBLK	Sample ID: **MBLK-193320-193320**				Units: **µg/Kg**			Analysis Date: **3/23/2022 01:53 PM**		
Client ID:		Run ID: **LCMS1_220323B**			SeqNo: **8264539**		Prep Date: **3/23/2022**		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	U	1.0								
Fluorotelomer Sulphonic Acid 6:2 (FtS	U	1.0								
Fluorotelomer Sulphonic Acid 8:2 (FtS	U	1.0								
Perfluorobutanesulfonic Acid (PFBS)	U	1.0								
Perfluorobutanoic Acid (PFBA)	U	1.0								
Perfluorodecanesulfonic Acid (PFDS)	U	1.0								
Perfluorodecanoic Acid (PFDA)	U	1.0								
Perfluorododecanoic Acid (PFDoA)	U	1.0								
Perfluoroheptanesulfonic Acid (PFHpS	U	1.0								
Perfluoroheptanoic Acid (PFHpA)	U	1.0								
Perfluorohexanesulfonic Acid (PFHxS)	U	1.0								
Perfluorohexanoic Acid (PFHxA)	U	1.0								
Perfluorononanesulfonic Acid (PFNS)	U	1.0								
Perfluorononanoic Acid (PFNA)	U	1.0								
Perfluorooctanesulfonamide (PFOSA)	U	1.0								
Perfluorooctanesulfonic Acid (PFOS)	U	1.0								
Perfluorooctanoic Acid (PFOA)	U	1.0								
Perfluoropentanesulfonic Acid (PFPeS	U	1.0								
Perfluoropentanoic Acid (PFPeA)	U	1.0								
Perfluorotetradecanoic Acid (PFTeA)	U	1.0								
Perfluorotridecanoic Acid (PFTriA)	U	1.0								
Perfluoroundecanoic Acid (PFUnA)	U	1.0								
N-Ethylperfluorooctanesulfonamidoace	U	1.0								
N-Methylperfluorooctanesulfonamidoa	U	1.0								
Hexafluoropropylene oxide dimer acid	U	1.0								
4,8-Dioxa-3H-perfluorononanoic Acid (	U	1.0								
11Cl-Pf3OUdS	U	1.0								
9Cl-PF3ONS	U	1.0								
Surr: 13C2-FtS 4:2	*12.28*	0	*18.68*	0	*65.7*	*50-150*	0			
Surr: 13C2-FtS 6:2	*13.74*	0	*19*	0	*72.3*	*50-150*	0			
Surr: 13C2-FtS 8:2	*14.89*	0	*19.16*	0	*77.7*	*50-150*	0			
Surr: 13C2-PFDA	*17.91*	0	*20*	0	*89.5*	*50-150*	0			
Surr: 13C2-PFDoA	*11.77*	0	*20*	0	*58.9*	*50-150*	0			
Surr: 13C2-PFHxA	*15.16*	0	*20*	0	*75.8*	*50-150*	0			
Surr: 13C2-PFHxDA	*16.69*	0	*20*	0	*83.5*	*50-150*	0			
Surr: 13C2-PFTeA	*15.19*	0	*20*	0	*75.9*	*50-150*	0			
Surr: 13C2-PFUnA	*17.1*	0	*20*	0	*85.5*	*50-150*	0			
Surr: 13C3-HFPO-DA	*17.14*	0	*20*	0	*85.7*	*50-150*	0			
Surr: 13C3-PFBS	*12.88*	0	*18.6*	0	*69.3*	*50-150*	0			
Surr: 13C4-PFBA	*15.09*	0	*20*	0	*75.4*	*50-150*	0			
Surr: 13C4-PFHpA	*16.17*	0	*20*	0	*80.9*	*50-150*	0			
Surr: 13C4-PFOA	*16.52*	0	*20*	0	*82.6*	*50-150*	0			

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

Client: Genesee County WWS
Work Order: 22030496
Project: Liden Biosolids

QC BATCH REPORT

Batch ID: **193320**	Instrument ID **LCMS1**		Method: **E537 Mod**				
Surr: 13C4-PFOS	*15.21*	0	*19.1*	0	*79.6*	*50-150*	0
Surr: 13C5-PFNA	*15.7*	0	*20*	0	*78.5*	*50-150*	0
Surr: 13C5-PFPeA	*14.64*	0	*20*	0	*73.2*	*50-150*	0
Surr: 13C8-FOSA	*13.56*	0	*20*	0	*67.8*	*50-150*	0
Surr: 18O2-PFHxS	*15.07*	0	*18.9*	0	*79.7*	*50-150*	0
Surr: d5-N-EtFOSA	*14.46*	0	*20*	0	*72.3*	*50-150*	0
Surr: d5-N-EtFOSAA	*14.4*	0	*20*	0	*72*	*50-150*	0
Surr: d9-N-EtFOSE	*12.91*	0	*20*	0	*64.5*	*50-150*	0
Surr: d3-N-MeFOSA	*13.33*	0	*20*	0	*66.6*	*50-150*	0
Surr: d3-N-MeFOSAA	*13.46*	0	*20*	0	*67.3*	*50-150*	0
Surr: d7-N-MeFOSE	*13.25*	0	*20*	0	*66.2*	*50-150*	0

LCS	Sample ID: **LCS-193320-193320**				Units: **µg/Kg**			Analysis Date: **3/23/2022 02:02 PM**		
Client ID:		Run ID: **LCMS1_220323B**			SeqNo: **8264540**		Prep Date: **3/23/2022**		DF: **1**	
Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Fluorotelomer Sulphonic Acid 6:2 (FtS	5.204	1.0	3.792	0	137	64-140	0			

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

Client: Genesee County WWS
Work Order: 22030496
Project: Liden Biosolids

QC BATCH REPORT

Batch ID: **193320** Instrument ID **LCMS1** Method: **E537 Mod**

LCS	Sample ID: **LCS-193320-193320**				Units: **µg/Kg**		Analysis Date: **3/23/2022 05:05 PM**			
Client ID:		Run ID: **LCMS1_220323B**			SeqNo: **8264559**		Prep Date: **3/23/2022**		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	4.291	1.0	3.736	0	115	62-145	0			
Fluorotelomer Sulphonic Acid 8:2 (FtS	4.736	1.0	3.832	0	124	65-137	0			
Perfluorobutanesulfonic Acid (PFBS)	3.814	1.0	3.536	0	108	72-128	0			
Perfluorobutanoic Acid (PFBA)	4.464	1.0	4	0	112	71-135	0			
Perfluorodecanesulfonic Acid (PFDS)	3.475	1.0	3.856	0	90.1	59-134	0			
Perfluorodecanoic Acid (PFDA)	4.553	1.0	4	0	114	69-133	0			
Perfluorododecanoic Acid (PFDoA)	5.034	1.0	4	0	126	69-135	0			
Perfluoroheptanesulfonic Acid (PFHpS	4.211	1.0	3.808	0	111	70-132	0			
Perfluoroheptanoic Acid (PFHpA)	3.916	1.0	4	0	97.9	71-131	0			
Perfluorohexanesulfonic Acid (PFHxS)	4.122	1.0	3.64	0	113	67-130	0			
Perfluorohexanoic Acid (PFHxA)	4.26	1.0	4	0	106	70-132	0			
Perfluorononanesulfonic Acid (PFNS)	3.358	1.0	3.84	0	87.5	69-125	0			
Perfluorononanoic Acid (PFNA)	4.289	1.0	4	0	107	72-129	0			
Perfluorooctanesulfonamide (PFOSA)	4.464	1.0	4	0	112	67-137	0			
Perfluorooctanesulfonic Acid (PFOS)	4.341	1.0	3.712	0	117	68-136	0			
Perfluorooctanoic Acid (PFOA)	4.469	1.0	4	0	112	69-133	0			
Perfluoropentanesulfonic Acid (PFPeS	4.148	1.0	3.752	0	111	73-123	0			
Perfluoropentanoic Acid (PFPeA)	4.144	1.0	4	0	104	69-132	0			
Perfluorotetradecanoic Acid (PFTeA)	4.018	1.0	4	0	100	69-133	0			
Perfluorotridecanoic Acid (PFTriA)	3.607	1.0	4	0	90.2	66-139	0			
Perfluoroundecanoic Acid (PFUnA)	4.28	1.0	4	0	107	64-136	0			
N-Ethylperfluorooctanesulfonamidoace	3.387	1.0	4	0	84.7	61-139	0			
N-Methylperfluorooctanesulfonamidoa	4.855	1.0	4	0	121	63-144	0			
Hexafluoropropylene oxide dimer acid	4.016	1.0	4	0	100	70-130	0			
4,8-Dioxa-3H-perfluorononanoic Acid (	3.354	1.0	3.768	0	89	70-130	0			
11Cl-Pf3OUdS	4.315	1.0	3.768	0	115	70-130	0			
9Cl-PF3ONS	4.028	1.0	3.728	0	108	70-130	0			
Surr: 13C2-FtS 4:2	*12.34*	0	*18.68*	0	*66*	*50-150*	0			
Surr: 13C2-FtS 6:2	*18.1*	0	*19*	0	*95.3*	*50-150*	0			
Surr: 13C2-FtS 8:2	*22.78*	0	*19.16*	0	*119*	*50-150*	0			
Surr: 13C2-PFDA	*18.72*	0	*20*	0	*93.6*	*50-150*	0			
Surr: 13C2-PFDoA	*13.44*	0	*20*	0	*67.2*	*50-150*	0			
Surr: 13C2-PFHxA	*15.67*	0	*20*	0	*78.4*	*50-150*	0			
Surr: 13C2-PFHxDA	*17.99*	0	*20*	0	*90*	*50-150*	0			
Surr: 13C2-PFTeA	*18.42*	0	*20*	0	*92.1*	*50-150*	0			
Surr: 13C2-PFUnA	*17.91*	0	*20*	0	*89.6*	*50-150*	0			
Surr: 13C3-HFPO-DA	*18.89*	0	*20*	0	*94.4*	*50-150*	0			
Surr: 13C3-PFBS	*13.37*	0	*18.6*	0	*71.9*	*50-150*	0			
Surr: 13C4-PFBA	*15.02*	0	*20*	0	*75.1*	*50-150*	0			
Surr: 13C4-PFHpA	*18.57*	0	*20*	0	*92.8*	*50-150*	0			
Surr: 13C4-PFOA	*17.59*	0	*20*	0	*88*	*50-150*	0			
Surr: 13C4-PFOS	*14.57*	0	*19.1*	0	*76.3*	*50-150*	0			

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

QC BATCH REPORT

Batch ID: **193320** Instrument ID **LCMS1** Method: **E537 Mod**

Surr: 13C5-PFNA	*17.5*	0	*20*	0	*87.5*	*50-150*	0
Surr: 13C5-PFPeA	*15.22*	0	*20*	0	*76.1*	*50-150*	0
Surr: 13C8-FOSA	*15.01*	0	*20*	0	*75.1*	*50-150*	0
Surr: 18O2-PFHxS	*14.49*	0	*18.9*	0	*76.7*	*50-150*	0
Surr: d5-N-EtFOSA	*14.99*	0	*20*	0	*75*	*50-150*	0
Surr: d5-N-EtFOSAA	*20.17*	0	*20*	0	*101*	*50-150*	0
Surr: d9-N-EtFOSE	*15.13*	0	*20*	0	*75.6*	*50-150*	0
Surr: d3-N-MeFOSA	*14.45*	0	*20*	0	*72.2*	*50-150*	0
Surr: d3-N-MeFOSAA	*18.33*	0	*20*	0	*91.7*	*50-150*	0
Surr: d7-N-MeFOSE	*14.14*	0	*20*	0	*70.7*	*50-150*	0

LCSD Sample ID: **LCSD-193320-193320** Units: **µg/Kg** Analysis Date: **3/23/2022 02:10 PM**

Client ID: Run ID: **LCMS1_220323B** SeqNo: **8264541** Prep Date: **3/23/2022** DF: **1**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Fluorotelomer Sulphonic Acid 6:2 (FtS	5.132	1.0	3.792	0	135	64-140	5.204	1.4	30	

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

Client: Genesee County WWS
Work Order: 22030496
Project: Liden Biosolids

QC BATCH REPORT

Batch ID: **193320** Instrument ID **LCMS1** Method: **E537 Mod**

LCSD	Sample ID: **LCSD-193320-193320**				Units: **µg/Kg**		Analysis Date: **3/23/2022 05:13 PM**			
Client ID:		Run ID: **LCMS1_220323B**			SeqNo: **8264560**		Prep Date: **3/23/2022**		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	4.682	1.0	3.736	0	125	62-145	4.291	8.71	30	
Fluorotelomer Sulphonic Acid 8:2 (FtS	4.514	1.0	3.832	0	118	65-137	4.736	4.79	30	
Perfluorobutanesulfonic Acid (PFBS)	4.184	1.0	3.536	0	118	72-128	3.814	9.24	30	
Perfluorobutanoic Acid (PFBA)	4.398	1.0	4	0	110	71-135	4.464	1.49	30	
Perfluorodecanesulfonic Acid (PFDS)	3.912	1.0	3.856	0	101	59-134	3.475	11.8	30	
Perfluorodecanoic Acid (PFDA)	4.298	1.0	4	0	107	69-133	4.553	5.78	30	
Perfluorododecanoic Acid (PFDoA)	5.254	1.0	4	0	131	69-135	5.034	4.28	30	
Perfluoroheptanesulfonic Acid (PFHpS	3.98	1.0	3.808	0	105	70-132	4.211	5.63	30	
Perfluoroheptanoic Acid (PFHpA)	4.688	1.0	4	0	117	71-131	3.916	17.9	30	
Perfluorohexanesulfonic Acid (PFHxS)	4.226	1.0	3.64	0	116	67-130	4.122	2.48	30	
Perfluorohexanoic Acid (PFHxA)	4.307	1.0	4	0	108	70-132	4.26	1.11	30	
Perfluorononanesulfonic Acid (PFNS)	3.338	1.0	3.84	0	86.9	69-125	3.358	0.621	30	
Perfluorononanoic Acid (PFNA)	4.278	1.0	4	0	107	72-129	4.289	0.261	30	
Perfluorooctanesulfonamide (PFOSA)	5.021	1.0	4	0	126	67-137	4.464	11.7	30	
Perfluorooctanesulfonic Acid (PFOS)	3.858	1.0	3.712	0	104	68-136	4.341	11.8	30	
Perfluorooctanoic Acid (PFOA)	4.481	1.0	4	0	112	69-133	4.469	0.268	30	
Perfluoropentanesulfonic Acid (PFPeS	4.098	1.0	3.752	0	109	73-123	4.148	1.2	30	
Perfluoropentanoic Acid (PFPeA)	4.358	1.0	4	0	109	69-132	4.144	5.02	30	
Perfluorotetradecanoic Acid (PFTeA)	4.66	1.0	4	0	116	69-133	4.018	14.8	30	
Perfluorotridecanoic Acid (PFTriA)	4.708	1.0	4	0	118	66-139	3.607	26.5	30	
Perfluoroundecanoic Acid (PFUnA)	4.247	1.0	4	0	106	64-136	4.28	0.779	30	
N-Ethylperfluorooctanesulfonamidoace	3.624	1.0	4	0	90.6	61-139	3.387	6.77	30	
N-Methylperfluorooctanesulfonamidoa	4.778	1.0	4	0	119	63-144	4.855	1.6	30	
Hexafluoropropylene oxide dimer acid	4.314	1.0	4	0	108	70-130	4.016	7.16	30	
4,8-Dioxa-3H-perfluorononanoic Acid (	3.605	1.0	3.768	0	95.7	70-130	3.354	7.23	30	
11Cl-Pf3OUdS	3.91	1.0	3.768	0	104	70-130	4.315	9.84	30	
9Cl-PF3ONS	3.899	1.0	3.728	0	105	70-130	4.028	3.26	30	
Surr: 13C2-FtS 4:2	*13.81*	0	*18.68*	0	*74*	*50-150*	12.34	*11.3*	*30*	
Surr: 13C2-FtS 6:2	*16.41*	0	*19*	0	*86.4*	*50-150*	18.1	*9.76*	*30*	
Surr: 13C2-FtS 8:2	*18.64*	0	*19.16*	0	*97.3*	*50-150*	22.78	*20*	*30*	
Surr: 13C2-PFDA	*20.54*	0	*20*	0	*103*	*50-150*	18.72	*9.29*	*30*	
Surr: 13C2-PFDoA	*17.42*	0	*20*	0	*87.1*	*50-150*	13.44	*25.8*	*30*	
Surr: 13C2-PFHxA	*17.03*	0	*20*	0	*85.1*	*50-150*	15.67	*8.31*	*30*	
Surr: 13C2-PFHxDA	*20.09*	0	*20*	0	*100*	*50-150*	17.99	*11*	*30*	
Surr: 13C2-PFTeA	*17.16*	0	*20*	0	*85.8*	*50-150*	18.42	*7.08*	*30*	
Surr: 13C2-PFUnA	*17.96*	0	*20*	0	*89.8*	*50-150*	17.91	*0.285*	*30*	
Surr: 13C3-HFPO-DA	*19.51*	0	*20*	0	*97.6*	*50-150*	18.89	*3.25*	*30*	
Surr: 13C3-PFBS	*14.74*	0	*18.6*	0	*79.2*	*50-150*	13.37	*9.7*	*30*	
Surr: 13C4-PFBA	*17.71*	0	*20*	0	*88.5*	*50-150*	15.02	*16.4*	*30*	
Surr: 13C4-PFHpA	*18.51*	0	*20*	0	*92.6*	*50-150*	18.57	*0.296*	*30*	
Surr: 13C4-PFOA	*19.15*	0	*20*	0	*95.8*	*50-150*	17.59	*8.49*	*30*	
Surr: 13C4-PFOS	*17.82*	0	*19.1*	0	*93.3*	*50-150*	14.57	*20.1*	*30*	

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

Client: Genesee County WWS
Work Order: 22030496
Project: Liden Biosolids

QC BATCH REPORT

Batch ID: **193320** Instrument ID **LCMS1** Method: **E537 Mod**

Surr: 13C5-PFNA	*18.59*	0	*20*	0	*92.9*	*50-150*	17.5	*6*	*30*
Surr: 13C5-PFPeA	*17.22*	0	*20*	0	*86.1*	*50-150*	15.22	*12.3*	*30*
Surr: 13C8-FOSA	*17.27*	0	*20*	0	*86.3*	*50-150*	15.01	*14*	*30*
Surr: 18O2-PFHxS	*16.64*	0	*18.9*	0	*88.1*	*50-150*	14.49	*13.8*	*30*
Surr: d5-N-EtFOSA	*16.28*	0	*20*	0	*81.4*	*50-150*	14.99	*8.23*	*30*
Surr: d5-N-EtFOSAA	*16.54*	0	*20*	0	*82.7*	*50-150*	20.17	*19.8*	*30*
Surr: d9-N-EtFOSE	*18.32*	0	*20*	0	*91.6*	*50-150*	15.13	*19.1*	*30*
Surr: d3-N-MeFOSA	*17.78*	0	*20*	0	*88.9*	*50-150*	14.45	*20.7*	*30*
Surr: d3-N-MeFOSAA	*17.08*	0	*20*	0	*85.4*	*50-150*	18.33	*7.07*	*30*
Surr: d7-N-MeFOSE	*18.23*	0	*20*	0	*91.2*	*50-150*	14.14	*25.2*	*30*

The following samples were analyzed in this batch: 22030496-01A

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

Client: Genesee County WWS
Work Order: 22030496
Project: Liden Biosolids

QC BATCH REPORT

Batch ID: **R339568** Instrument ID **MOIST** Method: **SW3550C**

MBLK Sample ID: **WBLKS-R339568** Units: **% of sample** Analysis Date: **3/8/2022 12:38 PM**
Client ID: Run ID: **MOIST_220308A** SeqNo: **8226102** Prep Date: DF: **1**

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

LCS Sample ID: **LCS-R339568** Units: **% of sample** Analysis Date: **3/8/2022 12:38 PM**
Client ID: Run ID: **MOIST_220308A** SeqNo: **8226101** Prep Date: DF: **1**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Moisture	99.98	0.10	100	0	100	98-102	0			

DUP Sample ID: **22030474-01A DUP** Units: **% of sample** Analysis Date: **3/8/2022 12:38 PM**
Client ID: Run ID: **MOIST_220308A** SeqNo: **8226092** Prep Date: DF: **1**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Moisture	19.95	0.10	0	0	0	0-0	20.42	2.33	10	

DUP Sample ID: **22030496-01A DUP** Units: **% of sample** Analysis Date: **3/8/2022 12:38 PM**
Client ID: **Linden Biosolids** Run ID: **MOIST_220308A** SeqNo: **8226098** Prep Date: DF: **1**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Moisture	97.04	0.10	0	0	0	0-0	97.02	0.0206	10	

The following samples were analyzed in this batch: 22030496-01A

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

Chain of Custody Form

Page 1 of 1

22030496

GENESEECO: Genesee County Water & Waste Services
Project: Liden Biosolids

ALS Project Manager:

Customer Information		Project Information		Parameter/Method Request for Analysis	
Purchase Order	2022-00040006	Project Name	Linden Biosolids	A	PFAS 28
Work Order		Project Number		B	
Company Name	GCDC WWS	Bill To Company	Genesee County Water and Waste Services	C	
Send Report To	Mark Earl	Invoice Attn.	Kimberly Gazso	D	
Address	6450 Silver Lake Rd	Address	4601 Beecher Rd.	E	
City/State/Zip	Linden, MI 48451	City/State/Zip	Flint, MI 48532	F	
Phone	(810) 735-7135	Phone	(810) 732-7870	G	
Fax	(810) 232-3250	Fax	(810) 732-9773	H	
e-Mail Address				I	
				J	

No.	Sample Description	Date	Time	Matrix	Pres. Key Numbers	# Bottles	A	B	C	D	E	F	G	H	I	J	Hold
1	Linden Biosolids	3/2/2022	08:19	SL	8	3	X										
2																	
3																	
4																	
5																	
6																	
7																	
8																	
9																	
10																	

Sampler(s): Please Print & Sign
Brent Pittenger 3/2/2022

Shipment Method:

Required Turnaround Time: (Check Box)
☐ 10 Wk Days ☐ 5 Wk Days ☐ 3 Wk Days ☐ 2 Wk Days ☐ 24 Hour ☑ Other _____

Results Due Date:

Relinquished by:	Date:	Time:	Received by:	Date:	Time:	Notes:
Brent Pittenger	3/4/2022	0700A		3-4-22	0854	
Relinquished by:	Date:	Time:	Received by (Laboratory):	Date:	Time:	
	3-4-22	1700	QS	3/4/22	2300	
Logged by (Laboratory):	Date:	Time:	Checked by (Laboratory):			
	3/7/22	0823				

ALS Cooler ID	Cooler Temp
IR1	4.8C

QC Package: (Check Box Below)
☐ Level II: Standard QC ☐ Level III: Raw Data
☐ TRRP LRC ☐ TRRP Level IV
☐ Level IV: SW846 Methods/CLP like
☐ 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

Note: Any changes must be made in writing once samples and COC Form have been submitted to ALS.

ALS Group, USA

Sample Receipt Checklist

Client Name: **GENESEECO** Date/Time Received: **04-Mar-22 23:00**

Work Order: **22030496** Received by: **LYS**

Checklist completed by Lydia Sweet (eSignature) 07-Mar-22 (Date) Reviewed by: Julian Johnson (eSignature) 07-Mar-22 (Date)

Matrices: Sludge
Carrier name: Courier

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):	4.8/4.8c	IR1	
Cooler(s)/Kit(s):			
Date/Time sample(s) sent to storage:	3/7/2022 9:10:20 AM		
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: