May 04, 2021

Vista Work Order No. 2104127

Mr. Doug Engelsman
City of Zeeland
350 Rich Ave.
Zeeland, MI 49464

Dear Mr. Engelsman,

Enclosed are the results for the sample set received at Vista Analytical Laboratory on April 13, 2021 under your Project Name 'Zeeland Biosolids'.

Vista Analytical Laboratory is committed to serving you effectively. If you require additional information, please contact me at 916-673-1520 or by email at mmaier@vista-analytical.com.

Thank you for choosing Vista as part of your analytical support team.

Sincerely,

Martha Maier
Laboratory Director

Vista Analytical Laboratory certifies that the report herein meets all the requirements set forth by NELAP for those applicable test methods. Results relate only to the samples as received by the laboratory. This report should not be reproduced except in full without the written approval of Vista.

Vista Work Order No. 2104127
Case Narrative

Sample Condition on Receipt:

Three sludge samples were received and stored securely in accordance with Vista standard operating procedures and EPA methodology. The samples were received in good condition and within the recommended temperature requirements. As directed, sample "Biosolids dupe" was extracted but not analyzed. As directed on, April 16th, 2021, the matrix of sample "Biosolids Blank" was reported as aqueous.

Analytical Notes:

PFAS Isotope Dilution Method - Solid

Sample "Biosolids" was extracted and analyzed for a selected list of PFAS using Vista's Isotope Dilution Method. The results for PFHxS, PFOA, PFOS, MeFOSAA and EtFOSAA include both linear and branched isomers. Results for all other analytes include the linear isomers only.

Holding Times

The sample was extracted and analyzed within the hold times.

Quality Control

The Initial Calibration and Continuing Calibration Verifications met the method acceptance criteria.

A Method Blank and Ongoing Precision and Recovery (OPR) sample were extracted and analyzed with the preparation batch. No analytes were detected in the Method Blank above the Reporting Limit (RL). The OPR recoveries were within the method acceptance criteria.

The labeled standard recoveries outside the acceptance criteria are listed in the table below.

PFAS Isotope Dilution Method - Aqueous

Sample "Biosolids Blank" was extracted and analyzed for a selected list of PFAS using Vista's PFAS Isotope Dilution Method. The results for PFHxS, PFOA, PFOS, MeFOSAA and EtFOSAA include both linear and branched isomers. Results for all other analytes include the linear isomers only.

Holding Times

The sample was extracted and analyzed within the hold times.

Quality Control

The Initial Calibration and Continuing Calibration Verifications met the acceptance criteria.

A Method Blank and Ongoing Precision and Recovery (OPR) sample were extracted and analyzed with the preparation batch. No analytes were detected in the Method Blank above the Reporting Limit. The OPR recoveries were within the method acceptance criteria.

The labeled standard recoveries for all QC and field samples were within the acceptance criteria.

QC Anomalies

LabNumber	SampleName	Analysis	Analyte	Flag	%Rec
2104127-01	Biosolids	PFAS Isotope Dilution Method	13C2-PFTeDA	H	13.5

H = Recovery was outside laboratory acceptance criteria.

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Sample Inventory Report

Vista Sample ID	Client Sample ID	Sampled	Received	Components/Containers
2104127-01	Biosolids	12-Apr-21 08:40	13-Apr-21 10:18	HDPE Bottle, 250 mL
2104127-02	Biosolids dupe	12-Apr-21 08:40	13-Apr-21 10:18	HDPE Bottle, 250 mL
2104127-03	Biosolids Blank	12-Apr-21 08:40	13-Apr-21 10:18	HDPE Bottle, 250 mL

ANALYTICAL RESULTS

Sample ID: Method Blank

PFAS Isotope Dilution Method

Client Data

Name: City of Zeeland
Project: Zeeland Biosolids
Matrix: Solid

Laboratory Data

Lab Sample: B1D0051-BLK1
Column: BEH C18

Analyte	CAS Number	Conc. (ng/g)	RL	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
PFBA	375-22-4	ND	1.00		B1D0051	20-Apr-21	0.500 g	25-Apr-21 04:52	1
PFPeA	2706-90-3	ND	1.00		B1D0051	20-Apr-21	0.500 g	25-Apr-21 04:52	1
PFBS	375-73-5	ND	1.00		B1D0051	20-Apr-21	0.500 g	25-Apr-21 04:52	1
4:2 FTS	757124-72-4	ND	1.00		B1D0051	20-Apr-21	0.500 g	25-Apr-21 04:52	1
PFHxA	307-24-4	ND	2.00		B1D0051	20-Apr-21	0.500 g	25-Apr-21 04:52	1
PFPeS	2706-91-4	ND	1.00		B1D0051	20-Apr-21	0.500 g	25-Apr-21 04:52	1
HFPO-DA	13252-13-6	ND	2.00		B1D0051	20-Apr-21	0.500 g	25-Apr-21 04:52	1
PFHpA	375-85-9	ND	1.00		B1D0051	20-Apr-21	0.500 g	25-Apr-21 04:52	1
ADONA	919005-14-4	ND	1.00		B1D0051	20-Apr-21	0.500 g	25-Apr-21 04:52	1
PFHxS	355-46-4	ND	1.00		B1D0051	20-Apr-21	0.500 g	25-Apr-21 04:52	1
6:2 FTS	27619-97-2	ND	2.00		B1D0051	20-Apr-21	0.500 g	25-Apr-21 04:52	1
PFOA	335-67-1	ND	1.00		B1D0051	20-Apr-21	0.500 g	25-Apr-21 04:52	1
PFHpS	375-92-8	ND	2.00		B1D0051	20-Apr-21	0.500 g	25-Apr-21 04:52	1
PFNA	375-95-1	ND	1.00		B1D0051	20-Apr-21	0.500 g	25-Apr-21 04:52	1
PFOSA	754-91-6	ND	1.00		B1D0051	20-Apr-21	0.500 g	25-Apr-21 04:52	1
PFOS	1763-23-1	ND	2.00		B1D0051	20-Apr-21	0.500 g	25-Apr-21 04:52	1
9Cl-PF3ONS	756426-58-1	ND	2.00		B1D0051	20-Apr-21	0.500 g	25-Apr-21 04:52	1
PFDA	335-76-2	ND	2.00		B1D0051	20-Apr-21	0.500 g	25-Apr-21 04:52	1
8:2 FTS	39108-34-4	ND	2.00		B1D0051	20-Apr-21	0.500 g	25-Apr-21 04:52	1
PFNS	68259-12-1	ND	2.00		B1D0051	20-Apr-21	0.500 g	25-Apr-21 04:52	1
MeFOSAA	2355-31-9	ND	1.00		B1D0051	20-Apr-21	0.500 g	25-Apr-21 04:52	1
EtFOSAA	2991-50-6	ND	2.00		B1D0051	20-Apr-21	0.500 g	25-Apr-21 04:52	1
PFUnA	2058-94-8	ND	1.00		B1D0051	20-Apr-21	0.500 g	25-Apr-21 04:52	1
PFDS	335-77-3	ND	2.00		B1D0051	20-Apr-21	0.500 g	25-Apr-21 04:52	1
11Cl-PF3OUdS	763051-92-9	ND	3.00		B1D0051	20-Apr-21	0.500 g	25-Apr-21 04:52	1
PFDoA	307-55-1	ND	1.00		B1D0051	20-Apr-21	0.500 g	25-Apr-21 04:52	1
PFTrDA	72629-94-8	ND	2.00		B1D0051	20-Apr-21	0.500 g	25-Apr-21 04:52	1
PFTeDA	376-06-7	ND	2.00		B1D0051	20-Apr-21	0.500 g	25-Apr-21 04:52	1

Labeled Standards	Type	% Recovery	Limits	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
13C3-PFBA	IS	72.7	25 - 150		B1D0051	20-Apr-21	0.500 g	25-Apr-21 04:52	1
13C3-PFPeA	IS	64.7	25 - 150		B1D0051	20-Apr-21	0.500 g	25-Apr-21 04:52	1
13C3-PFBS	IS	69.8	25 - 150		B1D0051	20-Apr-21	0.500 g	25-Apr-21 04:52	1
13C3-HFPO-DA	IS	79.4	25 - 150		B1D0051	20-Apr-21	0.500 g	25-Apr-21 04:52	1
13C2-4:2 FTS	IS	65.2	25 - 150		B1D0051	20-Apr-21	0.500 g	25-Apr-21 04:52	1
13C2-PFHxA	IS	62.9	25 - 150		B1D0051	20-Apr-21	0.500 g	25-Apr-21 04:52	1
13C4-PFHpA	IS	68.8	25 - 150		B1D0051	20-Apr-21	0.500 g	25-Apr-21 04:52	1
13C3-PFHxS	IS	76.6	25 - 150		B1D0051	20-Apr-21	0.500 g	25-Apr-21 04:52	1
13C2-6:2 FTS	IS	78.1	25 - 150		B1D0051	20-Apr-21	0.500 g	25-Apr-21 04:52	1

Sample ID: Method Blank

PFAS Isotope Dilution Method

Client Data

Name: City of Zeeland
Project: Zeeland Biosolids
Matrix: Solid

Laboratory Data

Lab Sample: B1D0051-BLK1
Column: BEH C18

Labeled Standards	Type	% Recovery	Limits	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
13C5-PFNA	IS	68.0	25 - 150		B1D0051	20-Apr-21	0.500 g	25-Apr-21 04:52	1
13C8-PFOSA	IS	24.2	10 - 150		B1D0051	20-Apr-21	0.500 g	25-Apr-21 04:52	1
13C2-PFOA	IS	62.9	25 - 150		B1D0051	20-Apr-21	0.500 g	25-Apr-21 04:52	1
13C8-PFOS	IS	81.7	25 - 150		B1D0051	20-Apr-21	0.500 g	25-Apr-21 04:52	1
13C2-PFDA	IS	49.4	25 - 150		B1D0051	20-Apr-21	0.500 g	25-Apr-21 04:52	1
13C2-8:2 FTS	IS	68.4	25 - 150		B1D0051	20-Apr-21	0.500 g	25-Apr-21 04:52	1
d3-MeFOSAA	IS	33.4	25 - 150		B1D0051	20-Apr-21	0.500 g	25-Apr-21 04:52	1
13C2-PFUnA	IS	40.8	25 - 150		B1D0051	20-Apr-21	0.500 g	25-Apr-21 04:52	1
d5-EtFOSAA	IS	31.9	25 - 150		B1D0051	20-Apr-21	0.500 g	25-Apr-21 04:52	1
13C2-PFDoA	IS	42.1	25 - 150		B1D0051	20-Apr-21	0.500 g	25-Apr-21 04:52	1
13C2-PFTeDA	IS	45.7	20 - 150		B1D0051	20-Apr-21	0.500 g	25-Apr-21 04:52	1

RL - Reporting limit

The results are reported in dry weight.
The sample size is reported in wet weight.
Results reported to RL.

When reported, PFHxS, PFOA, PFOS, MeFOSAA and EtFOSAA include both linear and branched isomers. Only the linear isomer is reported for all other analytes.

Sample ID: OPR **PFAS Isotope Dilution Method**

Client Data

Name: City of Zeeland
Project: Zeeland Biosolids
Matrix: Solid

Laboratory Data

Lab Sample: B1D0051-BS1
Column: BEH C18

Analyte	CAS Number	Amt Found (ng/g)	Spike Amt	% Rec	Limits	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
PFBA	375-22-4	20.1	20.0	101	65 - 135		B1D0051	20-Apr-21	0.500 g	25-Apr-21 05:03	1
PFPeA	2706-90-3	19.5	20.0	97.7	65 - 135		B1D0051	20-Apr-21	0.500 g	25-Apr-21 05:03	1
PFBS	375-73-5	19.7	20.0	98.6	65 - 135		B1D0051	20-Apr-21	0.500 g	25-Apr-21 05:03	1
4:2 FTS	757124-72-4	18.5	20.0	92.3	60 - 145		B1D0051	20-Apr-21	0.500 g	25-Apr-21 05:03	1
PFHxA	307-24-4	20.0	20.0	100	65 - 135		B1D0051	20-Apr-21	0.500 g	25-Apr-21 05:03	1
PFPeS	2706-91-4	21.1	20.0	106	65 - 135		B1D0051	20-Apr-21	0.500 g	25-Apr-21 05:03	1
HFPO-DA	13252-13-6	20.6	20.0	103	65 - 135		B1D0051	20-Apr-21	0.500 g	25-Apr-21 05:03	1
PFHpA	375-85-9	19.3	20.0	96.3	65 - 135		B1D0051	20-Apr-21	0.500 g	25-Apr-21 05:03	1
ADONA	919005-14-4	19.2	20.0	96.2	65 - 135		B1D0051	20-Apr-21	0.500 g	25-Apr-21 05:03	1
PFHxS	355-46-4	20.6	20.0	103	65 - 135		B1D0051	20-Apr-21	0.500 g	25-Apr-21 05:03	1
6:2 FTS	27619-97-2	20.0	20.0	99.9	60 - 140		B1D0051	20-Apr-21	0.500 g	25-Apr-21 05:03	1
PFOA	335-67-1	20.6	20.0	103	65 - 135		B1D0051	20-Apr-21	0.500 g	25-Apr-21 05:03	1
PFHpS	375-92-8	20.5	20.0	102	65 - 135		B1D0051	20-Apr-21	0.500 g	25-Apr-21 05:03	1
PFNA	375-95-1	17.8	20.0	89.1	65 - 135		B1D0051	20-Apr-21	0.500 g	25-Apr-21 05:03	1
PFOSA	754-91-6	19.2	20.0	96.0	65 - 140		B1D0051	20-Apr-21	0.500 g	25-Apr-21 05:03	1
PFOS	1763-23-1	19.9	20.0	99.7	65 - 140		B1D0051	20-Apr-21	0.500 g	25-Apr-21 05:03	1
9Cl-PF3ONS	756426-58-1	20.4	20.0	102	65 - 135		B1D0051	20-Apr-21	0.500 g	25-Apr-21 05:03	1
PFDA	335-76-2	21.9	20.0	109	65 - 135		B1D0051	20-Apr-21	0.500 g	25-Apr-21 05:03	1
8:2 FTS	39108-34-4	21.4	20.0	107	65 - 135		B1D0051	20-Apr-21	0.500 g	25-Apr-21 05:03	1
PFNS	68259-12-1	20.7	20.0	103	65 - 135		B1D0051	20-Apr-21	0.500 g	25-Apr-21 05:03	1
MeFOSAA	2355-31-9	19.0	20.0	95.2	65 - 135		B1D0051	20-Apr-21	0.500 g	25-Apr-21 05:03	1
EtFOSAA	2991-50-6	20.8	20.0	104	65 - 135		B1D0051	20-Apr-21	0.500 g	25-Apr-21 05:03	1
PFUnA	2058-94-8	22.6	20.0	113	65 - 140		B1D0051	20-Apr-21	0.500 g	25-Apr-21 05:03	1
PFDS	335-77-3	18.0	20.0	90.2	50 - 150		B1D0051	20-Apr-21	0.500 g	25-Apr-21 05:03	1
11Cl-PF3OUdS	763051-92-9	23.0	20.0	115	65 - 135		B1D0051	20-Apr-21	0.500 g	25-Apr-21 05:03	1
PFDoA	307-55-1	19.6	20.0	97.8	65 - 135		B1D0051	20-Apr-21	0.500 g	25-Apr-21 05:03	1
PFTrDA	72629-94-8	20.8	20.0	104	60 - 140		B1D0051	20-Apr-21	0.500 g	25-Apr-21 05:03	1
PFTeDA	376-06-7	20.6	20.0	103	65 - 135		B1D0051	20-Apr-21	0.500 g	25-Apr-21 05:03	1

Labeled Standards	Type	% Rec	Limits	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
13C3-PFBA	IS	73.2	25 - 150		B1D0051	20-Apr-21	0.500 g	25-Apr-21 05:03	1
13C3-PFPeA	IS	65.5	25 - 150		B1D0051	20-Apr-21	0.500 g	25-Apr-21 05:03	1
13C3-PFBS	IS	74.2	25 - 150		B1D0051	20-Apr-21	0.500 g	25-Apr-21 05:03	1
13C3-HFPO-DA	IS	66.7	25 - 150		B1D0051	20-Apr-21	0.500 g	25-Apr-21 05:03	1
13C2-4:2 FTS	IS	67.8	25 - 150		B1D0051	20-Apr-21	0.500 g	25-Apr-21 05:03	1
13C2-PFHxA	IS	64.9	25 - 150		B1D0051	20-Apr-21	0.500 g	25-Apr-21 05:03	1

Sample ID: OPR **PFAS Isotope Dilution Method**

Client Data

Name: City of Zeeland
Project: Zeeland Biosolids
Matrix: Solid

Laboratory Data

Lab Sample: B1D0051-BS1
Column: BEH C18

Labeled Standards	Type	% Rec	Limits	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
13C4-PFHpA	IS	70.1	25 - 150		B1D0051	20-Apr-21	0.500 g	25-Apr-21 05:03	1
13C3-PFHxS	IS	79.8	25 - 150		B1D0051	20-Apr-21	0.500 g	25-Apr-21 05:03	1
13C2-6:2 FTS	IS	72.3	25 - 150		B1D0051	20-Apr-21	0.500 g	25-Apr-21 05:03	1
13C5-PFNA	IS	71.2	25 - 150		B1D0051	20-Apr-21	0.500 g	25-Apr-21 05:03	1
13C8-PFOSA	IS	37.1	10 - 150		B1D0051	20-Apr-21	0.500 g	25-Apr-21 05:03	1
13C2-PFOA	IS	63.4	25 - 150		B1D0051	20-Apr-21	0.500 g	25-Apr-21 05:03	1
13C8-PFOS	IS	80.8	25 - 150		B1D0051	20-Apr-21	0.500 g	25-Apr-21 05:03	1
13C2-PFDA	IS	51.5	25 - 150		B1D0051	20-Apr-21	0.500 g	25-Apr-21 05:03	1
13C2-8:2 FTS	IS	69.4	25 - 150		B1D0051	20-Apr-21	0.500 g	25-Apr-21 05:03	1
d3-MeFOSAA	IS	45.3	25 - 150		B1D0051	20-Apr-21	0.500 g	25-Apr-21 05:03	1
13C2-PFUnA	IS	48.6	25 - 150		B1D0051	20-Apr-21	0.500 g	25-Apr-21 05:03	1
d5-EtFOSAA	IS	45.1	25 - 150		B1D0051	20-Apr-21	0.500 g	25-Apr-21 05:03	1
13C2-PFDoA	IS	51.1	25 - 150		B1D0051	20-Apr-21	0.500 g	25-Apr-21 05:03	1
13C2-PFTeDA	IS	55.1	20 - 150		B1D0051	20-Apr-21	0.500 g	25-Apr-21 05:03	1

Sample ID: Biosolids

PFAS Isotope Dilution Method

Client Data

Name: City of Zeeland
Project: Zeeland Biosolids
Location: Sieve Drum Discharge
Matrix: Sludge
Date Collected: 12-Apr-21 08:40

Laboratory Data

Lab Sample: 2104127-01
Date Received: 13-Apr-21 10:18
% Solids: 5.75
Column: BEH C18

Analyte	CAS Number	Conc. (ng/g)	RL	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
PFBA	375-22-4	ND	0.994		B1D0051	20-Apr-21	8.75 g	25-Apr-21 05:34	1
PFPeA	2706-90-3	1.92	0.994		B1D0051	20-Apr-21	8.75 g	25-Apr-21 05:34	1
PFBS	375-73-5	ND	0.994		B1D0051	20-Apr-21	8.75 g	25-Apr-21 05:34	1
4:2 FTS	757124-72-4	ND	0.994		B1D0051	20-Apr-21	8.75 g	25-Apr-21 05:34	1
PFHxA	307-24-4	5.90	1.99		B1D0051	20-Apr-21	8.75 g	25-Apr-21 05:34	1
PFPeS	2706-91-4	ND	0.994		B1D0051	20-Apr-21	8.75 g	25-Apr-21 05:34	1
HFPO-DA	13252-13-6	ND	1.99		B1D0051	20-Apr-21	8.75 g	25-Apr-21 05:34	1
PFHpA	375-85-9	ND	0.994		B1D0051	20-Apr-21	8.75 g	25-Apr-21 05:34	1
ADONA	919005-14-4	ND	0.994		B1D0051	20-Apr-21	8.75 g	25-Apr-21 05:34	1
PFHxS	355-46-4	ND	0.994		B1D0051	20-Apr-21	8.75 g	25-Apr-21 05:34	1
6:2 FTS	27619-97-2	ND	1.99		B1D0051	20-Apr-21	8.75 g	25-Apr-21 05:34	1
PFOA	335-67-1	5.02	0.994		B1D0051	20-Apr-21	8.75 g	25-Apr-21 05:34	1
PFHpS	375-92-8	ND	1.99		B1D0051	20-Apr-21	8.75 g	25-Apr-21 05:34	1
PFNA	375-95-1	1.07	0.994		B1D0051	20-Apr-21	8.75 g	25-Apr-21 05:34	1
PFOSA	754-91-6	ND	0.994		B1D0051	20-Apr-21	8.75 g	25-Apr-21 05:34	1
PFOS	1763-23-1	5.92	1.99	Q	B1D0051	20-Apr-21	8.75 g	25-Apr-21 05:34	1
9Cl-PF3ONS	756426-58-1	ND	1.99		B1D0051	20-Apr-21	8.75 g	25-Apr-21 05:34	1
PFDA	335-76-2	23.4	1.99		B1D0051	20-Apr-21	8.75 g	25-Apr-21 05:34	1
8:2 FTS	39108-34-4	ND	1.99		B1D0051	20-Apr-21	8.75 g	25-Apr-21 05:34	1
PFNS	68259-12-1	ND	1.99		B1D0051	20-Apr-21	8.75 g	25-Apr-21 05:34	1
MeFOSAA	2355-31-9	15.0	0.994		B1D0051	20-Apr-21	8.75 g	25-Apr-21 05:34	1
EtFOSAA	2991-50-6	4.17	1.99		B1D0051	20-Apr-21	8.75 g	25-Apr-21 05:34	1
PFUnA	2058-94-8	ND	0.994		B1D0051	20-Apr-21	8.75 g	25-Apr-21 05:34	1
PFDS	335-77-3	ND	1.99		B1D0051	20-Apr-21	8.75 g	25-Apr-21 05:34	1
11Cl-PF3OUdS	763051-92-9	ND	2.98		B1D0051	20-Apr-21	8.75 g	25-Apr-21 05:34	1
PFDoA	307-55-1	3.64	0.994	Q	B1D0051	20-Apr-21	8.75 g	25-Apr-21 05:34	1
PFTrDA	72629-94-8	ND	1.99		B1D0051	20-Apr-21	8.75 g	25-Apr-21 05:34	1
PFTeDA	376-06-7	ND	1.99		B1D0051	20-Apr-21	8.75 g	25-Apr-21 05:34	1

Labeled Standards	Type	% Recovery	Limits	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
13C3-PFBA	IS	93.8	25 - 150		B1D0051	20-Apr-21	8.75 g	25-Apr-21 05:34	1
13C3-PFPeA	IS	76.6	25 - 150		B1D0051	20-Apr-21	8.75 g	25-Apr-21 05:34	1
13C3-PFBS	IS	75.4	25 - 150		B1D0051	20-Apr-21	8.75 g	25-Apr-21 05:34	1
13C3-HFPO-DA	IS	85.6	25 - 150		B1D0051	20-Apr-21	8.75 g	25-Apr-21 05:34	1
13C2-4:2 FTS	IS	95.9	25 - 150		B1D0051	20-Apr-21	8.75 g	25-Apr-21 05:34	1
13C2-PFHxA	IS	73.6	25 - 150		B1D0051	20-Apr-21	8.75 g	25-Apr-21 05:34	1
13C4-PFHpA	IS	77.8	25 - 150		B1D0051	20-Apr-21	8.75 g	25-Apr-21 05:34	1
13C3-PFHxS	IS	74.1	25 - 150		B1D0051	20-Apr-21	8.75 g	25-Apr-21 05:34	1

Sample ID: Biosolids — **PFAS Isotope Dilution Method**

Client Data

Name:	City of Zeeland	Matrix:	Sludge
Project:	Zeeland Biosolids	Date Collected:	12-Apr-21 08:40
Location:	Sieve Drum Discharge		

Laboratory Data

Lab Sample:	2104127-01	Column:	BEH C18
Date Received:	13-Apr-21 10:18		
% Solids:	5.75		

Labeled Standards	Type	% Recovery	Limits	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
13C2-6:2 FTS	IS	76.9	25 - 150		B1D0051	20-Apr-21	8.75 g	25-Apr-21 05:34	1
13C5-PFNA	IS	53.8	25 - 150		B1D0051	20-Apr-21	8.75 g	25-Apr-21 05:34	1
13C8-PFOSA	IS	39.4	10 - 150		B1D0051	20-Apr-21	8.75 g	25-Apr-21 05:34	1
13C2-PFOA	IS	63.8	25 - 150		B1D0051	20-Apr-21	8.75 g	25-Apr-21 05:34	1
13C8-PFOS	IS	47.7	25 - 150		B1D0051	20-Apr-21	8.75 g	25-Apr-21 05:34	1
13C2-PFDA	IS	38.9	25 - 150		B1D0051	20-Apr-21	8.75 g	25-Apr-21 05:34	1
13C2-8:2 FTS	IS	48.4	25 - 150		B1D0051	20-Apr-21	8.75 g	25-Apr-21 05:34	1
d3-MeFOSAA	IS	28.0	25 - 150		B1D0051	20-Apr-21	8.75 g	25-Apr-21 05:34	1
13C2-PFUnA	IS	32.7	25 - 150		B1D0051	20-Apr-21	8.75 g	25-Apr-21 05:34	1
d5-EtFOSAA	IS	25.6	25 - 150		B1D0051	20-Apr-21	8.75 g	25-Apr-21 05:34	1
13C2-PFDoA	IS	29.6	25 - 150		B1D0051	20-Apr-21	8.75 g	25-Apr-21 05:34	1
13C2-PFTeDA	IS	13.5	20 - 150	H	B1D0051	20-Apr-21	8.75 g	25-Apr-21 05:34	1

RL - Reporting limit

The results are reported in dry weight.
The sample size is reported in wet weight.
Results reported to RL.

When reported, PFHxS, PFOA, PFOS, MeFOSAA and EtFOSAA include both linear and branched isomers. Only the linear isomer is reported for all other analytes.

Sample ID: Method Blank

PFAS Isotope Dilution Method

Client Data

Name: City of Zeeland
Project: Zeeland Biosolids
Matrix: Aqueous

Laboratory Data

Lab Sample: B1D0139-BLK1
Column: BEH C18

Analyte	CAS Number	Conc. (ng/L)	RL	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
PFBA	375-22-4	ND	4.00		B1D0139	27-Apr-21	0.250 L	29-Apr-21 22:01	1
PFPeA	2706-90-3	ND	4.00		B1D0139	27-Apr-21	0.250 L	29-Apr-21 22:01	1
PFBS	375-73-5	ND	4.00		B1D0139	27-Apr-21	0.250 L	29-Apr-21 22:01	1
4:2 FTS	757124-72-4	ND	4.00		B1D0139	27-Apr-21	0.250 L	29-Apr-21 22:01	1
PFHxA	307-24-4	ND	4.00		B1D0139	27-Apr-21	0.250 L	29-Apr-21 22:01	1
PFPeS	2706-91-4	ND	4.00		B1D0139	27-Apr-21	0.250 L	29-Apr-21 22:01	1
HFPO-DA	13252-13-6	ND	2.50		B1D0139	27-Apr-21	0.250 L	29-Apr-21 22:01	1
PFHpA	375-85-9	ND	4.00		B1D0139	27-Apr-21	0.250 L	29-Apr-21 22:01	1
ADONA	919005-14-4	ND	2.00		B1D0139	27-Apr-21	0.250 L	29-Apr-21 22:01	1
PFHxS	355-46-4	ND	4.00		B1D0139	27-Apr-21	0.250 L	29-Apr-21 22:01	1
6:2 FTS	27619-97-2	ND	4.00		B1D0139	27-Apr-21	0.250 L	29-Apr-21 22:01	1
PFOA	335-67-1	ND	4.00		B1D0139	27-Apr-21	0.250 L	29-Apr-21 22:01	1
PFHpS	375-92-8	ND	4.00		B1D0139	27-Apr-21	0.250 L	29-Apr-21 22:01	1
PFNA	375-95-1	ND	4.00		B1D0139	27-Apr-21	0.250 L	29-Apr-21 22:01	1
PFOSA	754-91-6	ND	4.00		B1D0139	27-Apr-21	0.250 L	29-Apr-21 22:01	1
PFOS	1763-23-1	ND	4.00		B1D0139	27-Apr-21	0.250 L	29-Apr-21 22:01	1
9Cl-PF3ONS	756426-58-1	ND	2.00		B1D0139	27-Apr-21	0.250 L	29-Apr-21 22:01	1
PFDA	335-76-2	ND	4.00		B1D0139	27-Apr-21	0.250 L	29-Apr-21 22:01	1
8:2 FTS	39108-34-4	ND	4.00		B1D0139	27-Apr-21	0.250 L	29-Apr-21 22:01	1
PFNS	68259-12-1	ND	4.00		B1D0139	27-Apr-21	0.250 L	29-Apr-21 22:01	1
MeFOSAA	2355-31-9	ND	4.00		B1D0139	27-Apr-21	0.250 L	29-Apr-21 22:01	1
EtFOSAA	2991-50-6	ND	4.00		B1D0139	27-Apr-21	0.250 L	29-Apr-21 22:01	1
PFUnA	2058-94-8	ND	4.00		B1D0139	27-Apr-21	0.250 L	29-Apr-21 22:01	1
PFDS	335-77-3	ND	4.00		B1D0139	27-Apr-21	0.250 L	29-Apr-21 22:01	1
11Cl-PF3OUdS	763051-92-9	ND	2.00		B1D0139	27-Apr-21	0.250 L	29-Apr-21 22:01	1
PFDoA	307-55-1	ND	4.00		B1D0139	27-Apr-21	0.250 L	29-Apr-21 22:01	1
PFTrDA	72629-94-8	ND	4.00		B1D0139	27-Apr-21	0.250 L	29-Apr-21 22:01	1
PFTeDA	376-06-7	ND	4.00		B1D0139	27-Apr-21	0.250 L	29-Apr-21 22:01	1

Labeled Standards	Type	% Recovery	Limits	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
13C3-PFBA	IS	138	25 - 150		B1D0139	27-Apr-21	0.250 L	29-Apr-21 22:01	1
13C3-PFPeA	IS	95.6	25 - 150		B1D0139	27-Apr-21	0.250 L	29-Apr-21 22:01	1
13C3-PFBS	IS	101	25 - 150		B1D0139	27-Apr-21	0.250 L	29-Apr-21 22:01	1
13C3-HFPO-DA	IS	96.7	25 - 150		B1D0139	27-Apr-21	0.250 L	29-Apr-21 22:01	1
13C2-4:2 FTS	IS	111	25 - 150		B1D0139	27-Apr-21	0.250 L	29-Apr-21 22:01	1
13C2-PFHxA	IS	106	25 - 150		B1D0139	27-Apr-21	0.250 L	29-Apr-21 22:01	1
13C4-PFHpA	IS	101	25 - 150		B1D0139	27-Apr-21	0.250 L	29-Apr-21 22:01	1
13C3-PFHxS	IS	98.5	25 - 150		B1D0139	27-Apr-21	0.250 L	29-Apr-21 22:01	1
13C2-6:2 FTS	IS	102	25 - 150		B1D0139	27-Apr-21	0.250 L	29-Apr-21 22:01	1

Sample ID: Method Blank

PFAS Isotope Dilution Method

Client Data

Name: City of Zeeland
Project: Zeeland Biosolids
Matrix: Aqueous

Laboratory Data

Lab Sample: B1D0139-BLK1
Column: BEH C18

Labeled Standards	Type	% Recovery	Limits	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
13C5-PFNA	IS	100	25 - 150		B1D0139	27-Apr-21	0.250 L	29-Apr-21 22:01	1
13C8-PFOSA	IS	51.5	10 - 150		B1D0139	27-Apr-21	0.250 L	29-Apr-21 22:01	1
13C2-PFOA	IS	95.7	25 - 150		B1D0139	27-Apr-21	0.250 L	29-Apr-21 22:01	1
13C8-PFOS	IS	104	25 - 150		B1D0139	27-Apr-21	0.250 L	29-Apr-21 22:01	1
13C2-PFDA	IS	94.3	25 - 150		B1D0139	27-Apr-21	0.250 L	29-Apr-21 22:01	1
13C2-8:2 FTS	IS	91.8	25 - 150		B1D0139	27-Apr-21	0.250 L	29-Apr-21 22:01	1
d3-MeFOSAA	IS	89.5	25 - 150		B1D0139	27-Apr-21	0.250 L	29-Apr-21 22:01	1
13C2-PFUnA	IS	84.8	25 - 150		B1D0139	27-Apr-21	0.250 L	29-Apr-21 22:01	1
d5-EtFOSAA	IS	86.0	25 - 150		B1D0139	27-Apr-21	0.250 L	29-Apr-21 22:01	1
13C2-PFDoA	IS	85.1	25 - 150		B1D0139	27-Apr-21	0.250 L	29-Apr-21 22:01	1
13C2-PFTeDA	IS	79.0	20 - 150		B1D0139	27-Apr-21	0.250 L	29-Apr-21 22:01	1

RL - Reporting limit

Results reported to RL.

When reported, PFHxS, PFOA, PFOS, MeFOSAA and EtFOSAA include both linear and branched isomers. Only the linear isomer is reported for all other analytes.

Sample ID: OPR **PFAS Isotope Dilution Method**

Client Data

Name: City of Zeeland
Project: Zeeland Biosolids
Matrix: Aqueous

Laboratory Data

Lab Sample: B1D0139-BS1
Column: BEH C18

Analyte	CAS Number	Amt Found (ng/L)	Spike Amt	% Rec	Limits	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
PFBA	375-22-4	38.4	40.0	96.1	65 - 135		B1D0139	27-Apr-21	0.250 L	29-Apr-21 22:11	1
PFPeA	2706-90-3	44.8	40.0	112	65 - 135		B1D0139	27-Apr-21	0.250 L	29-Apr-21 22:11	1
PFBS	375-73-5	39.5	40.0	98.7	65 - 135		B1D0139	27-Apr-21	0.250 L	29-Apr-21 22:11	1
4:2 FTS	757124-72-4	37.2	40.0	93.0	60 - 145		B1D0139	27-Apr-21	0.250 L	29-Apr-21 22:11	1
PFHxA	307-24-4	39.4	40.0	98.5	65 - 135		B1D0139	27-Apr-21	0.250 L	29-Apr-21 22:11	1
PFPeS	2706-91-4	41.0	40.0	103	65 - 135		B1D0139	27-Apr-21	0.250 L	29-Apr-21 22:11	1
HFPO-DA	13252-13-6	40.8	40.0	102	65 - 135		B1D0139	27-Apr-21	0.250 L	29-Apr-21 22:11	1
PFHpA	375-85-9	41.9	40.0	105	65 - 135		B1D0139	27-Apr-21	0.250 L	29-Apr-21 22:11	1
ADONA	919005-14-4	41.0	40.0	103	65 - 135		B1D0139	27-Apr-21	0.250 L	29-Apr-21 22:11	1
PFHxS	355-46-4	39.9	40.0	99.7	65 - 135		B1D0139	27-Apr-21	0.250 L	29-Apr-21 22:11	1
6:2 FTS	27619-97-2	40.5	40.0	101	60 - 140		B1D0139	27-Apr-21	0.250 L	29-Apr-21 22:11	1
PFOA	335-67-1	44.7	40.0	112	65 - 135		B1D0139	27-Apr-21	0.250 L	29-Apr-21 22:11	1
PFHpS	375-92-8	40.0	40.0	100	65 - 135		B1D0139	27-Apr-21	0.250 L	29-Apr-21 22:11	1
PFNA	375-95-1	40.1	40.0	100	65 - 135		B1D0139	27-Apr-21	0.250 L	29-Apr-21 22:11	1
PFOSA	754-91-6	42.0	40.0	105	65 - 140		B1D0139	27-Apr-21	0.250 L	29-Apr-21 22:11	1
PFOS	1763-23-1	37.0	40.0	92.5	65 - 140		B1D0139	27-Apr-21	0.250 L	29-Apr-21 22:11	1
9Cl-PF3ONS	756426-58-1	37.7	40.0	94.2	65 - 135		B1D0139	27-Apr-21	0.250 L	29-Apr-21 22:11	1
PFDA	335-76-2	42.7	40.0	107	65 - 135		B1D0139	27-Apr-21	0.250 L	29-Apr-21 22:11	1
8:2 FTS	39108-34-4	45.4	40.0	113	65 - 135		B1D0139	27-Apr-21	0.250 L	29-Apr-21 22:11	1
PFNS	68259-12-1	40.2	40.0	101	65 - 135		B1D0139	27-Apr-21	0.250 L	29-Apr-21 22:11	1
MeFOSAA	2355-31-9	43.5	40.0	109	65 - 135		B1D0139	27-Apr-21	0.250 L	29-Apr-21 22:11	1
EtFOSAA	2991-50-6	41.1	40.0	103	65 - 135		B1D0139	27-Apr-21	0.250 L	29-Apr-21 22:11	1
PFUnA	2058-94-8	41.1	40.0	103	65 - 140		B1D0139	27-Apr-21	0.250 L	29-Apr-21 22:11	1
PFDS	335-77-3	34.0	40.0	85.1	50 - 150		B1D0139	27-Apr-21	0.250 L	29-Apr-21 22:11	1
11Cl-PF3OUdS	763051-92-9	40.5	40.0	101	65 - 135		B1D0139	27-Apr-21	0.250 L	29-Apr-21 22:11	1
PFDoA	307-55-1	43.1	40.0	108	65 - 135		B1D0139	27-Apr-21	0.250 L	29-Apr-21 22:11	1
PFTrDA	72629-94-8	39.6	40.0	99.1	60 - 140		B1D0139	27-Apr-21	0.250 L	29-Apr-21 22:11	1
PFTeDA	376-06-7	47.6	40.0	119	65 - 135		B1D0139	27-Apr-21	0.250 L	29-Apr-21 22:11	1

Labeled Standards	Type	% Rec	Limits	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
13C3-PFBA	IS	143	25 - 150		B1D0139	27-Apr-21	0.250 L	29-Apr-21 22:11	1
13C3-PFPeA	IS	96.4	25 - 150		B1D0139	27-Apr-21	0.250 L	29-Apr-21 22:11	1
13C3-PFBS	IS	99.4	25 - 150		B1D0139	27-Apr-21	0.250 L	29-Apr-21 22:11	1
13C3-HFPO-DA	IS	94.4	25 - 150		B1D0139	27-Apr-21	0.250 L	29-Apr-21 22:11	1
13C2-4:2 FTS	IS	108	25 - 150		B1D0139	27-Apr-21	0.250 L	29-Apr-21 22:11	1
13C2-PFHxA	IS	116	25 - 150		B1D0139	27-Apr-21	0.250 L	29-Apr-21 22:11	1

Sample ID: OPR **PFAS Isotope Dilution Method**

Client Data

Name: City of Zeeland
Project: Zeeland Biosolids

Matrix: Aqueous

Laboratory Data

Lab Sample: B1D0139-BS1 Column: BEH C18

Labeled Standards	Type	% Rec	Limits	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
13C4-PFHpA	IS	99.3	25 - 150		B1D0139	27-Apr-21	0.250 L	29-Apr-21 22:11	1
13C3-PFHxS	IS	108	25 - 150		B1D0139	27-Apr-21	0.250 L	29-Apr-21 22:11	1
13C2-6:2 FTS	IS	99.6	25 - 150		B1D0139	27-Apr-21	0.250 L	29-Apr-21 22:11	1
13C5-PFNA	IS	104	25 - 150		B1D0139	27-Apr-21	0.250 L	29-Apr-21 22:11	1
13C8-PFOSA	IS	55.1	10 - 150		B1D0139	27-Apr-21	0.250 L	29-Apr-21 22:11	1
13C2-PFOA	IS	93.6	25 - 150		B1D0139	27-Apr-21	0.250 L	29-Apr-21 22:11	1
13C8-PFOS	IS	108	25 - 150		B1D0139	27-Apr-21	0.250 L	29-Apr-21 22:11	1
13C2-PFDA	IS	95.8	25 - 150		B1D0139	27-Apr-21	0.250 L	29-Apr-21 22:11	1
13C2-8:2 FTS	IS	89.4	25 - 150		B1D0139	27-Apr-21	0.250 L	29-Apr-21 22:11	1
d3-MeFOSAA	IS	89.6	25 - 150		B1D0139	27-Apr-21	0.250 L	29-Apr-21 22:11	1
13C2-PFUnA	IS	90.0	25 - 150		B1D0139	27-Apr-21	0.250 L	29-Apr-21 22:11	1
d5-EtFOSAA	IS	89.2	25 - 150		B1D0139	27-Apr-21	0.250 L	29-Apr-21 22:11	1
13C2-PFDoA	IS	86.5	25 - 150		B1D0139	27-Apr-21	0.250 L	29-Apr-21 22:11	1
13C2-PFTeDA	IS	77.4	20 - 150		B1D0139	27-Apr-21	0.250 L	29-Apr-21 22:11	1

Sample ID: Biosolids Blank

PFAS Isotope Dilution Method

Client Data

Name: City of Zeeland
Project: Zeeland Biosolids
Location: Sieve Drum Discharge
Matrix: Aqueous
Date Collected: 12-Apr-21 08:40

Laboratory Data

Lab Sample: 2104127-03
Date Received: 13-Apr-21 10:18
Column: BEH C18

Analyte	CAS Number	Conc. (ng/L)	RL	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
PFBA	375-22-4	ND	4.40		B1D0139	27-Apr-21	0.227 L	29-Apr-21 22:22	1
PFPeA	2706-90-3	ND	4.40		B1D0139	27-Apr-21	0.227 L	29-Apr-21 22:22	1
PFBS	375-73-5	ND	4.40		B1D0139	27-Apr-21	0.227 L	29-Apr-21 22:22	1
4:2 FTS	757124-72-4	ND	4.40		B1D0139	27-Apr-21	0.227 L	29-Apr-21 22:22	1
PFHxA	307-24-4	ND	4.40		B1D0139	27-Apr-21	0.227 L	29-Apr-21 22:22	1
PFPeS	2706-91-4	ND	4.40		B1D0139	27-Apr-21	0.227 L	29-Apr-21 22:22	1
HFPO-DA	13252-13-6	ND	2.75		B1D0139	27-Apr-21	0.227 L	29-Apr-21 22:22	1
PFHpA	375-85-9	ND	4.40		B1D0139	27-Apr-21	0.227 L	29-Apr-21 22:22	1
ADONA	919005-14-4	ND	2.20		B1D0139	27-Apr-21	0.227 L	29-Apr-21 22:22	1
PFHxS	355-46-4	ND	4.40		B1D0139	27-Apr-21	0.227 L	29-Apr-21 22:22	1
6:2 FTS	27619-97-2	ND	4.40		B1D0139	27-Apr-21	0.227 L	29-Apr-21 22:22	1
PFOA	335-67-1	ND	4.40		B1D0139	27-Apr-21	0.227 L	29-Apr-21 22:22	1
PFHpS	375-92-8	ND	4.40		B1D0139	27-Apr-21	0.227 L	29-Apr-21 22:22	1
PFNA	375-95-1	ND	4.40		B1D0139	27-Apr-21	0.227 L	29-Apr-21 22:22	1
PFOSA	754-91-6	ND	4.40		B1D0139	27-Apr-21	0.227 L	29-Apr-21 22:22	1
PFOS	1763-23-1	ND	4.40		B1D0139	27-Apr-21	0.227 L	29-Apr-21 22:22	1
9Cl-PF3ONS	756426-58-1	ND	2.20		B1D0139	27-Apr-21	0.227 L	29-Apr-21 22:22	1
PFDA	335-76-2	ND	4.40		B1D0139	27-Apr-21	0.227 L	29-Apr-21 22:22	1
8:2 FTS	39108-34-4	ND	4.40		B1D0139	27-Apr-21	0.227 L	29-Apr-21 22:22	1
PFNS	68259-12-1	ND	4.40		B1D0139	27-Apr-21	0.227 L	29-Apr-21 22:22	1
MeFOSAA	2355-31-9	ND	4.40		B1D0139	27-Apr-21	0.227 L	29-Apr-21 22:22	1
EtFOSAA	2991-50-6	ND	4.40		B1D0139	27-Apr-21	0.227 L	29-Apr-21 22:22	1
PFUnA	2058-94-8	ND	4.40		B1D0139	27-Apr-21	0.227 L	29-Apr-21 22:22	1
PFDS	335-77-3	ND	4.40		B1D0139	27-Apr-21	0.227 L	29-Apr-21 22:22	1
11Cl-PF3OUdS	763051-92-9	ND	2.20		B1D0139	27-Apr-21	0.227 L	29-Apr-21 22:22	1
PFDoA	307-55-1	ND	4.40		B1D0139	27-Apr-21	0.227 L	29-Apr-21 22:22	1
PFTrDA	72629-94-8	ND	4.40		B1D0139	27-Apr-21	0.227 L	29-Apr-21 22:22	1
PFTeDA	376-06-7	ND	4.40		B1D0139	27-Apr-21	0.227 L	29-Apr-21 22:22	1

Labeled Standards	Type	% Recovery	Limits	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
13C3-PFBA	IS	126	25 - 150		B1D0139	27-Apr-21	0.227 L	29-Apr-21 22:22	1
13C3-PFPeA	IS	87.8	25 - 150		B1D0139	27-Apr-21	0.227 L	29-Apr-21 22:22	1
13C3-PFBS	IS	93.9	25 - 150		B1D0139	27-Apr-21	0.227 L	29-Apr-21 22:22	1
13C3-HFPO-DA	IS	88.0	25 - 150		B1D0139	27-Apr-21	0.227 L	29-Apr-21 22:22	1
13C2-4:2 FTS	IS	99.0	25 - 150		B1D0139	27-Apr-21	0.227 L	29-Apr-21 22:22	1
13C2-PFHxA	IS	108	25 - 150		B1D0139	27-Apr-21	0.227 L	29-Apr-21 22:22	1
13C4-PFHpA	IS	97.4	25 - 150		B1D0139	27-Apr-21	0.227 L	29-Apr-21 22:22	1
13C3-PFHxS	IS	98.8	25 - 150		B1D0139	27-Apr-21	0.227 L	29-Apr-21 22:22	1

Sample ID: Biosolids Blank — **PFAS Isotope Dilution Method**

Client Data

Name: City of Zeeland
Project: Zeeland Biosolids
Location: Sieve Drum Discharge
Matrix: Aqueous
Date Collected: 12-Apr-21 08:40

Laboratory Data

Lab Sample: 2104127-03
Date Received: 13-Apr-21 10:18
Column: BEH C18

Labeled Standards	Type	% Recovery	Limits	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
13C2-6:2 FTS	IS	95.4	25 - 150		B1D0139	27-Apr-21	0.227 L	29-Apr-21 22:22	1
13C5-PFNA	IS	96.7	25 - 150		B1D0139	27-Apr-21	0.227 L	29-Apr-21 22:22	1
13C8-PFOSA	IS	56.0	10 - 150		B1D0139	27-Apr-21	0.227 L	29-Apr-21 22:22	1
13C2-PFOA	IS	91.7	25 - 150		B1D0139	27-Apr-21	0.227 L	29-Apr-21 22:22	1
13C8-PFOS	IS	101	25 - 150		B1D0139	27-Apr-21	0.227 L	29-Apr-21 22:22	1
13C2-PFDA	IS	87.4	25 - 150		B1D0139	27-Apr-21	0.227 L	29-Apr-21 22:22	1
13C2-8:2 FTS	IS	99.1	25 - 150		B1D0139	27-Apr-21	0.227 L	29-Apr-21 22:22	1
d3-MeFOSAA	IS	84.3	25 - 150		B1D0139	27-Apr-21	0.227 L	29-Apr-21 22:22	1
13C2-PFUnA	IS	94.4	25 - 150		B1D0139	27-Apr-21	0.227 L	29-Apr-21 22:22	1
d5-EtFOSAA	IS	82.1	25 - 150		B1D0139	27-Apr-21	0.227 L	29-Apr-21 22:22	1
13C2-PFDoA	IS	93.0	25 - 150		B1D0139	27-Apr-21	0.227 L	29-Apr-21 22:22	1
13C2-PFTeDA	IS	82.1	20 - 150		B1D0139	27-Apr-21	0.227 L	29-Apr-21 22:22	1

RL - Reporting limit

Results reported to RL.

When reported, PFHxS, PFOA, PFOS, MeFOSAA and EtFOSAA include both linear and branched isomers. Only the linear isomer is reported for all other analytes.

B	This compound was also detected in the method blank
Conc.	Concentration
CRS	Cleanup Recovery Standard
D	Dilution
DL	Detection Limit
E	The associated compound concentration exceeded the calibration range of the instrument
H	Recovery and/or RPD was outside laboratory acceptance limits
I	Chemical Interference
IS	Internal Standard
J	The amount detected is below the Reporting Limit/LOQ
LOD	Limit of Detection
LOQ	Limit of Quantitation
M	Estimated Maximum Possible Concentration (CA Region 2 projects only)
MDL	Method Detection Limit
NA	Not applicable
ND	Not Detected
OPR	Ongoing Precision and Recovery sample
P	The reported concentration may include contribution from chlorinated diphenyl ether(s).
Q	The ion transition ratio is outside of the acceptance criteria.
RL	Reporting Limit
RL	For 537.1, the reported RLs are the MRLs.
TEQ	Toxic Equivalency, sum of the toxic equivalency factors (TEF) multiplied by the sample concentrations.
TEQMax	TEQ calculation that uses the detection limit as the concentration for non-detects
TEQMin	TEQ calculation that uses zero as the concentration for non-detects
TEQRisk	TEQ calculation that uses ½ the detection limit as the concentration for non-detects
U	Not Detected (specific projects only)
*	See Cover Letter

Unless otherwise noted, solid sample results are reported in dry weight. Tissue samples are reported in wet weight.

Vista Analytical Laboratory Certifications

Accrediting Authority	Certificate Number
Alaska Department of Environmental Conservation	17-013
Arkansas Department of Environmental Quality	19-013-0
California Department of Health – ELAP	2892
DoD ELAP - A2LA Accredited - ISO/IEC 17025:2005	3091.01
Florida Department of Health	E87777-23
Hawaii Department of Health	N/A
Louisiana Department of Environmental Quality	01977
Maine Department of Health	2018017
Massachusetts Department of Environmental Protection	N/A
Michigan Department of Environmental Quality	9932
Minnesota Department of Health	1521520
New Hampshire Environmental Accreditation Program	207718-B
New Jersey Department of Environmental Protection	190001
New York Department of Health	11411
Oregon Laboratory Accreditation Program	4042-010
Pennsylvania Department of Environmental Protection	016
Texas Commission on Environmental Quality	T104704189-19-10
Vermont Department of Health	VT-4042
Virginia Department of General Services	10272
Washington Department of Ecology	C584-19
Wisconsin Department of Natural Resources	998036160

Current certificates and lists of licensed parameters are located in the Quality Assurance office and are available upon request.

NELAP Accredited Test Methods

MATRIX: Air	
Description of Test	**Method**
Determination of Polychlorinated p-Dioxins & Polychlorinated Dibenzofurans	EPA 23
Determination of Polychlorinated p-Dioxins & Polychlorinated Dibenzofurans	EPA TO-9A

MATRIX: Biological Tissue	
Description of Test	**Method**
Tetra- through Octa-Chlorinated Dioxins and Furans by Isotope Dilution GC/HRMS	EPA 1613B
Brominated Diphenyl Ethers by HRGC/HRMS	EPA 1614A
Chlorinated Biphenyl Congeners in Water, Soil, Sediment, and Tissue by GC/HRMS	EPA 1668A/C
Pesticides in Water, Soil, Sediment, Biosolids, and Tissue by HRGC/HRMS	EPA 1699
Perfluorinated Alkyl Acids in Drinking Water by SPE and LC/MS/MS	EPA 537
Polychlorinated Dibenzo-p-Dioxins and Polychlorinated Dibenzofurans by GC/HRMS	EPA 8280A/B
Polychlorinated Dibenzodioxins (PCDDs) and Polychlorinated Dibenzofurans (PCDFs) by GC/HRMS	EPA 8290/8290A

MATRIX: Drinking Water	
Description of Test	**Method**
2,3,7,8-Tetrachlorodibenzo- p-dioxin (2,3,7,8-TCDD) GC/HRMS	EPA 1613/1613B
1,4-Dioxane (1,4-Diethyleneoxide) analysis by GC/HRMS	EPA 522
Perfluorinated Alkyl Acids in Drinking Water by SPE and LC/MS/MS	EPA 537
Perfluorinated Alkyl Acids in Drinking Water by SPE and LC/MS/MS	ISO 25101 2009

MATRIX: Non-Potable Water	
Description of Test	**Method**
Tetra- through Octa-Chlorinated Dioxins and Furans by Isotope Dilution GC/HRMS	EPA 1613B
Brominated Diphenyl Ethers by HRGC/HRMS	EPA 1614A
Chlorinated Biphenyl Congeners in Water, Soil, Sediment, and Tissue by GC/HRMS	EPA 1668A/C
Pesticides in Water, Soil, Sediment, Biosolids, and Tissue by HRGC/HRMS	EPA 1699
Perfluorinated Alkyl Acids in Drinking Water by SPE and LC/MS/MS	EPA 537
Dioxin by GC/HRMS	EPA 613
Polychlorinated Dibenzo-p-Dioxins and Polychlorinated Dibenzofurans by GC/HRMS	EPA 8280A/B
Polychlorinated Dibenzodioxins (PCDDs) and Polychlorinated Dibenzofurans (PCDFs) by GC/HRMS	EPA 8290/8290A

MATRIX: Solids	
Description of Test	**Method**
Tetra-Octa Chlorinated Dioxins and Furans by Isotope Dilution GC/HRMS	EPA 1613
Tetra- through Octa-Chlorinated Dioxins and Furans by Isotope Dilution GC/HRMS	EPA 1613B
Brominated Diphenyl Ethers by HRGC/HRMS	EPA 1614A
Chlorinated Biphenyl Congeners in Water, Soil, Sediment, and Tissue by GC/HRMS	EPA 1668A/C
Pesticides in Water, Soil, Sediment, Biosolids, and Tissue by HRGC/HRMS	EPA 1699
Perfluorinated Alkyl Acids in Drinking Water by SPE and LC/MS/MS	EPA 537
Polychlorinated Dibenzo-p-Dioxins and Polychlorinated Dibenzofurans by GC/HRMS	EPA 8280A/B
Polychlorinated Dibenzodioxins (PCDDs) and Polychlorinated Dibenzofurans (PCDFs) by GC/HRMS	EPA 8290/8290A

Vista Analytical Laboratory

CHAIN OF CUSTODY

For Laboratory Use Only
Work Order #: 2104127 Temp: 1.5 °C
Storage ID: R-13, WR-2 Storage Secured: Yes ☑ No ☐
KA 04/14/21

Project ID: Zeeland Biosolids PO#: 5042- B Sampler: Doug Engelsman (name)

TAT (check one): Standard: x 21 days; Rush (surcharge may apply): ☐ 14 days ☐ 7 days Specify: ____

Relinquished by (printed name and signature)	Date	Time	Received by (printed name and signature)	Date	Time
D. Engelsman D. K	4/12/21	3:30 pm	Karen Y. Austin Kirkt	04/13/21	10:15

SHIP TO: Vista Analytical Laboratory
1104 Windfield Way
El Dorado Hills, CA 95762
(916) 673-1520 * Fax (916) 673-0106

ATTN: ____

Method of Shipment: Fed Ex - NDA
Tracking No.: ____

Add Analysis(es) Requested

Sample ID	Date	Time	Location/ Sample Description	Container(s) Quantity	Type	Matrix	PFAS by Isotope Dilution: PFOA/ PFOS	UCMR3 PFAS List:6	537.1 List: 14 or 18 (Circle One)	EPA Draft List of 24	OTHER: Please attach analyte list	EPA Method 537 (DW only): PFOA/ PFOS	UCMR3 PFAS List:6	537.1 List of 14	537.1 List of 18	Comments
Biosolids	4/12/2021	8:40am	Sieve Drum Discharge	1	P	SL					X					Michigan 28 PFAS panel
Biosolids dupe	4/12/2021	8:40am	Sieve Drum Discharge	1	P	SL					X					Michigan 28 PFAS panel
Biosolids Blank	4/12/2021	8:40 am	Sieve Drum Discharge	1	P	SL					X					Michigan 28 PFAS panel

Special Instructions/Comment
Only run the biosolids dupe if sample exceeds limits. Call with any questions

SEND DOCUMENTATION AND RESULTS TO:

Name: Doug Engelsman
Company: Zeeland CWP
Address: 21 S. Elm St.
City: Zeeland State: MI Zip: 49464
Phone: 616-772-0873
Email: dengelsman@cityofzeeland.com

Container Types: P = HDPE, PJ = HDPE Jar, PY = Polypropylene, O= Other ____

Bottle Preservation Type: TZ= Trizma: ____

Matrix Types: AQ = Aqueous, DW = Drinking Water, EF = Effluent, PP = Pulp/Paper, SD = Sediment, SL = Sludge, SO = Soil, WW = Wastewater, B = Blood/Serum, O = Other ____

Vista Analytical Laboratory

Sample Log-In Checklist

Page # 1 of 1

Vista Work Order #: 2104127 TAT Std

Samples Arrival:	**Date/Time** 04/13/21 10:18		**Initials:** KA		**Location:** WR-2 **Shelf/Rack:** N/A		
Delivered By:	(FedEx)	UPS	On Trac	GLS	DHL	Hand Delivered	Other
Preservation:	(Ice)		Blue Ice		Techni Ice	Dry Ice	None
Temp °C: 1.6 (uncorrected) **Temp °C:** 1.5 (corrected)			**Probe used: Y / (N)**		**Thermometer ID:** IR-3		

	YES	NO	NA
Shipping Container(s) Intact?	✓		
Shipping Custody Seals Intact?	✓		
Airbill ✓ Trk # 7855 8540 4602	✓		
Shipping Documentation Present?	✓		
Shipping Container: (Vista) Client (Retain) Return Dispose			
Chain of Custody / Sample Documentation Present?	✓		
Chain of Custody / Sample Documentation Complete?	✓		
Holding Time Acceptable?	✓		

Logged In:	**Date/Time** 04/14/21 14:06		**Initials:** KA	**Location:** WR-2 **Shelf/Rack:** F-1	
COC Anomaly/Sample Acceptance Form completed?				✓	✓

Comments:

CoC/Label Reconciliation Report WO# 2104127

LabNumber	CoC Sample ID		SampleAlias	Sample Date/Time		Container	BaseMatrix	Sample Comments
2104127-01	A Biosolids	☑	Sieve Drum Discharge	12-Apr-21 08:40	☑	HDPE Bottle, 250 mL	Solid	
2104127-02	A Biosolids dupe	☑	Sieve Drum Discharge	12-Apr-21 08:40	☑	HDPE Bottle, 250 mL	Solid	
2104127-03	A Biosolids Blank	☑ (A)	Sieve Drum Discharge	12-Apr-21 08:40	☑	HDPE Bottle, 250 mL	Aqueous	

Checkmarks indicate that information on the COC reconciled with the sample label.
Any discrepancies are noted in the following columns.

	Yes	No	NA
Sample Container Intact?	✓		
Sample Custody Seals Intact?		✓	✓
Adequate Sample Volume?	✓		
Container Type Appropriate for Analysis(es)	✓		

Comments:
(A) NO back-up volume
(B) Originally labeled + reconciled on 04/14/21

Preservation Documented: Na2S2O3 Trizma NH4CH3CO2 None (All) Other

Verifed by/Date: 04/19/21 (B)