April 13, 2022

Vista Work Order No. 2203115

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 March 14, 2022 under your Project Name 'Zeeland CWP 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 jfox@vista-analytical.com.

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

Sincerely,

Jamie Fox
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 Analytical Laboratory 1104 Windfield Way El Dorado Hills, CA 95762 ph: 916-673-1520 fx: 916-673-0106 www.vista-analytical.com

Vista Work Order No. 2203115
Case Narrative

Sample Condition on Receipt:

One sludge sample was received and stored securely in accordance with Vista standard operating procedures and EPA methodology. The sample was received in good condition and within the recommended temperature requirements.

Analytical Notes:

PFAS Isotope Dilution Method

The sample 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 recovery of 11Cl-PF3OUdS was greater than 135% in the OPR. This analyte was not detected in the sample. The recoveries of all other analytes were within the acceptance criteria.

The labeled standard recoveries outside the acceptance criteria are flagged with an "H" qualifier. The responses of the internal standards with low recoveries were greater than 10:1 signal-to-noise, which is the limit generally considered acceptable for accurate quantitation by isotope dilution analysis.

TABLE OF CONTENTS

Sample Inventory Report

Vista Sample ID	Client Sample ID	Sampled	Received	Components/Containers
2203115-01	Biosolids	11-Mar-22 10:20	14-Mar-22 09:30	HDPE Bottle, 250 mL HDPE Bottle, 250 mL

ANALYTICAL RESULTS

Sample ID: Method Blank

PFAS Isotope Dilution Method

Client Data

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

Laboratory Data

Lab Sample: B22C215-BLK1
Column: BEH C18

Analyte	CAS Number	Conc. (ng/g)	RL	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
PFBA	375-22-4	ND	0.250		B22C215	04-Apr-22	2.00 g	07-Apr-22 15:20	1
PFPeA	2706-90-3	ND	0.250		B22C215	04-Apr-22	2.00 g	07-Apr-22 15:20	1
PFBS	375-73-5	ND	0.250		B22C215	04-Apr-22	2.00 g	07-Apr-22 15:20	1
4:2 FTS	757124-72-4	ND	0.500		B22C215	04-Apr-22	2.00 g	07-Apr-22 15:20	1
PFHxA	307-24-4	ND	0.250		B22C215	04-Apr-22	2.00 g	07-Apr-22 15:20	1
PFPeS	2706-91-4	ND	0.250		B22C215	04-Apr-22	2.00 g	07-Apr-22 15:20	1
HFPO-DA	13252-13-6	ND	0.500		B22C215	04-Apr-22	2.00 g	07-Apr-22 15:20	1
PFHpA	375-85-9	ND	0.250		B22C215	04-Apr-22	2.00 g	07-Apr-22 15:20	1
ADONA	919005-14-4	ND	0.250		B22C215	04-Apr-22	2.00 g	07-Apr-22 15:20	1
PFHxS	355-46-4	ND	0.250		B22C215	04-Apr-22	2.00 g	07-Apr-22 15:20	1
6:2 FTS	27619-97-2	ND	0.500		B22C215	04-Apr-22	2.00 g	07-Apr-22 15:20	1
PFOA	335-67-1	ND	0.250		B22C215	04-Apr-22	2.00 g	07-Apr-22 15:20	1
PFHpS	375-92-8	ND	0.500		B22C215	04-Apr-22	2.00 g	07-Apr-22 15:20	1
PFNA	375-95-1	ND	0.250		B22C215	04-Apr-22	2.00 g	07-Apr-22 15:20	1
PFOSA	754-91-6	ND	0.500		B22C215	04-Apr-22	2.00 g	07-Apr-22 15:20	1
PFOS	1763-23-1	ND	0.500		B22C215	04-Apr-22	2.00 g	07-Apr-22 15:20	1
9Cl-PF3ONS	756426-58-1	ND	0.250		B22C215	04-Apr-22	2.00 g	07-Apr-22 15:20	1
PFDA	335-76-2	ND	0.250		B22C215	04-Apr-22	2.00 g	07-Apr-22 15:20	1
8:2 FTS	39108-34-4	ND	0.500		B22C215	04-Apr-22	2.00 g	07-Apr-22 15:20	1
PFNS	68259-12-1	ND	0.500		B22C215	04-Apr-22	2.00 g	07-Apr-22 15:20	1
MeFOSAA	2355-31-9	ND	0.250		B22C215	04-Apr-22	2.00 g	07-Apr-22 15:20	1
EtFOSAA	2991-50-6	ND	0.250		B22C215	04-Apr-22	2.00 g	07-Apr-22 15:20	1
PFUnA	2058-94-8	ND	0.500		B22C215	04-Apr-22	2.00 g	07-Apr-22 15:20	1
PFDS	335-77-3	ND	0.250		B22C215	04-Apr-22	2.00 g	07-Apr-22 15:20	1
11Cl-PF3OUdS	763051-92-9	ND	0.500		B22C215	04-Apr-22	2.00 g	07-Apr-22 15:20	1
PFDoA	307-55-1	ND	0.250		B22C215	04-Apr-22	2.00 g	07-Apr-22 15:20	1
PFTrDA	72629-94-8	ND	0.250		B22C215	04-Apr-22	2.00 g	07-Apr-22 15:20	1
PFTeDA	376-06-7	ND	0.250		B22C215	04-Apr-22	2.00 g	07-Apr-22 15:20	1

Labeled Standards	Type	% Recovery	Limits	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
13C3-PFBA	IS	66.3	25 - 150		B22C215	04-Apr-22	2.00 g	07-Apr-22 15:20	1
13C3-PFPeA	IS	77.0	25 - 150		B22C215	04-Apr-22	2.00 g	07-Apr-22 15:20	1
13C3-PFBS	IS	75.7	25 - 150		B22C215	04-Apr-22	2.00 g	07-Apr-22 15:20	1
13C3-HFPO-DA	IS	68.7	25 - 150		B22C215	04-Apr-22	2.00 g	07-Apr-22 15:20	1
13C2-4:2 FTS	IS	78.9	25 - 150		B22C215	04-Apr-22	2.00 g	07-Apr-22 15:20	1
13C2-PFHxA	IS	79.1	25 - 150		B22C215	04-Apr-22	2.00 g	07-Apr-22 15:20	1
13C4-PFHpA	IS	78.6	25 - 150		B22C215	04-Apr-22	2.00 g	07-Apr-22 15:20	1
13C3-PFHxS	IS	88.3	25 - 150		B22C215	04-Apr-22	2.00 g	07-Apr-22 15:20	1
13C2-6:2 FTS	IS	77.4	25 - 150		B22C215	04-Apr-22	2.00 g	07-Apr-22 15:20	1

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

Client Data

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

Laboratory Data

Lab Sample: B22C215-BLK1
Column: BEH C18

Labeled Standards	Type	% Recovery	Limits	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
13C5-PFNA	IS	63.7	25 - 150		B22C215	04-Apr-22	2.00 g	07-Apr-22 15:20	1
13C8-PFOSA	IS	34.9	10 - 150		B22C215	04-Apr-22	2.00 g	07-Apr-22 15:20	1
13C2-PFOA	IS	73.3	25 - 150		B22C215	04-Apr-22	2.00 g	07-Apr-22 15:20	1
13C8-PFOS	IS	79.8	25 - 150		B22C215	04-Apr-22	2.00 g	07-Apr-22 15:20	1
13C2-PFDA	IS	69.6	25 - 150		B22C215	04-Apr-22	2.00 g	07-Apr-22 15:20	1
13C2-8:2 FTS	IS	80.3	25 - 150		B22C215	04-Apr-22	2.00 g	07-Apr-22 15:20	1
d3-MeFOSAA	IS	51.1	25 - 150		B22C215	04-Apr-22	2.00 g	07-Apr-22 15:20	1
13C2-PFUnA	IS	49.1	25 - 150		B22C215	04-Apr-22	2.00 g	07-Apr-22 15:20	1
d5-EtFOSAA	IS	46.7	25 - 150		B22C215	04-Apr-22	2.00 g	07-Apr-22 15:20	1
13C2-PFDoA	IS	42.4	25 - 150		B22C215	04-Apr-22	2.00 g	07-Apr-22 15:20	1
13C2-PFTeDA	IS	51.0	20 - 150		B22C215	04-Apr-22	2.00 g	07-Apr-22 15:20	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 CWP Biosolids
Matrix: Solid

Laboratory Data

Lab Sample: B22C215-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	5.53	5.00	111	65 - 135		B22C215	04-Apr-22	2.00 g	07-Apr-22 15:09	1
PFPeA	2706-90-3	5.28	5.00	106	65 - 135		B22C215	04-Apr-22	2.00 g	07-Apr-22 15:09	1
PFBS	375-73-5	5.58	5.00	112	65 - 135		B22C215	04-Apr-22	2.00 g	07-Apr-22 15:09	1
4:2 FTS	757124-72-4	5.62	5.00	112	60 - 145		B22C215	04-Apr-22	2.00 g	07-Apr-22 15:09	1
PFHxA	307-24-4	5.41	5.00	108	65 - 135		B22C215	04-Apr-22	2.00 g	07-Apr-22 15:09	1
PFPeS	2706-91-4	5.43	5.00	109	65 - 135		B22C215	04-Apr-22	2.00 g	07-Apr-22 15:09	1
HFPO-DA	13252-13-6	5.12	5.00	102	65 - 135		B22C215	04-Apr-22	2.00 g	07-Apr-22 15:09	1
PFHpA	375-85-9	5.46	5.00	109	65 - 135		B22C215	04-Apr-22	2.00 g	07-Apr-22 15:09	1
ADONA	919005-14-4	5.48	5.00	110	65 - 135		B22C215	04-Apr-22	2.00 g	07-Apr-22 15:09	1
PFHxS	355-46-4	4.89	5.00	97.8	65 - 135		B22C215	04-Apr-22	2.00 g	07-Apr-22 15:09	1
6:2 FTS	27619-97-2	4.72	5.00	94.4	60 - 140		B22C215	04-Apr-22	2.00 g	07-Apr-22 15:09	1
PFOA	335-67-1	5.57	5.00	111	65 - 135		B22C215	04-Apr-22	2.00 g	07-Apr-22 15:09	1
PFHpS	375-92-8	5.02	5.00	100	65 - 135		B22C215	04-Apr-22	2.00 g	07-Apr-22 15:09	1
PFNA	375-95-1	5.09	5.00	102	65 - 135		B22C215	04-Apr-22	2.00 g	07-Apr-22 15:09	1
PFOSA	754-91-6	5.27	5.00	105	65 - 140		B22C215	04-Apr-22	2.00 g	07-Apr-22 15:09	1
PFOS	1763-23-1	5.28	5.00	106	65 - 140		B22C215	04-Apr-22	2.00 g	07-Apr-22 15:09	1
9Cl-PF3ONS	756426-58-1	5.14	5.00	103	65 - 135		B22C215	04-Apr-22	2.00 g	07-Apr-22 15:09	1
PFDA	335-76-2	5.02	5.00	100	65 - 135		B22C215	04-Apr-22	2.00 g	07-Apr-22 15:09	1
8:2 FTS	39108-34-4	5.15	5.00	103	65 - 135		B22C215	04-Apr-22	2.00 g	07-Apr-22 15:09	1
PFNS	68259-12-1	4.42	5.00	88.4	65 - 135		B22C215	04-Apr-22	2.00 g	07-Apr-22 15:09	1
MeFOSAA	2355-31-9	5.18	5.00	104	65 - 135		B22C215	04-Apr-22	2.00 g	07-Apr-22 15:09	1
EtFOSAA	2991-50-6	5.29	5.00	106	65 - 135		B22C215	04-Apr-22	2.00 g	07-Apr-22 15:09	1
PFUnA	2058-94-8	5.04	5.00	101	65 - 140		B22C215	04-Apr-22	2.00 g	07-Apr-22 15:09	1
PFDS	335-77-3	4.24	5.00	84.8	50 - 150		B22C215	04-Apr-22	2.00 g	07-Apr-22 15:09	1
11Cl-PF3OUdS	763051-92-9	7.30	5.00	146	65 - 135	H	B22C215	04-Apr-22	2.00 g	07-Apr-22 15:09	1
PFDoA	307-55-1	5.47	5.00	109	65 - 135		B22C215	04-Apr-22	2.00 g	07-Apr-22 15:09	1
PFTrDA	72629-94-8	5.96	5.00	119	60 - 140		B22C215	04-Apr-22	2.00 g	07-Apr-22 15:09	1
PFTeDA	376-06-7	5.73	5.00	115	65 - 135		B22C215	04-Apr-22	2.00 g	07-Apr-22 15:09	1

Labeled Standards	Type	% Rec	Limits	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
13C3-PFBA	IS	60.4	25 - 150		B22C215	04-Apr-22	2.00 g	07-Apr-22 15:09	1
13C3-PFPeA	IS	69.8	25 - 150		B22C215	04-Apr-22	2.00 g	07-Apr-22 15:09	1
13C3-PFBS	IS	74.3	25 - 150		B22C215	04-Apr-22	2.00 g	07-Apr-22 15:09	1
13C3-HFPO-DA	IS	51.8	25 - 150		B22C215	04-Apr-22	2.00 g	07-Apr-22 15:09	1
13C2-4:2 FTS	IS	69.6	25 - 150		B22C215	04-Apr-22	2.00 g	07-Apr-22 15:09	1
13C2-PFHxA	IS	68.0	25 - 150		B22C215	04-Apr-22	2.00 g	07-Apr-22 15:09	1

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

Client Data

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

Laboratory Data

Lab Sample: B22C215-BS1
Column: BEH C18

Labeled Standards	Type	% Rec	Limits	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
13C4-PFHpA	IS	71.8	25 - 150		B22C215	04-Apr-22	2.00 g	07-Apr-22 15:09	1
13C3-PFHxS	IS	82.1	25 - 150		B22C215	04-Apr-22	2.00 g	07-Apr-22 15:09	1
13C2-6:2 FTS	IS	84.4	25 - 150		B22C215	04-Apr-22	2.00 g	07-Apr-22 15:09	1
13C5-PFNA	IS	69.7	25 - 150		B22C215	04-Apr-22	2.00 g	07-Apr-22 15:09	1
13C8-PFOSA	IS	25.9	10 - 150		B22C215	04-Apr-22	2.00 g	07-Apr-22 15:09	1
13C2-PFOA	IS	68.3	25 - 150		B22C215	04-Apr-22	2.00 g	07-Apr-22 15:09	1
13C8-PFOS	IS	73.1	25 - 150		B22C215	04-Apr-22	2.00 g	07-Apr-22 15:09	1
13C2-PFDA	IS	59.2	25 - 150		B22C215	04-Apr-22	2.00 g	07-Apr-22 15:09	1
13C2-8:2 FTS	IS	85.1	25 - 150		B22C215	04-Apr-22	2.00 g	07-Apr-22 15:09	1
d3-MeFOSAA	IS	42.8	25 - 150		B22C215	04-Apr-22	2.00 g	07-Apr-22 15:09	1
13C2-PFUnA	IS	42.0	25 - 150		B22C215	04-Apr-22	2.00 g	07-Apr-22 15:09	1
d5-EtFOSAA	IS	40.0	25 - 150		B22C215	04-Apr-22	2.00 g	07-Apr-22 15:09	1
13C2-PFDoA	IS	37.5	25 - 150		B22C215	04-Apr-22	2.00 g	07-Apr-22 15:09	1
13C2-PFTeDA	IS	42.5	20 - 150		B22C215	04-Apr-22	2.00 g	07-Apr-22 15:09	1

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

Client Data

Name: City of Zeeland
Project: Zeeland CWP Biosolids
Location: GBT Discharge
Matrix: Sludge
Date Collected: 11-Mar-22 10:20

Laboratory Data

Lab Sample: 2203115-01
Date Received: 14-Mar-22 09:30
% Solids: 7.07
Column: BEH C18

Analyte	CAS Number	Conc. (ng/g)	RL	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
PFBA	375-22-4	ND	0.998		B22C215	04-Apr-22	7.09 g	07-Apr-22 16:01	1
PFPeA	2706-90-3	ND	0.998		B22C215	04-Apr-22	7.09 g	07-Apr-22 16:01	1
PFBS	375-73-5	ND	0.998		B22C215	04-Apr-22	7.09 g	07-Apr-22 16:01	1
4:2 FTS	757124-72-4	ND	2.00		B22C215	04-Apr-22	7.09 g	07-Apr-22 16:01	1
PFHxA	307-24-4	4.54	0.998		B22C215	04-Apr-22	7.09 g	07-Apr-22 16:01	1
PFPeS	2706-91-4	ND	0.998		B22C215	04-Apr-22	7.09 g	07-Apr-22 16:01	1
HFPO-DA	13252-13-6	ND	2.00		B22C215	04-Apr-22	7.09 g	07-Apr-22 16:01	1
PFHpA	375-85-9	ND	0.998		B22C215	04-Apr-22	7.09 g	07-Apr-22 16:01	1
ADONA	919005-14-4	ND	0.998		B22C215	04-Apr-22	7.09 g	07-Apr-22 16:01	1
PFHxS	355-46-4	ND	0.998		B22C215	04-Apr-22	7.09 g	07-Apr-22 16:01	1
6:2 FTS	27619-97-2	ND	2.00		B22C215	04-Apr-22	7.09 g	07-Apr-22 16:01	1
PFOA	335-67-1	4.62	0.998		B22C215	04-Apr-22	7.09 g	07-Apr-22 16:01	1
PFHpS	375-92-8	ND	2.00		B22C215	04-Apr-22	7.09 g	07-Apr-22 16:01	1
PFNA	375-95-1	1.21	0.998	Q	B22C215	04-Apr-22	7.09 g	07-Apr-22 16:01	1
PFOSA	754-91-6	ND	2.00		B22C215	04-Apr-22	7.09 g	07-Apr-22 16:01	1
PFOS	1763-23-1	27.7	2.00	Q	B22C215	04-Apr-22	7.09 g	07-Apr-22 16:01	1
9Cl-PF3ONS	756426-58-1	ND	0.998		B22C215	04-Apr-22	7.09 g	07-Apr-22 16:01	1
PFDA	335-76-2	37.6	0.998		B22C215	04-Apr-22	7.09 g	07-Apr-22 16:01	1
8:2 FTS	39108-34-4	ND	2.00		B22C215	04-Apr-22	7.09 g	07-Apr-22 16:01	1
PFNS	68259-12-1	ND	2.00		B22C215	04-Apr-22	7.09 g	07-Apr-22 16:01	1
MeFOSAA	2355-31-9	19.3	0.998	Q	B22C215	04-Apr-22	7.09 g	07-Apr-22 16:01	1
EtFOSAA	2991-50-6	5.64	0.998	Q	B22C215	04-Apr-22	7.09 g	07-Apr-22 16:01	1
PFUnA	2058-94-8	ND	2.00		B22C215	04-Apr-22	7.09 g	07-Apr-22 16:01	1
PFDS	335-77-3	ND	0.998		B22C215	04-Apr-22	7.09 g	07-Apr-22 16:01	1
11Cl-PF3OUdS	763051-92-9	ND	2.00		B22C215	04-Apr-22	7.09 g	07-Apr-22 16:01	1
PFDoA	307-55-1	5.67	0.998		B22C215	04-Apr-22	7.09 g	07-Apr-22 16:01	1
PFTrDA	72629-94-8	ND	0.998		B22C215	04-Apr-22	7.09 g	07-Apr-22 16:01	1
PFTeDA	376-06-7	ND	0.998		B22C215	04-Apr-22	7.09 g	07-Apr-22 16:01	1

Labeled Standards	Type	% Recovery	Limits	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
13C3-PFBA	IS	57.1	25 - 150		B22C215	04-Apr-22	7.09 g	07-Apr-22 16:01	1
13C3-PFPeA	IS	60.7	25 - 150		B22C215	04-Apr-22	7.09 g	07-Apr-22 16:01	1
13C3-PFBS	IS	72.5	25 - 150		B22C215	04-Apr-22	7.09 g	07-Apr-22 16:01	1
13C3-HFPO-DA	IS	65.8	25 - 150		B22C215	04-Apr-22	7.09 g	07-Apr-22 16:01	1
13C2-4:2 FTS	IS	78.5	25 - 150		B22C215	04-Apr-22	7.09 g	07-Apr-22 16:01	1
13C2-PFHxA	IS	57.6	25 - 150		B22C215	04-Apr-22	7.09 g	07-Apr-22 16:01	1
13C4-PFHpA	IS	44.3	25 - 150		B22C215	04-Apr-22	7.09 g	07-Apr-22 16:01	1
13C3-PFHxS	IS	33.1	25 - 150		B22C215	04-Apr-22	7.09 g	07-Apr-22 16:01	1

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

Client Data

Name: City of Zeeland
Project: Zeeland CWP Biosolids
Location: GBT Discharge
Matrix: Sludge
Date Collected: 11-Mar-22 10:20

Laboratory Data

Lab Sample: 2203115-01
Date Received: 14-Mar-22 09:30
% Solids: 7.07
Column: BEH C18

Labeled Standards	Type	% Recovery	Limits	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
13C2-6:2 FTS	IS	36.2	25 - 150		B22C215	04-Apr-22	7.09 g	07-Apr-22 16:01	1
13C5-PFNA	IS	11.9	25 - 150	H	B22C215	04-Apr-22	7.09 g	07-Apr-22 16:01	1
13C8-PFOSA	IS	9.10	10 - 150	H	B22C215	04-Apr-22	7.09 g	07-Apr-22 16:01	1
13C2-PFOA	IS	21.8	25 - 150	H	B22C215	04-Apr-22	7.09 g	07-Apr-22 16:01	1
13C8-PFOS	IS	9.90	25 - 150	H	B22C215	04-Apr-22	7.09 g	07-Apr-22 16:01	1
13C2-PFDA	IS	7.50	25 - 150	H	B22C215	04-Apr-22	7.09 g	07-Apr-22 16:01	1
13C2-8:2 FTS	IS	11.5	25 - 150	H	B22C215	04-Apr-22	7.09 g	07-Apr-22 16:01	1
d3-MeFOSAA	IS	4.20	25 - 150	H	B22C215	04-Apr-22	7.09 g	07-Apr-22 16:01	1
13C2-PFUnA	IS	5.60	25 - 150	H	B22C215	04-Apr-22	7.09 g	07-Apr-22 16:01	1
d5-EtFOSAA	IS	3.10	25 - 150	H	B22C215	04-Apr-22	7.09 g	07-Apr-22 16:01	1
13C2-PFDoA	IS	4.20	25 - 150	H	B22C215	04-Apr-22	7.09 g	07-Apr-22 16:01	1
13C2-PFTeDA	IS	2.40	20 - 150	H	B22C215	04-Apr-22	7.09 g	07-Apr-22 16:01	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.

DATA QUALIFIERS & ABBREVIATIONS

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	21-023-0
California Department of Health – ELAP	2892
DoD ELAP - A2LA Accredited - ISO/IEC 17025:2005	3091.01
Florida Department of Health	E87777-26
Hawaii Department of Health	N/A
Louisiana Department of Environmental Quality	01977
Maine Department of Health	2020018
Massachusetts Department of Environmental Protection	M-CA413
Michigan Department of Environmental Quality	9932
Minnesota Department of Health	1980678
New Hampshire Environmental Accreditation Program	207720
New Jersey Department of Environmental Protection	CA003
New York Department of Health	11411
Ohio Environmental Protection Agency	87778
Oregon Laboratory Accreditation Program	4042-016
Pennsylvania Department of Environmental Protection	017
Texas Commission on Environmental Quality	T104704189-21-12
Vermont Department of Health	VT-4042
Virginia Department of General Services	10769
Washington Department of Ecology	C584
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
Polychlorinated Dibenzodioxins in Ambient Air by GC/HRMS	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**
Tetra- through Octa-Chlorinated Dioxins and Furans by Isotope Dilution GC/HRMS	EPA 1613/1613B
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	EPA 537.1
Determination of Per- and Polyfluoroalkyl Substances in Drinking Water by Isotope Dilution Anion Exchange Solid Phase Extraction and Liquid Chromatography/Tandem Mass Spectrometry	EPA 533
Perfluorooctanesulonate (PFOS) and Perfluorooctanoate (PFOA) - Method for Unfiltered Samples Using Solid Phase Extraction and Liquid Chromatography/Mass Spectrometry	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 #: 2203115 Temp: 2.8 °C
Storage ID: CWR-2 Storage Secured: Yes ☑ No ☐

Project ID: Zeeland CWP Biosolids PO#: 5042 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
Doug Engelsman D.S.	3/11/22	10:45 Am	Marissa Sparks MSparks	03/14/22	0930
			MMS	03/14/22	
Relinquished by (printed name and signature)	Date	Time	Received by (printed name and signature)	Date	Time

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	03/11/2022	10:20am	GBT Discharge	2	P	SL					X					Michigan 28 PFAS panel

Special Instructions/Comment: Biosolids 7% Solids

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 #: 2203115 TAT 5+1

Samples Arrival:	**Date/Time** 03/14/22 0930		**Initials:** WWS		**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: 2.9 (uncorrected) **Temp °C:** 2.8 (corrected)			**Probe used: Y / N**		**Thermometer ID:** IR-3		

	YES	NO	NA
Shipping Container(s) Intact?	✓		
Shipping Custody Seals Intact?	✓		
Airbill — Trk # 2707 5541 6990	✓		
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** 03/15/22 08:45		**Initials:** KM	**Location:** WR-2 **Shelf/Rack:** A-3	
COC Anomaly/Sample Acceptance Form completed?				✓	✓

Comments:

CoC/Label Reconciliation Report WO# 2203115

LabNumber	CoC Sample ID		SampleAlias	Sample Date/Time		Container	BaseMatrix	Sample Comments
2203115-01	A Biosolids	☑	GBT Discharge	11-Mar-22 10:20	☑	HDPE Bottle, 250 mL	Solid	
2203115-01	B Biosolids	☑	GBT Discharge	11-Mar-22 10:20	☑	HDPE Bottle, 250 mL	Solid	

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:

Preservation Documented: Na2S2O3 Trizma NH4CH3CO2 (None) Other

Verifed by/Date: CRW 3/15/22