Remedial Action Performance Three-Month Post-Injection

Darwin Burn Pit
Dane County Regional Airport
International Lane and Darwin Road
Madison, Wisconsin

Fehr Graham Project No.: 24-1675
DNR BRRTS # 02-13-583366

December 2025

Fehr Graham
200 Prairie Street
Suite 208
Rockford, Illinois 61107

ORIN Technologies
405 Investment Court
Verona, Wisconsin 53593

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TABLES

APPENDICES

1.0 INTRODUCTION

Fehr Graham & Associates, LLC (Fehr Graham) has completed this *Remedial Action Performance Monitoring Report (RAPMR) – Three-Month Post Injection* for remedial activities for the Darwin Burn Pit (DBP) at Dane County Region Airport located at International Lane and Darwin Road in Madison, Wisconsin (the Site). The purpose of this report is to describe the completed groundwater performance monitoring activities and up to three (3) months post-remedial activities. Remedial activities included soil blending of Bioavailable Absorbent Media™ (BAM) and organoclay and injections of BAM into impacted groundwater. Further, the BAM treatment was augmented with microbes and electrochemical oxidation to enhance remedial effectiveness.

The groundwater performance monitoring activities include groundwater sampling completed in August 2025, three months post-injection. Evaluation of data has been performed within the framework of the Wisconsin Department of Natural Resources (WDNR) PFAS List - 3.1.21 and the NR 720 RCL Spreadsheet (updated October 2024). Both resources provide the recommended standards for specific perfluoroalkyl and polyfluoroalkyl substances (PFAS) compounds. The WDNR is currently in the rule-making process to include these recommended values in the Ch. NR 140 Wisconsin Administrative Code.

2.0 BACKGROUND

2.1 Site Location

The Site is approximately 3.5 acres and is located immediately north of Darwin Road on the west side of the DCRA property in Madison, Dane County, Wisconsin. (Figure 1 and Figure 2).

The property has been identified as:

Darwin Burn Pit
Darwin Road and International Lane
Madison, Wisconsin 53704
Parcel ID# 081030100903
Dane County, Wisconsin

2.2 Contacts

The project contacts are as follows:

Responsible Party
Dane County Regional Airport
Ryan Falch
4000 International Lane
Madison, Wisconsin 53704

Wisconsin Department of Natural Resources (WDNR) Project Manager
WDNR
Department of Remediation and Redevelopment
Stephan Ales
Hydrogeologist Program Coord
Wisconsin Department of Natural Resources
PO Box 7921
Madison, Wisconsin 53707-7921

Remediation Contractor:
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Consultant
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909 North 8th Street, Suite 101
Sheboygan, Wisconsin 53081

Analytical Laboratory:
Pace Analytical Laboratory
Chris Hyska
Project Manager
1241 Bellevue Street – Suite 9
Green Bay, Wisconsin 54302

2.3 Site Characterization

Site characterization information, including description of site location, regional geology and hydrogeology, site history, and remedial actions history, were included in the *Remedial Action Performance Monitoring Report – One-Month Post Injection* by Fehr Graham, dated November 3, 2025.

3.0 PERFORMANCE MONITORING ACTIVITIES

Fehr Graham completed groundwater performance monitoring three-months post remedial activities in August 2025. Sample locations and the parameters ran for analysis were based upon the schedule outlined in the work plans submitted to WDNR by ORIN Technologies and Marquette University, with consulting firm WSP. PFAS sampling practices were provided by Pace Analytical Services (Pace) through a "PFAS Field Sampling Guide" for general guidance. A copy of the guide is included in Appendix A. The specific physical and chemical methods utilized for each performance monitoring event are described in the following sections.

3.1 Groundwater Performance Monitoring

A total of seven (7) groundwater monitoring wells and one (1) piezometer are present on the Site for IRM performance monitoring purposes. Four (4) monitoring wells were installed in historic investigations near the former DBP to evaluate the shallow portion of the water table (MW-1 through MW-4) and one (1) piezometer well was installed to evaluate the deeper portions of the unconfined aquifer (PZ-1). ORIN Technologies then installed three (3) additional monitoring wells in 2025 to support IRM implementation and performance monitoring. One (1) monitoring well was installed upgradient from the groundwater treatment area (MW-5), one (1) monitoring well was installed adjacent to the groundwater treatment area (MW-6), and one (1) monitoring well was installed downgradient from the groundwater treatment area (MW-7).

A total of four (4) monitoring wells (MW-3, MW-4, MW-5 and MW-6) were sampled during the three-month post-injection event. Sample locations can be found in Figure 3. Prior to groundwater sampling, groundwater levels were taken from the sampled groundwater monitoring wells. Recorded depth to water measurements for each monitoring well and the piezometer well are provided in *Table 3.1* below.

Table 3.1 Groundwater Elevations

Well ID	Total Depth (ft bgs)	Screen Length (ft)	Depth to water (ft btoc)
MW-3	25	10	14.5
MW-4	22	10	14
MW-5	22	10	13.6
MW-6	22	10	14.5

The groundwater monitoring wells were sampled using a low-flow peristaltic pump with dedicated high-density polyethylene (HDPE) tubing and a multi-parameter water quality meter. The peristaltic pump operated at a flow rate of 100 to 500 milliliters per minute, and low-flow water quality parameters (i.e., pH, conductivity, dissolved oxygen, and oxygen-reduction potential (ORP), as well as the depth to water (i.e., drawdown), were monitored at 3 to 5-minute intervals until the water quality parameters stabilized over three (3) successive monitoring intervals.

Groundwater samples were collected in laboratory-provided containers and stored on wet ice for transport to the laboratory, Pace Analytical, under standard chain-of-custody procedures.

Groundwater well and piezometer samples were submitted for analysis of the following analytical suites:

- PFAS by US EPA Method 1633
- Microbial Assay (genus level) by Quantitative polymerase chain reaction (qPCR) methods (S16) Next Generation Sequencing-Eubacterial Profile (NGS Scan)
- Inorganic Fluoride by method SM 4500-F-C

The specific sampling rationale for individual monitoring wells sampled during the three-month post-injection event is broken down in *Table 3.2*.

Table 3.2 Groundwater Sampling Activities

Well ID	Groundwater Sampling Event	Rationale
	3-mo (08/18/25)	
MW-3	P, F, M	Source/Treatment Area
MW-4	P, F, M	Source/Treatment Area
MW-5	P, F, M	Upgradient: Edge of treatment area
MW-6	P, F	Source/Treatment Area

P = PFAS; F = Inorganic fluoride; M = Microbial Assay

4.0 PERFORMANCE MONITORING RESULTS

4.1 Groundwater Performance Results

Groundwater analytical results were compared to Wisconsin Department of Natural Resources (WDNR) PFAS List - 3.1.21. The Enforcement Standard (ES) and Preventive Action Limit (PAL) listed in this table have been recommended by the Wisconsin Department of Health Services to the WDNR. The WDNR is in the rule making process to include these values into ch. NR 140 Wisconsin Administrative Code. Laboratory analytical reports can be found in Appendix B.

4.1.1 PFAS

PFAS analytical results were summarized below to include the cumulative concentrations of PFOA, PFOS, PFHxS and PFNA, as previous investigations determined these to be the main compounds of concern, as these are the compounds to detect in groundwater at levels that exceed the recommended ES and PALs. Compounds detected in groundwater at levels that exceed the recommended ES and PALs, and the associated sample location, are shown in Figure 4. For comparison purposes, the previous pre- and post-injection sampling event results are shown in Figure 5.

Following the 3-month post-injection sampling event, ORIN completed a follow-up sampling event on August 28, 2025. The summary of results for MW-3, MW-4, MW-5, and MW-6 for the August 28, 2025, sampling date can be found in Tables 4.1 through 4.5. Analytical results for all PFAS compounds and groundwater monitoring wells can be found in Table A.1.a.

Table 4.1 PFNA concentrations at Monitoring Wells

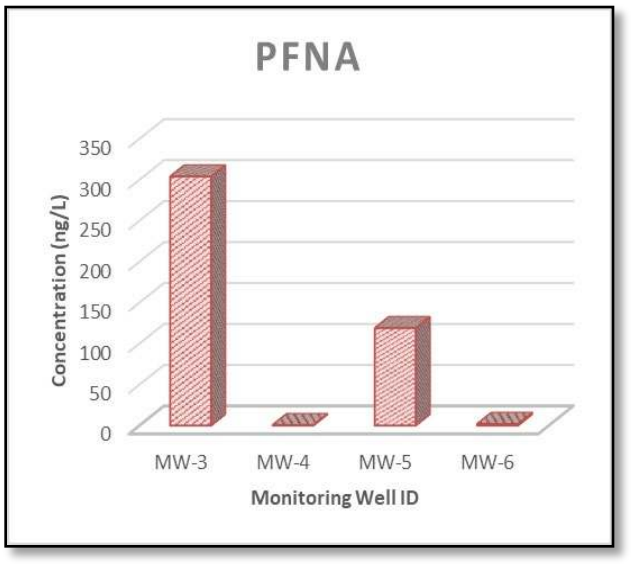


Table 4.2 PFOA concentrations at Monitoring Wells

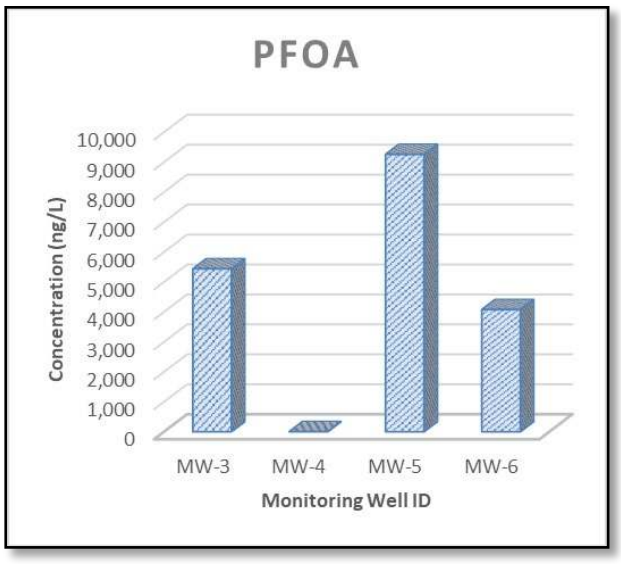


Table 4.3 PFHxS concentrations at Monitoring Wells

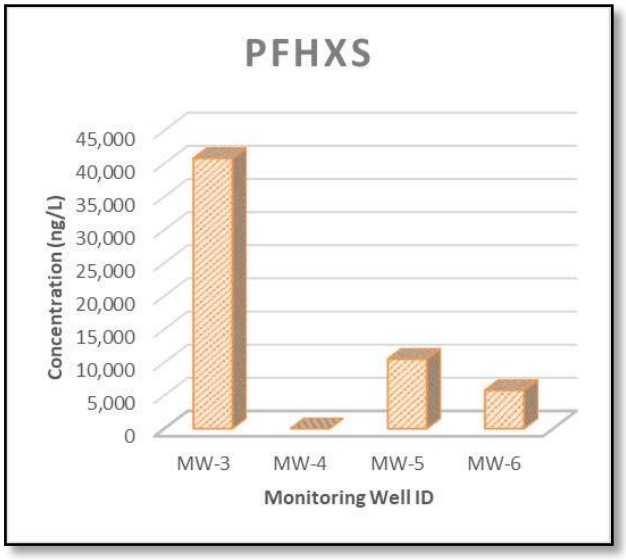


Table 4.4 PFOS concentrations at Monitoring Wells

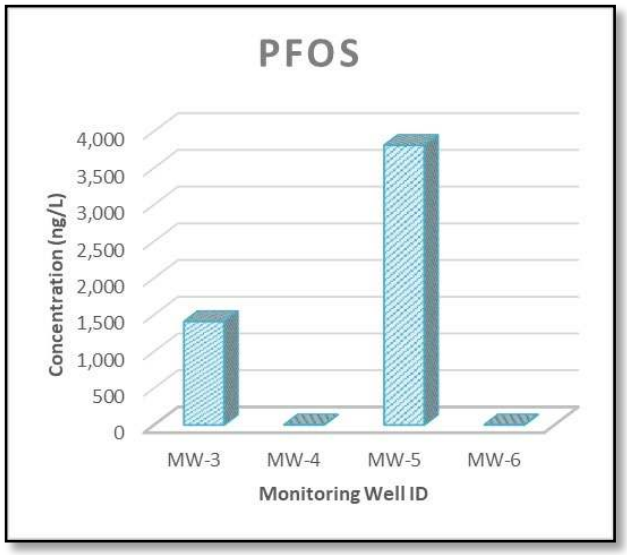
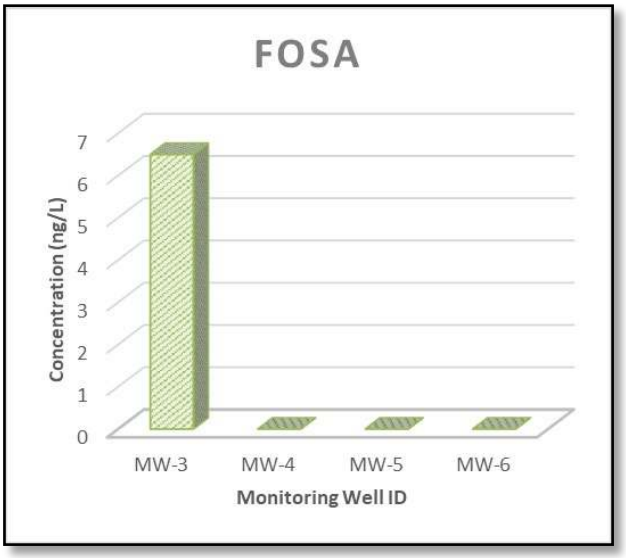


Table 4.5 FOSA concentrations at Monitoring Wells



4.1.2 Fluoride

Fehr Graham completed groundwater sampling for fluoride analysis from MW-3, MW-4, MW-5, and MW-6 on August 18, 2025. The summary of results for fluoride analysis for each sampling event can be found in *Table 4.5*. through *Table 4.8*. Analytical results for fluoride can be found in Table A.1.b.

Table 4.5. MW-3 Fluoride Concentrations

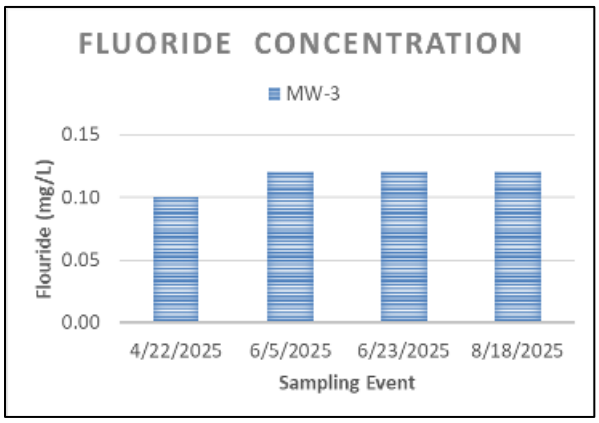


Table 4.6. MW-4 Fluoride Concentrations

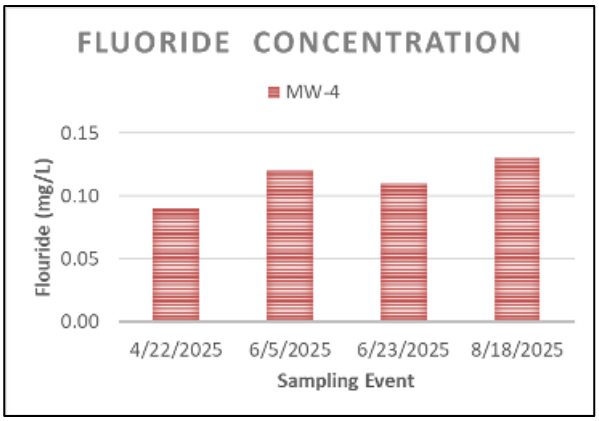


Table 4.7. MW-5 Fluoride Concentrations

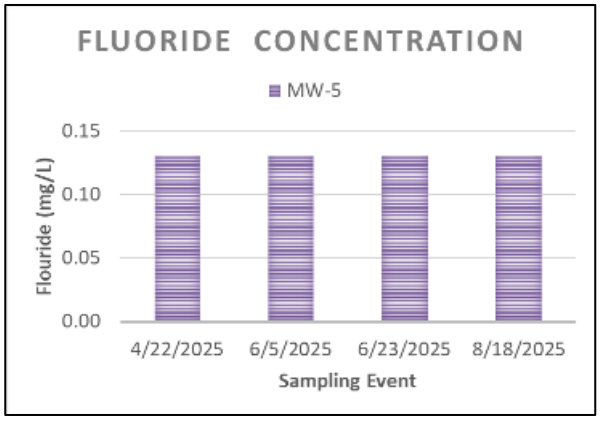
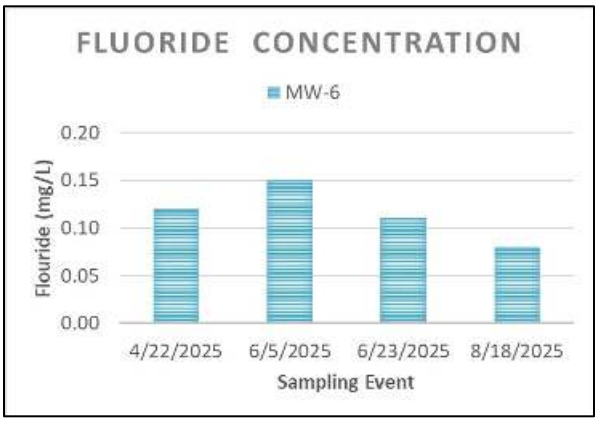


Table 4.8. MW-6 Fluoride Concentrations



4.1.3 Microbial Assay

In addition, Fehr Graham collected groundwater samples for microbial analysis from MW-3, MW-4, and MW-5 on August 18, 2025. Analytical results for the microbial assay can be found in Table A.1.c.

5.0 CONCLUSIONS

Based on the results of the performance monitoring through 3-month post-IRM, Fehr Graham has made the following conclusions:

- Monitoring wells MW-3 (5,440 ng/L), MW-5 (4,080 ng/L), and MW-6 (9,260 ng/L) continue exceed the Ch. NR 140 Enforcement Standard for PFOA of 20 ng/L while MW-4 (3.8 ng/L) exceeds the Ch. NR 140 Preventative Action Limit for PFOA of 2 ng/L.

- Monitoring wells MW-3 (304 ng/L) and MW-5 (119 ng/L) exceed the Ch. NR 140 Enforcement Standard for PFNA of 30 ng/L while MW-4 (0.50 ng/L) and MW-6 (1.9 ng/L) are below the Ch. NR 140 Preventative Action Limit for PFNA of 3 ng/L.

- Monitoring wells MW-3 (40,800 ng/L), MW-5 (10,500 ng/L), and MW-6 (5,780 ng/L) exceed the Ch. NR 140 Enforcement Standard for PFHxS of 40 ng/L while MW-4 (7.4 ng/L) exceeds the Ch. NR 140 Preventative Action Limit for PFHxS of 4 ng/L.

- Monitoring wells MW-3 (1,410 ng/L) and MW-5 (3,810 ng/L) exceed the Ch. NR 140 Enforcement Standard for PFOS of 20 ng/L while MW-4 (3.6 ng/L) and MW-6 (2.5 ng/L) exceeds the Ch. NR 140 Preventative Action Limit for PFOS of 2 ng/L.

- Monitoring well MW-3 (6.5 ng/L) exceeds the Ch. NR 140 Preventative Action Limit for FOSA of 2 ng/L.

- Fluoride concentrations remain stable in sampled wells in comparison to past sampling events.

6.0 PERFORMANCE MONITORING SCHEDULE

Additional performance-monitoring sampling for groundwater following this report will occur according to the following schedule.

Table 5.1 Performance groundwater monitoring schedule.

Well ID	Groundwater Sampling Event		Rationale
	6-mo* (Tentatively Scheduled for Early November 2025)	1-yr* (Tentatively Scheduled for Late May 2026)	
MW-1	P	P	Upgradient
MW-2	P	P	Downgradient
MW-3	P, F	P, F	Source/Treatment Area
MW-4	P, F	P, F	Source/Treatment Area
MW-5	P, F	P, F	Upgradient: Edge of treatment area
MW-6	P, F	P, F	Source/Treatment Area
MW-7	P	P	Downgradient
PZ-1	P	P	Source/Treatment Area

**Post IRM implementation.*

Additional performance monitor sampling for soil following this report will occur 1-year post IRM implementation and is tentatively scheduled for late May 2026.

Additional Remedial Action Performance Monitoring Reports will be completed and submitted upon the receipt of laboratory analytical results following the 6-month post IRM groundwater sampling event and 1-year post IRM soil and groundwater sampling event. The 1-year post IRM soil and groundwater sampling event Remedial Action Performance Monitoring Report will include final conclusions of the effectiveness of the IRM, and recommendations of further investigation and/or remediation activities.

7.0 NR 712.09 Submittal Certification

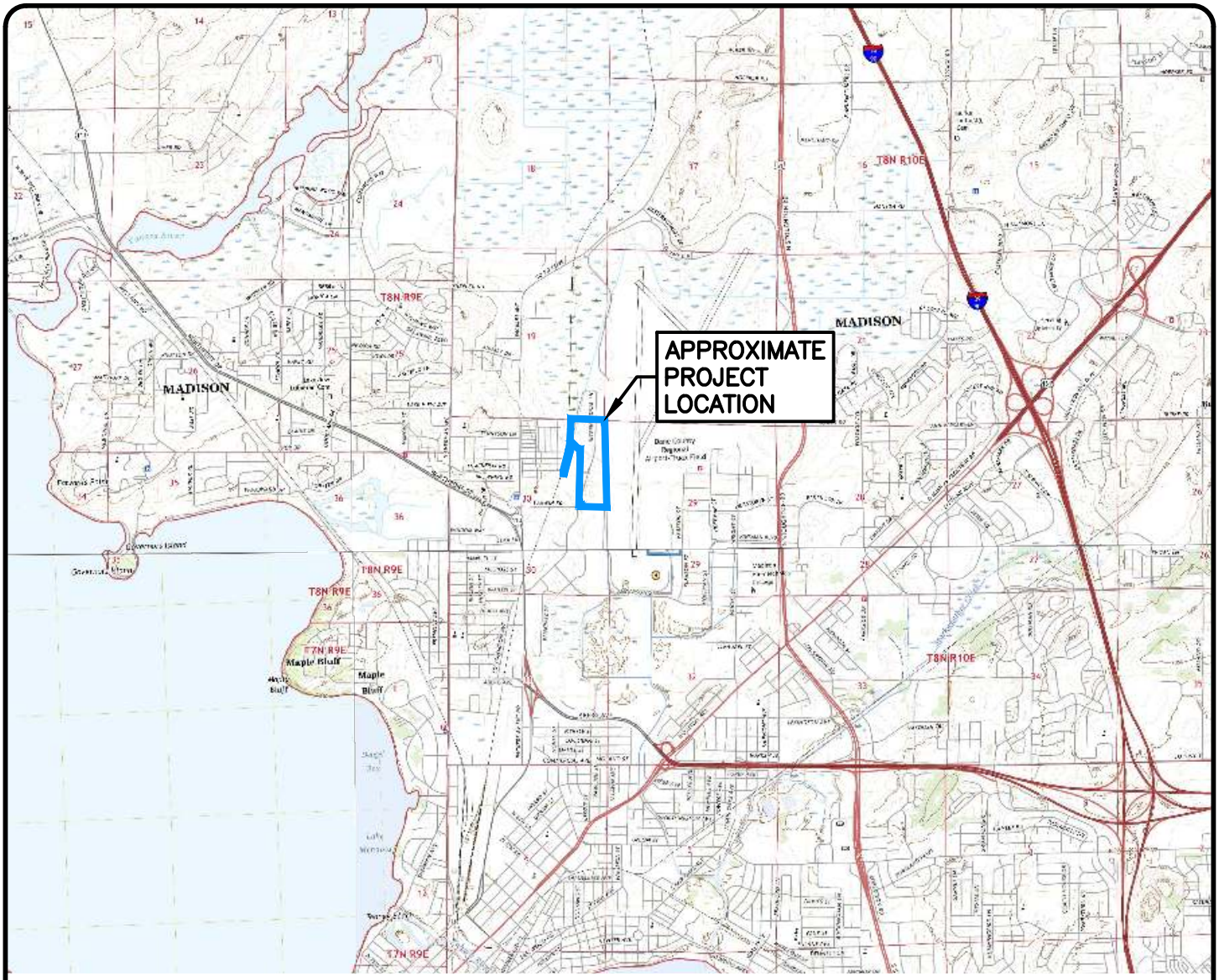
I, Dillon Plamann, hereby certify that I am a scientist as that term is defined in s. NR 712.03 (3), Wis. Adm. Code, and that, to the best of my knowledge, all of the information contained in this document is correct and the document was prepared in compliance with all applicable requirements in chs. NR 700 to 726, Wis. Adm. Code.

Signature

December 10, 2025
Date

Figure 1

Site Location Map



N
W E
S

5000 0 5000

GRAPHIC SCALE IN FEET

FIGURE 1

SITE LOCATION MAP
INTERNATIONAL LN. & DARWIN RD.
MADISON, WI

10/1/25

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ENGINEERING & ENVIRONMENTAL

ILLINOIS
IOWA
WISCONSIN

PLOT DATE: 10/1/25
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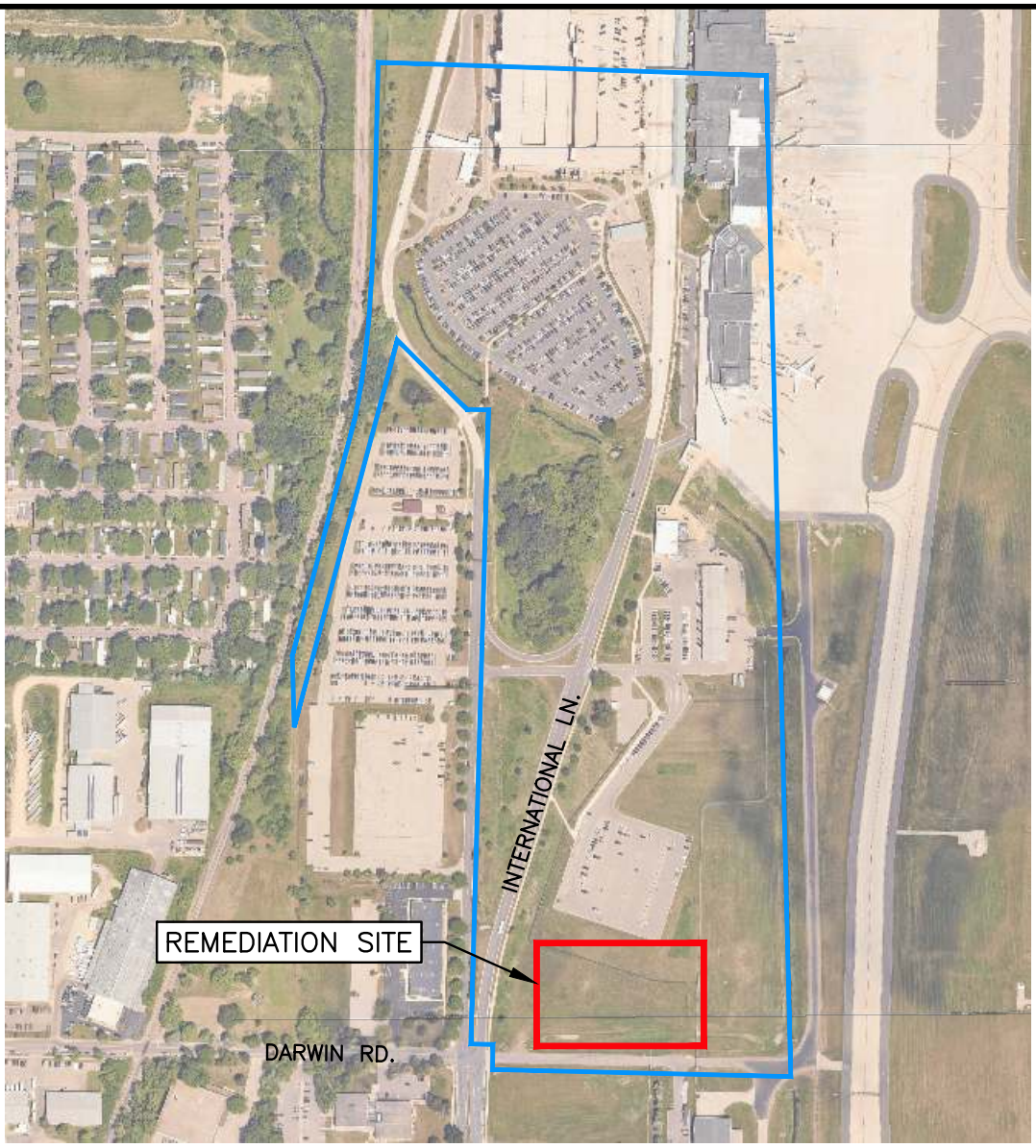
Figure 2
Site Layout Map



N
W E
S

500 0 500 FEET
GRAPHIC SCALE IN FEET

FIGURE 2
SITE LAYOUT MAP
INTERNATIONAL LN. & DARWIN RD.
MADISON, WI

10/1/25

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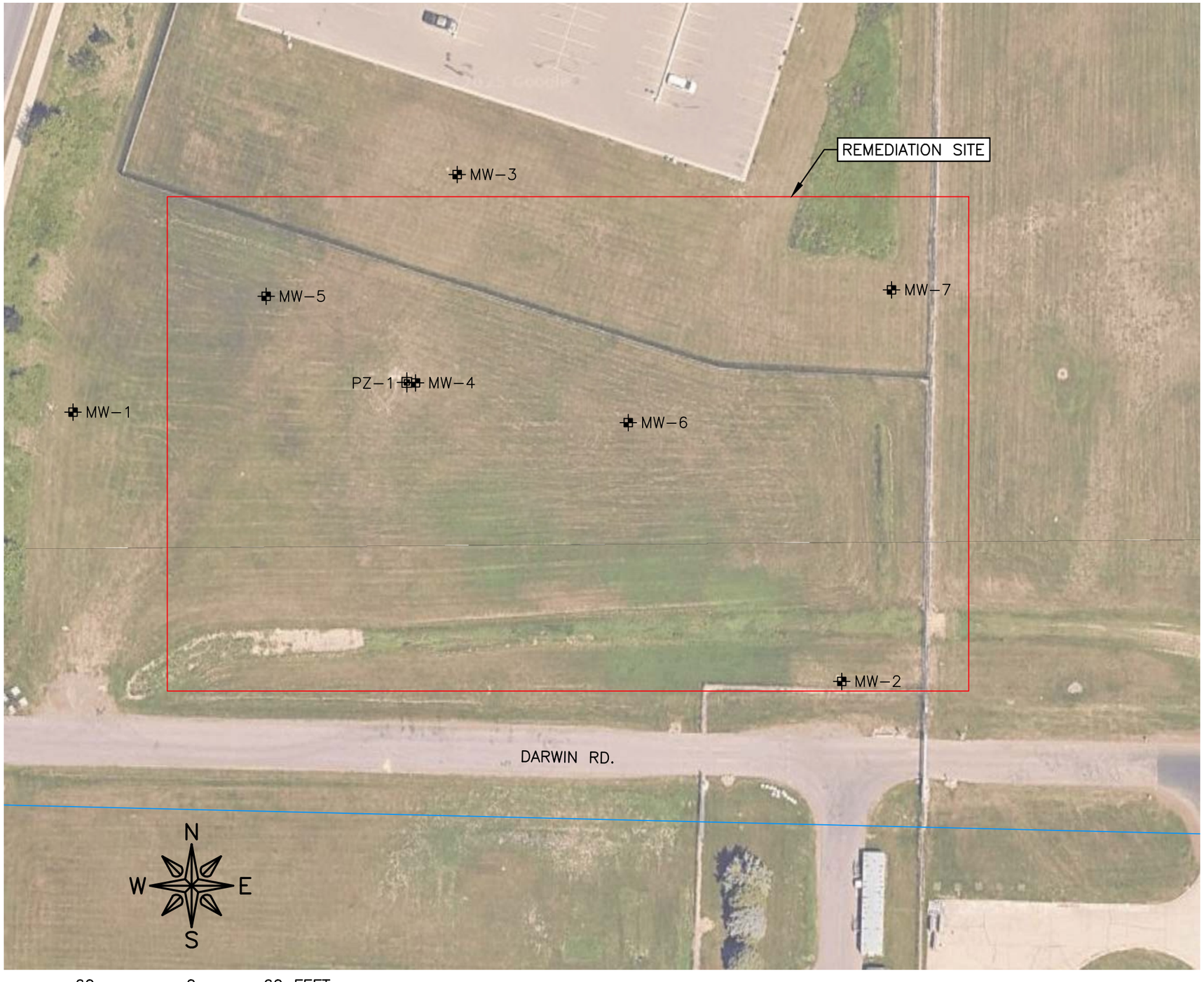
ILLINOIS
IOWA
WISCONSIN

PLOT DATE: 10/1/25
G:\C3D\24\24-1675\Exhibits\24-1675_Site.dwg, Site Layout

Figure 3

Sample Location Map



60 0 60 FEET

GRAPHIC SCALE IN FEET

LEGEND

- MONITORING WELL
- PIEZOMETER WELL

NOTE: WELL LOCATIONS REFERENCED FROM WSP, 2025

FIGURE 3

SAMPLE LOCATION MAP
INTERNATIONAL LN. & DARWIN RD.
MADISON, WI

10/1/25

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ILLINOIS DESIGN FIRM NO. 194–003525

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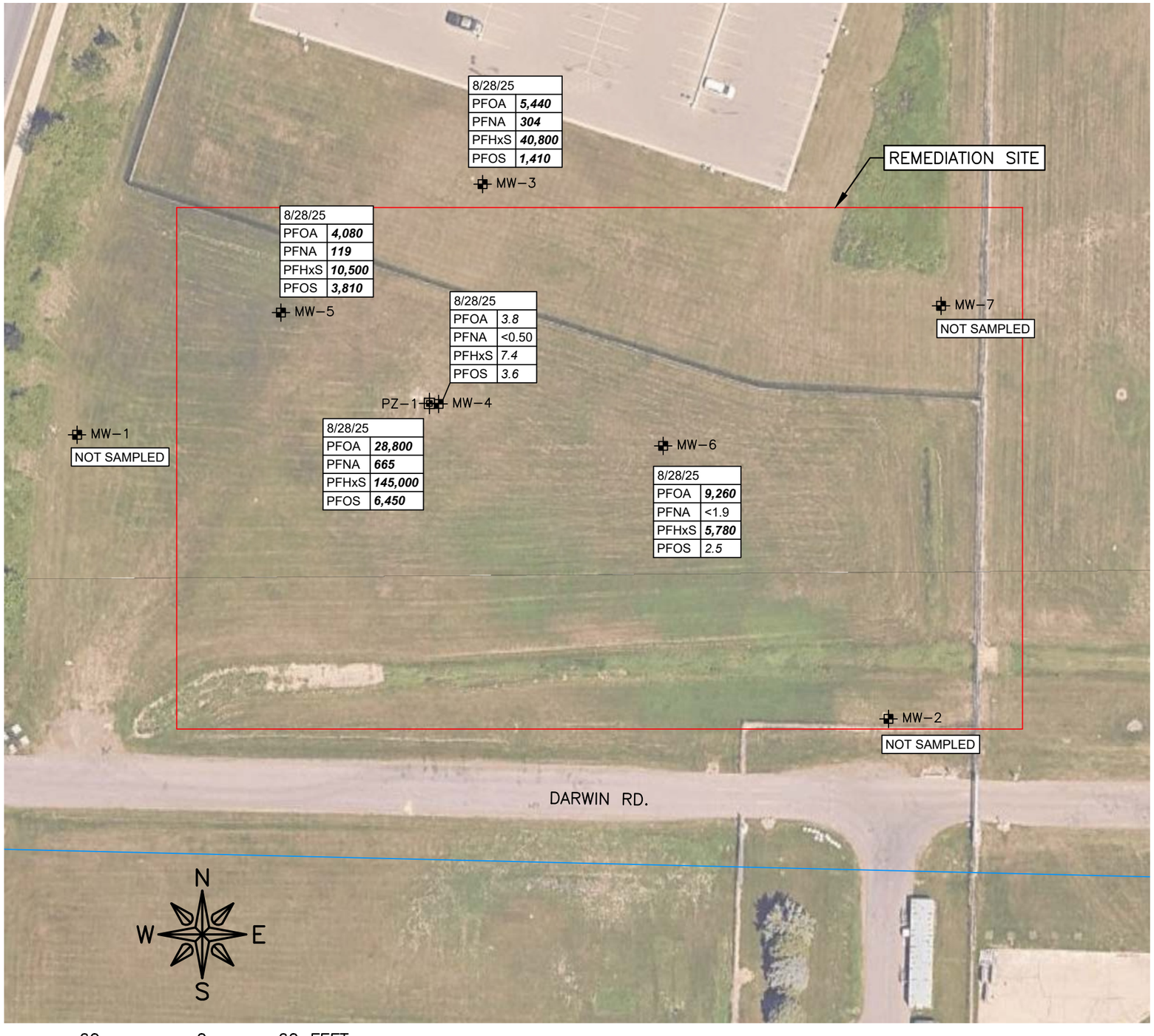
WISCONSIN

G:\C3D\24\24–1675\Exhibits\24–1675_Site.dwg, Sample Location
PLOT DATE: 10/1/25

Figure 4
Post Injection Groundwater Exceedance Map



LEGEND

- MONITORING WELL
- PIEZOMETER WELL

PFOA	PERFLUOROOCTANOIC ACID
PFNA	PERFLUORONONANOIC ACID
PFHxS	PERFLUOROHEXANESULFONIC ACID
PFOS	PERFLUOROOACTANESULFONIC ACID
BOLD	EXCEEDS ENFORCEMENT STANDARDS
ITALICS	EXCEEDS PREVENTATIVE ACTION LIMITS

NOTES:
1. RESULTS REPORTED IN (ng/L)

FIGURE 4

GROUNDWATER CHEMISTRY
AUG. 28, 2025
INTERNATIONAL LN. & DARWIN RD.
MADISON, WI

11/17/25

FEHR GRAHAM
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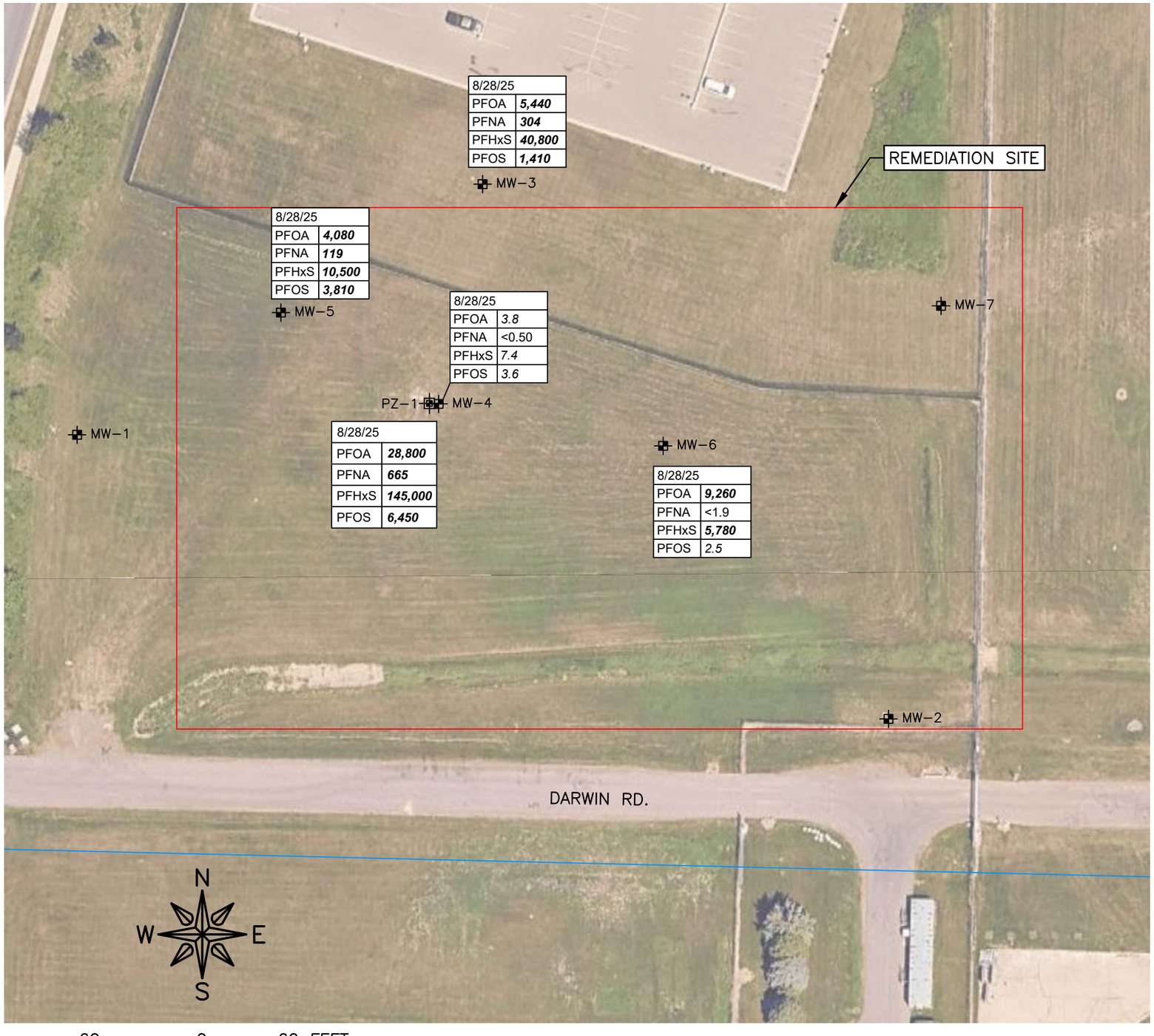
PLOT DATE: 11/17/25

Figure 5
Pre and Post Injection Groundwater Exceedance Map



LEGEND

- MONITORING WELL
- PIEZOMETER WELL

PFOA	PERFLUOROOCTANOIC ACID
PFNA	PERFLUORONONANOIC ACID
PFHxS	PERFLUOROHEXANESULFONIC ACID
PFOS	PERFLUOROOACTANESULFONIC ACID
BOLD	EXCEEDS ENFORCEMENT STANDARDS
ITALICS	EXCEEDS PREVENTATIVE ACTION LIMITS
DATE*	INDICATES DUPLICATE SAMPLE. HIGHEST REPORTED RESULT SHOWN

NOTES:
1. RESULTS REPORTED IN (ng/L)

FIGURE 5

PRE AND POST INJECTION GROUNDWATER EXCEEDANCE MAP INTERNATIONAL LN. & DARWIN RD. MADISON, WI

12/5/25

FEHR GRAHAM
ENGINEERING & ENVIRONMENTAL
ILLINOIS DESIGN FIRM NO. 194–003525
ILLINOIS
IOWA
WISCONSIN

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PLOT DATE: 12/5/25

Table A.1.a

Groundwater Analytical Results – PFAS

Sample ID	EPA Acronym	Preventative Action Limit (PAL)*	Enforcement Standard (ES)*	MW-1	MW-2	MW-3				
Date				4/22/2025	4/23/2025	4/22/2025	5/29/2025	6/5/2025	6/23/2025	8/28/2025
Notes				Clear	Clear	Clear	Clear	Cloudy	Clear	-
PFAS (ng/L)										
Fluorotelomer Carboxylic Acids (ng/L)										
3-Perfluoropropyl propanoic acid	3:3 FTCA	--	--	<2.1	<2.1	<110	<8.6	<4.3	<4.3	<2.1
2H,2H,3H,3H-Perfluorooctanoic acid	5:3 FTCA	--	--	<9.3	<9.2	<480	<37.4	<18.9	<18.5	<9.3
3-Perfluoroheptyl propanoic acid	7:3 FTCA	--	--	<11.1	<11.0	<570	<44.4	<22.4	<21.9	<11.0
Carboxylic Acids (ng/L)										
Perfluorobutanoic acid [C4] (FC 23, Fluorad FC 23)	PFBA	*2,000*	**10,000**	7.4	246	1,150	<16.0	1,350	1,660	914
Perfluoropentanoic acid [C5]	PFPeA	--	--	9.0	472	3,770	4,320	4,510	6,240	3,300
Perfluorohexanoic acid [C6]	PFHxA	*30,000*	**150,000**	20.4	806	5,280	5,600	2,700	7,940	4,090
Perfluoroheptanoic acid [C7]	PFHpA	--	--	17.5	241	2,290	2,210	2,110	2,930	1,800
Perfluorooctanoic acid [C8]	PFOA	*2*	**20**	**362**	***3,850***	***11,800***	***12,000***	***12,800***	***14,400***	***5,440***
Perfluorononanoic acid [C9]	PFNA	*3*	**30**	<0.51	***46.9***	***599***	***352***	***329***	***272***	***304***
Perfluorodecanoic acid [C10]	PFDA	*60*	**300**	<0.48	1.7	<24.8	<1.9	<0.97	<0.95	5.7
Perfluoroundecanoic acid [C11]	PFUnA	*600*	**3,000**	<0.35	<0.34	<17.8	<1.4	<0.70	<0.68	0.88 J
Perfluorododecanoic acid [C12]	PFDoA	*100*	**500**	<0.48	<0.47	<24.5	<1.9	<0.96	<0.94	<0.47
Perfluorotridecanoic acid [C13]	PFTrDA	--	--	<0.44	<0.44	<22.6	<1.8	<0.89	<0.87	<0.44
Perfluorotetradecanoic acid [C14]	PFTeDA	*2,000*	**10,000**	<0.40	<0.40	<20.7	<1.6	<0.81	<0.80	<0.40
Sulfonic Acids (ng/L)										
Perfluorobutanesulfonic acid [C4] (*FC-98*)	PFBS	*90,000*	**450,000**	5.1	445	1,480	1,680	1,670	2,440	1,170
Perfluoropentanesulfonic acid [C5]	PFPeS	--	--	2.8	266	1,910	2,340	2,240	3,450	1,810
Perfluorohexanesulfonic acid [C6]	PFHxS	*4*	**40**	***414***	***11,200***	***43,300***	***40,000***	***31,400***	***40,000***	***40,800***
Perfluoroheptanesulfonic acid [C7]	PFHpS	--	--	2.1	39.5	204	<105	109	83.9	113
Perfluorooctanesulfonic acid [C8] (*FC 95, Fluorad FC 95*)	PFOS	*2*	**20**	***13.7***	***1,060***	***1,190***	***669***	***692***	***598***	***1,410***
Perfluorononanesulfonic acid [C9]	PFNS	--	--	<0.46	<0.45	<23.6	<1.8	<0.93	<0.91	0.59 J
Perfluorodecanesulfonic acid [C10]	PFDS	--	--	<0.67	<0.66	<34.4	<2.7	<1.4	<1.3	<0.66
Perfluorododecanesulfonic acid [C12]	PFDoS	--	--	<0.34	<0.33	<17.2	<1.3	<0.68	<0.66	<0.33
4:2 fluorotelomersulfonic acid [C6]	4:2 FTS	--	--	<1.6	<1.5	<80.0	<6.2	<3.1	<3.1	<1.5
6:2 fluorotelomersulfonic acid [C8]	6:2 FTS	--	--	<1.8	43.4	<92.5	46.3	42.4	49.4	32.1
8:2 fluorotelomersulfonic acid [C10]	8:2 FTS	--	--	<1.6	60.1	<83.0	<6.5	<3.3	<3.2	<1.6
Sulfonamides, Sulfomidoacetic acids, Sulfonamidoethanols (ng/L)										
Perfluorooctanesulfonamide [C8]	FOSA	*2*	**20**	<0.48	*3.9*	<24.4	<1.9	<0.96	<0.94	*6.5*
N-Methylperfluorooctanesulfonamide [C9] (*Fluorad FX 12*)	NMeFOSA	--	--	<0.48	<0.47	<24.6	<1.9	<0.97	<0.95	<0.48
N-Ethylperfluorooctanesulfonamide [C10] *(Alstar, Finitron, Fluramin, FX 12, Mirex S, Sulfluramid, Volcano)*	NEtFOSA	*2*	**20**	<0.49	<0.49	<25.3	<2.0	<0.99	<0.97	<0.49
N-Methylperfluorooctanesulfonamidoacetic acid [C11]	NMeFOSAA	--	--	<0.49	<0.48	<25.0	<1.9	<0.98	<0.96	<0.48
N-Ethylperfluorooctanesulfonamidoacetic acid [C12]	NEtFOSAA	*2*	**20**	<0.65	<0.64	<33.2	<2.6	<1.3	<1.3	<0.64
N-Methylperfluorooctanesulfonamidoethanol [C11]	NMeFOSE	--	--	<4.0	<4.0	<206	<16.0	<8.1	<7.9	<4.0
N-Ethylperfluorooctanesulfonamidoethanol [C12] (*FC-10, Fluorad FC 10*)	NEtFOSE	*2*	**20**	<4.0	<4.0	<206	<16.1	<8.1	<7.9	<4.0
Replacement Chemicals (ng/L)										
Hexafluoropropylene oxide dimer acid [C6] (*FRD-903, GenX*)	HFPO-DA	*30*	**300**	<1.7	<1.7	<89.5	<7.0	<3.5	<3.4	<1.7
4,8-dioxa-3H-perfluorononanoic acid [C7]	ADONA	*600*	**3,000**	<1.8	<1.8	<94.0	<7.3	<3.7	<3.6	<1.8
9-chlorohexadecafluoro-3-oxanonane-1-sulfonic acid [C8]	9Cl-PF3ONS	--	--	<1.6	<1.6	<84.5	<6.6	<3.3	<3.3	<1.6
11-chloroeicosafluoro-3-oxaundecane-1-sulfonic acid [C10]	11Cl-PF3OUdS	--	--	<1.9	<1.9	<97.0	<7.5	<3.8	<3.7	<1.9
Nonafluoro-3,6-dioxaheptanoic acid	NFDHA	--	--	<1.3	<1.3	<65.5	<5.1	<2.6	<2.5	<1.3
Perfluoro-3-methoxypropanoic acid	PFMPA	--	--	<0.60	<0.60	<31.1	<2.4	<1.2	2.4 J	1.9 J
Perfluoro-4-methoxybutanoic acid	PFMBA	--	--	<0.75	<0.75	<38.8	<3.0	<1.5	1.6 J	0.84 J
Perfluoro(2-ethoxyethane)sulfonic acid	PFEESA	--	--	<0.67	<0.67	<34.6	<2.7	<1.4	<1.3	0.72 J

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PFAS = perfluoroalkyl and polyfluoroalkyl substances
NT = Parameter not analyzed
-- = Standard not established
< = Less than laboratory method detection limit (MDL)
BOLD = Sample result exceeds the ch. NR 140 ES
Italics = Sample result exceeds the ch. NR 140 PAL
Italics /**BOLD** = Sample result exceeds the ch. NR 140 PAL and the ch. NR 140 ES
J = Estimated concentration at or above limit of detection & limit of quantification
Green highlighted row are the compounds included in the charts in Section 4.0 of the Remedial Action Documentation Report

Sample ID	EPA Acronym	Preventative Action Limit (PAL)*	Enforcement Standard (ES)*	MW-4					Duplicate (MW-4)			
Date				4/22/2025	5/29/2025	6/5/2025	6/23/2025	8/28/2025	4/22/2025	5/29/2025	6/5/2025	6/23/2025
Notes				Clear	Clear	Clear	Cloudy	-	Clear	Clear	Clear	Cloudy
PFAS (ng/L)												
Fluorotelomer Carboxylic Acids (ng/L)												
3-Perfluoropropyl propanoic acid	3:3 FTCA	--	--	<230	<8.6	<4.4	<230	<2.1	<230	<2.2	<4.4	<257
2H,2H,3H,3H-Perfluorooctanoic acid	5:3 FTCA	--	--	<1,000	<37.5	<19.3	<1,000	<9.2	<1,000	<9.6	<19.3	<1,120
3-Perfluoroheptyl propanoic acid	7:3 FTCA	--	--	<1,190	<44.5	<22.9	<1,190	<10.9	<1,190	<11.4	<22.9	<1,330
Carboxylic Acids (ng/L)												
Perfluorobutanoic acid [C4] (FC 23, Fluorad FC 23)	PFBA	*2,000*	**10,000**	*2,440*	*2,140*	2,220	2,570	131	*2,580*	271	*2,120*	2,590
Perfluoropentanoic acid [C5]	PFPeA	--	--	10,500	9,050	9,170	10,900	19.8	10,900	594	8,890	10,900
Perfluorohexanoic acid [C6]	PFHxA	*30,000*	**150,000**	20,400	17,300	19,300	20,700	2.3	20,400	673	16,000	20,300
Perfluoroheptanoic acid [C7]	PFHpA	--	--	9,700	8,250	6,660	9,100	0.66 J	9,760	810	6,980	8,650
Perfluorooctanoic acid [C8]	PFOA	*2*	**20**	***16,300***	***17,400***	***19,000***	***20,100***	*3.8*	***17,000***	***3,400***	***19,600***	***19,100***
Perfluorononanoic acid [C9]	PFNA	*3*	**30**	***414***	***373***	***442***	***509***	<0.50	***428***	***47.4***	***458***	***475***
Perfluorodecanoic acid [C10]	PFDA	*60*	**300**	<51.7	<1.9	<1.0	<51.7	<0.47	<51.7	<0.50	<0.99	<57.7
Perfluoroundecanoic acid [C11]	PFUnA	*600*	**3,000**	<37.0	<1.4	<0.71	<37.0	<0.34	<37.0	<0.36	<0.71	<41.3
Perfluorododecanoic acid [C12]	PFDoA	*100*	**500**	<51.0	<1.9	<0.98	<51.0	<0.47	<51.0	<0.49	<0.98	<57.0
Perfluorotridecanoic acid [C13]	PFTrDA	--	--	<47.2	<1.8	<0.91	<47.2	<0.43	<47.2	<0.45	<0.91	<52.7
Perfluorotetradecanoic acid [C14]	PFTeDA	*2,000*	**10,000**	<43.1	<1.6	<0.83	<43.1	<0.40	<43.1	<0.42	<0.83	<48.1
Sulfonic Acids (ng/L)												
Perfluorobutanesulfonic acid [C4] (*FC-98*)	PFBS	*90,000*	**450,000**	5,170	4,780	3,840	4,960	0.81 J	5,460	174	4,010	4,700
Perfluoropentanesulfonic acid [C5]	PFPeS	--	--	7,600	7,050	5,710	7,420	0.47 J	7,800	348	9,100	7,470
Perfluorohexanesulfonic acid [C6]	PFHxS	*4*	**40**	***63,900***	***71,600***	***58,200***	***91,500***	*7.4*	***60,100***	***9,640***	***66,100***	***80,000***
Perfluoroheptanesulfonic acid [C7]	PFHpS	--	--	723	822	896	1,230	<0.45	759	184	808	1,110
Perfluorooctanesulfonic acid [C8] (*FC 95, Fluorad FC 95*)	PFOS	*2*	**20**	***3,540***	***1,860***	***2,570***	***2,870***	*3.6*	***3,740***	***1,230***	***2,450***	***2,460***
Perfluorononanesulfonic acid [C9]	PFNS	--	--	<49.2	<1.8	<0.95	<49.2	<0.45	<49.2	<0.47	<0.95	<54.9
Perfluorodecanesulfonic acid [C10]	PFDS	--	--	<71.7	<2.7	<1.4	<71.7	<0.66	<71.7	<0.69	<1.4	<80.0
Perfluorododecanesulfonic acid [C12]	PFDoS	--	--	<35.9	<1.3	<0.69	<35.9	<0.33	<35.9	<0.35	<0.69	<40.1
4:2 fluorotelomersulfonic acid [C6]	4:2 FTS	--	--	<167	<6.2	<3.2	<167	<1.5	<167	<1.6	<3.2	<186
6:2 fluorotelomersulfonic acid [C8]	6:2 FTS	--	--	315 J	285	292	317 J	<1.8	339 J	1,780	279	329 J
8:2 fluorotelomersulfonic acid [C10]	8:2 FTS	--	--	<173	<6.5	<3.3	<173	<1.6	<173	17.4	<3.3	<193
Sulfonamides, Sulfomidoacetic acids, Sulfonamidoethanols (ng/L)												
Perfluorooctanesulfonamide [C8]	FOSA	*2*	**20**	<50.9	<1.9	<0.98	<50.9	<0.47	<50.9	<0.49	1.3 J	<56.9
N-Methylperfluorooctanesulfonamide [C9] (*Fluorad FX 12*)	NMeFOSA	--	--	<51.4	<1.9	<8.3	<51.4	<0.47	<51.4	<0.49	<0.99	<57.3
N-Ethylperfluorooctanesulfonamide [C10] *(Alstar, Finitron, Fluramin, FX 12, Mirex S, Sulfluramid, Volcano)*	NEtFOSA	*2*	**20**	<52.7	<2.0	<1.0	<52.7	<0.48	<52.7	<0.51	<1.0	<58.8
N-Methylperfluorooctanesulfonamidoacetic acid [C11]	NMeFOSAA	--	--	<52.1	<2.0	<1.0	<52.1	<0.48	<52.1	<0.50	<1.0	<58.1
N-Ethylperfluorooctanesulfonamidoacetic acid [C12]	NEtFOSAA	*2*	**20**	<69.3	<2.6	<1.3	<69.3	<0.64	<69.3	<0.67	<1.3	<77.3
N-Methylperfluorooctanesulfonamidoethanol [C11]	NMeFOSE	--	--	<428	<16.0	<8.3	<428	<3.9	<428	<4.1	<8.2	<478
N-Ethylperfluorooctanesulfonamidoethanol [C12] (*FC-10, Fluorad FC 10*)	NEtFOSE	*2*	**20**	<430	<16.1	<8.3	<430	<4.0	<430	<4.1	<8.3	<480
Replacement Chemicals (ng/L)												
Hexafluoropropylene oxide dimer acid [C6] (*FRD-903, GenX*)	HFPO-DA	*30*	**300**	<186	<7.0	<3.6	<186	<1.7	<186	<1.8	<3.6	<208
4,8-dioxa-3H-perfluorononanoic acid [C7]	ADONA	*600*	**3,000**	<196	<7.3	<3.8	<196	<1.8	<196	<1.9	<3.8	<219
9-chlorohexadecafluoro-3-oxanonane-1-sulfonic acid [C8]	9Cl-PF3ONS	--	--	<176	<6.6	<3.4	<176	<1.6	<176	<1.7	<3.4	<197
11-chloroeicosafluoro-3-oxaundecane-1-sulfonic acid [C10]	11Cl-PF3OUdS	--	--	<202	<7.6	<3.9	<202	<1.9	<202	<1.9	<3.9	<226
Nonafluoro-3,6-dioxaheptanoic acid	NFDHA	--	--	<136	<5.1	<2.6	<136	<1.3	<136	<1.3	<2.6	<152
Perfluoro-3-methoxypropanoic acid	PFMPA	--	--	<64.8	3.3J	2.6 J	<64.8	<0.60	<64.8	<0.62	2.7 J	87.4 J
Perfluoro-4-methoxybutanoic acid	PFMBA	--	--	<80.7	3.4J	3.5 J	<80.7	<0.74	<80.7	<0.78	4.0 J	<90.1
Perfluoro(2-ethoxyethane)sulfonic acid	PFEESA	--	--	<72.1	<2.7	2.3 J	<72.1	<0.66	<72.1	<0.69	2.5 J	<80.5

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Italics /**BOLD** = Sample result exceeds the ch. NR 140 PAL and the ch. NR 140 ES
J = Estimated concentration at or above limit of detection & limit of quantification
Green highlighted row are the compounds included in the charts in Section 4.0 of the Remedial Action Documentation Report

Sample ID	EPA Acronym	Preventative Action Limit (PAL)*	Enforcement Standard (ES)*	MW-5					MW-6				
Date				4/22/2025	5/29/2025	6/5/2025	6/23/2025	8/28/2025	4/22/2025	5/29/2025	6/5/2025	6/23/2025	8/28/2025
Notes				Clear	Clear	Clear	Clear	-	Clear	NA	Black, Purged	Clear	-
PFAS (ng/L)													
Fluorotelomer Carboxylic Acids (ng/L)													
3-Perfluoropropyl propanoic acid	3:3 FTCA	--	--	<22.5	<2.2	<2.2	<2.2	5.6 J	<230	NT	<108	38.6	<8.2
2H,2H,3H,3H-Perfluorooctanoic acid	5:3 FTCA	--	--	<97.9	<9.4	<9.5	<9.4	12.5 J	<1,000	NT	<471	166	<35.7
3-Perfluoroheptyl propanoic acid	7:3 FTCA	--	--	<116	<11.2	<11.3	<11.2	<10.8	<1,190	NT	<559	49.3	<42.3
Carboxylic Acids (ng/L)													
Perfluorobutanoic acid [C4] (FC 23, Fluorad FC 23)	PFBA	*2,000*	**10,000**	275	273	309	400	403	*4,350*	NT	797	*2,950*	1,290
Perfluoropentanoic acid [C5]	PFPeA	--	--	569	615	699	919	979	14,800	NT	2,490	9,660	1940
Perfluorohexanoic acid [C6]	PFHxA	*30,000*	**150,000**	759	687	833	1,100	1,230	*37,000*	NT	5,610	21,600	4,410
Perfluoroheptanoic acid [C7]	PFHpA	--	--	845	799	748	1,130	866	5,430	NT	374	1,710	354
Perfluorooctanoic acid [C8]	PFOA	*2*	**20**	***4,280***	***3,520***	***3,650***	***3,650***	***4,080***	***146,000***	NT	***10,400***	***30,800***	***9,260***
Perfluorononanoic acid [C9]	PFNA	*3*	**30**	*25.6*	***49.8***	***45.1***	***46***	***119***	<54.5	NT	<25.6	*9.6*	<1.9
Perfluorodecanoic acid [C10]	PFDA	*60*	**300**	<5.1	<0.49	<0.49	<0.49	<0.47	<51.7	NT	<24.3	1.6	<1.8
Perfluoroundecanoic acid [C11]	PFUnA	*600*	**3,000**	<3.6	<0.35	<0.35	<0.35	<0.34	<37.0	NT	<17.4	1.7	<1.3
Perfluorododecanoic acid [C12]	PFDoA	*100*	**500**	<5.0	<0.48	<0.49	<0.48	<0.46	<51.0	NT	<24.0	2.1	<1.8
Perfluorotridecanoic acid [C13]	PFTrDA	--	--	<4.6	<0.44	<0.45	<0.44	<0.43	<47.2	NT	<22.2	2.2	<1.7
Perfluorotetradecanoic acid [C14]	PFTeDA	*2,000*	**10,000**	<4.2	<0.41	<0.41	<0.41	<0.39	<43.1	NT	<20.3	2.6	<1.5
Sulfonic Acids (ng/L)													
Perfluorobutanesulfonic acid [C4] (*FC-98*)	PFBS	*90,000*	**450,000**	190	179	192	218	192	7,630	NT	1,050	4,850	707
Perfluoropentanesulfonic acid [C5]	PFPeS	--	--	217	430	363	438	262	4,170	NT	444	2,180	444
Perfluorohexanesulfonic acid [C6]	PFHxS	*4*	**40**	***8,780***	***14,300***	***7,480***	***9,180***	***10,500***	***74,900***	NT	***5,340***	***22,000***	***5,780***
Perfluoroheptanesulfonic acid [C7]	PFHpS	--	--	175	182	192	210	326	187	NT	<22.8	32.2	2.8 J
Perfluorooctanesulfonic acid [C8] (*FC 95, Fluorad FC 95*)	PFOS	*2*	**20**	***420***	***1,160***	***1,090***	***1,400***	***3,810***	***73.7 J***	NT	<19.3	***144***	*2.5 J*
Perfluorononanesulfonic acid [C9]	PFNS	--	--	<4.8	<0.46	<0.47	<0.46	<0.45	<49.2	NT	<23.1	1.2 J	<1.8
Perfluorodecanesulfonic acid [C10]	PFDS	--	--	<7.0	<0.67	<0.68	<0.68	<0.65	<71.7	NT	<33.7	1.1 J	<2.6
Perfluorododecanesulfonic acid [C12]	PFDoS	--	--	<3.5	<0.34	<0.34	<0.34	<0.33	0	NT	<16.9	0.87 J	<1.3
4:2 fluorotelomersulfonic acid [C6]	4:2 FTS	--	--	<16.3	<1.6	<1.6	<1.6	<1.5	<167	NT	<78.4	21	<5.9
6:2 fluorotelomersulfonic acid [C8]	6:2 FTS	--	--	1,530	1,800	1,810	2,870	2,870	5,730	NT	272 J	1,340	260
8:2 fluorotelomersulfonic acid [C10]	8:2 FTS	--	--	<16.9	18.6	21.1	23	33.6	<173	NT	<81.4	9.1	<6.2
Sulfonamides, Sulfomidoacetic acids, Sulfonamidoethanols (ng/L)													
Perfluorooctanesulfonamide [C8]	FOSA	*2*	**20**	<5.0	<0.48	<0.48	<0.48	0.63 J	<50.9	NT	<24.0	2.3	<1.8
N-Methylperfluorooctanesulfonamide [C9] (*Fluorad FX 12*)	NMeFOSA	--	--	<5.0	<0.48	<0.49	<0.48	<0.47	<51.4	NT	<24.2	2	<1.8
N-Ethylperfluorooctanesulfonamide [C10] *(Alstar, Finitron, Fluramin, FX 12, Mirex S, Sulfluramid, Volcano)*	NEtFOSA	*2*	**20**	<5.2	<0.50	<0.50	<0.50	<0.48	<52.7	NT	<24.8	2.1	<1.9
N-Methylperfluorooctanesulfonamidoacetic acid [C11]	NMeFOSAA	--	--	<5.1	<0.49	<0.50	<0.49	<0.47	<52.1	NT	<24.5	1.8	<1.9
N-Ethylperfluorooctanesulfonamidoacetic acid [C12]	NEtFOSAA	*2*	**20**	<6.8	<0.65	<0.66	<0.65	<0.63	<69.3	NT	<32.6	1.8	<2.5
N-Methylperfluorooctanesulfonamidoethanol [C11]	NMeFOSE	--	--	<41.9	<4.0	<4.1	<4.0	<3.9	<428	NT	<201	22.2	<15.3
N-Ethylperfluorooctanesulfonamidoethanol [C12] (*FC-10, Fluorad FC 10*)	NEtFOSE	*2*	**20**	<42.1	<4.0	<4.1	<4.1	<3.9	<430	NT	<202	***33.3***	<15.3
Replacement Chemicals (ng/L)													
Hexafluoropropylene oxide dimer acid [C6] (*FRD-903, GenX*)	HFPO-DA	*30*	**300**	<18.2	<1.8	<1.8	<1.8	<1.7	*<186*	NT	<87.7	8.5	<6.6
4,8-dioxa-3H-perfluorononanoic acid [C7]	ADONA	*600*	**3,000**	<19.1	<1.8	<1.9	<1.8	<1.8	<196	NT	<92.2	8.9	<7.0
9-chlorohexadecafluoro-3-oxanonane-1-sulfonic acid [C8]	9Cl-PF3ONS	--	--	<17.2	<1.7	<1.7	<1.7	<1.6	<176	NT	<82.8	6.3	<6.3
11-chloroeicosafluoro-3-oxaundecane-1-sulfonic acid [C10]	11Cl-PF3OUdS	--	--	<19.8	<1.9	<1.9	<1.9	<1.8	<202	NT	<95.1	4.1 J	<7.2
Nonafluoro-3,6-dioxaheptanoic acid	NFDHA	--	--	<13.3	<1.3	<1.3	<1.3	<1.2	<136	NT	<64.2	9.7	<4.9
Perfluoro-3-methoxypropanoic acid	PFMPA	--	--	<6.3	<0.61	<0.62	<0.61	0.81 J	<64.8	NT	<30.5	20.8	2.9 J
Perfluoro-4-methoxybutanoic acid	PFMBA	--	--	<7.9	<0.76	<0.77	<0.76	<0.73	<80.7	NT	<38.0	40.7	3.6 J
Perfluoro(2-ethoxyethane)sulfonic acid	PFEESA	--	--	<7.0	<0.68	<0.69	<0.68	<0.66	<72.1	NT	<33.9	18.6	<2.6

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Sample ID	EPA Acronym	Preventative Action Limit (PAL)*	Enforcement Standard (ES)*	MW-7	MW-8	MW-9	MW-10	PZ-1	
Date				4/23/2025	8/28/2025	8/28/2025	8/28/2025	4/22/2025	8/28/2025
Notes				Clear	-	-	-	Clear	-
PFAS (ng/L)									
Fluorotelomer Carboxylic Acids (ng/L)									
3-Perfluoropropyl propanoic acid	3:3 FTCA	--	--	401	<2.1	<8.3	3.1 J	<113	<4.3
2H,2H,3H,3H-Perfluorooctanoic acid	5:3 FTCA	--	--	<36.5	<9.3	<36.2	<9.2	<490	<18.7
3-Perfluoroheptyl propanoic acid	7:3 FTCA	--	--	<43.2	<11.0	<42.9	<10.9	<582	<22.2
Carboxylic Acids (ng/L)									
Perfluorobutanoic acid [C4] (FC 23, Fluorad FC 23)	PFBA	*2,000*	**10,000**	*9,480*	*617*	*116*	*202*	1,530	2,200
Perfluoropentanoic acid [C5]	PFPeA	--	--	42,400	1,700	117	601	6,750	9,170
Perfluorohexanoic acid [C6]	PFHxA	*30,000*	**150,000**	*60,000*	*1,400*	*128*	*1,060*	12,200	12,800
Perfluoroheptanoic acid [C7]	PFHpA	--	--	12,900	693	25.5	445	3,520	8,060
Perfluorooctanoic acid [C8]	PFOA	*2*	**20**	***102,000***	***3,570***	***212***	***5,980***	***15,900***	***28,800***
Perfluorononanoic acid [C9]	PFNA	*3*	**30**	*29.2*	***461***	<2.0	*9.3*	***2,550***	***665***
Perfluorodecanoic acid [C10]	PFDA	*60*	**300**	<1.9	0.58 J	<1.9	0.96 J	<25.3	<0.97
Perfluoroundecanoic acid [C11]	PFUnA	*600*	**3,000**	<1.3	<0.34	<1.3	<0.34	<18.1	<0.69
Perfluorododecanoic acid [C12]	PFDoA	*100*	**500**	<1.9	<0.47	<1.8	<0.47	<25.0	<0.96
Perfluorotridecanoic acid [C13]	PFTrDA	--	--	<1.7	<0.44	<1.7	<0.43	<23.1	<0.88
Perfluorotetradecanoic acid [C14]	PFTeDA	*2,000*	**10,000**	<1.6	<0.40	<1.6	<0.40	<21.1	<0.81
Sulfonic Acids (ng/L)									
Perfluorobutanesulfonic acid [C4] (*FC-98*)	PFBS	*90,000*	**450,000**	14,100	335	17.6	584	2,630	4,040
Perfluoropentanesulfonic acid [C5]	PFPeS	--	--	9,240	793	14.5	243	2,280	7,120
Perfluorohexanesulfonic acid [C6]	PFHxS	*4*	**40**	***110,000***	***31,400***	***388***	***5,390***	***30,700***	***145,000***
Perfluoroheptanesulfonic acid [C7]	PFHpS	--	--	132	137	<1.8	182	320	930
Perfluorooctanesulfonic acid [C8] (*FC 95, Fluorad FC 95*)	PFOS	*2*	**20**	***27.8***	***2,990***	*5.5 J*	***143***	***33,900***	***6,450***
Perfluorononanesulfonic acid [C9]	PFNS	--	--	<1.8	<0.45	<1.8	<0.45	<24.1	<0.92
Perfluorodecanesulfonic acid [C10]	PFDS	--	--	<2.6	<0.66	<2.6	<0.66	<35.1	<1.3
Perfluorododecanesulfonic acid [C12]	PFDoS	--	--	<1.3	<0.33	<1.3	<0.33	<17.6	<0.67
4:2 fluorotelomersulfonic acid [C6]	4:2 FTS	--	--	125	<1.5	<6.0	<1.5	<81.6	4.4 J
6:2 fluorotelomersulfonic acid [C8]	6:2 FTS	--	--	7,780	7.4	28.9	62.9	146 J	454
8:2 fluorotelomersulfonic acid [C10]	8:2 FTS	--	--	<6.3	<1.6	<6.2	<1.6	<84.7	<3.2
Sulfonamides, Sulfomidoacetic acids, Sulfonamidoethanols (ng/L)									
Perfluorooctanesulfonamide [C8]	FOSA	*2*	**20**	<1.9	1.2 J	<1.8	3.1	<24.9	1.1 J
N-Methylperfluorooctanesulfonamide [C9] (*Fluorad FX 12*)	NMeFOSA	--	--	<1.9	<0.47	<1.9	<0.47	<25.2	<0.96
N-Ethylperfluorooctanesulfonamide [C10] *(Alstar, Finitron, Fluramin, FX 12, Mirex S, Sulfluramid, Volcano)*	NEtFOSA	*2*	**20**	<1.9	<0.49	<1.9	<0.49	<25.8	<0.99
N-Methylperfluorooctanesulfonamidoacetic acid [C11]	NMeFOSAA	--	--	<1.9	<0.48	<1.9	<0.48	<25.5	<0.98
N-Ethylperfluorooctanesulfonamidoacetic acid [C12]	NEtFOSAA	*2*	**20**	<2.5	<0.64	<2.5	<0.64	<33.9	<1.3
N-Methylperfluorooctanesulfonamidoethanol [C11]	NMeFOSE	--	--	<15.6	<4.0	<15.5	<3.9	<210	<8.0
N-Ethylperfluorooctanesulfonamidoethanol [C12] (*FC-10, Fluorad FC 10*)	NEtFOSE	*2*	**20**	<15.7	<4.0	<15.5	<4.0	<211	<8.1
Replacement Chemicals (ng/L)									
Hexafluoropropylene oxide dimer acid [C6] (*FRD-903, GenX*)	HFPO-DA	*30*	**300**	<6.8	<1.7	<6.7	<1.7	<91.3	<3.5
4,8-dioxa-3H-perfluorononanoic acid [C7]	ADONA	*600*	**3,000**	<7.1	<1.8	<7.1	<1.8	<95.9	<3.7
9-chlorohexadecafluoro-3-oxanonane-1-sulfonic acid [C8]	9Cl-PF3ONS	--	--	<6.4	<1.6	<6.4	<1.6	<86.2	<3.3
11-chloroeicosafluoro-3-oxaundecane-1-sulfonic acid [C10]	11Cl-PF3OUdS	--	--	<7.4	<1.9	<7.3	<1.9	<99.0	<3.8
Nonafluoro-3,6-dioxaheptanoic acid	NFDHA	--	--	<5.0	<1.3	<4.9	<1.3	<66.8	<2.6
Perfluoro-3-methoxypropanoic acid	PFMPA	--	--	51.7	1.6 J	<2.3	0.68 J	<31.7	4.1 J
Perfluoro-4-methoxybutanoic acid	PFMBA	--	--	62	<0.75	<2.9	<0.74	<39.5	3.0 J
Perfluoro(2-ethoxyethane)sulfonic acid	PFEESA	--	--	12.3	<0.67	<2.6	<0.66	<35.3	2.9 J

* = Source: Wisconsin Department of Natural Resources (WDNR) PFAS List - 1.1.21. The Enforcement Standard (ES) and Preventive Action Limit (PAL) listed in this table have been recommended by the Wisconsin Department of Health Services to the WDNR. The WDNR is in the rule making process to include these values into ch. NR 140 Wisconsin Administrative Code.

PFAS = perfluoroalkyl and polyfluoroalkyl substances
NT = Parameter not analyzed
-- = Standard not established
< = Less than laboratory method detection limit (MDL)
BOLD = Sample result exceeds the ch. NR 140 ES
Italics = Sample result exceeds the ch. NR 140 PAL
Italics /**BOLD** = Sample result exceeds the ch. NR 140 PAL and the ch. NR 140 ES
J = Estimated concentration at or above limit of detection & limit of quantification
Green highlighted row are the compounds included in the charts in Section 4.0 of the Remedial Action Documentation Report

Table A.1.b

Groundwater Analytical Results – Fluoride

Table A.1.b
Groundwater Analytical Results - Flouride

ORIN Dane County Airport
4000 International Lane Madison, Wisconsin 53704

Sample ID	Preventative Action Limit (PAL)	Enforcement Standard (ES)	MW-3					MW-4					Duplicate				
Date			4/22/2025	5/29/2025	6/5/2025	6/23/2025	8/18/2025	4/22/2025	5/29/2025	6/5/2025	6/23/2025	8/18/2025	4/22/2025	5/29/2025	6/5/2025	6/23/2025	8/18/2025
Notes			Clear	Clear	Cloudy	Clear	--	Clear	Clear	Clear	Cloudy	--	Clear	Clear	Clear	Cloudy	--
Fluoride (mg/L)																	
Fluoride	*0.8*	**4.0**	0.10	NT	0.12	0.12	0.12	0.090	NT	0.12	0.11	0.13	0.087	NT	0.11	0.11	0.12

NT = Parameter not analyzed
NA = Not Applicable
< = Less than laboratory method detection limit (MDL)
BOLD = Sample result exceeds the ch. NR 140 ES
Italics = Sample result exceeds the ch. NR 140 PAL
Italics /**BOLD** = Sample result exceeds the ch. NR 140 PAL and the ch. NR 140 ES
J = Estimated concentration at or above limit of detection & limit of quantification

Table A.1.b
Groundwater Analytical Results - Flouride

ORIN Dane County Airport
4000 International Lane Madison, Wisconsin 53704

Sample ID	Preventative Action Limit (PAL)	Enforcement Standard (ES)	MW-5					MW-6				
Date			4/22/2025	5/29/2025	6/5/2025	6/23/2025	8/18/2025	4/22/2025	5/29/2025	6/5/2025	6/23/2025	8/18/2025
Notes			Clear	Clear	Clear	Clear	--	Clear	NA	Black, Purged	Clear	--
Fluoride (mg/L)												
Fluoride	*0.8*	**4.0**	0.13	NT	0.13	0.13	0.13	0.12	NT	0.15	0.11	0.080 J

NT = Parameter not analyzed
NA = Not Applicable
< = Less than laboratory method detection limit (MDL)
BOLD = Sample result exceeds the ch. NR 140 ES
Italics = Sample result exceeds the ch. NR 140 PAL
Italics /**BOLD** = Sample result exceeds the ch. NR 140 PAL and the ch. NR 140 ES
J = Estimated concentration at or above limit of detection & limit of quantification

Table A.1.c

Groundwater Analytical Results - Microbial Assay

Table A.1.c
Groundwater Analytical Results - Microbial Assay

ORIN Dane County Airport
4000 International Lane Madison, Wisconsin 53704

Sample ID	MW-3			MW-4			MW-5		
Date	4/22/2025	6/5/2025	8/18/2025	4/22/2025	6/5/2025	8/18/2025	4/22/2025	6/5/2025	8/18/2025
Notes	Clear	Cloudy	--	Clear	Clear	--	Clear	Clear	--
Phylum (Percent)									
Proteobacteria	40.6%	38.5%	34.5%	48.1%	63.4%	57.4%	35.6%	28.3%	32.2%
Parcubacteria	31.0%	35.3%	31.0%	17.6%	10.7%	20.1%	6.8%	10.6%	12.0%
Acidobacteria	2.8%	3.0%	2.3%	5.9%	3.8%	4.2%	10.1%	7.9%	6.3%
Bacteroidetes	5.6%	4.3%	9.6%	4.5%	3.0%	2.7%	5.6%	6.6%	8.1%
Firmicutes	2.7%	2.2%	1.8%	4.4%	2.5%	4.4%	15.7%	6.2%	5.5%
Actinobacteria	1.4%	1.6%	3.4%	3.1%	5.0%	1.6%	2.8%	5.7%	2.8%
Chloroflexi	1.0%	0.8%	0.6%	2.8%	1.7%	1.4%	0.9%	1.0%	0.7%
Planctomycetes	0.9%	0.3%	1.6%	2.2%	2.0%	1.1%	2.2%	4.6%	5.8%
Ignavibacteriae	0.5%	0.6%	NA	2.2%	0.7%	1.5%	NA	NA	NA
Armatimonadetes	1.3%	0.8%	0.3%	1.2%	0.7%	1.4%	0.8%	0.5%	0.6%
Chlamydiae	NA	NA	0.9%	1.1%	0.6%	0.3%	NA	0.4%	0.4%
Nitrospirae	0.6%	0.5%	NA	1.0%	0.8%	0.4%	2.1%	2.9%	2.5%
Microgenomates	0.2%	NA	0.3%	0.9%	0.3%	0.2%	NA	NA	0.5%
Euryarchaeota	1.4%	1.0%	NA	0.8%	0.3%	0.2%	NA	NA	NA
Elusimicrobia	0.3%	0.4%	0.4%	0.7%	0.4%	0.8%	NA	NA	NA
Verrucomicrobia	1.9%	1.6%	5.4%	0.7%	1.4%	0.6%	4.2%	9.0%	9.9%
Tenericutes	NA	NA	NA	0.6%	NA	0.2%	NA	NA	NA
Lentisphaerae	0.5%	0.5%	NA	NA	NA	NA	NA	NA	NA
Omnitrophica	4.8%	6.0%	0.4%	NA	NA	NA	NA	0.3%	NA
Spirochaetes	1.2%	0.6%	0.4%	NA	NA	NA	NA	NA	0.2%
Thermodesulfobacteria	NA	NA	NA	NA	NA	NA	6.6%	11.1%	8.6%
Gemmatimonadetes	NA	NA	NA	NA	NA	NA	3.0%	0.7%	0.7%
Nitrospirae	NA	NA	NA	NA	NA	NA	2.1%	NA	NA
Candidatus Saccharibacteria	NA	NA	4.4%	NA	0.9%	NA	0.7%	1.0%	1.2%
Cyanobacteria/Chloroplast	NA	NA	0.3%	NA	NA	NA	0.3%	0.4%	NA
DeinococcusUnclassifiedThermus	NA	0.5%	NA	NA	NA	NA	0.3%	NA	0.3%
Thaumarchaeota	NA	NA	NA	NA	NA	NA	0.3%	NA	NA
candidate division WPSUnclassified1	NA	NA	0.5%	NA	0.3%	NA	NA	NA	NA

NA = Phylum not within the top phyla present in sample

APPENDIX A

PFAS SAMPLING INFORMATION

Pace Analytical®
ENVIRONMENTAL SCIENCES

ENVIRONMENT

SPECIALTY SERVICES

PFAS FIELD SAMPLING GUIDE

Per- and Polyfluoroalkyl Substances (PFAS) are found in a variety of sources, including equipment typically used to collect soil, groundwater, surface water, sediment, and drinking water samples. Due to this concern, as well as the need for very low reporting limits, special handling and care must be taken when collecting samples.

To avoid PFAS sample contamination, Pace Analytical® has developed this Guide of recommendations for collecting PFAS samples for testing and analysis.

BEST PRACTICES FOR PFAS SAMPLE COLLECTION

- Wash hands and use new nitrile gloves for each sample collected
- Groundwater, surface water, or drinking water samples should not be filtered as the glass fiber on the filter can potentially absorb PFAS
- Collect the PFAS sample first, prior to collecting samples for any other parameters into any other containers. This avoids contact with any other type of sample container, bottles or package materials
- Do not place the sample bottle cap on any surface when collecting the sample, and avoid all contact with the inside of the sample bottle or its cap
- When the labeled sample is collected, place the samples in an individual sealed plastic bag separate from all other sample parameter bottles
- Samples must be chilled during shipment and should arrive at the lab at <6 C +/-2

FIELD QUALITY CONTROL

Field QC is important since many items typically taken to the field contain PFAS and laboratories report to single digit ppt or ng/L levels. The use of Field Reagent Blanks (FRB) (synonymous with Field Blanks) is written into EPA 537.1 and 533 as a means to verify that PFAS contamination of samples was not caused by the field sampling activity. FRBs include a container filled with PFAS-free water and an empty container. An FRB is collected by pouring the PFAS-free water into the empty container at the time a sample is collected in the field. The FRB is processed in the laboratory in the same manner as a field sample.

The use of PFAS-free rinsate water is recommended after cleaning any required sampling equipment (before and after sampling) for matrices such as soil. Collection of the rinsate water as an Equipment Blank (EB) and submittal to the laboratory for analysis is recommended to verify that sampling equipment did not cause contamination of samples.

Some states have issued sampling standard operating procedures that also stipulate the use of Trip Blanks (TBs) for PFAS projects.

FIELD SAMPLING GUIDE

MATRIX	CONTAINER	PRESERVATIVE	METHOD	NOTES
Drinking Water	2 x 250 ml HDPE or PP	Trizma	EPA Method 537 or EPA Method 537M	Trizma is a buffer and removes free chlorine.
Groundwater, surface water, waters	2 x 250 ml HDPE or PP	none	EPA Method 537M	
Effluent	2 x 250 ml HDPE or PP	Trizma	EPA Method 537M	Finished samples may require Trizma.
Soil, sediment, bio-solids	1 x 250 ml (or 4 ounce) HDPE or PP	none	EPA Method 537M	

Sample extraction = 14 days. Sample analysis = 28 days.

DO USE

DO NOT USE

Sample Container Items

- HDPE or Polypropylene (PP)
- Lined or unlined HDPE or polypropylene caps

- Glass or LDPE container
- Teflon™-lined cap

Field Equipment

- High density polyethylene (HDPE) or polypropylene materials
- Silicon tubing
- Loose paper (non-water resistant)
- Aluminum field clipboards or Masonite
- Sharpies, pens
- Regular Ice

- Teflon™ containing materials
- Teflon™ tubing
- Waterproof field books
- Plastic clipboards, binders, or spiral notebooks
- Post-It Notes
- Chemical (blue) ice packs

Field Clothing and Personal Protection Equipment

- Well-laundered clothing, defined as clothing that has been washed six or more times after purchase, made of synthetic or natural fibers. Cotton clothing preferred.
- No fabric softener
- Boots made with polyurethane and polyvinyl chloride (PVC)
- Sunscreen that is all natural and/or organic
- Insect repellents that is all natural and/or organic

- New clothing or water resistant, waterproof, or stain-treated clothing; no clothing containing Gore-Tex™
- Clothing laundered using fabric softener
- Tyvek®
- Boots containing Gore-Tex™
- Cosmetics, moisturizers, hand cream or related products as part of personal hygiene and/or showering routine the day of sampling

Field Equipment Decontamination Items

- Alconox® and/or Liquinox®

- Decon 90

Food Items

- Bottled water and hydration drinks (i.e. Gatorade® and Powerade®) to be brought and consumed only in the staging area

- Food and drink other than the exceptions listed at left.

Field Sampling Guidance & SOPs

Click here for a list of state and other organization issued SOPs.

APPENDIX B

LABORATORY ANALYTICAL REPORTS

Pace Analytical Services, LLC
1241 Bellevue Street - Suite 9
Green Bay, WI 54302
(920)469-2436

December 10, 2025

Matt Dahlem
Fehr Graham Engineering and Environmental
909 N. 8th Street
Suite 101
Sheboygan, WI 53081

RE: Project: 24-1675 Dane Co Airport 3-mo.
Pace Project No.: 40300331

Dear Matt Dahlem:

Enclosed are the analytical results for sample(s) received by the laboratory on August 19, 2025. The results relate only to the samples included in this report. Results reported herein conform to the applicable TNI/NELAC Standards and the laboratory's Quality Manual, where applicable, unless otherwise noted in the body of the report.

Some analyses were subcontracted outside of the Pace Network. The test report from the external subcontractor is attached to this report in its entirety.

The test results provided in this final report were generated by each of the following laboratories within the Pace Network:

- Pace Analytical Services - Green Bay

If you have any questions concerning this report, please feel free to contact me.

Sincerely,

Christopher Hyska

Christopher Hyska
christopher.hyska@pacelabs.com
(920)469-2436
Project Manager

Enclosures
cc:

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Pace Analytical Services, LLC
1241 Bellevue Street - Suite 9
Green Bay, WI 54302
(920)469-2436

CERTIFICATIONS

Project: 24-1675 Dane Co Airport 3-mo.
Pace Project No.: 40300331

Pace Analytical Services Green Bay

1241 Bellevue Street, Green Bay, WI 54302
Florida DOH Certification # E87948
Illinois EPA Certification # 200050
ISO/IEC 17025 (A2LA) Certification # 6154.01
Kentucky UST DEP Certification # 123059
Louisiana DEQ Certification # 04168
Minnesota DOH Certification # 055-999-334
New York DOH Certification # 12064
North Dakota DEQ Certification # R-150
ISO/IEC 17025 (A2LA) Certification # 6154.01
South Carolina DES Certification # 83006001
Texas TCEQ Certification # T104704529
USDA APHIS Foreign Soil Permit # 525-24-3-36355
U.S. Fish & Wildlife Service Permit # 51774A
Virginia VELAP Certification # 460263
Wisconsin DATCP Certification # 444
Wisconsin DNR Certification # 405132750

REPORT OF LABORATORY ANALYSIS

Date: 12/10/2025 10:31 AM

Pace Analytical Services, LLC
1241 Bellevue Street - Suite 9
Green Bay, WI 54302
(920)469-2436

SAMPLE SUMMARY

Project: 24-1675 Dane Co Airport 3-mo.
Pace Project No.: 40300331

Lab ID	Sample ID	Matrix	Date Collected	Date Received
40300331001	**MW-3**	Water	08/18/25 13:10	08/19/25 10:15
40300331002	**MW-4**	Water	08/18/25 10:55	08/19/25 10:15
40300331003	**MW-5**	Water	08/18/25 09:35	08/19/25 10:15
40300331004	**MW-6**	Water	08/18/25 13:40	08/19/25 10:15
40300331005	**DUPLICATE**	Water	08/18/25 09:45	08/19/25 10:15
40300331006	**Field Blank**	Water	08/18/25 09:15	08/19/25 10:15
40300331007	**Equipment Blank**	Water	08/18/25 11:45	08/19/25 10:15
40300331008	**Trip**	Water	08/18/25 09:00	08/19/25 10:15

Pace Analytical Services, LLC
1241 Bellevue Street - Suite 9
Green Bay, WI 54302
(920)469-2436

SAMPLE ANALYTE COUNT

Project: 24-1675 Dane Co Airport 3-mo.
Pace Project No.: 40300331

Lab ID	Sample ID	Method	Analysts	Analytes Reported	Laboratory
40300331001	**MW-3**	SM 4500F/C	DAW	1	PASI-G
40300331002	**MW-4**	SM 4500F/C	DAW	1	PASI-G
40300331003	**MW-5**	SM 4500F/C	DAW	1	PASI-G
40300331004	**MW-6**	SM 4500F/C	DAW	1	PASI-G
40300331005	**DUPLICATE**	SM 4500F/C	DAW	1	PASI-G

PASI-G = Pace Analytical Services - Green Bay

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
1241 Bellevue Street - Suite 9
Green Bay, WI 54302
(920)469-2436

SUMMARY OF DETECTION

Project: 24-1675 Dane Co Airport 3-mo.
Pace Project No.: 40300331

Lab Sample ID / Method	Client Sample ID / Parameters	Result	Units	Report Limit	Analyzed	Qualifiers
40300331001	**MW-3**					
SM 4500F/C	Fluoride	0.12	mg/L	0.10	08/27/25 10:11	
40300331002	**MW-4**					
SM 4500F/C	Fluoride	0.13	mg/L	0.10	08/27/25 10:13	
40300331003	**MW-5**					
SM 4500F/C	Fluoride	0.13	mg/L	0.10	08/27/25 10:16	
40300331004	**MW-6**					
SM 4500F/C	Fluoride	0.080J	mg/L	0.10	08/27/25 10:18	
40300331005	**DUPLICATE**					
SM 4500F/C	Fluoride	0.12	mg/L	0.10	08/27/25 10:19	

REPORT OF LABORATORY ANALYSIS

Date: 12/10/2025 10:31 AM

Pace Analytical Services, LLC
1241 Bellevue Street - Suite 9
Green Bay, WI 54302
(920)469-2436

ANALYTICAL RESULTS

Project: 24-1675 Dane Co Airport 3-mo.
Pace Project No.: 40300331

Sample: MW-3 **Lab ID: 40300331001** Collected: 08/18/25 13:10 Received: 08/19/25 10:15 Matrix: Water

Parameters	Results	Units	LOQ	LOD	DF	Prepared	Analyzed	CAS No.	Qual
4500FC Fluoride	Analytical Method: SM 4500F/C Pace Analytical Services - Green Bay								
Fluoride	**0.12**	mg/L	0.10	0.019	1		08/27/25 10:11	16984-48-8	

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REPORT OF LABORATORY ANALYSIS

Date: 12/10/2025 10:31 AM

Pace Analytical Services, LLC
1241 Bellevue Street - Suite 9
Green Bay, WI 54302
(920)469-2436

ANALYTICAL RESULTS

Project: 24-1675 Dane Co Airport 3-mo.
Pace Project No.: 40300331

Sample: MW-4 **Lab ID: 40300331002** Collected: 08/18/25 10:55 Received: 08/19/25 10:15 Matrix: Water

Parameters	Results	Units	LOQ	LOD	DF	Prepared	Analyzed	CAS No.	Qual
4500FC Fluoride	Analytical Method: SM 4500F/C Pace Analytical Services - Green Bay								
Fluoride	**0.13**	mg/L	0.10	0.019	1		08/27/25 10:13	16984-48-8	

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REPORT OF LABORATORY ANALYSIS

Date: 12/10/2025 10:31 AM

Pace Analytical Services, LLC
1241 Bellevue Street - Suite 9
Green Bay, WI 54302
(920)469-2436

ANALYTICAL RESULTS

Project: 24-1675 Dane Co Airport 3-mo.
Pace Project No.: 40300331

Sample: MW-5 **Lab ID: 40300331003** Collected: 08/18/25 09:35 Received: 08/19/25 10:15 Matrix: Water

Parameters	Results	Units	LOQ	LOD	DF	Prepared	Analyzed	CAS No.	Qual
4500FC Fluoride	Analytical Method: SM 4500F/C Pace Analytical Services - Green Bay								
Fluoride	**0.13**	mg/L	0.10	0.019	1		08/27/25 10:16	16984-48-8	

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REPORT OF LABORATORY ANALYSIS

Date: 12/10/2025 10:31 AM

Pace Analytical Services, LLC
1241 Bellevue Street - Suite 9
Green Bay, WI 54302
(920)469-2436

ANALYTICAL RESULTS

Project: 24-1675 Dane Co Airport 3-mo.
Pace Project No.: 40300331

Sample: MW-6 **Lab ID: 40300331004** Collected: 08/18/25 13:40 Received: 08/19/25 10:15 Matrix: Water

Parameters	Results	Units	LOQ	LOD	DF	Prepared	Analyzed	CAS No.	Qual
4500FC Fluoride	Analytical Method: SM 4500F/C Pace Analytical Services - Green Bay								
Fluoride	**0.080J**	mg/L	0.10	0.019	1		08/27/25 10:18	16984-48-8	

5

REPORT OF LABORATORY ANALYSIS

Date: 12/10/2025 10:31 AM

Pace Analytical Services, LLC
1241 Bellevue Street - Suite 9
Green Bay, WI 54302
(920)469-2436

ANALYTICAL RESULTS

Project: 24-1675 Dane Co Airport 3-mo.
Pace Project No.: 40300331

Sample: DUPLICATE **Lab ID: 40300331005** Collected: 08/18/25 09:45 Received: 08/19/25 10:15 Matrix: Water

Parameters	Results	Units	LOQ	LOD	DF	Prepared	Analyzed	CAS No.	Qual
4500FC Fluoride	Analytical Method: SM 4500F/C Pace Analytical Services - Green Bay								
Fluoride	**0.12**	mg/L	0.10	0.019	1		08/27/25 10:19	16984-48-8	

5

REPORT OF LABORATORY ANALYSIS

Date: 12/10/2025 10:31 AM

Pace Analytical Services, LLC
1241 Bellevue Street - Suite 9
Green Bay, WI 54302
(920)469-2436

QUALITY CONTROL DATA

Project: 24-1675 Dane Co Airport 3-mo.
Pace Project No.: 40300331

QC Batch: 514452
QC Batch Method: SM 4500F/C
Analysis Method: SM 4500F/C
Analysis Description: SM4500FC Fluoride Water
Laboratory: Pace Analytical Services - Green Bay

Associated Lab Samples: 40300331001, 40300331002, 40300331003, 40300331004, 40300331005

METHOD BLANK: 2936026 Matrix: Water

Associated Lab Samples: 40300331001, 40300331002, 40300331003, 40300331004, 40300331005

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Fluoride	mg/L	<0.019	0.10	08/27/25 10:09	

LABORATORY CONTROL SAMPLE: 2936027

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Fluoride	mg/L	2	2.0	101	90-110	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 2936028 2936029

Parameter	Units	40300331002 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qualifiers
Fluoride	mg/L	0.13	2	2	2.2	2.2	103	104	90-110	0	20	

Results presented on this page are in the units indicated by the "Units" column except where an alternate unit is presented to the right of the result.

REPORT OF LABORATORY ANALYSIS

Date: 12/10/2025 10:31 AM

Pace Analytical Services, LLC
1241 Bellevue Street - Suite 9
Green Bay, WI 54302
(920)469-2436

QUALIFIERS

Project: 24-1675 Dane Co Airport 3-mo.
Pace Project No.: 40300331

DEFINITIONS

DF - Dilution Factor, if reported, represents the factor applied to the reported data due to dilution of the sample aliquot.

ND - Not Detected at or above LOD.

J - The reported result is an estimated value.

LOD - Limit of Detection adjusted for dilution factor, percent moisture, initial weight and final volume.

LOQ - Limit of Quantitation adjusted for dilution factor, percent moisture, initial weight and final volume.

DL - Adjusted Method Detection Limit.

S - Surrogate

1,2-Diphenylhydrazine decomposes to and cannot be separated from Azobenzene using Method 8270. The result for each analyte is a combined concentration.

Consistent with EPA guidelines, unrounded data are displayed and have been used to calculate % recovery and RPD values.

LCS(D) - Laboratory Control Sample (Duplicate)

MS(D) - Matrix Spike (Duplicate)

DUP - Sample Duplicate

RPD - Relative Percent Difference

NC - Not Calculable.

SG - Silica Gel - Clean-Up

U - Analyte was not detected and is reported as less than the LOD or as defined by the customer.

N-Nitrosodiphenylamine decomposes and cannot be separated from Diphenylamine using Method 8270. The result reported for each analyte is a combined concentration.

Pace Analytical is TNI accredited. Contact your Pace PM for the current list of accredited analytes.

TNI - The NELAC Institute.

Pace Analytical Services, LLC
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(920)469-2436

QUALITY CONTROL DATA CROSS REFERENCE TABLE

Project: 24-1675 Dane Co Airport 3-mo.
Pace Project No.: 40300331

Lab ID	Sample ID	QC Batch Method	QC Batch	Analytical Method	Analytical Batch
40300331001	**MW-3**	SM 4500F/C	514452		
40300331002	**MW-4**	SM 4500F/C	514452		
40300331003	**MW-5**	SM 4500F/C	514452		
40300331004	**MW-6**	SM 4500F/C	514452		
40300331005	**DUPLICATE**	SM 4500F/C	514452		

8

Pace® Location Requested (City/State):
Pace Analytical Green Bay
1241 Bellevue Street, Suite 9
Green Bay, WI 54302

CHAIN-OF-CUSTODY Analytical Request Document

Chain-of-Custody is a LEGAL DOCUMENT - Complete all relevant fields

LAB USE ONLY- Affix Workorder/Login Label Here

40300331

Scan QR Code for instructions

Company Name:	Fehr Graham_WI	Contact/Report To:	Matt Dahlem
Street Address:	909 N. 8th Street Suite 101 Sheboygan, WI 53081	Phone #:	920-892-2444
		E-Mail:	mdahlem@fehr-graham.com
		Cc E-Mail:	jmirtield@orinrt.com dplumeau@fehrgraham.com
Customer Project #:	24-1675	Invoice To:	Accounts Payable
Project Name:	Dane Co Airport 3-month	Invoice E-Mail:	ap@fehr-graham.com
Site Collection Info/Facility ID (as applicable):	Dane County Airport ORZN	Purchase Order # (if applicable):	
		Quote #:	
Time Zone Collected:	[ ] AK [ ] PT [ ] MT [X] CT [ ] ET	County / State origin of sample(s):	Wisconsin
Data Deliverables:	[ ] Level II [ ] Level III [ ] Level IV [ ] EQUIS [ ] Other	Regulatory Program (DW, RCRA, etc.) as applicable:	Reportable [ ] Yes [ ] No
		Rush (Pre-approval required):	[ ] Same Day [ ] 1 Day [ ] 2 Day [ ] 3 Day [ ] Other _____
		Date Results Requested:	Standard
		DW PWSID # or WW Permit # as applicable:	
		Field Filtered (if applicable):	[ ] Yes [ ] No
		Analysis:	

Specify Container Size **: 2 3

Identify Container Preservative Type***: 1 1

Analysis Requested

**Container Size: (1) 1L, (2) 500mL, (3) 250mL, (4) 125mL, (5) 100mL, (6) 40mL vial, (7) EnCore, (8) TerraCore, (9) 90mL, (10) Other

*** Preservative Types: (1) None, (2) HNO3, (3) H2SO4, (4) HCl, (5) NaOH, (6) Zn Acetate, (7) NaHSO4, (8) Sod. Thiosulfate, (9) Ascorbic Acid, (10) MeOH, (11) Other

Lab Use Only

Proj. Mgr: Christopher Hyska
AcctNum / Client ID:
Table #:
Profile / Template: 4096
Prelog / Bottle Ord. ID: EZ 3267480

* Matrix Codes (Insert in Matrix box below): Drinking Water (DW), Ground Water (GW), Waste Water (WW), Product (P), Soil/Solid (SS), Oil (OL), Wipe (WP), Tissue (TS), Bioassay (B), Vapor (V), Surface Water (SW), Sediment (SED), Sludge (SL), Caulk (CK), Leachate (LL), Biosolid (BS), Other (OT)

Customer Sample ID	Matrix *	Comp / Grab	Composite Start Date	Composite Start Time	Collected or Composite End Date	Collected or Composite End Time	# Cont.	Res. Chlorine Results	Res. Chlorine Units	1633 PFAS	4500FC Fluoride	Sample Comment	Preservation non-conformance identified for sample.
mw-3	WT	G			8/18/25	1310	3			X	X	001	
mw-4	WT	G			8/18/25	1055	3	PS		X	X	1055 PS sample no 002	
mw-5	WT	G			8/18/25	935	3			X	X	003	
mw-6	WT	G	PS		8/18/25	1340	3			X	X	004	
Duplicate	WT	G			8/18/25	915	3			X	X	005	
MS	WT	G			8/18/25	1100	2			X	X	mw-4 002	
MSD	WT	G			8/18/25	1105	2			X	X	mw-4 002	
Field Blank	WT				8/18/25	0915	1					006	
Equipment Blank	WT				8/18/25	1145	1					007	
Trip	WT				8/18/25	0900	1					008	

Additional Instructions from Pace®: Pam 8-19-25 Field Blank, Equipment blank & Trip blank in cooler added to COC by Pace

Collected By: (Printed Name) Philip Simenton

Signature: Philip Simenton

Customer Remarks / Special Conditions / Possible Hazards:

# Coolers:	Thermometer ID:	Correction Factor (°C):	Obs. Temp. (°C)	Corrected Temp. (°C)	On Ice:
1	L18	+0.5	-0.5	0.0	Y

Relinquished by/Company: (Signature)	Date/Time:	Received by/Company: (Signature)	Date/Time:
Philip Simenton	8/18/25 1520		
Fed Ex	8-19-25 1015		

Tracking Number: 4050 6347 2534

Delivered by: [ ] In-Person [ ] Courier [✓] FedEx [ ] UPS [ ] Other

Page: 1 of 1

Submitting a sample via this chain of custody constitutes acknowledgment and acceptance of the Pace® Terms and Conditions found at https://www.pacelabs.com/resource-library/resource/pace-terms-and-conditions/

ENV-FRM-CORQ-0019_v02_110123 ©

Client Name: Fehr Graham

Sample Preservation Receipt Form

Project # 40300331

All containers needing preservation have been checked and noted below: ☐Yes ☐No ☑N/A

Lab Lot# of pH paper:

Lab Std #ID of preservation (if pH adjusted):

Initial when completed:

Date/ Time:

	Glass							Plastic						Vials						Jars				General									
Pace Lab #	AG1U	BG1U	AG1H	AG4S	AG5U	AG2S	BG3U	BP1U	BP3U	BP3B	BP3N	BP3S	BP2Z	VG9C	DG9T	VG9U	VG9H	VG9M	VG9D	JGFU	JG9U	WGFU	WPFU	SP5T	ZPLC	GN 1	GN 2	VOA Vials (>6mm) *	H2SO4 pH ≤2	NaOH+Zn Act pH ≥9	NaOH pH ≥12	HNO3 pH ≤2	pH after adjusted	Volume (mL)
001																										1								2.5 / 5
002																										1								2.5 / 5
003																										1								2.5 / 5
004																										1								2.5 / 5
005																										1								2.5 / 5
006																																		2.5 / 5
007																																		2.5 / 5
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016																																		2.5 / 5
017																																		2.5 / 5
018																																		2.5 / 5
019																																		2.5 / 5
020																																		2.5 / 5

08-19-25

Exceptions to preservation check: VOA, Coliform, TOC, TOX, TOH, O&G, WI DRO, Phenolics, Other:

Headspace in VOA Vials (>6mm) : ☐Yes ☐No ☑N/A ***If yes look in headspace column**

AG1U	1 liter amber glass	BP1U	1 liter plastic unpres	VG9C	40 mL clear ascorbic w/ HCl	JGFU	4 oz amber jar unpres
BG1U	1 liter clear glass	BP3U	250 mL plastic unpres	DG9T	40 mL amber Na Thio	JG9U	9 oz amber jar unpres
AG1H	1 liter amber glass HCL	BP3B	250 mL plastic NaOH	VG9U	40 mL clear vial unpres	WGFU	4 oz clear jar unpres
AG4S	125 mL amber glass H2SO4	BP3N	250 mL plastic HNO3	VG9H	40 mL clear vial HCL	WPFU	4 oz plastic jar unpres
AG5U	100 mL amber glass unpres	BP3S	250 mL plastic H2SO4	VG9M	40 mL clear vial MeOH	SP5T	120 mL plastic Na Thiosulfate
AG2S	500 mL amber glass H2SO4	BP2Z	500 mL plastic NaOH + Zn	VG9D	40 mL clear vial DI	ZPLC	ziploc bag
BG3U	250 mL clear glass unpres					GN 1	500mL plastic unpres
						GN 2	

Page 1 of 2

Sample Condition Upon Receipt Form (SCUR)

Project #:

WO# : 40300331

40300331

Client Name: Fehr Graham

Courier: ☐ CS Logistics ☑ Fed Ex ☐ Speedee ☐ UPS ☐ Purple Mountain ☐ Client ☐ Pace Other:

Tracking #: 4050 6347 2534

Custody Seal on Cooler/Box Present: ☐ yes ☑ no Seals intact: ☑ yes ☐ no

Custody Seal on Samples Present: ☐ yes ☑ no Seals intact: ☐ yes ☐ no

Packing Material: ☐ Bubble Wrap ☐ Bubble Bags ☑ None ☐ Other

Thermometer Used SR - 118 **Type of Ice:** (Wet) Blue Dry None ☐ Meltwater Only

Cooler Temperature Uncorr: 0.5 /Corr: 0.0

Temp Blank Present: ☑ yes ☐ no **Biological Tissue is Frozen:** ☐ yes ☐ no

Temp should be above freezing to 6°C.
Biota Samples may be received at ≤ 0°C if shipped on Dry Ice.

Person examining contents:
Date: 8-19-25 /Initials: RAM

Labeled By Initials: EL

Chain of Custody Present:	☑Yes ☐No ☐N/A	1.
Chain of Custody Filled Out:	☑Yes ☐No ☐N/A	2.
Chain of Custody Relinquished:	☑Yes ☐No ☐N/A	3.
Sampler Name & Signature on COC:	☑Yes ☐No ☐N/A	4.
Samples Arrived within Hold Time:	☑Yes ☐No	5.
- DI VOA Samples frozen upon receipt	☐Yes ☐No	Date/Time:
Short Hold Time Analysis (<72hr):	☐Yes ☑No	6.
Rush Turn Around Time Requested:	☐Yes ☑No	7.
Sufficient Volume: For Analysis: ☑Yes ☐No MS/MSD: ☑Yes ☐No ☐N/A		8.
Correct Containers Used: Correct Type: Pace Green Bay, Pace IR, Non-Pace	☑Yes ☐No	9.
Containers Intact:	☑Yes ☐No	10.
Filtered volume received for Dissolved tests	☐Yes ☑No ☐N/A	11.
Sample Labels match COC: -Includes date/time/ID/Analysis Matrix: W	☑Yes ☐No ☐N/A	12.
Trip Blank Present:	☑Yes ☐No ☐N/A	13.
Trip Blank Custody Seals Present	☐Yes ☑No ☐N/A	
Pace Trip Blank Lot # (if purchased):		

Client Notification/ Resolution: If checked, see attached form for additional comments ☐

Person Contacted: Date/Time:

Comments/ Resolution: Field Blank, Equipment Blank & TB Blank in cooler but not on COC, added to COC Ram 8-19-25

PM Review is documented electronically in LIMs. By releasing the project, the PM acknowledges they have reviewed the sample logir

Page 2 of 2

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Web: www.microbe.com

SITE LOGIC Report

Next Generation Sequencing (NGS) Report

Contact: Chris Hyska
Phone: 920.469.2436
Address: Pace Analytical
1241 Bellevue St.
Suite 9
Green Bay, WI 54302
Email: christopher.hyska@pacelabs.com

MI Identifier: 070WH

Report Date: 09/04/2025

Project: Dane Co Airport 3-month, 24-1675
Comments:

Sample Overview

Table 1: Sample information for 070WH.

MI Identifier	Sample Name	Sample Date	Reads Passing Quality Filtering	% Reads Classified to Genus
070WH-1	MW-5	08/18/2025	11,838,925	75.4%
070WH-2	MW-4	08/18/2025	6,166,891	88.8%
070WH-3	MW-3	08/18/2025	13,021,303	89.9%

Table 2: Genus diversity indices for 070WH. Please refer to the Interpretation section for more information on what these diversity indices mean.

MI Identifier	Sample Name	Shannon	Simpson	Chao1 Predicted Genera	Total Genera Observed
070WH-1	MW-5	4.26	0.96	2171.85	1980
070WH-2	MW-4	2.24	0.69	1927.85	1750
070WH-3	MW-3	3.97	0.88	2197.01	2107

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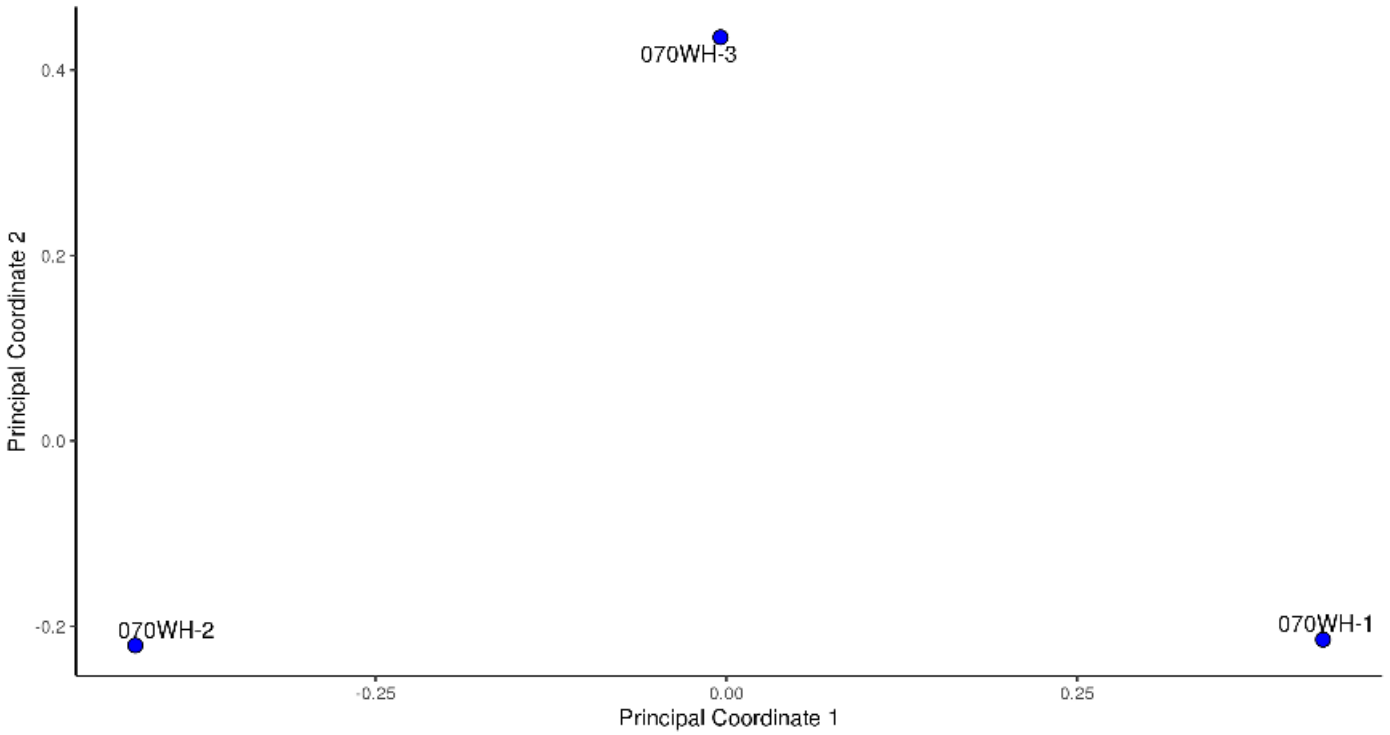

Figure 1: Principal Coordinate Analysis. This scatterplot shows a Principal Coordinate Analysis (PCoA) of the normalized relative abundance of all samples at the genus-level classifications. Increasing distance between sample points on this plot indicate increasing dissimilarity between bacterial populations in the samples.

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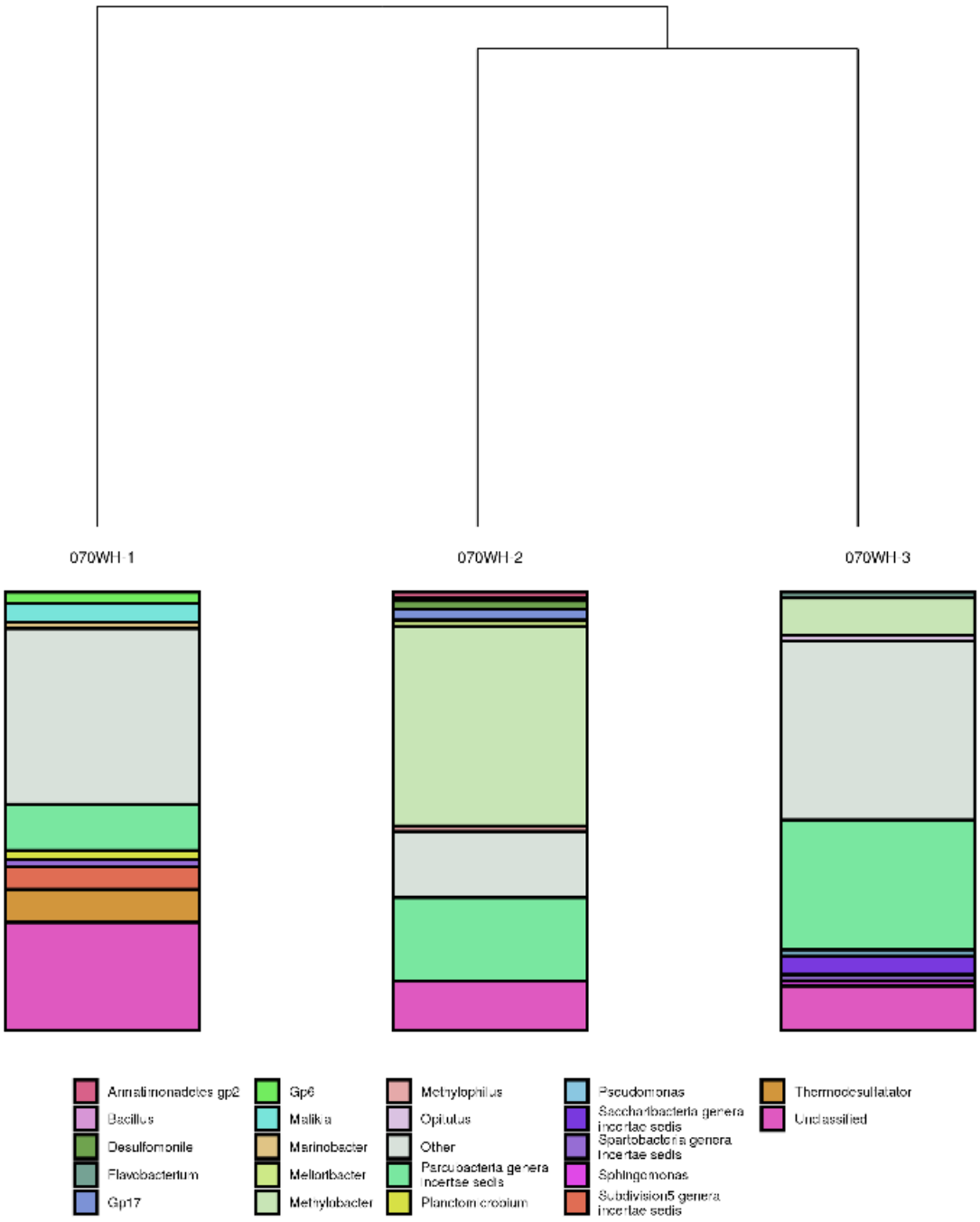

Figure 2: Hierarchical Clustering Dendrogram. This dendrogram shows a hierarchical clustering of samples based on genus-level classifications. Branch length is representative of relatedness between samples. The barchart beneath each sample show the relative abundance of the top 8 genus-level classifications, along with all other classified and unclassified genera. See the following detailed analysis by sample to identify the dominant genera in each sample.

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Results for MW-5

Table 3: Sequencing Statistics for MW-5

Total Reads	Reads Passing Quality Filtering	% Reads Passing Quality Filtering
11,838,925	11,838,925	100.0%

Table 4: Classification Rate Summary MW-5

Taxonomic Level	Reads Classified to Taxonomic Level	% Total Reads Classified to Taxonomic Level
Kingdom	11,636,377	98.3%
Phylum	10,407,943	87.9%
Class	9,832,630	83.1%
Order	9,662,540	81.6%
Family	9,510,397	80.3%
Genus	8,923,650	75.4%
Species	6,001,343	50.7%

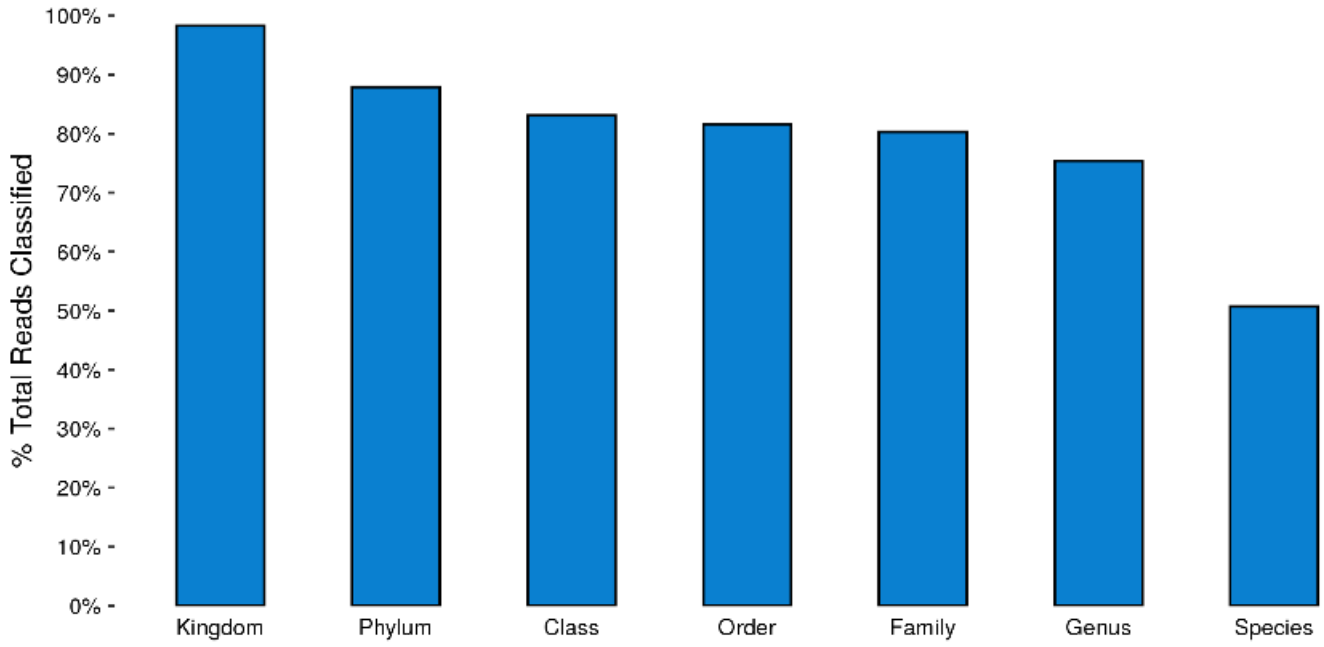

Figure 3: Classification Rate by Taxonomic Level for MW-5

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Web: www.microbe.com

MW-5 Classification Results by Taxonomic Level

Table 5: Top phyla classification results for MW-5. Additional identified phyla are included in the accompanying Excel data file.

Phylum	Reads	Percent
Proteobacteria	3,353,617	32.2%
Parcubacteria	1,245,937	12.0%
Verrucomicrobia	1,034,636	9.9%
Thermodesulfobacteria	891,633	8.6%
Bacteroidetes	843,319	8.1%
Acidobacteria	653,122	6.3%
Planctomycetes	608,535	5.8%
Firmicutes	574,609	5.5%
Actinobacteria	296,365	2.8%
Nitrospirae	257,019	2.5%
Candidatus Saccharibacteria	122,842	1.2%
Chloroflexi	75,365	0.7%
Gemmatimonadetes	70,238	0.7%
Armatimonadetes	63,214	0.6%
Microgenomates	50,766	0.5%
Chlamydiae	44,888	0.4%
DeinococcusUnclassifiedThermus	28,704	0.3%
Spirochaetes	19,046	0.2%

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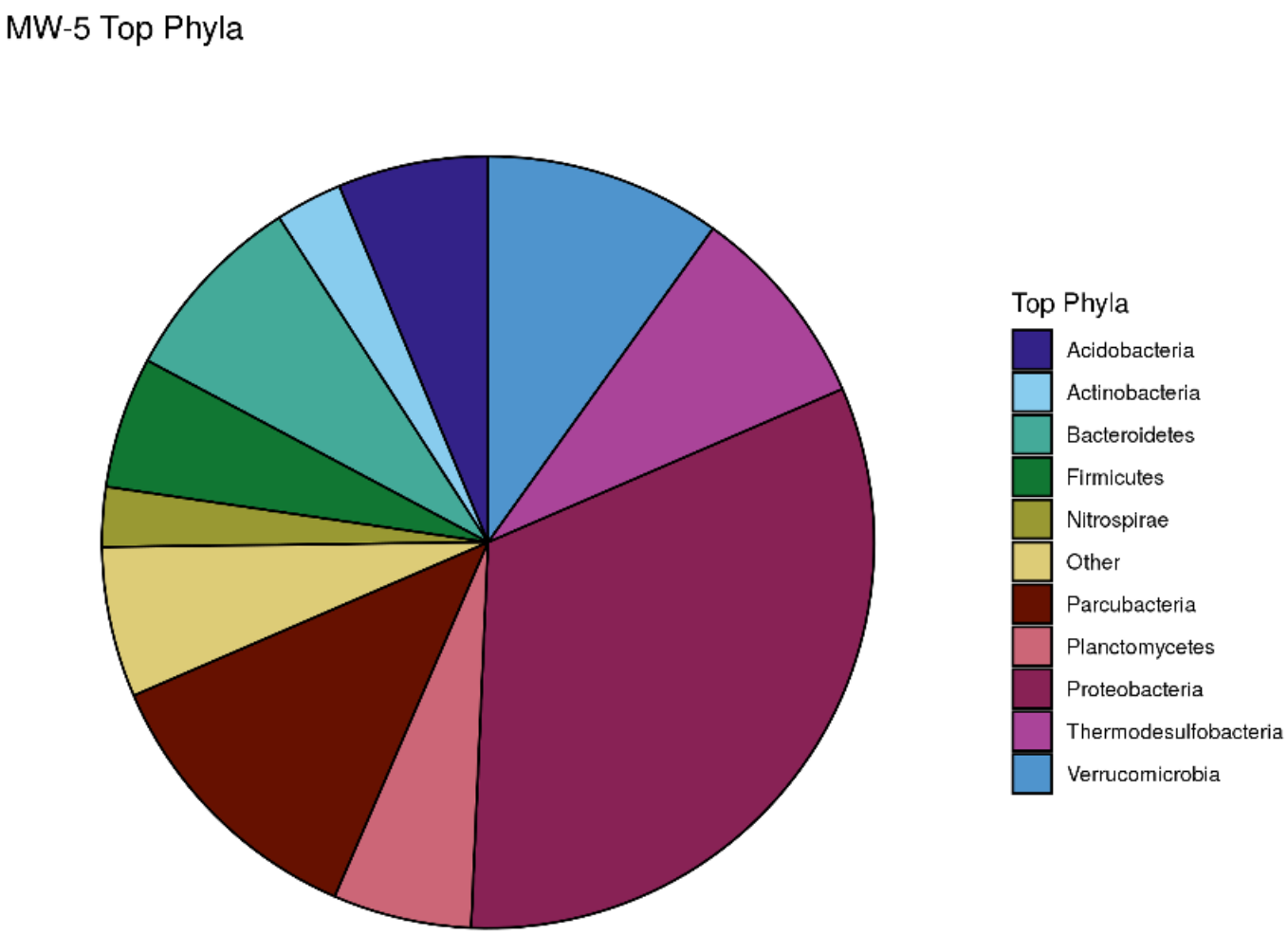

Figure 4: Top Phylum Classification Results for MW-5

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Table 6: Top genera classification results for sample MW-5. Additional identified genera are included in the accompanying Excel data file.

Genus	Reads	Percent	Description
Parcubacteria genera incertae sedis	1,245,937	14.0%	Genus of unclassified bacteria. It is proposed that Parcubacteria obligately ferments simple sugars to organic acids and can also degrade complex carbon sources. Species have also been implicated in hydrogen and sulfur cycles in anoxic sediments. These bacteria are found in exclusively anoxic environments.
Thermodesulfatator	889,198	10.0%	Genus of strictly anaerobic sulfate reducing thermophiles. Hydrogen is used as the sole electron donor with sulfate as the sole electron acceptor. Growth is stimulated by methanol and other organic compounds. Ammonium is utilized as the nitrogen source. Thermodesulfatator has been isolated from a hydrothermal vent in the deep sea.
Subdivision5 genera incertae sedis	614,113	6.9%	This is a subgroup of Verrucomicrobia that includes organisms that were isolated from a hydrocarbon and chlorinated-solvent-contaminated aquifer.
Malikia	496,685	5.6%	Strictly aerobic genus of chemoorganotrophs. Organic acids are the main growth substrates though some carbohydrates and amino acids may also be used. PHAs and poly-phosphate granules accumulate in cells and biofilms may be produced. Malikia has been found in freshwater and sludge.
Gp6	306,510	3.4%	Unclassified Acidobacteria.
Planctomicrobium	247,766	2.8%	Aerobic genus of chemoorganotrophic planctomycetes. Cell morphology is characterized by the presence of crateriform pits and stalks. A wide range of carbohydrates and organic acids are utilized as growth substrates. Planctomicrobium is found in marine environments.
Spartobacteria genera incertae sedis	195,216	2.2%	Unclassified genus of the candidate phylum Spartobacteria.
Marinobacter	179,421	2.0%	Genus of chemoheterotrophic proteobacteria capable of growing aerobically or anaerobically. Alcohols, organic and amino acids and hydrocarbons are utilized as carbon and energy sources. Denitrification is possible. Some species produce a nondialyzable (immovable) bioemulsifier when gown on hydrocarbons. Marinobacter is halotolerant and has been found in oil brine.
Pelotomaculum	176,833	2.0%	Thermophilic genus of anaerobic non-sulfate reducing bacteria. Growth can be fermentative, utilizing a number of carboxylates and primary alcohols. Syntrophic growth with hydrogenotrophic methanogens is also possible but the specific compounds required are species-dependent. Strains have been mostly isolated from sludge.
Azospirillum	157,093	1.8%	Microaerobic genus of nitrogen-fixing chemoorganotrophs. Metabolism is generally respiratory but can be fermentative also. Carboxylates and certain carbohydrates are utilized as carbon and energy sources. Some strains exhibit autotrophic growth facultatively with hydrogen. This plant growth-promoting rhizobacteria has been isolated from soil or plant material.

Continued on next page

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Table 6: Top genera classification results for sample MW-5. Additional identified genera are included in the accompanying Excel data file.

Genus	Reads	Percent	Description
Thermodesulfovibrio	147,782	1.7%	Thermophilic genus of anaerobic sulfate-reducing bacteria. Sulfate and thiosulfate are generally utilized as electron acceptors but sulfite, nitrate, and Fe (III) may also be used depending on the species. Syntrophic growth with a hydrogenotrophic methanogen is also possible. Organic compounds are oxidized completely to acetate. Members of this genus have been isolated from hot springs and sludge.
Azospira	142,973	1.6%	Generally aerobic genus of chemoorganotrophic nitrogen-fixers. Organic acids and alcohols are used as carbon and energy sources. Acetylene is reduced to ethylene. Oxygen and nitrate are utilized as electron acceptors with some species additionally using nitrate and perchlorate. Azospira species have been isolated from groundwater and rice paddies.
Magnetospirillum	127,387	1.4%	Genus of microaerophilic magnetic chemoorganotrophs. Oxygen is utilized as the terminal electron acceptor. A variety of organic acids are used as carbon and energy sources. Iron is acquired and converted into magnetite and accumulates in the cells as magnetosomes. Respiratory nitrate reduction is possible. Magnetospirillum has been found in freshwater environments
Geobacter	125,964	1.4%	Anaerobic genus of chemoorganotrophs. Fe(III) is used as the sole electron acceptor and acetate as an electron donor. Several Geobacter species also utilize hydrogen as an electron donor. While Geobacter spp. are known as iron reducing bacteria, some species can also utilize a variety of other growth supporting electron acceptors such as elemental sulfur, Mn(IV), and U(VI). Some species have been shown to degrade toluene and benzene. Strains of one species, G. lovleyi, contain a pceA gene and are capable of reductive dechlorination of PCE to cis-DCE. Geobacter species are ubiquitous in nature.
Opitutus	125,380	1.4%	Chemoorganotrophic genus of facultatively anaerobic bacteria. Carbohydrates are solely utilized as carbon and energy sources. Metabolism is mostly fermentative with acetate, propionate, CO2 and H2 as the main products. Opitutus is found in rice paddy soil.
Saccharibacteria genera incertae sedis	122,842	1.4%	Unclassified genus of aerobic or facultatively anaerobic bacteria. A limited range of organic compounds are utilized as carbon and energy sources but specific type varies under anaerobic, anoxic, or aerobic conditions though aerobic conditions are most favorable. Nitrate is reduced under anoxic conditions. This genus is ubiquitous in nature.
Azoarcus	107,035	1.2%	Genus of aerobic or facultatively anaerobic chemoorganoheterotrophs. Oxygen is the terminal electron acceptor. Organic acids are utilized as carbon and energy sources. Nitrate may be reduced under anerobic conditions with aromatic compounds being used as sole carbon sources. Some species are capable of nitrogen fixation. Azoarcus is found in soil, often as endophytes.
Massilia	90,325	1.0%	Genus of strictly aerobic chemoorganotrophs. A wide range of organic compounds are used for growth. Massilia species have been isolated from clinical samples, drinking water, soil and air.

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Table 6: Top genera classification results for sample MW-5. Additional identified genera are included in the accompanying Excel data file.

Genus	Reads	Percent	Description
Nitrospira	88,169	1.0%	Genus of aerobic lithoautotrophs. Nitrite is oxidized to nitrate. Nitrospira has been isolated from a number of environments including soil, salt and freshwater and activated sludge.
Legionella	86,986	1.0%	Genus of aerobic filamentous chemoorganotrophs. Amino acids are generally utilized as carbon and energy sources and require iron salts for growth. Legionella is found in a variety of natural and urban water environments.
Pseudomonas	83,913	0.9%	Genus of metabolically versatile, chemoorganotrophic aerobes. Generally, oxygen is the terminal electron acceptor, though growth by nitrate reduction or complete denitrification may also occur under anerobic conditions by many species. Growth conditions vary greatly between species. Pseudomonas is ubiquitous in nature but may be less tolerant of acidic environments.
Gp17	82,931	0.9%	Unclassified Acidobacteria.
Extensimonas	79,480	0.9%	These are aerobic organisms that have been isolated from industrial wastewater. The type strain utilizes proteinaceous substrates and organic acids as sole carbon sources.
Polaromonas	71,312	0.8%	Genus of aerobic mixotrophs. Amino acids are the main source of carbon and energy. Some species degrade naphthalene, hydrocarbons and xenobiotic compounds. One species, P. hydrogenivorans, can also oxidize hydrogen with carbon dioxide as a carbon source. Gas vesicles are present in cells. Most species are psychrophilic and have been isolated from polar environments.
Gemmatimonas	70,238	0.8%	Genus of heterotrophic aerobic to microaerobic bacteria. Certain carboxylates such as acetate, benzoate and succinate are utilized as carbon and energy sources while some sugars are used weakly. At least one species is capable of nitrous oxide reduction with O2 as the electron acceptor. Gemmatimonas species have been isolated from lakes.
Olsenella	66,128	0.7%	Genus of anaerobic lactic acid bacteria (LAB). Carbohydrates are fermented and the products of glucose fermentation are acetate and lactate. Olsenella species have been isolated from mammalian samples.
Bdellovibrio	63,435	0.7%	Aerobic genus of predatory bacteria. Bdellovibrio invade and consume gram-negative bacteria and are sometimes associated with biofilms. This organism degrades the biofilms of S. aureus, in particular, by obtaining nutrients and secreting proteolytic enzymes which then continues the breakdown cycle. Bdellovibrio is found in soil, sewage and fresh and salt water.
Desulfobulbus	60,266	0.7%	Strictly anaerobic genus of chemoorganotrophic sulfate reducing bacteria. Metabolism can be respiratory or fermentative. A limited number of organic acids and alcohols are utilized as carbon sources and electron donors which are oxidized incompletely to acetate. Sulfate and other sulfur compounds serve as electron acceptors and are reduced to hydrogen sulfide. Desulfobulbus is found in low oxygen aquatic environments and in mammals.

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Genus	Reads	Percent	Description
Pedobacter	58,135	0.7%	Aerobic genus of chemoorganotrophs. A variety of organic compounds are utilized as carbon and energy sources but type is species-dependent. Many species are contained within the genus. Pedobacter is ubiquitous in nature.
Denitratisoma	56,447	0.6%	Genus of facultative anaerobic bacteria. Nitrate, nitrite or perchlorate are electron acceptors. In addition to volatile fatty acids such as acetate and propionate, 17b-oestradiol (E2) is utilized as the sole energy and carbon source and is completely oxidized to carbon dioxide and water facultatively with the reduction of nitrate. Nitrate is reduced to N2O and N2. Denitratisoma has been isolated from activated sludge from a wastewater plant.
Microgenomates genera incertae sedis	50,766	0.6%	Unclassified genus within the Microgenomates phylum that is thought to be comprised of heterotrophic and fermentative bacteria found in eutrophic water and soil.
Sediminibacterium	48,588	0.5%	Genus of aerobic or facultatively anaerobic chemoorganotrophs. Carbohydrates are utilized as carbon and energy sources. Sediminibacterium is found in sediment.
Bradyrhizobium	48,230	0.5%	This acid-tolerant genus of slime producers is best known for symbiotic nitrogen fixation but also utilizes nitrates, amino acids, and ammonium salts as nitrogen sources. Different Bradyrhizobium species perform a range of biochemical functions including induction of root nodules and symbiotic nitrogen fixation, photosynthesis, denitrification and even chemolithotrophic growth under microaerophilic conditions.
Propionivibrio	47,625	0.5%	Chemoorganotrophic genus of anaerobic to aerotolerant bacteria. Though generally fermentative, some species possess a respiratory type of metabolism. Acetate and propionate are formed from fermentation. One species P. militaris, completely reduces perchlorate and chlorate to chlorine ions. Propionivibrio has been isolated from mud in freshwater environments.
Subdivision3 genera incertae sedis	47,484	0.5%	This is a subgroup of Verrucomicrobia that includes bacteria isolated from soils, vinyl chloride degrading enrichments, river biofilms, hot springs, and nitrifying-denitrifying activated sludge.
Gp16	45,889	0.5%	Unclassified Acidobacteria.
Ferribacterium	44,015	0.5%	Genus of strictly anaerobic chemoorganotrophs. Acetate and other organic acids are utilized as carbon sources and electron donors. Fe(III) is used as an electron acceptor (dissimilatory reduction) in addition to fumarate and nitrate. Polyhydroxybutyrate granules are accumulated in cells. Ferribacterium was originally isolated from mining-impacted freshwater sediment.
Aquicella	43,293	0.5%	Genus of intracellular, strictly aerobic chemoorganotrophs. Though not much is known about this bacterium, growth conditions are very specific with cells requiring alpha-ketoglutarate and activated charcoal for growth under lab conditions. Aquicella is found in protozoa, floating-free in water.
Gaiella	38,517	0.4%	Chemoorganotrophic genus of aerobic Actinobacteria. Amino and organic acids and some carbohydrates are utilized as a carbon and energy sources. Gaiella was originally isolated from a deep aquifer.

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Genus	Reads	Percent	Description
Vampirovibrio	38,329	0.4%	Genus of predatory cyanobacteria that targets the microalgae genus Chlorella. Chlorella cells are killed and digested extracellularly. Cell morphology is characterized by extracellular appendages.
Acidiferrobacter	37,350	0.4%	Genus of thermotolerant and acidophilic autotrophs and facultative diazotrophs. Ferrous iron, pyrite, sulfide, sulfur and tetrathionate are used as electron donors. Ferric iron or oxygen are utilized as electron acceptors. A. thiooxydans, the only known species, can be found in acidic and iron-rich environments such as acid mine drainage waters.
Gp5	37,186	0.4%	Unclassified Acidobacteria.
Thermogemmatispora	37,088	0.4%	Aerobic genus of filamentous, spore-forming heterotrophs. Species are thermophilic. Sugar alcohols and amino acids are utilized as carbon and energy sources. One species, t. carboxidivorans oxidizes carbon monoxide. Thermogemmatispora has been isolated from fallen leaves on soils and biofilms in waters of geothermally heated locations.
Rugamonas	35,045	0.4%	Genus of aerobic chemoorganotrophs. Carbohydrates, amino acids and organic acids serve as carbon and energy sources. Dissimilatory reduction of nitrate to nitrogen gas is possible. Rugamonas was originally isolated from freshwater.
Paenibacillus	33,981	0.4%	Genus of metabolically diverse species. Some species are facultatively anaerobic fermenters, using nitrate as an electron acceptor while others are strictly aerobic. Paenibacillus form endospores with some species producing an extracellular polysaccharide (EPS) which is useful in a variety of industries. Carbohydrates are generally utilized as carbon and energy sources. Hydrocarbons are also degraded by a few strains. This genus often promotes plant growth. Paenibacillus is ubiquitous in nature.
Reyranella	32,166	0.4%	Genus of microaerophilic to aerobic rods. A variety of organic compounds are utilized for growth and energy. Nitrate is reduced by some species. Reyranella is found in aquatic and soil environments.
Anderseniella	31,818	0.4%	This is a genus of aerobic organisms that have been isolated from marine sediments. They type strain utilizes organic acids as carbon sources and possesses alkaline phosphatase genes for the mineralization of phosphorus.
Aquihabitans	29,375	0.3%	Aerobic genus of chemoorganotrophic actinobacteria. Organic acids and carbohydrates are the main carbon and energy sources. Aquihabitans is found in freshwater.
Armatimonadetes gp4	28,662	0.3%	Unclassified organism of the Armatimonadetes phylum. The phylum is characterized by the ability to degrade polysaccharides, oligotrophic ability and pinkish pigments in cells. Species are generally found in hot springs or geothermal soils.
Parachlamydia	27,326	0.3%	Members of this genus are chlamydia-like intracellular organisms that often grow within the free-living amoebae Acanthamoeba using them for replication, as a cosmopolite aquatic reservoir, and a vector. Parachlamydia spp. can also play pathogenic roles in respiratory infections.

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Table 6: Top genera classification results for sample MW-5. Additional identified genera are included in the accompanying Excel data file.

Genus	Reads	Percent	Description
Rhodopirellula	26,864	0.3%	Chemoheterotrophic genus of strictly aerobic planctomycetes. Carbohydrates are the main source of carbon and energy though other organic compounds may be used. Sea water is required for growth. Rhodopirellula is found in aquatic environments.
Sunxiuqinia	25,728	0.3%	Aerobic genus of chemoorganoheterotrophs. Metabolism can be respiratory or fermentative. Proteinous substrates are fermented under anaerobic conditions. Species have been isolated from marine sediment.
Rhodoferax	25,386	0.3%	Genus of purple nonsulfur bacteria. Species are capable of growth under photosynthetic, aerobic or fermentative conditions. Simple carbon compounds are utilized as carbon and energy sources including lactate, acetate, butyrate, and ethanol. One species, R. fermentans, can grow anaerobically in the light or under aerobic conditions in the dark. Rhodoferax have been isolated from marine environments with some psychrophilic species located in polar environments.
Isosphaera	24,526	0.3%	Aerobic genus of chemoheterotrophic bacteria. Morphology is characterized by the formation of long chains of spherical cells or macroscopic aggregates (comets) which reproduce by budding and are motile by gliding. Cells are phototactic (move toward light) and gas vesicles are present. The type strain, I. pallida, is thermophilic and slightly alkaliphilic. Glucose or lactic acid are utilized as the carbon and energy source though growth is hindered by increased amounts of glucose. Isosphaera was originally isolated from hot springs.
Thermus	24,353	0.3%	Genus of thermophiles. Respiratory metabolism is generally aerobic though some species can use nitrate and nitrite as electron acceptors under anaerobic conditions. Carbohydrates, organic acids and amino acids are utilized as carbon and energy sources. All Thermus species hydrolyze proteins and peptides with some species also capable of starch hydrolysis. Due to their thermostable polymer-degrading enzymes, this bacterium is useful in many biotechnological applications. Thermus is found in natural and manmade hydrothermal environments.
Anaeromyxobacter	23,611	0.3%	Anaerobic genus of halorespiring myxobacteria (slime producing). Nitrate, fumarate and chlorophenolic compounds are generally uses as terminal electron acceptors. Organic acids are used as electron donors. Nitrate and nitrite are reduced to ammonia. Manganese oxide, ferrous iron, uranium (VI) and other metals may also be reduced. Anaeromyxobacter is found in soil.
Bifidobacterium	21,153	0.2%	Generally anaerobic genus of fermenters. Some species are aerotolerant and can grow under aerobic conditions in the presence of CO2. Acetic and lactic acid are the main fermentation products with ethanol, formic and succinic acid found in small amounts. Morphology of this genus is varied, with cells forming different rod shapes with bends or branched aggregates. Bifidobacteria species are normal fauna of the intestinal tracts of mammals.

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Genus	Reads	Percent	Description
Singulisphaera	20,623	0.2%	Genus of chemoorganotrophic aerobic to microaerobic eubacteria. Singulisphaera is moderately acidophilic and has hydrolytic abilities. Carbohydrates and N-acetylglucosamine, preferably, are utilized as carbon and energy sources. Amino acids and organic nitrogen compounds are used as nitrogen sources. Singulisphaera lack peptidoglycan in their cell walls and species have been found in acidic wetlands.
Aquabacterium	20,286	0.2%	Capable of microaerophilic growth, Aquabacterium uses nitrate and oxygen as electron acceptors. A broad range of organic acids but not carbohydrates are metabolized. This genus was originally isolated from biofilms in drinking water.
Gp7	19,494	0.2%	Unclassified Acidobacteria.
Dongia	18,941	0.2%	Strictly aerobic genus of heterotrophs. Carbohydrates and sugar alcohols are utilized as carbon and energy sources. Dongia species have been isolated from soil, freshwater and activated sludge.
Pseudohongiella	18,317	0.2%	Aerobic genus of chemoorganotrophs. A limited range or organic compounds are utilized for growth and energy but depends on species. Some species can reduce nitrate. Pseudohongiella is found in aquatic environments.
Noviherbaspirillum	18,041	0.2%	Chemoorganotrophic genus of aerobic or facultatively anaerobic bacteria. A wide range of organic compounds are used as carbon and energy sources but specific types varies between species. Some species are capable of denitrification and autotrophic growth using carbon dioxide as the carbon source. Most species have been isolated from soil.
Gp3	17,902	0.2%	Unclassified Acidobacteria.
Herbaspirillum	17,288	0.2%	Genus of aerobic bacteria possessing a strictly respiratory metabolism. Sugars are oxidized. Carboxylates serve as carbon sources for nitrogen dependent growth. Some species can fix atmospheric nitrogen under microaerobic conditions. Herbaspirillum species have been found in roots, stems and leaves of plants.
Dechloromonas	16,499	0.2%	Genus of facultatively anaerobic proteobacteria. This genus utilizes a variety of electron acceptors including chlorate, perchlorate, and oxygen. Organic acids are used as electron donors although sulfide and Fe(II) are also used for chlorate reduction. Some Dechloromonas species perform nitrate reduction coupled with hydrocarbon degradation.
Poribacteria genera incertae sedis	16,240	0.2%	Genus of aerobic mixotrophs of the candidate phylum Poribacteria. This bacterium is found in aquatic environments, associated with sea sponges.
Asaia	16,220	0.2%	Members of this genus are aerobic organisms that are capable of oxidizing lactate and/or acetate to CO2 and water. They produce acids from glucose and various other sugars. Some strains can also produce acids from ethanol, propanol, and butanol.
Clostridium XlVa	16,111	0.2%	Obligately anaerobic genus possessing a fermentative type of metabolism. Some species are aerotolerant. Growth requirements vary greatly between species, utilizing a range of compounds. Fermentation end products are usually a combination of alcohols and organic acids. Some species are acetogens.

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Genus	Reads	Percent	Description
Sphingomonas	16,003	0.2%	This aerobic genus is metabolically versatile. Most species are chemoheterotrophs though some are capable of photosynthetic growth. Sphingomonas is particularly useful in bioremediation of soils due to the ability of some species to degrade various aromatic compounds. Sphingomonas is ubiquitous in nature.
Prosthecobacter	15,809	0.2%	Genus of obligately aerobic chemooganotrophs. Carbohydrates are utilized as carbon sources and ammonium as the nitrogen source. Prosthecobacter is found in freshwater.
Spirochaeta	15,692	0.2%	Anaerobic or facultatively anaerobic genus of helical chemoorganotrophs. Yellow-orange carotenoid pigments are produced under aerobic conditions. Carbohydrates are utilized as carbon and energy sources oxidatively. The main products are ethanol, acetate, CO2 and H2. Some species are thermophilic. Spirochaeta is generally found in freshwater environments but have also been detected in oil fields and termite guts.
Planctopirus	15,680	0.2%	Genus of aerobic planctomycetes. Cell morphology is characterized by the formation of rosettes with crateriforms and fibers on the surface. Carbohydrates are the main source of carbon and energy. Metabolites are produced by one species. Planctopirus has been isolated from an alkaline lake and a plant surface.
Desulfovibrio	15,018	0.2%	Anerobic genus of halophilic sulfate reducers. Metabolism is respiratory but fermentative growth is possible. Sulfate and other sulfur compounds are reduced to hydrogen sulfide. Under fermentative growth, organic compounds are oxidized incompletely to acetate. Some species can use hydrogen as an electron donor with acetate and CO2 as carbon sources. The species D. desulfuricans has been linked to heavy metal reduction and microbial induced corrosion. Desulfovibrio is found in a variety of environments including anoxic sediment and in mammals.
Fluviicola	14,584	0.2%	Genus of strictly aerobic chemoorganotrophs. A small range of carbohydrates can be utilized for energy and growth. Glucose is not used and cells do not grow in the presence of salt. Fluviicola is found in freshwater.
Thiobacillus	14,340	0.2%	Genus of sulfur oxidizing aerobes or facultative anaerobes. Reduced sulfur compounds are oxidized to sulfate. Thiobacillus generally grows autotrophically but some species grow chemoorganotrophically or chemolithotrophically. All species are carbon dioxide fixers. Additionally, some species are facultative denitrifiers with T. denitrificans capable of complete denitrification. Thiobacillus spp are found in a variety of environments where high levels of oxidizable sulfur compounds are present such as sulfur springs or sewage treatment plants.
Desemzia	14,291	0.2%	Genus of microaerophilic lactic acid bacteria. Carbohydrates are fermented and lactic acid is produced from glucose. They also possess alpha glucosidase genes for the decomposition of carbohydrates. Desemzia was originally isolated from an insect though the normal habitat is unknown.

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Genus	Reads	Percent	Description
Thiocapsa	14,265	0.2%	Genus of purple sulfur bacteria. Thiocapsa grow phototrophically, oxidizing sulfide and thiosulfate in the presence of O2 and carbon dioxide. Tetrads are formed from division and cells may produce slime.
Desulfotomaculum	13,754	0.2%	Genus of strictly anaerobic sulfate-reducers. Chemoorganotrophic growth is possible utilizing simple organic compounds which are oxidized to carbon dioxide completely or partially to acetate. For some species, chemoautotrophic growth occurs with carbon dioxide and hydrogen. Sulfate, sulfite and thiosulfate are reduced to hydrogen sulfide. Some species are fermentative or nitrogen fixers. This genus is found in anoxic freshwater or marine sediments.
Aminicenantes genera incertae sedis	13,719	0.2%	Not much is known about this candidate organism except that it is found in hydrocarbon-impacted environments as well as marine locations.
Thermomonospora	13,353	0.1%	Aerobic genus of chemoorganotrophic actinomycetes. Cell morphology is characterized but spiny cells differentiating into branched substrate and aerial mycelia. A number of thermostable enzymes are produced. Species are slightly thermophilic and have been found in soil and compost.
Gp4	13,257	0.1%	This is a subgroup of Acidobacteria that contains heterotrophic, aerobic bacteria.
Litorilinea	12,442	0.1%	Aerobic genus of thermophilic and filamentous chemoogan-otrophs. Carbohydrates are the main carbon and energy source. Litorilinea was originally isolated from a hot spring.
Rivicola	12,327	0.1%	Genus of facultatively anaerobic chemoorganotrophs. Organic and amino acids are the main carbon and energy source though some carbohydrates may also be used. Rivicola is found in freshwater.
Mucilaginibacter	11,761	0.1%	Aerobic or facultatively aerobic genus of chemoorganotrophs. Carbohydrates are fermented. Proteinous compounds are degraded but specific type varies between species. Mucilaginibacter species have been isolated from many types of soil.
Paludibacter	11,447	0.1%	Genus of anaerobic chemoorganotrophs. Glucose and other carbohydrates are fermented to acetate and propionate with trace amounts to succinate. Paludibacter species were originally isolated from rice paddy soil.
Desulfosporosinus	10,910	0.1%	Anaerobic genus of sulfate-reducing bacteria. In the presence of some volatile fatty acids, sulfate and thiosulfate are reduced to sulfide. Desulfosporosinus also utilizes hydrogen as an electron donor coupled to sulfate reduction. Acetate is produced from fermentation. Some species have bssA genes and can utilize toluene and other substituted aromatic hydrocarbons as energy sources. Some strains can also reduce Fe(III) and arsenate. Desulfosporosinus is found in many types of soil environments.
Armatimonadetes gp5	10,430	0.1%	Unclassified organism of the Armatimonadetes phylum. The phylum is characterized by the ability to degrade polysaccharides, oligotrophic ability and pinkish pigments in cells. Species are generally found in hot springs or geothermal soils.

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Genus	Reads	Percent	Description
Gemmata	10,380	0.1%	Genus of aerobic planctomycetes. Sugars and starch are utilized as carbon and energy sources. Gemmata synthesize C30 sterols, an uncommon trait among bacteria. This bacterium is found in freshwater.
Conexibacter	9,965	0.1%	Genus of strictly aerobic chemoorganotrophs. Carbohydrates are utilized as carbon and energy sources. Some species can reduce nitrate. Conexibacter is usually found in soil.
Clostridium IV	9,901	0.1%	Obligately anaerobic genus possessing a fermentative type of metabolism. Some species are aerotolerant. Growth requirements vary greatly between species, utilizing a range of compounds. Fermentation end products are usually a combination of alcohols and organic acids. Some species are acetogens.
Geothrix	9,751	0.1%	Chemoorganotrophic genus of obligate anaerobes possessing a fermentative or respiratory type of metabolism. Though generally iron reducing bacteria, Geothrix also utilizes nitrate and Mn(IV) as electron acceptors. Organic acids are used as electron donors. Acetate and succinate are fermentation products from organic acids. The type species, G. fermentans was isolated from a petroleum-contaminated aquifer.
Saccharopolyspora	9,708	0.1%	Chemoorganotrophic genus of aerobic non-acid-fast spore-producing actinobacteria. Branched substrate and aerial hyphae are formed. A variety of compounds are utilized as carbon and nitrogen sources. Saccharopolyspora species have been found in a variety of environments but mainly where plant material decays.
Chthonomonas/ Armatimonadetes gp3	9,375	0.1%	Unclassified thermophilic genus of aerobic chemoorganotrophs. A number of organic compounds are utilized for growth and energy including polysaccharides and amide derivatives. Chthonomonas is found in geothermal soil.
Flavobacterium	9,267	0.1%	Genus of chemoorganotrophs with numerous species having varying growth conditions. Generally aerobic, some species grow under microaerobic to anaerobic conditions. Carbohydrates are usually utilized as carbon and energy sources and certain species are capable of reducing nitrate. Ubiquitous in nature, Flavobacterium has been isolated from soil and marine environments.
Georgfuchsia	9,217	0.1%	Genus of anaerobic chemoorganoheterotrophs. Fe(III), Mn (IV) and nitrate are used as electron acceptors. Aromatic compounds are degraded. Species possess the gene benzylsuccinate synthase A (bssA) which allows for the degradation of toluene anoxically. Georgfuchsia was originally isolated from a landfill aquifer.
Leptospirillum	9,165	0.1%	Genus of chemolithotrophic iron-oxidizers. Ferrous oxide and other iron-containing minerals are oxidized. Carbon dioxide is fixed. Exopolysaccharides are secreted which may lead to microbial induced corrosion. Acidophilic and sometimes thermophilic, Leptospirillum is found in metal-rich environments throughout nature.
Ramlibacter	9,006	0.1%	Aerobic genus of chemoorganotrophs. Acetate and other carboxylates are oxidized. Some species may form biofilms. These cyst-producing bacteria have been isolated from a variety of soil environments.

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Genus	Reads	Percent	Description
Angiococcus	8,866	<0.1%	Genus of Myxobacteria found in high moisture soils and peat bogs. Morphology is characterized by flat, disc-shaped sporangioles with spheroidal myxospores. Antibiotics and iron-chelating compounds have been isolated from Angiococcus. In general, Myxobacteria are social - growing in cell communities called swarms. Carbohydrates are utilized as carbon and energy sources but Myxobacteria are generally thought to utilize the degradation products of biopolymers such as proteins, cellulose, and other cellular constituents.

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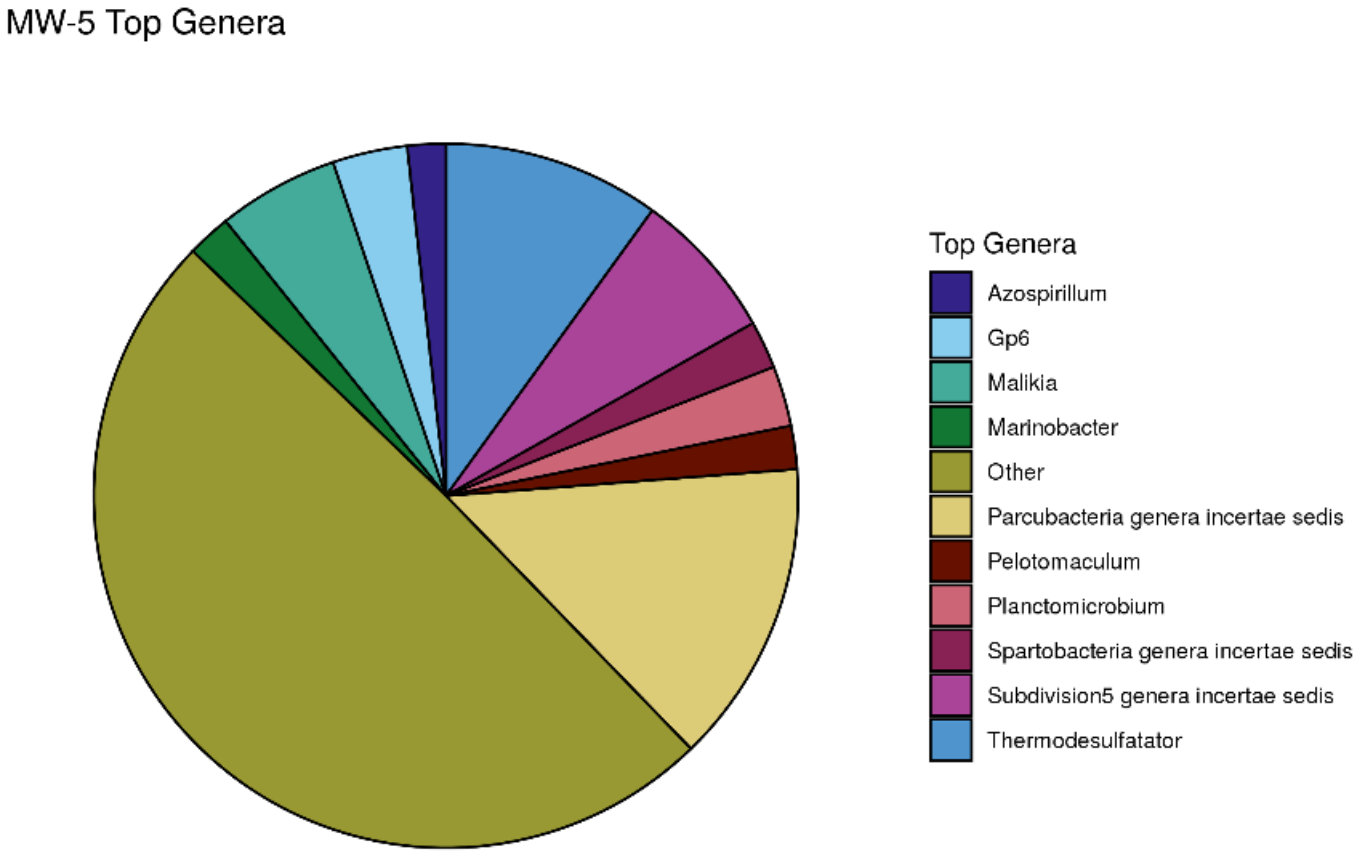

Figure 5: Top Genus Classification Results for MW-5

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Results for MW-4

Table 7: Sequencing Statistics for MW-4

Total Reads	Reads Passing Quality Filtering	% Reads Passing Quality Filtering
6,166,891	6,166,891	100.0%

Table 8: Classification Rate Summary MW-4

Taxonomic Level	Reads Classified to Taxonomic Level	% Total Reads Classified to Taxonomic Level
Kingdom	6,115,195	99.2%
Phylum	5,856,323	95.0%
Class	5,811,781	94.2%
Order	5,756,191	93.3%
Family	5,692,026	92.3%
Genus	5,477,195	88.8%
Species	4,629,513	75.1%

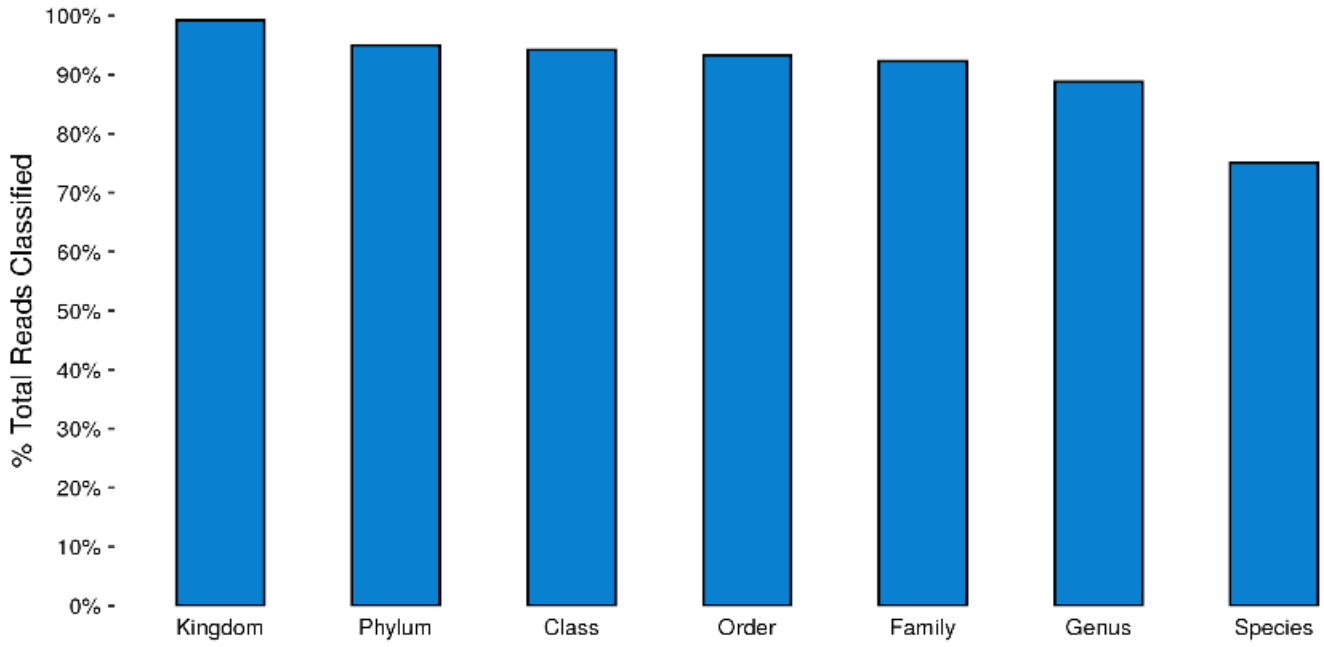

Figure 6: Classification Rate by Taxonomic Level for MW-4

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MW-4 Classification Results by Taxonomic Level

Table 9: Top phyla classification results for MW-4. Additional identified phyla are included in the accompanying Excel data file.

Phylum	Reads	Percent
Proteobacteria	3,363,530	57.4%
Parcubacteria	1,177,510	20.1%
Firmicutes	256,500	4.4%
Acidobacteria	244,524	4.2%
Bacteroidetes	160,584	2.7%
Actinobacteria	93,880	1.6%
Ignavibacteriae	87,298	1.5%
Armatimonadetes	84,794	1.4%
Chloroflexi	83,236	1.4%
Planctomycetes	64,637	1.1%
Elusimicrobia	48,874	0.8%
Verrucomicrobia	33,754	0.6%
Nitrospirae	22,950	0.4%
Chlamydiae	18,704	0.3%
Tenericutes	14,536	0.2%
Microgenomates	14,527	0.2%
Euryarchaeota	9,560	0.2%

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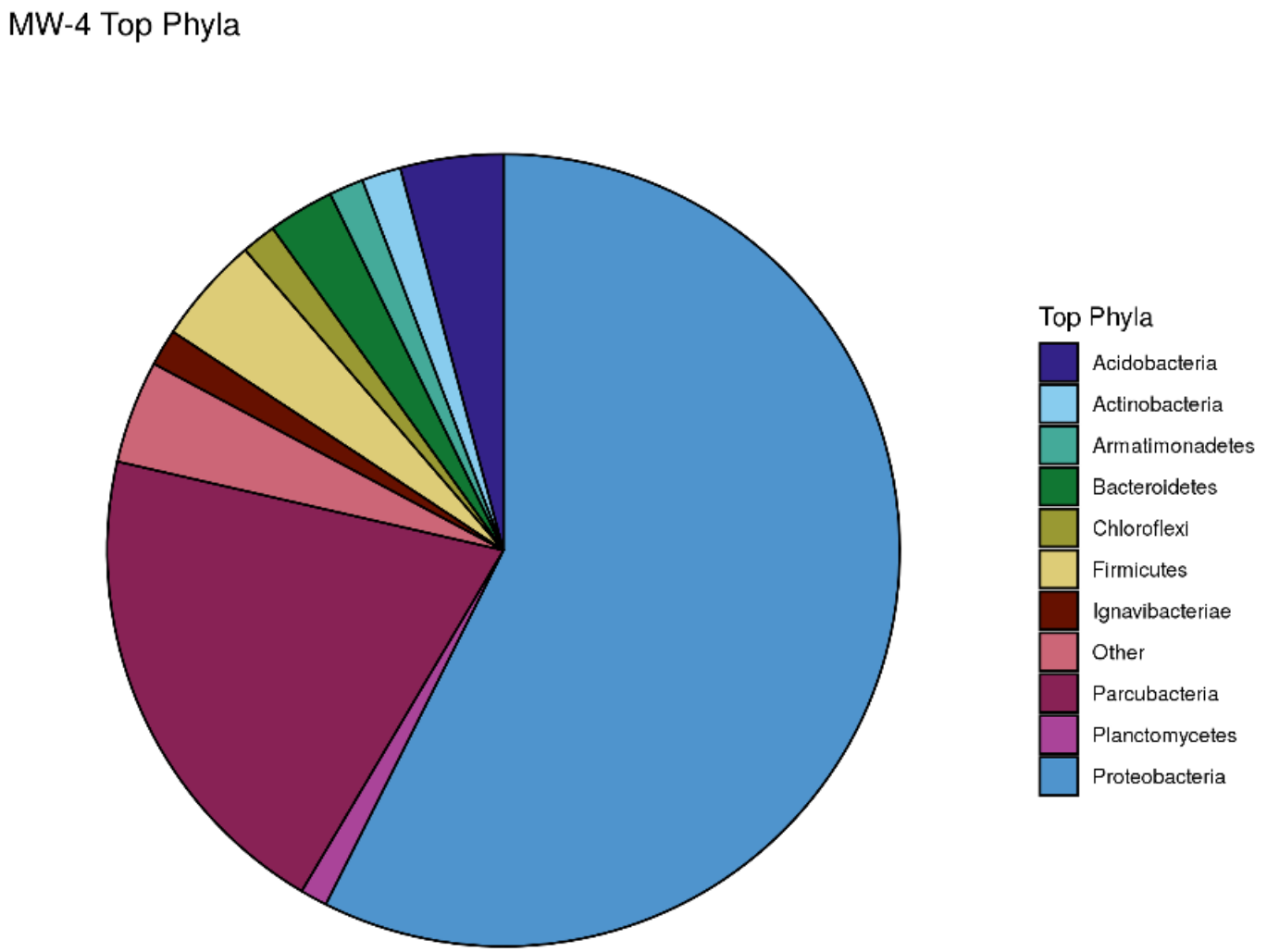

Figure 7: Top Phylum Classification Results for MW-4

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Table 10: Top genera classification results for sample MW-4. Additional identified genera are included in the accompanying Excel data file.

Genus	Reads	Percent	Description
Methylobacter	2,810,900	51.3%	Genus of obligate methanotrophs. Methane is the sole carbon and energy source. Some species may require sodium ions. Psychrotolerant and psychrophilic species have been described. Methylobacter is found in sediment and soil, sludge, ocean water and wastewater.
Parcubacteria genera incertae sedis	1,177,510	21.5%	Genus of unclassified bacteria. It is proposed that Parcubacteria obligately ferments simple sugars to organic acids and can also degrade complex carbon sources. Species have also been implicated in hydrogen and sulfur cycles in anoxic sediments. These bacteria are found in exclusively anoxic environments.
Gp17	152,811	2.8%	Unclassified Acidobacteria.
Desulfomonile	118,123	2.2%	Genus of strictly anaerobic, sulfate reducing bacteria. Some species can grow autotrophically on hydrogen and carbon dioxide with sulfate or thiosulfate as terminal electron acceptors. Acetate and lactate are fermentation products from glucose. Some species are capable of reductive dehalogenation of some chlorophenols or chlorobenzoates. Desulfomonile has been isolated from sediment, soil and sludge.
Melioribacter	87,215	1.6%	Thermophilic genus of facultatively anaerobic organotrophs. Metabolism can be respiratory or fermentative. Fe(III), arsenate and nitrite are used as electron acceptors. Polysaccharides are fermented to H2, acetate and CO2 with trace amounts of lactate. The only known species, M. roseus, was originally isolated from microbial mats.
Methylophilus	79,910	1.5%	Genus of aerobic restricted facultative methylotrophs. Methanol is utilized as the sole energy and carbon source. Some species may be able to use some carbohydrates or methylamines, but not methane. Species have been mostly isolated from soil and air.
Armatimonadetes gp2	72,352	1.3%	Unclassified organism of the Armatimonadetes phylum. The phylum is characterized by the ability to degrade polysaccharides, oligotrophic ability and pinkish pigments in cells. Species are generally found in hot springs or geothermal soils.
Bacillus	48,596	0.9%	Genus of mostly chemoorganotrophic and diverse species. Generally, oxygen is utilized as the terminal electron acceptor, but species may be strictly aerobic, facultatively anaerobic or strictly anaerobic. Some species are fermentative. Physiological characteristics also vary greatly among species. Some are thermophilic or psychrophilic, acidophilic or alkaliphilic. Considered nearly ubiquitous in nature, Bacillus species are commonly found in soil, water, food, and clinical environments. Under stressful environmental conditions, cells can produce endospores and remain dormant for extended periods.
Candidatus Endomicrobium	47,942	0.9%	Intracellular symbiont of gut protists (single-celled organisms), mainly termites. This ultramicrobacterium is obligately anaerobic with a heterotrophic type of metabolism. Glucose derivatives are fermented to acetate, lactate, ethanol, CO2 and H2 through glycolysis. Some species are diazotrophs (atmospheric nitrogen fixers).

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Table 10: Top genera classification results for sample MW-4. Additional identified genera are included in the accompanying Excel data file.

Genus	Reads	Percent	Description
Syntrophus	40,847	0.7%	Genus of strictly anaerobic chemoorganotrophs. Crotonate is generally fermented though other aromatic compound may be used. In co-culture with sulfate-reducing bacteria or a methanogen that utilizes H2/formate, benzoate and fatty acids are oxidized. Syntrophus is found in freshwater.
Candidatus Kuenenia	29,850	0.5%	Genus of anaerobic ammonium-oxidizing (anammox) Planctomycete.
Azoarcus	27,151	0.5%	Genus of aerobic or facultatively anaerobic chemoorganoheterotrophs. Oxygen is the terminal electron acceptor. Organic acids are utilized as carbon and energy sources. Nitrate may be reduced under anerobic conditions with aromatic compounds being used as sole carbon sources. Some species are capable of nitrogen fixation. Azoarcus is found in soil, often as endophytes.
Elizabethkingia	26,988	0.5%	Aerobic genus of chemoorganotrophs. Metabolism is respiratory. Carbohydrates are utilized as carbon and energy sources. Cells possess strong proteolytic capabilities. Elizabethkingia species are ubiquitous in soil and freshwater but have been isolated from clinical samples as well.
Thermomarinilinea	22,309	0.4%	Filamentous and multicellular anaerobic genus of thermophilic heterotrophs. Carbohydrates and amino acids are fermented. Sea water is required for growth. Thermomarinilinea was originally isolated from a hydrothermal vent.
Geobacter	21,088	0.4%	Anaerobic genus of chemoorganotrophs. Fe(III) is used as the sole electron acceptor and acetate as an electron donor. Several Geobacter species also utilize hydrogen as an electron donor. While Geobacter spp. are known as iron reducing bacteria, some species can also utilize a variety of other growth supporting electron acceptors such as elemental sulfur, Mn(IV), and U(VI). Some species have been shown to degrade toluene and benzene. Strains of one species, G. lovleyi, contain a pceA gene and are capable of reductive dechlorination of PCE to cis-DCE. Geobacter species are ubiquitous in nature.
Thermodesulfovibrio	20,855	0.4%	Thermophilic genus of anaerobic sulfate-reducing bacteria. Sulfate and thiosulfate are generally utilized as electron acceptors but sulfite, nitrate, and Fe (III) may also be used depending on the species. Syntrophic growth with a hydrogenotrophic methanogen is also possible. Organic compounds are oxidized completely to acetate. Members of this genus have been isolated from hot springs and sludge.
Pedobacter	19,902	0.4%	Aerobic genus of chemoorganotrophs. A variety of organic compounds are utilized as carbon and energy sources but type is species-dependent. Many species are contained within the genus. Pedobacter is ubiquitous in nature.
Phaeocystidibacter	19,837	0.4%	Halophilic genus of marine bacteria. Sodium and either magnesium or calcium ions are required for growth. Species have been found in sea water and sediment.

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Table 10: Top genera classification results for sample MW-4. Additional identified genera are included in the accompanying Excel data file.

Genus	Reads	Percent	Description
Blastopirellula	15,359	0.3%	Aerobic genus of chemoheterotrophs. Morphology is characterized by ovoid or pear-shaped rosettes with a pirellulosome forming in cells. Carbohydrates are the main carbon and energy source though amides may be utilized as carbon and nitrogen sources. Sea water is required for growth and Blastopirellula is found in marine environments.
Gp6	15,231	0.3%	Unclassified Acidobacteria.
Pelobacter	14,740	0.3%	Genus of strictly anaerobic chemoorganotrophs with a fermentative type of metabolism. A small range of simple organic compounds are utilized for fermentation such as acetoin, butanediol and ethylene glycol. One species, P. carbinolicus, reduces Fe(III) and oxidizes H2. Fermentation products are generally acetate and ethanol. This genus has been isolated from sediment.
Microgenomates genera incertae sedis	14,527	0.3%	Unclassified genus within the Microgenomates phylum that is thought to be comprised of heterotrophic and fermentative bacteria found in eutrophic water and soil.
Gp13	13,740	0.3%	Unclassified Acidobacteria.
Mycoplasma	13,378	0.2%	Pleomorphic genus of aerobic or facultatively anaerobic chemoorganotrophs. Sugars or arginine are used as the main energy sources and sterols are required for growth. Mycoplasma is obligately commensal being found in eukaryotic cells.
Parachlamydia	13,180	0.2%	Members of this genus are chlamydia-like intracellular organisms that often grow within the free-living amoebae Acanthamoeba using them for replication, as a cosmopolite aquatic reservoir, and a vector. Parachlamydia spp. can also play pathogenic roles in respiratory infections.
Pseudomonas	12,416	0.2%	Genus of metabolically versatile, chemoorganotrophic aerobes. Generally, oxygen is the terminal electron acceptor, though growth by nitrate reduction or complete denitrification may also occur under anerobic conditions by many species. Growth conditions vary greatly between species. Pseudomonas is ubiquitous in nature but may be less tolerant of acidic environments.
Tangfeifania	11,415	0.2%	Genus of facultatively anaerobic bacteria. Morphology is characterized by pink-pigmented cells. Metabolism can be respiratory or fermentative. Carbohydrates are the main carbon and energy sources. Tangfeifania was originally isolated from a saltwater lake.
Gp16	11,191	0.2%	Unclassified Acidobacteria.
Solirubrobacter	10,361	0.2%	Genus of aerobic mesophiles. Amino acids and sugars are utilized as carbon sources. Solirubrobacter species have been isolated from soil environments including ginseng fields.
Gp4	10,266	0.2%	This is a subgroup of Acidobacteria that contains heterotrophic, aerobic bacteria.
Gaiella	9,998	0.2%	Chemoorganotrophic genus of aerobic Actinobacteria. Amino and organic acids and some carbohydrates are utilized as a carbon and energy sources. Gaiella was originally isolated from a deep aquifer.
Spartobacteria genera incertae sedis	9,353	0.2%	Unclassified genus of the candidate phylum Spartobacteria.

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Table 10: Top genera classification results for sample MW-4. Additional identified genera are included in the accompanying Excel data file.

Genus	Reads	Percent	Description
Labrys	9,012	0.2%	Genus of mostly aerobic chemoheterotrophs. At least one species is facultatively methylotrophic. Cells reproduce by budding. A wide range of carbohydrates, aromatic compounds, organic acids and sugar alcohols are utilized as carbon and energy sources though C-1 compound are generally not used. Amino acids are used as nitrogen sources. Labrys species have been isolated from a variety of soil and water environments worldwide.
Subdivision3 genera incertae sedis	8,544	0.2%	This is a subgroup of Verrucomicrobia that includes bacteria isolated from soils, vinyl chloride degrading enrichments, river biofilms, hot springs, and nitrifying-denitrifying activated sludge.
Oligosphaera	8,033	0.1%	Obligately anaerobic genus of fermenters. Carbohydrates are fermented. Acetate, ethanol and hydrogen are the products of glucose fermentation. Oligosphaera was originally isolated from an upflow sludge reactor.
Rhodoferax	7,744	0.1%	Genus of purple nonsulfur bacteria. Species are capable of growth under photosynthetic, aerobic or fermentative conditions. Simple carbon compounds are utilized as carbon and energy sources including lactate, acetate, butyrate, and ethanol. One species, R. fermentans, can grow anaerobically in the light or under aerobic conditions in the dark. Rhodoferax have been isolated from marine environments with some psychrophilic species located in polar environments.
Mucinivorans	7,258	0.1%	Anaerobic genus of chemoorganotrophs. Carbohydrate are utilized as carbon and energy sources which may be fermented. Mucin is degraded. Mucinivorans was originally isolated from a leech.
Omnitrophica genera incertae sedis	7,016	0.1%	Genus of the unclassified Omnitrophica phylum. Not much is known about this group except that they live in anoxic environments. This phylum is part of the Planctomycetes/Verrucomicrobia/Chlamydiae (PVC) superphylum.
Subdivision5 genera incertae sedis	6,814	0.1%	This is a subgroup of Verrucomicrobia that includes organisms that were isolated from a hydrocarbon and chlorinated-solvent-contaminated aquifer.
Smithella	6,679	0.1%	Strictly anaerobic genus of chemoorganoheterotrophs. Crotonate and propionate are the main energy sources. Some additional organic acids may be fermented in syntrophic growth with H2 or formate utilizing organisms such as Methanospirillum hungateii. Smithella was originally isolated from a methanogenic digester.
Chthonomonas/ Armatimonadetes gp3	6,539	0.1%	Unclassified thermophilic genus of aerobic chemoorganotrophs. A number of organic compounds are utilized for growth and energy including polysaccharides and amide derivatives. Chthonomonas is found in geothermal soil.
Dehalogenimonas	6,443	0.1%	Genus of strictly anaerobic chemoheterotrophs. Species reductively dehalogenate chlorinated alkanes by using molecular hydrogen as an electron donor. Isolated from contaminated groundwater, these bacteria are of particular use in bioremediation due to their dechlorination capabilities.

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Table 10: Top genera classification results for sample MW-4. Additional identified genera are included in the accompanying Excel data file.

Genus	Reads	Percent	Description
Deinococcus	6,197	0.1%	Aerobic genus of chemoorganotrophs. Some species may be facultatively anaerobic. Carbohydrates and amino acids are utilized as growth substrates. All species are resistant to ionizing-radiation. The type species, D. radiodurans also reduce and are heavy metal tolerant. Some species are thermophilic and proteolytic. Recent studies have characterized Deinococcus as efficient primary biofilm formers. Deinococcus is found in a number of different habitats.
Polaromonas	6,195	0.1%	Genus of aerobic mixotrophs. Amino acids are the main source of carbon and energy. Some species degrade naphthalene, hydrocarbons and xenobiotic compounds. One species, P. hydrogenivorans, can also oxidize hydrogen with carbon dioxide as a carbon source. Gas vesicles are present in cells. Most species are psychrophilic and have been isolated from polar environments.
Agromyces	6,177	0.1%	Aerobic to microaerophilic genus of chemooganotrophs. Cells are filamentous and form branched vegetative hyphae. Though nutritionally fastidious, there is a wide range of compounds utilized for growth. Agromyces is ubiquitous in nature but is generally found in soil.
Desulfatiglans	6,112	0.1%	Strictly anaerobic genus of sulfate-reducing chemoorganoheterotrophs. Organic acids, phenols and benzoates are used as electron donors and carbon sources. Sulfate is reduced to H2S with the use of sulfite and thiosulfate varying across species. Desulfatiglans species are found in freshwater and marine environments.
Vampirovibrio	5,835	0.1%	Genus of predatory cyanobacteria that targets the microalgae genus Chlorella. Chlorella cells are killed and digested extracellularly. Cell morphology is characterized by extracellular appendages.
Opitutus	5,534	0.1%	Chemoorganotrophic genus of facultatively anaerobic bacteria. Carbohydrates are solely utilized as carbon and energy sources. Metabolism is mostly fermentative with acetate, propionate, CO2 and H2 as the main products. Opitutus is found in rice paddy soil.
Methanolobus	5,510	0.1%	Methanogenic genus of strictly anaerobic archaea. Methane is produced from methanol and amines with some species also capable of using dimethyl sulfide. Some species are psychrophilic. Methanolobus is found in a variety of environments including saline habitats and cold soils.
Dactylosporangium	5,185	<0.1%	Aerobic genus of filamentous chemoorganotrophic actinomycetes. Spores form short chains or globose bodies on substrate mycelium. Carbohydrates are utilized as carbon and energy sources. Dactylosporangium species are found in soil.
Rhodopirellula	5,169	<0.1%	Chemoheterotrophic genus of strictly aerobic planctomycetes. Carbohydrates are the main source of carbon and energy though other organic compounds may be used. Sea water is required for growth. Rhodopirellula is found in aquatic environments.
Holophaga	5,137	<0.1%	Strictly anaerobic genus of homoacetogenic fermenters. Methylated and aromatic compounds are fermented. Holophaga was originally isolated from anoxic water.

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Table 10: Top genera classification results for sample MW-4. Additional identified genera are included in the accompanying Excel data file.

Genus	Reads	Percent	Description
Saccharibacteria genera incertae sedis	5,109	<0.1%	Unclassified genus of aerobic or facultatively anaerobic bacteria. A limited range of organic compounds are utilized as carbon and energy sources but specific type varies under anaerobic, anoxic, or aerobic conditions though aerobic conditions are most favorable. Nitrate is reduced under anoxic conditions. This genus is ubiquitous in nature.
Tetrasphaera	5,090	<0.1%	Aerobic genus of chemoheterotrophs. A limited range of carbohydrates and organic acids are utilized as carbon and energy sources and propionate is preferred. Polyphosphate granules accumulate in cells. Species have been linked to phosphorous removal in wastewater.
Sunxiuqinia	4,982	<0.1%	Aerobic genus of chemoorganoheterotrophs. Metabolism can be respiratory or fermentative. Proteinous substrates are fermented under anaerobic conditions. Species have been isolated from marine sediment.
Coprothermobacter	4,547	<0.1%	Strictly anaerobic genus of thermophiles. Carbohydrates and proteins are fermented to acetic acid, hydrogen and carbon dioxide. Thiosulfate can be utilized as an electron acceptor. Coprothermobacter is found in wastewater.
Armatimonadetes gp4	4,470	<0.1%	Unclassified organism of the Armatimonadetes phylum. The phylum is characterized by the ability to degrade polysaccharides, oligotrophic ability and pinkish pigments in cells. Species are generally found in hot springs or geothermal soils.
Megasphaera	4,400	<0.1%	Genus of strictly anaerobic chemoorganotrophs. Sugars are utilized for growth, but specificity is species-dependent. Fermentation products are generally acetic, propionic, butyric or valeric acids but vary between strains. Gas is sometimes produced. Megasphaera is found in cattle and sheep rumen, in human intestines and is often the cause of beer spoilage.
Latescibacteria genera incertae sedis	4,235	<0.1%	Unclassified genus of anaerobic bacteria. Metabolic reconstruction suggests a fermentative type of metabolism as well as the capability to degrade multiple polysaccharides and glycoproteins composing green and brown algae cell walls, storage molecules, and extracellular polymeric substances. Latescibacteria can be found in terrestrial, aquatic, and marine ecosystems.
Gemmatimonas	4,166	<0.1%	Genus of heterotrophic aerobic to microaerobic bacteria. Certain carboxylates such as acetate, benzoate and succinate are utilized as carbon and energy sources while some sugars are used weakly. At least one species is capable of nitrous oxide reduction with O2 as the electron acceptor. Gemmatimonas species have been isolated from lakes.
Coxiella	4,143	<0.1%	Genus of intracellular bacteria. Coxiella grows in host cell vacuoles, particularly of arthropods and vertebrates. This genus is resistant to chemical agents and high temperatures. One species is the causative agent of Q fever.

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Table 10: Top genera classification results for sample MW-4. Additional identified genera are included in the accompanying Excel data file.

Genus	Reads	Percent	Description
Gallionella	3,929	<0.1%	Iron-oxidizing genus of chemolithotrophic bacteria with a mixotrophic type of metabolism. Precipitated ferric iron oxide encrusts bacterial sheaths in environments with low organic content and high ferrous iron. Iron-oxidizing bacteria like Gallionella are associated with tubercle formation, under deposit corrosion and formation of differential aeration cells. Species have been isolated from aquatic environments.
Desulfobacula	3,636	<0.1%	Thermophilic genus of anaerobic sulfate-reducing bacteria. Metabolism can be respiratory or fermentative. Carbohydrates, organic acids, alcohols and amino acids are utilized for chemoorganoheterotrophic growth. Carbohydrates are fermented. Molecular hydrogen and carbon dioxide are utilized for chemolithoheterotrophic growth in the presence of acetate. Aromatic compounds are degraded. Species have been isolated from soil, freshwater, spoiled foods and from wastewater sludge.
Ilumatobacter	3,636	<0.1%	Aerobic genus of chemoorganotrophs. Sea water is required for growth. Ilumatobacter is found in marine environments.
Nitrosococcus	3,633	<0.1%	Genus of strictly aerobic ammonia-oxidizing bacteria (AOB) performing chemolithotrophic growth. Salt is required for growth. Nitrosococcus is light sensitive and moderately alkaliphilic. This genus has been isolated from marine environments.
Nitrosospira	3,590	<0.1%	Chemolithoautotrophic and aerobic genus of ammonia-oxidizing bacteria (AOB). Ammonia is oxidized to nitrite. Some species may produce nitrous oxide. Nitrosospira is mainly found in soil but has been isolated from building stone and freshwater as well.
Gp18	3,549	<0.1%	Unclassified Acidobacteria.
Reyranella	3,545	<0.1%	Genus of microaerophilic to aerobic rods. A variety of organic compounds are utilized for growth and energy. Nitrate is reduced by some species. Reyranella is found in aquatic and soil environments.
Paludibaculum	3,457	<0.1%	Genus of facultatively anaerobic organisms that have been isolated from wetlands. Carbohydrates are the main carbon source for fermentative growth. Polysaccharides such as CM-cellulose, starch and xanthine are degraded. Dissimilatory iron reduction is possible.
Thermoanaerobacter	3,437	<0.1%	Genus of metabolically diverse anaerobic thermophiles. Some species utilize elemental sulfur as an electron acceptor and lactate as an electron donor and carbon source while others are able to grow with hydrogen facultatively as the electron donor. The species T. siderophilus reduces Fe(III). Ethanol, acetate, and lactate are produced from fermentation. Species have been isolated from hot springs and hydrothermal vents as well as from soil and an oil field.
Gp10	3,386	<0.1%	Unclassified Acidobacteria.

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Table 10: Top genera classification results for sample MW-4. Additional identified genera are included in the accompanying Excel data file.

Genus	Reads	Percent	Description
Phaselicystis	3,208	<0.1%	Genus of aerobic chemoheterotrophic myxobacteria. In general, Myxobacteria move by gliding, are known to produce fruiting bodies during starvation conditions, are social - growing in cell communities called swarms. Carbohydrates are utilized as carbon and energy source but Myxobacteria as a characterization are thought to live from the degradation products of biopolymers such as proteins, cellulose, and other cellular constituents. Phaselicystis is found in soil and is resistant to various antibiotics.
Halanaerobacter	3,201	<0.1%	Genus of strictly anaerobic chemoorganotrophic fermenters. Carbohydrates are generally fermented to acetate, H2, and CO2. Amino acids may also be utilized with hydrogen as an electron donor. Some species are thermotolerant. Halanaerobacter is halophilic and is found in hypersaline, anoxic habitats.
Anaerobacterium	3,173	<0.1%	Obligately anaerobic genus of fermenters. Carbohydrates are fermented to ethanol and lactate. This bacterium is thermotolerant and slightly alkaliphilic. The type species, A. chartisolvens, can degrade filter paper and other cellulose. Anaerobacterium was originally isolated from soil of a rice paddy field.
Pacearchaeota Incertae Sedis AR13	3,162	<0.1%	Unclassified archaeal genus of the Pacearchaeota phylum.
Desulfatibacillum	3,046	<0.1%	Genus of sulfate-reducing autotrophs. Hydrocarbons are utilized as carbon and energy sources. Organic acids, hydrogen and fatty acids are utilized as electron donors. Sulfate, sulfite and thiosulfate serve as electron acceptors. Species have been isolated from contaminated sediment.
Alistipes	2,991	<0.1%	Genus of anaerobic chemoorganotrophs. A limited range of carbohydrates are fermented. Glucose fermentation yields succinic acid as the main product. Alistipes has been isolated from human samples and is part of the normal intestinal fauna.
Desulfotomaculum	2,964	<0.1%	Genus of strictly anaerobic sulfate-reducers. Chemoorganotrophic growth is possible utilizing simple organic compounds which are oxidized to carbon dioxide completely or partially to acetate. For some species, chemoautotrophic growth occurs with carbon dioxide and hydrogen. Sulfate, sulfite and thiosulfate are reduced to hydrogen sulfide. Some species are fermentative or nitrogen fixers. This genus is found in anoxic freshwater or marine sediments.
Phytomonospora	2,830	<0.1%	Genus of aerobic gram-positive endophytic actinomycete in the Micromonosporaceae family which was isolated from plant tissues.
Sideroxydans	2,745	<0.1%	Genus of microaerophilic chemolithoautotrophs. Fe(II) is utilized as the sole energy source and carbon dioxide as the carbon source. Sideroxydans is found in soil.
Rhodocyclus	2,733	<0.1%	Genus of anoxygenic purple phototrophic bacteria. Organic substrates such as carboxylates are utilized as carbon sources and energy. Hydrogen is also used and chemotrophic growth can occur in the dark under oxic conditions. Rhodocyclus is found in ponds and sewage ditches.
BRC1 genera incertae sedis	2,681	<0.1%	Unclassified organism containing the BRC1 gene, associated with branching signals and bud development.

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Table 10: Top genera classification results for sample MW-4. Additional identified genera are included in the accompanying Excel data file.

Genus	Reads	Percent	Description
Bifidobacterium	2,525	<0.1%	Generally anaerobic genus of fermenters. Some species are aerotolerant and can grow under aerobic conditions in the presence of CO2. Acetic and lactic acid are the main fermentation products with ethanol, formic and succinic acid found in small amounts. Morphology of this genus is varied, with cells forming different rod shapes with bends or branched aggregates. Bifidobacteria species are normal fauna of the intestinal tracts of mammals.
Mucilaginibacter	2,467	<0.1%	Aerobic or facultatively aerobic genus of chemoorganotrophs. Carbohydrates are fermented. Proteinous compounds are degraded but specific type varies between species. Mucilaginibacter species have been isolated from many types of soil.
Litorilinea	2,410	<0.1%	Aerobic genus of thermophilic and filamentous chemoorganotrophs. Carbohydrates are the main carbon and energy source. Litorilinea was originally isolated from a hot spring.
Povalibacter	2,403	<0.1%	Strictly aerobic genus of chemoorganotrophs. Carbohydrates are the main carbon and energy source. Polyvinyl alcohol, anthracene and phenanthrene are degraded. Ammonia is produced from the reduction of nitrate and nitrite acquired through assimilation. Povalibacter was originally isolated from grapes.
Desulfovibrio	2,388	<0.1%	Anerobic genus of halophilic sulfate reducers. Metabolism is respiratory but fermentative growth is possible. Sulfate and other sulfur compounds are reduced to hydrogen sulfide. Under fermentative growth, organic compounds are oxidized incompletely to acetate. Some species can use hydrogen as an electron donor with acetate and CO2 as carbon sources. The species D. desulfuricans has been linked to heavy metal reduction and microbial induced corrosion. Desulfovibrio is found in a variety of environments including anoxic sediment and in mammals.
Anaeromyxobacter	2,368	<0.1%	Anaerobic genus of halorespiring myxobacteria (slime producing). Nitrate, fumarate and chlorophenolic compounds are generally uses as terminal electron acceptors. Organic acids are used as electron donors. Nitrate and nitrite are reduced to ammonia. Manganese oxide, ferrous iron, uranium (VI) and other metals may also be reduced. Anaeromyxobacter is found in soil.

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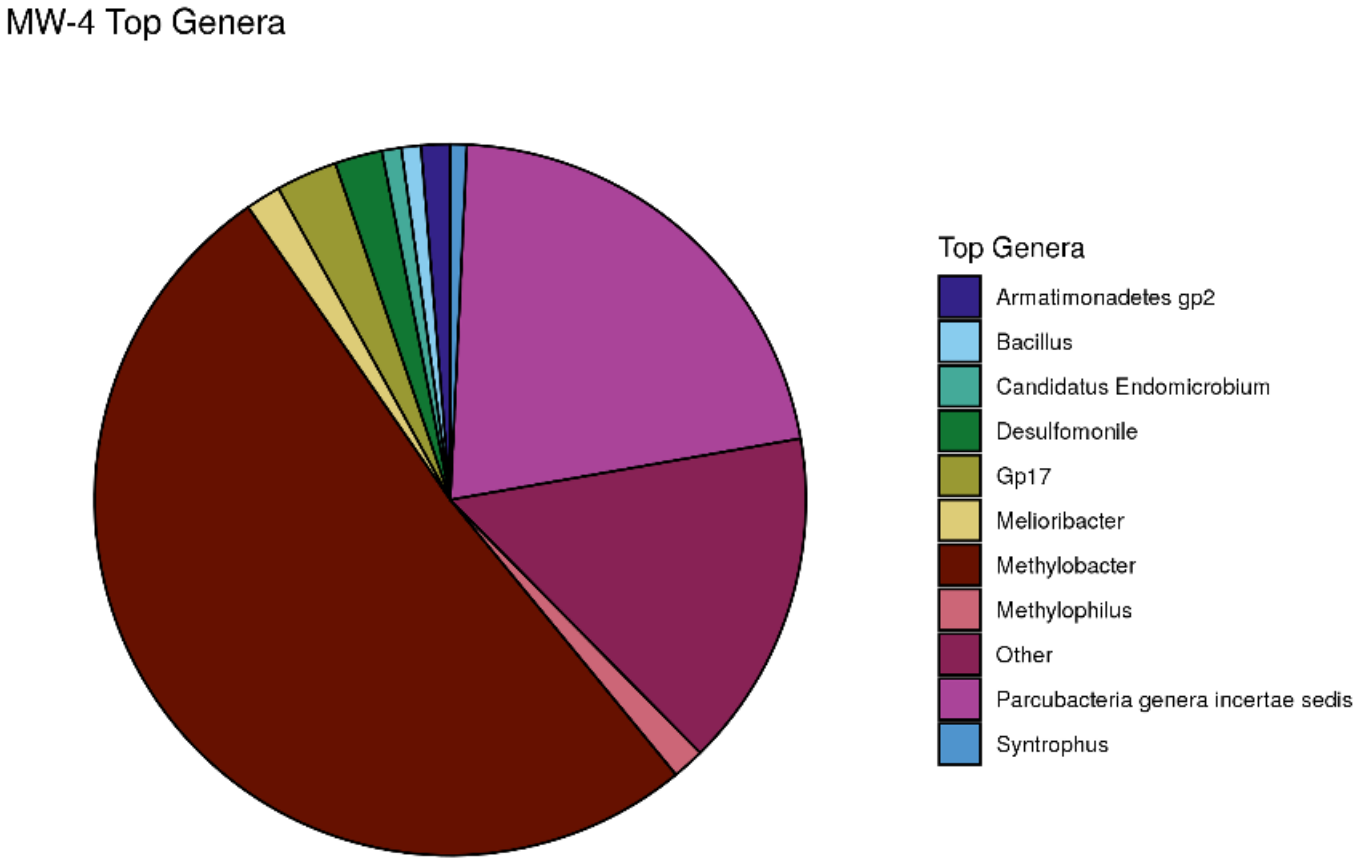

Figure 8: Top Genus Classification Results for MW-4

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Results for MW-3

Table 11: Sequencing Statistics for MW-3

Total Reads	Reads Passing Quality Filtering	% Reads Passing Quality Filtering
13,021,303	13,021,303	100.0%

Table 12: Classification Rate Summary MW-3

Taxonomic Level	Reads Classified to Taxonomic Level	% Total Reads Classified to Taxonomic Level
Kingdom	12,809,645	98.4%
Phylum	12,439,533	95.5%
Class	12,321,847	94.6%
Order	12,200,652	93.7%
Family	12,083,499	92.8%
Genus	11,709,453	89.9%
Species	7,774,794	59.7%

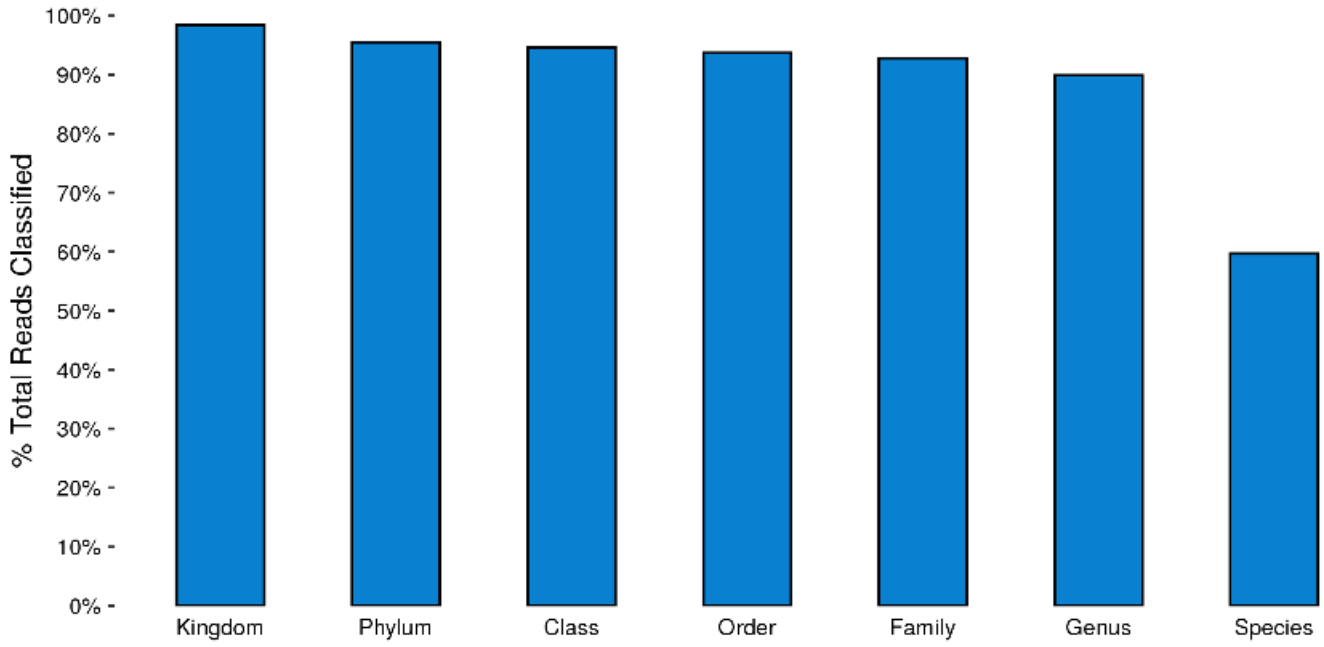

Figure 9: Classification Rate by Taxonomic Level for MW-3

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MW-3 Classification Results by Taxonomic Level

Table 13: Top phyla classification results for MW-3. Additional identified phyla are included in the accompanying Excel data file.

Phylum	Reads	Percent
Proteobacteria	4,290,408	34.5%
Parcubacteria	3,860,906	31.0%
Bacteroidetes	1,194,601	9.6%
Verrucomicrobia	674,205	5.4%
Candidatus Saccharibacteria	552,796	4.4%
Actinobacteria	419,987	3.4%
Acidobacteria	281,403	2.3%
Firmicutes	225,567	1.8%
Planctomycetes	201,116	1.6%
Chlamydiae	111,322	0.9%
Chloroflexi	77,065	0.6%
candidate division WPSUnclassified1	65,084	0.5%
Spirochaetes	51,530	0.4%
Omnitrophica	48,262	0.4%
Elusimicrobia	44,096	0.4%
Cyanobacteria/Chloroplast	36,666	0.3%
Microgenomates	35,746	0.3%
Armatimonadetes	33,789	0.3%

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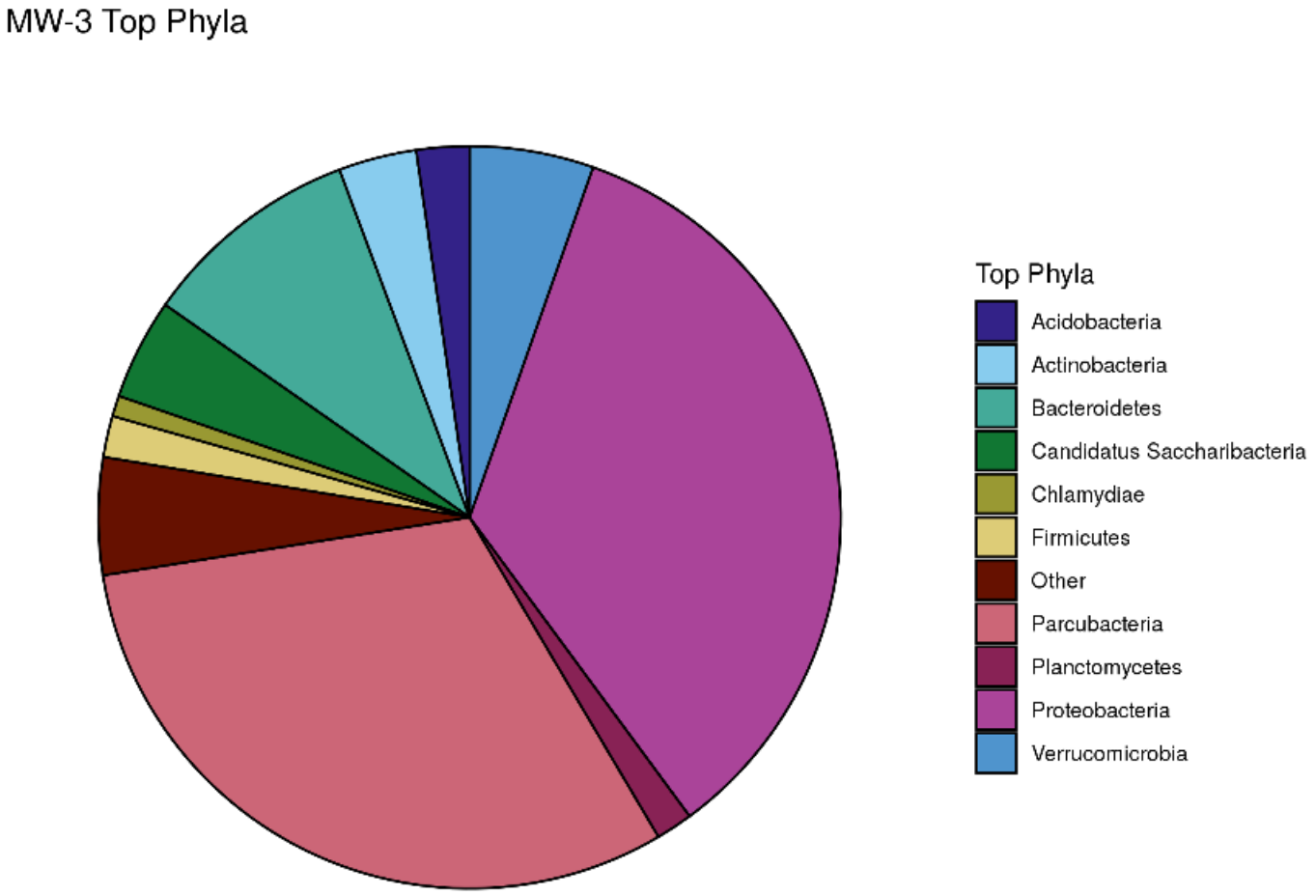

Figure 10: Top Phylum Classification Results for MW-3

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Table 14: Top genera classification results for sample MW-3. Additional identified genera are included in the accompanying Excel data file.

Genus	Reads	Percent	Description
Parcubacteria genera incertae sedis	3,860,906	33.0%	Genus of unclassified bacteria. It is proposed that Parcubacteria obligately ferments simple sugars to organic acids and can also degrade complex carbon sources. Species have also been implicated in hydrogen and sulfur cycles in anoxic sediments. These bacteria are found in exclusively anoxic environments.
Methylobacter	1,106,356	9.4%	Genus of obligate methanotrophs. Methane is the sole carbon and energy source. Some species may require sodium ions. Psychrotolerant and psychrophilic species have been described. Methylobacter is found in sediment and soil, sludge, ocean water and wastewater.
Saccharibacteria genera incertae sedis	552,796	4.7%	Unclassified genus of aerobic or facultatively anaerobic bacteria. A limited range of organic compounds are utilized as carbon and energy sources but specific type varies under anaerobic, anoxic, or aerobic conditions though aerobic conditions are most favorable. Nitrate is reduced under anoxic conditions. This genus is ubiquitous in nature.
Pseudomonas	186,478	1.6%	Genus of metabolically versatile, chemoorganotrophic aerobes. Generally, oxygen is the terminal electron acceptor, though growth by nitrate reduction or complete denitrification may also occur under anerobic conditions by many species. Growth conditions vary greatly between species. Pseudomonas is ubiquitous in nature but may be less tolerant of acidic environments.
Spartobacteria genera incertae sedis	178,357	1.5%	Unclassified genus of the candidate phylum Spartobacteria.
Opitutus	175,459	1.5%	Chemoorganotrophic genus of facultatively anaerobic bacteria. Carbohydrates are solely utilized as carbon and energy sources. Metabolism is mostly fermentative with acetate, propionate, CO2 and H2 as the main products. Opitutus is found in rice paddy soil.
Flavobacterium	166,452	1.4%	Genus of chemoorganotrophs with numerous species having varying growth conditions. Generally aerobic, some species grow under microaerobic to anaerobic conditions. Carbohydrates are usually utilized as carbon and energy sources and certain species are capable of reducing nitrate. Ubiquitous in nature, Flavobacterium has been isolated from soil and marine environments.
Sphingomonas	162,491	1.4%	This aerobic genus is metabolically versatile. Most species are chemoheterotrophs though some are capable of photosynthetic growth. Sphingomonas is particularly useful in bioremediation of soils due to the ability of some species to degrade various aromatic compounds. Sphingomonas is ubiquitous in nature.
Mucilaginibacter	151,731	1.3%	Aerobic or facultatively aerobic genus of chemoorganotrophs. Carbohydrates are fermented. Proteinous compounds are degraded but specific type varies between species. Mucilaginibacter species have been isolated from many types of soil.
Vampirovibrio	129,692	1.1%	Genus of predatory cyanobacteria that targets the microalgae genus Chlorella. Chlorella cells are killed and digested extracellularly. Cell morphology is characterized by extracellular appendages.

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Genus	Reads	Percent	Description
Pedobacter	118,041	1.0%	Aerobic genus of chemoorganotrophs. A variety of organic compounds are utilized as carbon and energy sources but type is species-dependent. Many species are contained within the genus. Pedobacter is ubiquitous in nature.
Bdellovibrio	112,340	1.0%	Aerobic genus of predatory bacteria. Bdellovibrio invade and consume gram-negative bacteria and are sometimes associated with biofilms. This organism degrades the biofilms of S. aureus, in particular, by obtaining nutrients and secreting proteolytic enzymes which then continues the breakdown cycle. Bdellovibrio is found in soil, sewage and fresh and salt water.
Cellvibrio	100,823	0.9%	Genus of aerobic bacteria. Curdlan (a glucose polymer) is formed from the oxidation of glucose. Cellulose as well as chitin, esculin and pectate are hydrolyzed. Acid is produced from some sugars. Cellvibrio species are generally found in soil.
Subdivision3 genera incertae sedis	96,847	0.8%	This is a subgroup of Verrucomicrobia that includes bacteria isolated from soils, vinyl chloride degrading enrichments, river biofilms, hot springs, and nitrifying-denitrifying activated sludge.
Chryseobacterium	88,405	0.8%	Genus of aerobic chemoorganotrophs. Several types of carbohydrates are utilized as carbon and energy sources. Some species have demonstrated anaerobic respiration with nitrate or fumarate serving as the terminal electron acceptor. Species promote plant growth and at least one strain has shown to produce an anti-corrosion biopolymer. Chryseobacterium is found in many diverse environments including soil, fresh and sea water, and in clinical samples.
Peredibacter	85,481	0.7%	Genus of predatory bacteria. Peredibacter have a biphasic lifestyle and use Gram-negative bacteria as prey. Species have been found in soil.
Gp17	82,898	0.7%	Unclassified Acidobacteria.
Tepidisphaera	71,032	0.6%	Thermophilic genus of facultatively aerobic heterotrophs. Metabolism can be respiratory or fermentative. Mono, di and polysaccharides are utilized as carbon and energy sources. Acetate and propionate are the main products from glucose fermentation. Tepidisphaera was originally isolated from hot springs.
Pantoea	67,568	0.6%	Members of this genus are facultatively anaerobic organisms that have been isolated from soils, plants, and various other environments. They can utilize glucose, fructose, galactose, and various other carbohydrates, organic acids, and amino acids as carbon sources. Of the carbon sources utilized, various sugars can be used to produce acids. This genus also includes one strain that is a plant pathogen.
WPSUnclassified1 genera incertae sedis	65,084	0.6%	Unclassified candidate phylum of Archaea.
Rhizobium	62,133	0.5%	Genus of aerobic chemoorganotrophic symbiotic nitrogen-fixers. A variety of carbohydrates and carboxylates are utilized as carbon and energy sources and nitrates, amino acids and ammonium salts are used as nitrogen sources. Slime is produced from carbohydrates. Vitamins are required for growth. Rhizobium induces hypertrophisms in root nodules of plants.

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Genus	Reads	Percent	Description
Aquabacterium	60,487	0.5%	Capable of microaerophilic growth, Aquabacterium uses nitrate and oxygen as electron acceptors. A broad range of organic acids but not carbohydrates are metabolized. This genus was originally isolated from biofilms in drinking water.
Sunxiuqinia	58,830	0.5%	Aerobic genus of chemoorganoheterotrophs. Metabolism can be respiratory or fermentative. Proteinous substrates are fermented under anaerobic conditions. Species have been isolated from marine sediment.
Mycobacterium	56,657	0.5%	Genus of mostly obligately aerobic, acid-fast-bacteria. Species are highly adaptable, utilizing many types of organic compounds for growth and amino acids, and ammonia as nitrogen sources. Carbon dioxide is required. Mycobacterium species are particularly useful in bioremediation, having been shown to degrade polycyclic aromatic hydrocarbons and pentachlorophenol as well as mineralizing vinyl chloride. Members of this genus are ubiquitous in nature and are found free-living in soil and water and in mammalian and clinical samples.
Massilia	56,613	0.5%	Genus of strictly aerobic chemoorganotrophs. A wide range of organic compounds are used for growth. Massilia species have been isolated from clinical samples, drinking water, soil and air.
Luteolibacter	53,955	0.5%	Genus of strictly aerobic chemoheterotrophs. Luteolibacter is found in aquatic environments, mostly from algae or driftwood.
Omnitrophica genera incertae sedis	48,262	0.4%	Genus of the unclassified Omnitrophica phylum. Not much is known about this group except that they live in anoxic environments. This phylum is part of the Planctomycetes/Verrucomicrobia/Chlamydiae (PVC) superphylum.
Legionella	47,769	0.4%	Genus of aerobic filamentous chemoorganotrophs. Amino acids are generally utilized as carbon and energy sources and require iron salts for growth. Legionella is found in a variety of natural and urban water environments.
Mucinivorans	46,917	0.4%	Anaerobic genus of chemoorganotrophs. Carbohydrate are utilized as carbon and energy sources which may be fermented. Mucin is degraded. Mucinivorans was originally isolated from a leech.
Elizabethkingia	46,592	0.4%	Aerobic genus of chemoorganotrophs. Metabolism is respiratory. Carbohydrates are utilized as carbon and energy sources. Cells possess strong proteolytic capabilities. Elizabethkingia species are ubiquitous in soil and freshwater but have been isolated from clinical samples as well.
Microbacterium	45,464	0.4%	Genus of aerobic chemooganotrophs. A strictly aerobic type of metabolism is seen with some species capable of facultatively anaerobic respiration. A limited range of carbohydrates and organic acids are utilized as carbon and energy sources. Two species, M. oleivorans and M. hydrocarbonoxydans degrade crude oil. Microbacterium can be found in a variety of environmental habitats as well as in clinical samples.

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Genus	Reads	Percent	Description
Methylobacterium	44,119	0.4%	Aerobic genus of chemoorganotrophs and facultative methylotrophs. A variety of C-1 compounds such as formaldehyde, formate and methanol and other multi-carbon carboxylates are utilized as growth substrates. Methylamines may also be used. Methylobacterium is ubiquitous in nature.
Candidatus Endomicrobium	43,494	0.4%	Intracellular symbiont of gut protists (single-celled organisms), mainly termites. This ultramicrobacterium is obligately anaerobic with a heterotrophic type of metabolism. Glucose derivatives are fermented to acetate, lactate, ethanol, CO2 and H2 through glycolysis. Some species are diazotrophs (atmospheric nitrogen fixers).
Simkania	42,345	0.4%	These chlamydia-like organisms may be symbionts of amoebae. Although considered intracellular bacteria, may maintain the ability to utilize glucose directly.
Taibaiella	41,995	0.4%	Aerobic genus of chemoorganotrophs. Carbohydrates and organic acids are utilized as carbon and energy sources. Proteinaceous compounds are degraded. Taibaiella is found in soil.
Fluviicola	39,148	0.3%	Genus of strictly aerobic chemoorganotrophs. A small range of carbohydrates can be utilized for energy and growth. Glucose is not used and cells do not grow in the presence of salt. Fluviicola is found in freshwater.
Phaselicystis	38,503	0.3%	Genus of aerobic chemoheterotrophic myxobacteria. In general, Myxobacteria move by gliding, are known to produce fruiting bodies during starvation conditions, are social - growing in cell communities called swarms. Carbohydrates are utilized as carbon and energy source but Myxobacteria as a characterization are thought to live from the degradation products of biopolymers such as proteins, cellulose, and other cellular constituents. Phaselicystis is found in soil and is resistant to various antibiotics.
Gp16	37,993	0.3%	Unclassified Acidobacteria.
Parachlamydia	36,438	0.3%	Members of this genus are chlamydia-like intracellular organisms that often grow within the free-living amoebae Acanthamoeba using them for replication, as a cosmopolite aquatic reservoir, and a vector. Parachlamydia spp. can also play pathogenic roles in respiratory infections.
Ohtaekwangia	36,303	0.3%	Genus of strictly aerobic bacteria isolated from marine sand.
Methylophilus	36,168	0.3%	Genus of aerobic restricted facultative methylotrophs. Methanol is utilized as the sole energy and carbon source. Some species may be able to use some carbohydrates or methylamines, but not methane. Species have been mostly isolated from soil and air.
Prosthecobacter	35,972	0.3%	Genus of obligately aerobic chemooganotrophs. Carbohydrates are utilized as carbon sources and ammonium as the nitrogen source. Prosthecobacter is found in freshwater.
Microgenomates genera incertae sedis	35,746	0.3%	Unclassified genus within the Microgenomates phylum that is thought to be comprised of heterotrophic and fermentative bacteria found in eutrophic water and soil.

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Genus	Reads	Percent	Description
Aquicella	35,392	0.3%	Genus of intracellular, strictly aerobic chemoorganotrophs. Though not much is known about this bacterium, growth conditions are very specific with cells requiring alpha-ketoglutarate and activated charcoal for growth under lab conditions. Aquicella is found in protozoa, floating-free in water.
Gp6	34,596	0.3%	Unclassified Acidobacteria.
Aeromonas	34,422	0.3%	Genus of facultatively anaerobic chemoorganotrophs. Carbohydrates are fermented. Acids and gas may be produced from fermentation, depending on the species. A number of species are contained within the genus and all are generally resistant to the vibriostatic agent O/129. Aeromonas is ubiquitous in nature, often associated with fish, and clinical samples.
Terrimicrobium	34,148	0.3%	Genus of strictly anaerobic chemoorganotrophs. A limited range of carbohydrates are oxidized or fermented. Acetate and propionate are the main fermentation products from glucose. Terrimicrobium was originally isolated from anoxic rice paddy soil.
Thermomicrobium	32,373	0.3%	Genus of aerobic thermophiles. A range of organic compounds are used as carbon and energy sources. Some species utilized hydrocarbons. Carbon monoxide is oxidized. Thermomicrobium species have been found in geothermally heated environments.
Novosphingobium	32,310	0.3%	Strictly aerobic genus of chemoorganotrophs. A sub-genus of Sphingomonas. Some species reduce nitrate and degrade aromatic compounds with one species capable of polychlorophenol degradation. Novosphingobium is ubiquitous in nature.
Acidovorax	31,288	0.3%	Generally chemoorganotrophic, utilizing O2 as the terminal electron acceptor, this aerobic genus can also grow lithoautotrophically with H2 as the energy source. Organic and amino acids are the main carbon and energy sources. Some strains have also been shown to denitrify nitrate heterotrophically. Acidovorax has been isolated in multiple environments including water, soil and activated sludge.
Xanthomonas	30,431	0.3%	Genus of aerobic Gammaproteobacteria. Xanthan, an extracellular acidic heteropolysaccharide, is secreted by many strains and has many industrial applications. A range of carbohydrates and carboxylates are utilized as carbon and energy sources. Ammonium salts and some amino acids are used as nitrogen sources. Some species of Xanthomonas are capable of degrading aromatics while others are involved in aromatic synthesis. This genus is often found in plants.
Duganella	29,851	0.3%	Aerobic genus of chemoorganotrophs. Cells may form amorphous flocs. A number of carbohydrates and other organic compounds serve as growth substrates. Proteinaceous compounds are hydrolyzed by most species. Duganella species were originally isolated from sewage and polluted water but have also been found in soil, sometimes associated with plants.

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Genus	Reads	Percent	Description
Magnetovibrio	26,083	0.2%	Genus of magnetotactic mixotrophic bacteria. Cell morphology is characterized by the presence of magnetosomes aligned in a chain allowing for rapid movement along geomagnetic field lines. Magnetovibrio can grow under anaerobic and microaerobic conditions. Under chemoorganotrophic growth, organic and amino acids are used as the growth substrates. Thiosulfate and sulfide are utilized for energy under microaerobic conditions. Nitrous oxide is utilized as the electron acceptor with thiosulfate as the donor under anaerobic conditions. Magnetovibrio was originally isolated from a salt marsh.
Victivallis	24,651	0.2%	Strictly anaerobic genus of chemoorganotrophs. Sugars are fermented to acetate, ethanol, hydrogen and bicarbonate. This bacterium was originally isolated from human feces.
Azospirillum	24,144	0.2%	Microaerobic genus of nitrogen-fixing chemoorganotrophs. Metabolism is generally respiratory but can be fermentative also. Carboxylates and certain carbohydrates are utilized as carbon and energy sources. Some strains exhibit autotrophic growth facultatively with hydrogen. This plant growth-promoting rhizobacteria has been isolated from soil or plant material.
Chitinophaga	24,100	0.2%	Genus of aerobic chemoorganotrophic gliding bacteria. Metabolism can be oxidative or fermentative. Most species hydrolyze chitin with some also being able to degrade xylan, cellulose, casein, laminarin and other complex protein or polysaccharides. Chitinophaga is found in soil and as endophytes.
Micromonospora	23,626	0.2%	Aerobic to microaerophilic genus of chemoorganotrophic actinobacteria. Spores are produced. Most carbohydrates are utilized as carbon and energy sources though specificity depends on the species which have biocontrol, biomedicine and bioremediation applications. Micromonospora has been isolated from soil, plants, marine, and freshwater environments.
Melioribacter	23,593	0.2%	Thermophilic genus of facultatively anaerobic organotrophs. Metabolism can be respiratory or fermentative. Fe(III), arsenate and nitrite are used as electron acceptors. Polysaccharides are fermented to H2, acetate and CO2 with trace amounts of lactate. The only known species, M. roseus, was originally isolated from microbial mats.
Povalibacter	23,591	0.2%	Strictly aerobic genus of chemoorganotrophs. Carbohydrates are the main carbon and energy source. Polyvinyl alcohol, anthracene and phenanthrene are degraded. Ammonia is produced from the reduction of nitrate and nitrite acquired through assimilation. Povalibacter was originally isolated from grapes.

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Genus	Reads	Percent	Description
Geobacter	23,348	0.2%	Anaerobic genus of chemoorganotrophs. Fe(III) is used as the sole electron acceptor and acetate as an electron donor. Several Geobacter species also utilize hydrogen as an electron donor. While Geobacter spp. are known as iron reducing bacteria, some species can also utilize a variety of other growth supporting electron acceptors such as elemental sulfur, Mn(IV), and U(VI). Some species have been shown to degrade toluene and benzene. Strains of one species, G. lovleyi, contain a pceA gene and are capable of reductive dechlorination of PCE to cis-DCE. Geobacter species are ubiquitous in nature.
Oligoflexus	23,133	0.2%	Aerobic genus of oligotrophs. The best-known growth occurs under low nutrient conditions. Cell morphology is characterized by the formation of filaments in a helical or long fusiform shape. Oligoflexus was originally isolated from desert sand.
Gemmatimonas	22,979	0.2%	Genus of heterotrophic aerobic to microaerobic bacteria. Certain carboxylates such as acetate, benzoate and succinate are utilized as carbon and energy sources while some sugars are used weakly. At least one species is capable of nitrous oxide reduction with O2 as the electron acceptor. Gemmatimonas species have been isolated from lakes.
Dongia	22,733	0.2%	Strictly aerobic genus of heterotrophs. Carbohydrates and sugar alcohols are utilized as carbon and energy sources. Dongia species have been isolated from soil, freshwater and activated sludge.
Nocardioides	22,348	0.2%	Chemoorganotrophic genus of non-acid-fast aerobic actinomycetes. Cells of most strains form vegetative and aerial hyphae. A variety of carbon and nitrogen sources are used including environmental pollutants such as atrazine, pentachloronitrobenzene and hexachlorobenzene. Nocardioides is usually found in soil.
Pseudoduganella	21,769	0.2%	These are aerobic organisms that have been isolated from soils and marine environments. The type strain is capable of utilizing galactose, glucose, maltose, and a few other organic acids and amino acids as sole carbon sources. A second strain is capable of hydrolyzing aesculin and reducing nitrate to nitrite.
Devosia	21,198	0.2%	Genus of obligately aerobic bacteria. A wide range of organic compounds are utilized as carbon and energy sources and vary between species. Some species are capable of nitrate reduction and can grow in the presence of hydrocarbons. One species, D. glacialis is a known slime producer.
Desulfovibrio	20,767	0.2%	Anerobic genus of halophilic sulfate reducers. Metabolism is respiratory but fermentative growth is possible. Sulfate and other sulfur compounds are reduced to hydrogen sulfide. Under fermentative growth, organic compounds are oxidized incompletely to acetate. Some species can use hydrogen as an electron donor with acetate and CO2 as carbon sources. The species D. desulfuricans has been linked to heavy metal reduction and microbial induced corrosion. Desulfovibrio is found in a variety of environments including anoxic sediment and in mammals.

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Genus	Reads	Percent	Description
Bifidobacterium	20,331	0.2%	Generally anaerobic genus of fermenters. Some species are aerotolerant and can grow under aerobic conditions in the presence of CO2. Acetic and lactic acid are the main fermentation products with ethanol, formic and succinic acid found in small amounts. Morphology of this genus is varied, with cells forming different rod shapes with bends or branched aggregates. Bifidobacteria species are normal fauna of the intestinal tracts of mammals.
Bacteriovorax	19,596	0.2%	Aerobic genus of predatory bacteria with close similarity to Bdellovibrio. Gram-negative bacteria are invaded and consumed. May degrade biofilms. Bacteriovorax is found in marine environments.
Solirubrobacter	19,341	0.2%	Genus of aerobic mesophiles. Amino acids and sugars are utilized as carbon sources. Solirubrobacter species have been isolated from soil environments including ginseng fields.
Dechloromonas	19,092	0.2%	Genus of facultatively anaerobic proteobacteria. This genus utilizes a variety of electron acceptors including chlorate, perchlorate, and oxygen. Organic acids are used as electron donors although sulfide and Fe(II) are also used for chlorate reduction. Some Dechloromonas species perform nitrate reduction coupled with hydrocarbon degradation.
Halobacteriovorax	19,033	0.2%	Genus of predatory bacteria found in aquatic environments.
Lysinibacillus	18,908	0.2%	Aerobic genus of bacteria. A variety of organic compounds are utilized as carbon and energy sources. Some species require or are at least tolerant to boron and at least one species is resistant to chromate. Lysinibacillus species have mostly been isolated from soil.
Reyranella	18,603	0.2%	Genus of microaerophilic to aerobic rods. A variety of organic compounds are utilized for growth and energy. Nitrate is reduced by some species. Reyranella is found in aquatic and soil environments.
Alistipes	18,359	0.2%	Genus of anaerobic chemoorganotrophs. A limited range of carbohydrates are fermented. Glucose fermentation yields succinic acid as the main product. Alistipes has been isolated from human samples and is part of the normal intestinal fauna.
Rhodoferax	18,302	0.2%	Genus of purple nonsulfur bacteria. Species are capable of growth under photosynthetic, aerobic or fermentative conditions. Simple carbon compounds are utilized as carbon and energy sources including lactate, acetate, butyrate, and ethanol. One species, R. fermentans, can grow anaerobically in the light or under aerobic conditions in the dark. Rhodoferax have been isolated from marine environments with some psychrophilic species located in polar environments.
Gp19	18,137	0.2%	Unclassified Acidobacteria.
Gemmata	17,994	0.2%	Genus of aerobic planctomycetes. Sugars and starch are utilized as carbon and energy sources. Gemmata synthesize C30 sterols, an uncommon trait among bacteria. This bacterium is found in freshwater.

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Genus	Reads	Percent	Description
Magnetospirillum	17,961	0.2%	Genus of microaerophilic magnetic chemoorganotrophs. Oxygen is utilized as the terminal electron acceptor. A variety of organic acids are used as carbon and energy sources. Iron is acquired and converted into magnetite and accumulates in the cells as magnetosomes. Respiratory nitrate reduction is possible. Magnetospirillum has been found in freshwater environments
Paludibacter	17,833	0.2%	Genus of anaerobic chemoorganotrophs. Glucose and other carbohydrates are fermented to acetate and propionate with trace amounts to succinate. Paludibacter species were originally isolated from rice paddy soil.
Neochlamydia	16,962	0.1%	Genus of obligately intracellular bacteria. Neochlamydia is found in the amoeba Hartmannella vermiformis.
Kiloniella	16,894	0.1%	Chemoheterotrophic genus of aerobic or facultatively anaerobic bacteria. A number of organic compounds are utilized for growth and energy. Denitrification occurs under anoxic conditions with nitrate or nitrite as the electron acceptor. Kiloniella is found in marine environments, often associated with marine organisms such as sponges and crustaceans.
Hydrogenophaga	16,150	0.1%	Genus of aerobic mixotrophs. This genus can grow chemoorganotrophically using hydrogen as the electron donor and carbon dioxide as the carbon source. Chemolithoautotrophic growth occurs with multiple organic compounds as the carbon source and oxygen as the electron acceptor. Two species, H. pseudoflava and H. taeniospiralis can heterotrophically denitrify nitrate and one species has been shown to degrade MTBE. Hydrogenophaga is widely distributed in soils and aquatic habitats including a waste-oil contaminated site.
Phycisphaera	16,116	0.1%	Facultatively anaerobic genus of chemoorganotrophs. Carbohydrates and some organic acids are used as carbon and energy sources. Seawater is required for growth. Phycisphaera is found in marine environments.
Treponema	15,934	0.1%	Genus of anaerobic to microaerophilic chemoorganotrophic homoacetogens. Many carbohydrates and amino acids are utilized as carbon and energy sources. Acetate is produced from carbon dioxide and hydrogen. Treponema has been isolated from mammalian fauna and from wood-feeding insects.
Bangiophyceae	15,552	0.1%	Genus of unclassified red algae of the Chloroplast family.
Sphingobium	15,166	0.1%	Strictly aerobic genus of chemoorganotrophs isolated from wastewaters and a variety of contaminated soils. While substrates differ greatly between species, strains of some characterized species are capable of utilizing aromatic compounds such as phenanthrene and chlorinated aromatics including chlorophenols.
Nitrospira	15,047	0.1%	Genus of aerobic lithoautotrophs. Nitrite is oxidized to nitrate. Nitrospira has been isolated from a number of environments including soil, salt and freshwater and activated sludge.

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Genus	Reads	Percent	Description
Sandaracinus	14,682	0.1%	Aerobic genus of chemoorganotrophic myxobacteria. In general, Myxobacteria move by gliding, produce fruiting bodies during starvation conditions and are social - growing in cell communities called swarms. Myxobacteria are generally are thought to live from the degradation products of biopolymers such as proteins, cellulose, and other cellular constituents. The type species, S. amylolyticus, was originally isolated from soil.
Desulfomonile	14,572	0.1%	Genus of strictly anaerobic, sulfate reducing bacteria. Some species can grow autotrophically on hydrogen and carbon dioxide with sulfate or thiosulfate as terminal electron acceptors. Acetate and lactate are fermentation products from glucose. Some species are capable of reductive dehalogenation of some chlorophenols or chlorobenzoates. Desulfomonile has been isolated from sediment, soil and sludge.
Armatimonas/ Armatimonadetes gp1	14,413	0.1%	Aerobic genus of unclassified Armatimonadetes. Members of this phylum are characterized by the ability to degrade polysaccharides, are oligotrophs and produce pinkish pigments in cells. Additionally, cells of Armatimonas produce hard colonies. Species are generally found in hot springs or geothermal soils.
Rhizobacter	14,225	0.1%	Aerobic genus of chemoorganotrophs. Cell morphology is characterized by the formation of flocs of globular aggregates. Glucose serves as the sole carbon and energy source. Poly-b-hydroxybutyrate granules accumulate in cells. Rhizobacter is found in soil, often associated with plants.
Shewanella	14,185	0.1%	Chemoheterotrophic genus of facultatively anaerobic bacteria. Metabolism is mostly respiratory but fermentation is possible. While generally known as iron reducing bacteria, Shewanella utilizes a variety of electron acceptors in addition to ferric iron including nitrate oxyanions, amine oxides, sulfur compounds and manganese ions. Due to this metal reducing capability, species are particularly useful in bioremediation efforts. Shewanella is ubiquitous in nature.
Curtobacterium	13,835	0.1%	This is a ubiquitous genus of bacteria that is typically found in various soils and plants. Some strains were isolated from a community that was capable of degrading polyphenols, and other strains can be pathogenic.
Labilithrix	13,720	0.1%	Genus of aerobic and organotrophic myxobacteria. Cell morphology is characterized by cilia protruding from cells resembling fungal mycelium or paramecium. Metabolites are produced. Species have been isolated from forest soils and coal seams.
Clostridium sensu stricto	13,703	0.1%	Obligately anaerobic genus possessing a fermentative type of metabolism. Some species are aerotolerant. Growth requirements vary greatly between species, utilizing a range of compounds. Fermentation end products are usually a combination of alcohols and organic acids. Some species are acetogens.
Roseospira	13,330	0.1%	Genus of phototrophic purple non-sulfur bacteria. This halophilic genus can grow either photoheterotrophically or chemotrophically anoxically in the light and microoxically in the dark. The type species for this genus has a high sulfide tolerance and is capable of sulfide oxidation. Photolithoautotrophic growth can also occur in the presence of sulfide.

Continued on next page

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Table 14: Top genera classification results for sample MW-3. Additional identified genera are included in the accompanying Excel data file.

Genus	Reads	Percent	Description
Filimonas	13,234	0.1%	Members of this genus are strictly aerobic, filamentous organisms that have been isolated from freshwater environments. The type strain utilizes glucose, arabinose, mannose, maltose, galactose, dextrin, and glycerol as carbon sources.
Stenotrophomonas	13,026	0.1%	Genus of aerobic chemoorganotrophs. Metabolism is strictly respiratory with oxygen as the terminal electron acceptor. Biofilm production of Stenotrophomonas has been linked to corrosion of metal surfaces. Some species have shown resistance to hexavalent chromium and to degrade xenobiotic compounds. This organism is ubiquitous in the environment but has also been found in clinical samples.
Verrucomicrobium	12,993	0.1%	Genus of aerobic or facultatively anaerobic unicellular bacteria. Morphology is characterized by fimbriae (fingerlike projections) extending from numerous prosthecae (appendages). A wide variety of organic acids and carbohydrates are utilized as carbon and energy sources. Glucose and other sugars may be fermented under anaerobic conditions. Verrucomicrobium was originally isolated from a eutrophic (high nutrient) lake.
Thermodesulfovibrio	12,990	0.1%	Thermophilic genus of anaerobic sulfate-reducing bacteria. Sulfate and thiosulfate are generally utilized as electron acceptors but sulfite, nitrate, and Fe (III) may also be used depending on the species. Syntrophic growth with a hydrogenotrophic methanogen is also possible. Organic compounds are oxidized completely to acetate. Members of this genus have been isolated from hot springs and sludge.
Spirochaeta	12,924	0.1%	Anaerobic or facultatively anaerobic genus of helical chemoorganotrophs. Yellow-orange carotenoid pigments are produced under aerobic conditions. Carbohydrates are utilized as carbon and energy sources oxidatively. The main products are ethanol, acetate, CO2 and H2. Some species are thermophilic. Spirochaeta is generally found in freshwater environments but have also been detected in oil fields and termite guts.
Desulfobacterium	12,796	0.1%	Strictly anaerobic genus of chemoorganotrophic or chemoautotrophic bacteria. A variety of compounds are utilized as electron donors and energy sources including carboxylates, organic acids, alcohols and hydrogen and carbon dioxide. Sulfate and other oxidized sulfur compounds are reduced to hydrogen sulfide. Growth can also occur fermentatively. Carbon dioxide fixation is also possible, but seawater or magnesium chloride are required. Desulfobacterium is generally found in marine environments.
Subdivision5 genera incertae sedis	12,488	0.1%	This is a subgroup of Verrucomicrobia that includes organisms that were isolated from a hydrocarbon and chlorinated-solvent-contaminated aquifer.

Continued on next page

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Table 14: Top genera classification results for sample MW-3. Additional identified genera are included in the accompanying Excel data file.

Genus	Reads	Percent	Description
Paenibacillus	12,342	0.1%	Genus of metabolically diverse species. Some species are facultatively anaerobic fermenters, using nitrate as an electron acceptor while others are strictly aerobic. Paenibacillus form endospores with some species producing an extracellular polysaccharide (EPS) which is useful in a variety of industries. Carbohydrates are generally utilized as carbon and energy sources. Hydrocarbons are also degraded by a few strains. This genus often promotes plant growth. Paenibacillus is ubiquitous in nature.
Chryseolinea	12,245	0.1%	Strictly aerobic genus of chemoheterotrophs. Carbohydrates including some polysaccharides but no alcohols are utilized as carbon and energy sources. Chryseolinea is found in soil.

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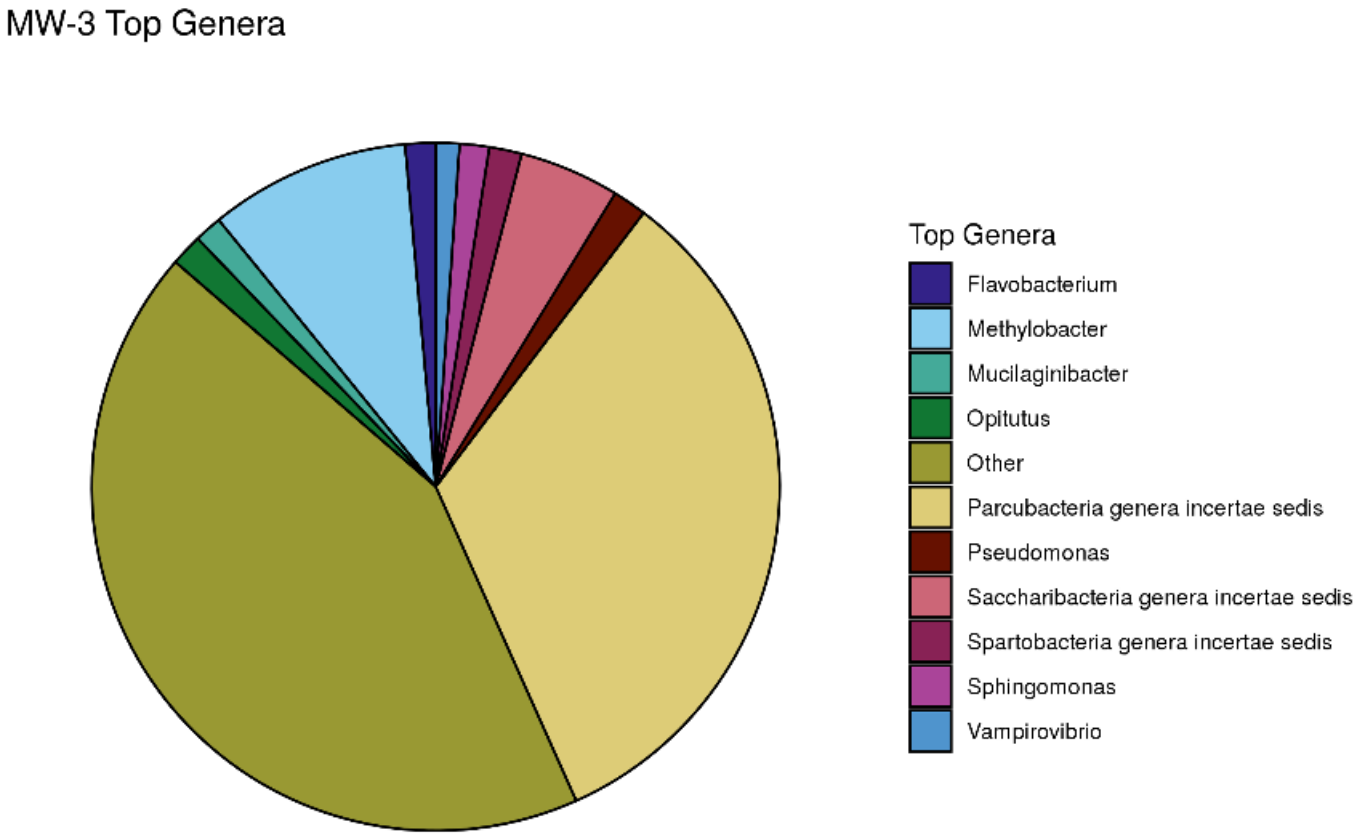

Figure 11: Top Genus Classification Results for MW-3

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Interpretation

Diversity Indices

The Shannon diversity index is a quantitative measurement that characterizes how many different genera are present in the sample and takes into account the distribution of the number of organisms classified to each genus present in the sample (commonly referred to as species eveness) [1, 2]. Shannon's diversity index increases in value as the number of genera increases and as the number of organisms present per genera becomes even. Simpson's index measures the probability that two individuals selected randomly from the sample would belong to different genera: the greater the value, the greater the sample diversity. The Chao1 index is an excellent indicator of species richness and is based on the number of reads when one (singleton) or two (doubleton) operational taxonomic units (OTUs) are observed. This value is the predicted number of genera based on the number of singletons and doubletons. The total genera observed is presented here, but does not include reads unclassified at genus species.

Principal Coordinate Analysis

Principal coordinate analysis (PCoA) is an excellent tool for visualizing differences in microbial communities between samples [3]. Unlike more traditional methods such as principal component analysis (PCA), PCoA calculates complex functions for the axes rather than dimensional scaling used in PCA. Therefore, PCoA is able to better demonstrate dissimilarities that may be nuanced in PCA tests. PCoA accomplishes this by using a dissimilarity matrix to assign each sample a location in dimensional space, then changes the coordinate system to display the data in two dimensions.

Hierarchical Clustering Dendrogram

Hierarchical clustering is accomplished by comparing dissimilarities between the samples using complete agglomeration of the Bray-Curtis dissimilarity. This groups samples which are the least dissimilar together. The length of the branches indicate the amount of dissimilarity between samples. Therefore, shorter branches are more similar. The stacked bar chart below each leaf of the tree represents the relative abundance of genus-level classifications.

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References

1. Gotelli, N. J. & Colwell, R. K. Quantifying biodiversity: procedures and pitfalls in the measurement and comparison of species richness. *Ecology letters* **4,** 379–391 (2001).
2. Hill, M. O. Diversity and evenness: a unifying notation and its consequences. *Ecology* **54,** 427–432 (1973).
3. Buttigieg, P. L. & Ramette, A. A guide to statistical analysis in microbial ecology: a community-focused, living review of multivariate data analyses. *FEMS Microbiology Ecology* **90,** 543–550. ISSN: 1574-6941 (2014).

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Pace® Location Requested (City/State):
Pace Analytical Green Bay
1241 Bellevue Street, Suite 9
Green Bay, WI 54302

CHAIN-OF-CUSTODY Analytical Request Document

Chain-of-Custody is a LEGAL DOCUMENT - Complete all relevant fields

LAB USE ONLY- Affix Workorder/Login Label Here

Scan QR Code for instructions

Company Name:	Fehr Graham_WI	Contact/Report To:	Matt Dahlem
Street Address:	909 N. 8th Street Suite 101 Sheboygan, WI 53081	Phone #:	920-892-2444
		E-Mail:	mdahlem@fehr-graham.com
		Cc E-Mail:	jmirfield@crinrt.com dplamann@fehrgraham.com
Customer Project #:	24-1675	Invoice To:	Accounts Payable
Project Name:	Dane Co Aiport 3-month	Invoice E-Mail:	ap@fehr-graham.com
Site Collection Info/Facility ID (as applicable):	Airport CRIN Dane County	Purchase Order # (if applicable):	
		Quote #:	
Time Zone Collected:	[ ] AK [ ] PT [ ] MT [X] CT [ ] ET	County / State origin of sample(s):	Wisconsin
Data Deliverables:	[ ] Level II [ ] Level III [ ] Level IV [ ] EQUIS [ ] Other	Regulatory Program (DW, RCRA, etc.) as applicable:	Reportable [ ] Yes [ ] No
		Rush (Pre-approval required):	[ ] Same Day [ ] 1 Day [ ] 2 Day [ ] 3 Day [ ] Other _____
		DW PWSID # or WW Permit # as applicable:	
		Date Results Requested:	Standard
		Field Filtered (if applicable):	[ ] Yes [X] No
		Analysis:	

* Matrix Codes (Insert in Matrix box below): Drinking Water (DW), Ground Water (GW), Waste Water (WW), Product (P), Soil/Solid (SS), Oil (OL), Wipe (WP), Tissue (TS), Bioassay (B), Vapor (V), Surface Water (SW),Sediment (SED), Sludge (SL), Caulk (CK), Leachate (LL), Biosolid (BS), Other (OT)

Specify Container Size **: 1

Identify Container Preservative Type***: 1

**Container Size: (1) 1L, (2) 500mL, (3) 250mL, (4) 125mL, (5) 100mL, (6) 40mL vial, (7) EnCore, (8) TerraCore, (9) 90mL, (10) Other

*** Preservative Types: (1) None, (2) HNO3, (3) H2SO4, (4) HCl, (5) NaOH, (6) Zn Acetate, (7) NaHSO4, (8) Sod. Thiosulfate, (9) Ascorbic Acid, (10) MeOH, (11) Other

Lab Use Only: Proj. Mgr: Christopher Hyska; AcctNum / Client ID:; Table #:; Profile / Template: 4096; Prelog / Bottle Ord. ID: EZ 3267480

	Customer Sample ID	Matrix *	Comp / Grab	Composite Start Date	Composite Start Time	Collected or Composite End Date	Collected or Composite End Time	# Cont.	Res. Chlorine Results	Res. Chlorine Units	Microbial assay (genus level) via qPCR (Lab Filter samples)	Analysis Requested: # qPCR modified SIG	Sample Comment	Preservation non-conformance identified for sample.
1	MW-5	GW	G			8/18/25	935	1			2	2		
2	MW-4	GW	G			8/18/25	1055	1			2	2		
3	MW-3	GW	G			8/18/25	1310	1			2	2		

PS PS PS 10

Additional Instructions from Pace®:
See Chris Hyska - Pace Green Bay, WI for questions (christopher.hyska@pacelabs.com)

Collected By: (Printed Name) Philip Simenten
Signature: Philip Simenten

Customer Remarks / Special Conditions / Possible Hazards:

# Coolers:	Thermometer ID:	Correction Factor (°C):	Obs. Temp. (°C)	Corrected Temp. (°C)	On Ice:

	Date/Time:	Received by/Company: (Signature)	Date/Time:
Relinquished by/Company: (Signature) Philip Simenten	8/18/2025 1520		8/19/25 0935
Relinquished by/Company: (Signature)	Date/Time:	Received by/Company: (Signature)	Date/Time:
Relinquished by/Company: (Signature)	Date/Time:	Received by/Company: (Signature)	Date/Time:
Relinquished by/Company: (Signature)	Date/Time:	Received by/Company: (Signature)	Date/Time:

Tracking Number:

Delivered by: [ ] In-Person [ ] Courier [ ] FedEX [ ] UPS [ ] Other

Pace Analytical Services, LLC
1241 Bellevue Street - Suite 9
Green Bay, WI 54302
(920)469-2436

September 22, 2025

Jacob Mirfield
ORIN Technologies
405 Investment Court
Verona, WI 53593

RE: Project: DBP
Pace Project No.: 40300904

Dear Jacob Mirfield:

Enclosed are the analytical results for sample(s) received by the laboratory on August 29, 2025. The results relate only to the samples included in this report. Results reported herein conform to the applicable TNI/NELAC Standards and the laboratory's Quality Manual, where applicable, unless otherwise noted in the body of the report.

The test results provided in this final report were generated by each of the following laboratories within the Pace Network:

- Pace Analytical Services - Minneapolis

For WIDNR, reporting of results by method EPA 1633 is equivalent to the reporting of results by method EPA 1633A for PAS-Minneapolis laboratory.

If you have any questions concerning this report, please feel free to contact me.

Sincerely,

Christopher Hyska

Christopher Hyska
christopher.hyska@pacelabs.com
(920)469-2436
Project Manager

Enclosures

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
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CERTIFICATIONS

Project: DBP
Pace Project No.: 40300904

Pace Analytical Services, LLC - Minneapolis MN
1700 Elm Street SE, Minneapolis, MN 55414
Alabama Certification #: 40770
Alaska Contaminated Sites Certification #: 17-009
Alaska DW Certification #: MN00064
Arizona Certification #: AZ0014
Arkansas DW Certification #: MN00064
Arkansas WW Certification #: 88-0680
California Certification #: 2929
Colorado Certification #: MN00064
Connecticut Certification #: PH-0256
DoD Certification via A2LA #: 2926.01
EPA Region 8 Tribal Water Systems+Wyoming DW Certification #: via MN 027-053-137
Florida Certification #: E87605
Georgia Certification #: 959
Idaho Certification #: MN00064
Illinois Certification #: 200011
Indiana Certification #: C-MN-01
Iowa Certification #: 368
ISO/IEC 17025 Certification via A2LA #: 2926.01
Kansas Certification #: E-10167
Kentucky DW Certification #: 90062
Kentucky WW Certification #: 90062
Louisiana DEQ Certification #: AI-03086
Louisiana DW Certification #: MN00064
Maine Certification #: MN00064
Maryland Certification #: 322
Michigan Certification #: 9909
Minnesota Certification #: 027-053-137
Minnesota Dept of Ag Approval: via MN 027-053-137
Minnesota Petrofund Registration #: 1240
Mississippi Certification #: MN00064
Missouri Certification #: 10100
Montana Certification #: CERT0092
Nebraska Certification #: NE-OS-18-06
Nevada Certification #: MN00064
New Hampshire Certification #: 2081
New Jersey Certification #: MN002
New York Certification #: 11647
North Carolina DW Certification #: 27700
North Carolina WW Certification #: 530
North Dakota Certification via A2LA #: R-036
North Dakota Certification via MN #: R-036
Ohio DW Certification #: 41244
Ohio VAP Certification (1700) #: CL101
Oklahoma Certification #: 9507
Oregon Primary Certification #: MN300001
Oregon Secondary Certification #: MN200001
Pennsylvania Certification #: 68-00563
Puerto Rico Certification #: MN00064
South Carolina Certification #:74003001
Tennessee Certification #: TN02818
Texas Certification #: T104704192
Utah Certification #: MN00064
Vermont Certification #: VT-027053137
Virginia Certification #: 460163
Washington Certification #: C486
West Virginia DEP Certification #: 382
West Virginia DW Certification #: 9952 C
Wisconsin Certification #: 999407970
Wyoming UST Certification via A2LA #: 2926.01
USDA Permit #: P330-19-00208

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SAMPLE SUMMARY

Project: DBP
Pace Project No.: 40300904

Lab ID	Sample ID	Matrix	Date Collected	Date Received
40300904001	**MW3**	Water	08/28/25 13:00	08/29/25 09:15
40300904002	**MW4**	Water	08/28/25 13:00	08/29/25 09:15
40300904003	**MW5**	Water	08/28/25 13:00	08/29/25 09:15
40300904004	**MW6**	Water	08/28/25 13:00	08/29/25 09:15
40300904005	**MW8**	Water	08/28/25 13:00	08/29/25 09:15
40300904006	**MW9**	Water	08/28/25 13:00	08/29/25 09:15
40300904007	**MW10**	Water	08/28/25 13:00	08/29/25 09:15
40300904008	**PZ1**	Water	08/28/25 13:00	08/29/25 09:15

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SAMPLE ANALYTE COUNT

Project: DBP
Pace Project No.: 40300904

Lab ID	Sample ID	Method	Analysts	Analytes Reported	Laboratory
40300904001	**MW3**	EPA 1633	AJG, CS4, NBH	65	PASI-M
40300904002	**MW4**	EPA 1633	MJL	65	PASI-M
40300904003	**MW5**	EPA 1633	CS4, MJL	65	PASI-M
40300904004	**MW6**	EPA 1633	CS4, MJL	65	PASI-M
40300904005	**MW8**	EPA 1633	AJG, NBH	65	PASI-M
40300904006	**MW9**	EPA 1633	MJL	65	PASI-M
40300904007	**MW10**	EPA 1633	CS4, MJL, NBH	65	PASI-M
40300904008	**PZ1**	EPA 1633	AJG, CS4, NBH	65	PASI-M

PASI-M = Pace Analytical Services - Minneapolis

Pace Analytical Services, LLC
1241 Bellevue Street - Suite 9
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ANALYTICAL RESULTS

Project: DBP
Pace Project No.: 40300904

Sample: MW3 **Lab ID: 40300904001** Collected: 08/28/25 13:00 Received: 08/29/25 09:15 Matrix: Water

Parameters	Results	Units	LOQ	LOD	DF	Prepared	Analyzed	CAS No.	Qual
EPA 1633F Water	Analytical Method: EPA 1633 Preparation Method: EPA 1633								
	Pace Analytical Services - Minneapolis								
11Cl-PF3OUdS	**<1.9**	ng/L	6.2	1.9	1	09/06/25 09:40	09/08/25 19:29	763051-92-9	
3:3 FTCA	**<2.1**	ng/L	7.7	2.1	1	09/06/25 09:40	09/08/25 19:29	356-02-5	
4:2 FTS	**<1.5**	ng/L	6.2	1.5	1	09/06/25 09:40	09/08/25 19:29	757124-72-4	
5:3 FTCA	**<9.3**	ng/L	38.6	9.3	1	09/06/25 09:40	09/08/25 19:29	914637-49-3	
6:2 FTS	**32.1**	ng/L	6.2	1.8	1	09/06/25 09:40	09/08/25 19:29	27619-97-2	
7:3 FTCA	**<11.0**	ng/L	38.6	11.0	1	09/06/25 09:40	09/08/25 19:29	812-70-4	
8:2 FTS	**<1.6**	ng/L	6.2	1.6	1	09/06/25 09:40	09/08/25 19:29	39108-34-4	
9Cl-PF3ONS	**<1.6**	ng/L	6.2	1.6	1	09/06/25 09:40	09/08/25 19:29	756426-58-1	
ADONA	**<1.8**	ng/L	6.2	1.8	1	09/06/25 09:40	09/08/25 19:29	919005-14-4	
HFPO-DA	**<1.7**	ng/L	6.2	1.7	1	09/06/25 09:40	09/08/25 19:29	13252-13-6	
NEtFOSAA	**<0.64**	ng/L	1.5	0.64	1	09/06/25 09:40	09/08/25 19:29	2991-50-6	
NEtFOSA	**<0.49**	ng/L	1.5	0.49	1	09/06/25 09:40	09/08/25 19:29	4151-50-2	
NEtFOSE	**<4.0**	ng/L	15.4	4.0	1	09/06/25 09:40	09/08/25 19:29	1691-99-2	
NFDHA	**<1.3**	ng/L	3.1	1.3	1	09/06/25 09:40	09/08/25 19:29	151772-58-6	
NMeFOSAA	**<0.48**	ng/L	1.5	0.48	1	09/06/25 09:40	09/08/25 19:29	2355-31-9	
NMeFOSA	**<0.48**	ng/L	1.5	0.48	1	09/06/25 09:40	09/08/25 19:29	31506-32-8	
NMeFOSE	**<4.0**	ng/L	15.4	4.0	1	09/06/25 09:40	09/08/25 19:29	24448-09-7	
PFBS	**1170**	ng/L	15.4	4.1	10	09/06/25 09:40	09/09/25 15:42	375-73-5	
PFDA	**5.7**	ng/L	1.5	0.48	1	09/06/25 09:40	09/08/25 19:29	335-76-2	
PFHxA	**4090**	ng/L	154	37.1	100	09/06/25 09:40	09/09/25 15:53	307-24-4	
PFBA	**914**	ng/L	6.2	1.5	1	09/06/25 09:40	09/08/25 19:29	375-22-4	
PFDS	**<0.66**	ng/L	1.5	0.66	1	09/06/25 09:40	09/08/25 19:29	335-77-3	
PFDoS	**<0.33**	ng/L	1.5	0.33	1	09/06/25 09:40	09/08/25 19:29	79780-39-5	
PFEESA	**0.72J**	ng/L	3.1	0.67	1	09/06/25 09:40	09/08/25 19:29	113507-82-7	
PFHpS	**113**	ng/L	1.5	0.45	1	09/06/25 09:40	09/08/25 19:29	375-92-8	
PFMBA	**0.84J**	ng/L	3.1	0.75	1	09/06/25 09:40	09/08/25 19:29	863090-89-5	
PFMPA	**1.9J**	ng/L	3.1	0.60	1	09/06/25 09:40	09/08/25 19:29	377-73-1	
PFNS	**0.59J**	ng/L	1.5	0.46	1	09/06/25 09:40	09/08/25 19:29	68259-12-1	
PFOSA	**6.5**	ng/L	1.5	0.47	1	09/06/25 09:40	09/08/25 19:29	754-91-6	
PFPeA	**3300**	ng/L	30.9	9.2	10	09/06/25 09:40	09/09/25 15:42	2706-90-3	
PFPeS	**1810**	ng/L	15.4	3.7	10	09/06/25 09:40	09/09/25 15:42	2706-91-4	
PFDoA	**<0.47**	ng/L	1.5	0.47	1	09/06/25 09:40	09/08/25 19:29	307-55-1	
PFHpA	**1800**	ng/L	15.4	5.9	10	09/06/25 09:40	09/09/25 15:42	375-85-9	
PFHxS	**40800**	ng/L	154	39.6	100	09/06/25 09:40	09/09/25 15:53	355-46-4	E
PFNA	**304**	ng/L	1.5	0.50	1	09/06/25 09:40	09/08/25 19:29	375-95-1	
PFOS	**1410**	ng/L	15.4	3.8	10	09/06/25 09:40	09/09/25 15:42	1763-23-1	
PFOA	**5440**	ng/L	154	47.0	100	09/06/25 09:40	09/09/25 15:53	335-67-1	
PFTeDA	**<0.40**	ng/L	1.5	0.40	1	09/06/25 09:40	09/08/25 19:29	376-06-7	
PFTrDA	**<0.44**	ng/L	1.5	0.44	1	09/06/25 09:40	09/08/25 19:29	72629-94-8	
PFUnA	**0.88J**	ng/L	1.5	0.34	1	09/06/25 09:40	09/08/25 19:29	2058-94-8	
Surrogates									
13C2-PFDoA (S)	60	%.	10-130		1	09/06/25 09:40	09/08/25 19:29		
13C3HFPO-DA (S)	86	%.	40-130		1	09/06/25 09:40	09/08/25 19:29		
13C3-PFBS (S)	128	%.	40-135		1	09/06/25 09:40	09/08/25 19:29		
13C3-PFHxS (S)	42	%.	40-130		1	09/06/25 09:40	09/08/25 19:29		

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
1241 Bellevue Street - Suite 9
Green Bay, WI 54302
(920)469-2436

ANALYTICAL RESULTS

Project: DBP
Pace Project No.: 40300904

Sample: MW3 **Lab ID: 40300904001** Collected: 08/28/25 13:00 Received: 08/29/25 09:15 Matrix: Water

Parameters	Results	Units	LOQ	LOD	DF	Prepared	Analyzed	CAS No.	Qual
EPA 1633F Water	Analytical Method: EPA 1633 Preparation Method: EPA 1633 Pace Analytical Services - Minneapolis								
Surrogates									
13C4-PFBA (S)	76	%.	5-130		1	09/06/25 09:40	09/08/25 19:29		
13C4-PFHpA (S)	74	%.	40-130		1	09/06/25 09:40	09/08/25 19:29		
13C5-PFHxA (S)	63	%.	40-130		1	09/06/25 09:40	09/08/25 19:29		
13C5-PFPeA (S)	75	%.	40-130		1	09/06/25 09:40	09/08/25 19:29		
13C6-PFDA (S)	65	%.	40-130		1	09/06/25 09:40	09/08/25 19:29		
13C8-PFOA (S)	65	%.	40-130		1	09/06/25 09:40	09/08/25 19:29		
13C8-PFOS (S)	66	%.	40-130		1	09/06/25 09:40	09/08/25 19:29		
13C8-PFOSA (S)	71	%.	40-130		1	09/06/25 09:40	09/08/25 19:29		
13C9-PFNA (S)	65	%.	40-130		1	09/06/25 09:40	09/08/25 19:29		
d3-MeFOSAA (S)	58	%.	40-170		1	09/06/25 09:40	09/08/25 19:29		
d3-NMeFOSA (S)	61	%.	10-130		1	09/06/25 09:40	09/08/25 19:29		
d5-EtFOSAA (S)	51	%.	25-135		1	09/06/25 09:40	09/08/25 19:29		
d5-NEtFOSA (S)	56	%.	10-130		1	09/06/25 09:40	09/08/25 19:29		
d7-NMeFOSE (S)	53	%.	10-130		1	09/06/25 09:40	09/08/25 19:29		
d9-NEtFOSE (S)	51	%.	10-130		1	09/06/25 09:40	09/08/25 19:29		
13C2-PFTA (S)	63	%.	10-130		1	09/06/25 09:40	09/08/25 19:29		
13C7-PFUdA (S)	66	%.	30-130		1	09/06/25 09:40	09/08/25 19:29		
13C24:2FTS (S)	237	%.	40-200		1	09/06/25 09:40	09/08/25 19:29		S0
13C26:2FTS (S)	238	%.	40-200		1	09/06/25 09:40	09/08/25 19:29		S0
13C28:2FTS (S)	271	%.	40-300		1	09/06/25 09:40	09/08/25 19:29		
13C3-PFPrA (S)	5	%.	5-130		1	09/06/25 09:40	09/08/25 19:29		

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
1241 Bellevue Street - Suite 9
Green Bay, WI 54302
(920)469-2436

ANALYTICAL RESULTS

Project: DBP
Pace Project No.: 40300904

Sample: MW4 **Lab ID: 40300904002** Collected: 08/28/25 13:00 Received: 08/29/25 09:15 Matrix: Water

Parameters	Results	Units	LOQ	LOD	DF	Prepared	Analyzed	CAS No.	Qual
EPA 1633F Water	Analytical Method: EPA 1633 Preparation Method: EPA 1633 Pace Analytical Services - Minneapolis								
11Cl-PF3OUdS	**<1.9**	ng/L	6.1	1.9	1	09/06/25 09:40	09/08/25 19:40	763051-92-9	
3:3 FTCA	**<2.1**	ng/L	7.7	2.1	1	09/06/25 09:40	09/08/25 19:40	356-02-5	
4:2 FTS	**<1.5**	ng/L	6.1	1.5	1	09/06/25 09:40	09/08/25 19:40	757124-72-4	
5:3 FTCA	**<9.2**	ng/L	38.3	9.2	1	09/06/25 09:40	09/08/25 19:40	914637-49-3	
6:2 FTS	**<1.8**	ng/L	6.1	1.8	1	09/06/25 09:40	09/08/25 19:40	27619-97-2	
7:3 FTCA	**<10.9**	ng/L	38.3	10.9	1	09/06/25 09:40	09/08/25 19:40	812-70-4	
8:2 FTS	**<1.6**	ng/L	6.1	1.6	1	09/06/25 09:40	09/08/25 19:40	39108-34-4	
9Cl-PF3ONS	**<1.6**	ng/L	6.1	1.6	1	09/06/25 09:40	09/08/25 19:40	756426-58-1	
ADONA	**<1.8**	ng/L	6.1	1.8	1	09/06/25 09:40	09/08/25 19:40	919005-14-4	
HFPO-DA	**<1.7**	ng/L	6.1	1.7	1	09/06/25 09:40	09/08/25 19:40	13252-13-6	
NEtFOSAA	**<0.64**	ng/L	1.5	0.64	1	09/06/25 09:40	09/08/25 19:40	2991-50-6	
NEtFOSA	**<0.48**	ng/L	1.5	0.48	1	09/06/25 09:40	09/08/25 19:40	4151-50-2	
NEtFOSE	**<4.0**	ng/L	15.3	4.0	1	09/06/25 09:40	09/08/25 19:40	1691-99-2	
NFDHA	**<1.3**	ng/L	3.1	1.3	1	09/06/25 09:40	09/08/25 19:40	151772-58-6	
NMeFOSAA	**<0.48**	ng/L	1.5	0.48	1	09/06/25 09:40	09/08/25 19:40	2355-31-9	
NMeFOSA	**<0.47**	ng/L	1.5	0.47	1	09/06/25 09:40	09/08/25 19:40	31506-32-8	
NMeFOSE	**<3.9**	ng/L	15.3	3.9	1	09/06/25 09:40	09/08/25 19:40	24448-09-7	
PFBS	**0.81J**	ng/L	1.5	0.40	1	09/06/25 09:40	09/08/25 19:40	375-73-5	
PFDA	**<0.47**	ng/L	1.5	0.47	1	09/06/25 09:40	09/08/25 19:40	335-76-2	
PFHxA	**2.3**	ng/L	1.5	0.37	1	09/06/25 09:40	09/08/25 19:40	307-24-4	
PFBA	**131**	ng/L	6.1	1.5	1	09/06/25 09:40	09/08/25 19:40	375-22-4	
PFDS	**<0.66**	ng/L	1.5	0.66	1	09/06/25 09:40	09/08/25 19:40	335-77-3	
PFDoS	**<0.33**	ng/L	1.5	0.33	1	09/06/25 09:40	09/08/25 19:40	79780-39-5	
PFEESA	**<0.66**	ng/L	3.1	0.66	1	09/06/25 09:40	09/08/25 19:40	113507-82-7	
PFHpS	**<0.45**	ng/L	1.5	0.45	1	09/06/25 09:40	09/08/25 19:40	375-92-8	
PFMBA	**<0.74**	ng/L	3.1	0.74	1	09/06/25 09:40	09/08/25 19:40	863090-89-5	
PFMPA	**<0.60**	ng/L	3.1	0.60	1	09/06/25 09:40	09/08/25 19:40	377-73-1	
PFNS	**<0.45**	ng/L	1.5	0.45	1	09/06/25 09:40	09/08/25 19:40	68259-12-1	
PFOSA	**<0.47**	ng/L	1.5	0.47	1	09/06/25 09:40	09/08/25 19:40	754-91-6	
PFPeA	**19.8**	ng/L	3.1	0.91	1	09/06/25 09:40	09/08/25 19:40	2706-90-3	
PFPeS	**0.47J**	ng/L	1.5	0.36	1	09/06/25 09:40	09/08/25 19:40	2706-91-4	
PFDoA	**<0.47**	ng/L	1.5	0.47	1	09/06/25 09:40	09/08/25 19:40	307-55-1	
PFHpA	**0.66J**	ng/L	1.5	0.59	1	09/06/25 09:40	09/08/25 19:40	375-85-9	
PFHxS	**7.4**	ng/L	1.5	0.39	1	09/06/25 09:40	09/08/25 19:40	355-46-4	
PFNA	**<0.50**	ng/L	1.5	0.50	1	09/06/25 09:40	09/08/25 19:40	375-95-1	
PFOS	**3.6**	ng/L	1.5	0.38	1	09/06/25 09:40	09/08/25 19:40	1763-23-1	
PFOA	**3.8**	ng/L	1.5	0.47	1	09/06/25 09:40	09/08/25 19:40	335-67-1	
PFTeDA	**<0.40**	ng/L	1.5	0.40	1	09/06/25 09:40	09/08/25 19:40	376-06-7	
PFTrDA	**<0.43**	ng/L	1.5	0.43	1	09/06/25 09:40	09/08/25 19:40	72629-94-8	
PFUnA	**<0.34**	ng/L	1.5	0.34	1	09/06/25 09:40	09/08/25 19:40	2058-94-8	
Surrogates									
13C2-PFDoA (S)	43	%.	10-130		1	09/06/25 09:40	09/08/25 19:40		
13C3HFPO-DA (S)	45	%.	40-130		1	09/06/25 09:40	09/08/25 19:40		
13C3-PFBS (S)	47	%.	40-135		1	09/06/25 09:40	09/08/25 19:40		
13C3-PFHxS (S)	44	%.	40-130		1	09/06/25 09:40	09/08/25 19:40		

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
1241 Bellevue Street - Suite 9
Green Bay, WI 54302
(920)469-2436

ANALYTICAL RESULTS

Project: DBP
Pace Project No.: 40300904

Sample: MW4 **Lab ID: 40300904002** Collected: 08/28/25 13:00 Received: 08/29/25 09:15 Matrix: Water

Parameters	Results	Units	LOQ	LOD	DF	Prepared	Analyzed	CAS No.	Qual
EPA 1633F Water	Analytical Method: EPA 1633 Preparation Method: EPA 1633 Pace Analytical Services - Minneapolis								
Surrogates									
13C4-PFBA (S)	46	%.	5-130		1	09/06/25 09:40	09/08/25 19:40		
13C4-PFHpA (S)	45	%.	40-130		1	09/06/25 09:40	09/08/25 19:40		
13C5-PFHxA (S)	45	%.	40-130		1	09/06/25 09:40	09/08/25 19:40		
13C5-PFPeA (S)	47	%.	40-130		1	09/06/25 09:40	09/08/25 19:40		
13C6-PFDA (S)	44	%.	40-130		1	09/06/25 09:40	09/08/25 19:40		
13C8-PFOA (S)	44	%.	40-130		1	09/06/25 09:40	09/08/25 19:40		
13C8-PFOS (S)	42	%.	40-130		1	09/06/25 09:40	09/08/25 19:40		
13C8-PFOSA (S)	36	%.	40-130		1	09/06/25 09:40	09/08/25 19:40		S0
13C9-PFNA (S)	44	%.	40-130		1	09/06/25 09:40	09/08/25 19:40		
d3-MeFOSAA (S)	37	%.	40-170		1	09/06/25 09:40	09/08/25 19:40		S0
d3-NMeFOSA (S)	33	%.	10-130		1	09/06/25 09:40	09/08/25 19:40		
d5-EtFOSAA (S)	35	%.	25-135		1	09/06/25 09:40	09/08/25 19:40		
d5-NEtFOSA (S)	35	%.	10-130		1	09/06/25 09:40	09/08/25 19:40		
d7-NMeFOSE (S)	34	%.	10-130		1	09/06/25 09:40	09/08/25 19:40		
d9-NEtFOSE (S)	34	%.	10-130		1	09/06/25 09:40	09/08/25 19:40		
13C2-PFTA (S)	44	%.	10-130		1	09/06/25 09:40	09/08/25 19:40		
13C7-PFUdA (S)	40	%.	30-130		1	09/06/25 09:40	09/08/25 19:40		
13C24:2FTS (S)	48	%.	40-200		1	09/06/25 09:40	09/08/25 19:40		
13C26:2FTS (S)	55	%.	40-200		1	09/06/25 09:40	09/08/25 19:40		
13C28:2FTS (S)	69	%.	40-300		1	09/06/25 09:40	09/08/25 19:40		
13C3-PFPrA (S)	39	%.	5-130		1	09/06/25 09:40	09/08/25 19:40		

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
1241 Bellevue Street - Suite 9
Green Bay, WI 54302
(920)469-2436

ANALYTICAL RESULTS

Project: DBP
Pace Project No.: 40300904

Sample: MW5 **Lab ID: 40300904003** Collected: 08/28/25 13:00 Received: 08/29/25 09:15 Matrix: Water

Parameters	Results	Units	LOQ	LOD	DF	Prepared	Analyzed	CAS No.	Qual
EPA 1633F Water	Analytical Method: EPA 1633 Preparation Method: EPA 1633 Pace Analytical Services - Minneapolis								
11Cl-PF3OUdS	**<1.8**	ng/L	6.1	1.8	1	09/06/25 09:40	09/08/25 19:50	763051-92-9	
3:3 FTCA	**5.6J**	ng/L	7.6	2.1	1	09/06/25 09:40	09/08/25 19:50	356-02-5	
4:2 FTS	**<1.5**	ng/L	6.1	1.5	1	09/06/25 09:40	09/08/25 19:50	757124-72-4	
5:3 FTCA	**12.5J**	ng/L	37.9	9.1	1	09/06/25 09:40	09/08/25 19:50	914637-49-3	
6:2 FTS	**2870**	ng/L	60.6	17.5	10	09/06/25 09:40	09/09/25 16:04	27619-97-2	
7:3 FTCA	**<10.8**	ng/L	37.9	10.8	1	09/06/25 09:40	09/08/25 19:50	812-70-4	
8:2 FTS	**33.6**	ng/L	6.1	1.6	1	09/06/25 09:40	09/08/25 19:50	39108-34-4	
9Cl-PF3ONS	**<1.6**	ng/L	6.1	1.6	1	09/06/25 09:40	09/08/25 19:50	756426-58-1	
ADONA	**<1.8**	ng/L	6.1	1.8	1	09/06/25 09:40	09/08/25 19:50	919005-14-4	
HFPO-DA	**<1.7**	ng/L	6.1	1.7	1	09/06/25 09:40	09/08/25 19:50	13252-13-6	
NEtFOSAA	**<0.63**	ng/L	1.5	0.63	1	09/06/25 09:40	09/08/25 19:50	2991-50-6	
NEtFOSA	**<0.48**	ng/L	1.5	0.48	1	09/06/25 09:40	09/08/25 19:50	4151-50-2	
NEtFOSE	**<3.9**	ng/L	15.2	3.9	1	09/06/25 09:40	09/08/25 19:50	1691-99-2	
NFDHA	**<1.2**	ng/L	3.0	1.2	1	09/06/25 09:40	09/08/25 19:50	151772-58-6	
NMeFOSAA	**<0.47**	ng/L	1.5	0.47	1	09/06/25 09:40	09/08/25 19:50	2355-31-9	
NMeFOSA	**<0.47**	ng/L	1.5	0.47	1	09/06/25 09:40	09/08/25 19:50	31506-32-8	
NMeFOSE	**<3.9**	ng/L	15.2	3.9	1	09/06/25 09:40	09/08/25 19:50	24448-09-7	
PFBS	**192**	ng/L	1.5	0.40	1	09/06/25 09:40	09/08/25 19:50	375-73-5	
PFDA	**<0.47**	ng/L	1.5	0.47	1	09/06/25 09:40	09/08/25 19:50	335-76-2	
PFHxA	**1230**	ng/L	15.2	3.6	10	09/06/25 09:40	09/09/25 16:04	307-24-4	
PFBA	**403**	ng/L	6.1	1.5	1	09/06/25 09:40	09/08/25 19:50	375-22-4	
PFDS	**<0.65**	ng/L	1.5	0.65	1	09/06/25 09:40	09/08/25 19:50	335-77-3	
PFDoS	**<0.33**	ng/L	1.5	0.33	1	09/06/25 09:40	09/08/25 19:50	79780-39-5	
PFEESA	**<0.66**	ng/L	3.0	0.66	1	09/06/25 09:40	09/08/25 19:50	113507-82-7	
PFHpS	**326**	ng/L	1.5	0.44	1	09/06/25 09:40	09/08/25 19:50	375-92-8	
PFMBA	**<0.73**	ng/L	3.0	0.73	1	09/06/25 09:40	09/08/25 19:50	863090-89-5	
PFMPA	**0.81J**	ng/L	3.0	0.59	1	09/06/25 09:40	09/08/25 19:50	377-73-1	
PFNS	**<0.45**	ng/L	1.5	0.45	1	09/06/25 09:40	09/08/25 19:50	68259-12-1	
PFOSA	**0.63J**	ng/L	1.5	0.46	1	09/06/25 09:40	09/08/25 19:50	754-91-6	
PFPeA	**979**	ng/L	30.3	9.0	10	09/06/25 09:40	09/09/25 16:04	2706-90-3	
PFPeS	**262**	ng/L	15.2	3.6	10	09/06/25 09:40	09/09/25 16:04	2706-91-4	
PFDoA	**<0.46**	ng/L	1.5	0.46	1	09/06/25 09:40	09/08/25 19:50	307-55-1	
PFHpA	**866**	ng/L	15.2	5.8	10	09/06/25 09:40	09/09/25 16:04	375-85-9	
PFHxS	**10500**	ng/L	152	38.8	100	09/06/25 09:40	09/09/25 16:14	355-46-4	
PFNA	**119**	ng/L	1.5	0.50	1	09/06/25 09:40	09/08/25 19:50	375-95-1	
PFOS	**3810**	ng/L	152	37.2	100	09/06/25 09:40	09/09/25 16:14	1763-23-1	
PFOA	**4080**	ng/L	152	46.1	100	09/06/25 09:40	09/09/25 16:14	335-67-1	
PFTeDA	**<0.39**	ng/L	1.5	0.39	1	09/06/25 09:40	09/08/25 19:50	376-06-7	
PFTrDA	**<0.43**	ng/L	1.5	0.43	1	09/06/25 09:40	09/08/25 19:50	72629-94-8	
PFUnA	**<0.34**	ng/L	1.5	0.34	1	09/06/25 09:40	09/08/25 19:50	2058-94-8	
Surrogates									
13C2-PFDoA (S)	107	%.	10-130		1	09/06/25 09:40	09/08/25 19:50		
13C3HFPO-DA (S)	107	%.	40-130		1	09/06/25 09:40	09/08/25 19:50		
13C3-PFBS (S)	186	%.	40-135		1	09/06/25 09:40	09/08/25 19:50		S0
13C3-PFHxS (S)	72	%.	40-130		1	09/06/25 09:40	09/08/25 19:50		

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
1241 Bellevue Street - Suite 9
Green Bay, WI 54302
(920)469-2436

ANALYTICAL RESULTS

Project: DBP
Pace Project No.: 40300904

Sample: MW5 **Lab ID: 40300904003** Collected: 08/28/25 13:00 Received: 08/29/25 09:15 Matrix: Water

Parameters	Results	Units	LOQ	LOD	DF	Prepared	Analyzed	CAS No.	Qual
EPA 1633F Water	Analytical Method: EPA 1633 Preparation Method: EPA 1633 Pace Analytical Services - Minneapolis								
Surrogates									
13C4-PFBA (S)	92	%.	5-130		1	09/06/25 09:40	09/08/25 19:50		
13C4-PFHpA (S)	80	%.	40-130		1	09/06/25 09:40	09/08/25 19:50		
13C5-PFHxA (S)	86	%.	40-130		1	09/06/25 09:40	09/08/25 19:50		
13C5-PFPeA (S)	95	%.	40-130		1	09/06/25 09:40	09/08/25 19:50		
13C6-PFDA (S)	86	%.	40-130		1	09/06/25 09:40	09/08/25 19:50		
13C8-PFOA (S)	84	%.	40-130		1	09/06/25 09:40	09/08/25 19:50		
13C8-PFOS (S)	88	%.	40-130		1	09/06/25 09:40	09/08/25 19:50		
13C8-PFOSA (S)	123	%.	40-130		1	09/06/25 09:40	09/08/25 19:50		
13C9-PFNA (S)	87	%.	40-130		1	09/06/25 09:40	09/08/25 19:50		
d3-MeFOSAA (S)	62	%.	40-170		1	09/06/25 09:40	09/08/25 19:50		
d3-NMeFOSA (S)	97	%.	10-130		1	09/06/25 09:40	09/08/25 19:50		
d5-EtFOSAA (S)	77	%.	25-135		1	09/06/25 09:40	09/08/25 19:50		
d5-NEtFOSA (S)	95	%.	10-130		1	09/06/25 09:40	09/08/25 19:50		
d7-NMeFOSE (S)	99	%.	10-130		1	09/06/25 09:40	09/08/25 19:50		
d9-NEtFOSE (S)	98	%.	10-130		1	09/06/25 09:40	09/08/25 19:50		
13C2-PFTA (S)	111	%.	10-130		1	09/06/25 09:40	09/08/25 19:50		
13C7-PFUdA (S)	119	%.	30-130		1	09/06/25 09:40	09/08/25 19:50		
13C24:2FTS (S)	242	%.	40-200		1	09/06/25 09:40	09/08/25 19:50		S0
13C26:2FTS (S)	128	%.	40-200		1	09/06/25 09:40	09/08/25 19:50		
13C28:2FTS (S)	233	%.	40-300		1	09/06/25 09:40	09/08/25 19:50		
13C3-PFPrA (S)	6	%.	5-130		1	09/06/25 09:40	09/08/25 19:50		

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
1241 Bellevue Street - Suite 9
Green Bay, WI 54302
(920)469-2436

ANALYTICAL RESULTS

Project: DBP
Pace Project No.: 40300904

Sample: MW6 **Lab ID: 40300904004** Collected: 08/28/25 13:00 Received: 08/29/25 09:15 Matrix: Water

Parameters	Results	Units	LOQ	LOD	DF	Prepared	Analyzed	CAS No.	Qual
EPA 1633F Water	Analytical Method: EPA 1633 Preparation Method: EPA 1633								
	Pace Analytical Services - Minneapolis								
11Cl-PF3OUdS	**<7.2**	ng/L	23.8	7.2	1	09/06/25 09:40	09/08/25 20:22	763051-92-9	
3:3 FTCA	**<8.2**	ng/L	29.7	8.2	1	09/06/25 09:40	09/08/25 20:22	356-02-5	
4:2 FTS	**<5.9**	ng/L	23.8	5.9	1	09/06/25 09:40	09/08/25 20:22	757124-72-4	
5:3 FTCA	**<35.7**	ng/L	148	35.7	1	09/06/25 09:40	09/08/25 20:22	914637-49-3	
6:2 FTS	**260**	ng/L	23.8	6.9	1	09/06/25 09:40	09/08/25 20:22	27619-97-2	
7:3 FTCA	**<42.3**	ng/L	148	42.3	1	09/06/25 09:40	09/08/25 20:22	812-70-4	
8:2 FTS	**<6.2**	ng/L	23.8	6.2	1	09/06/25 09:40	09/08/25 20:22	39108-34-4	
9Cl-PF3ONS	**<6.3**	ng/L	23.8	6.3	1	09/06/25 09:40	09/08/25 20:22	756426-58-1	
ADONA	**<7.0**	ng/L	23.8	7.0	1	09/06/25 09:40	09/08/25 20:22	919005-14-4	
HFPO-DA	**<6.6**	ng/L	23.8	6.6	1	09/06/25 09:40	09/08/25 20:22	13252-13-6	
NEtFOSAA	**<2.5**	ng/L	5.9	2.5	1	09/06/25 09:40	09/08/25 20:22	2991-50-6	
NEtFOSA	**<1.9**	ng/L	5.9	1.9	1	09/06/25 09:40	09/08/25 20:22	4151-50-2	
NEtFOSE	**<15.3**	ng/L	59.4	15.3	1	09/06/25 09:40	09/08/25 20:22	1691-99-2	
NFDHA	**<4.9**	ng/L	11.9	4.9	1	09/06/25 09:40	09/08/25 20:22	151772-58-6	
NMeFOSAA	**<1.9**	ng/L	5.9	1.9	1	09/06/25 09:40	09/08/25 20:22	2355-31-9	
NMeFOSA	**<1.8**	ng/L	5.9	1.8	1	09/06/25 09:40	09/08/25 20:22	31506-32-8	
NMeFOSE	**<15.3**	ng/L	59.4	15.3	1	09/06/25 09:40	09/08/25 20:22	24448-09-7	
PFBS	**707**	ng/L	5.9	1.6	1	09/06/25 09:40	09/08/25 20:22	375-73-5	
PFDA	**<1.8**	ng/L	5.9	1.8	1	09/06/25 09:40	09/08/25 20:22	335-76-2	
PFHxA	**4410**	ng/L	59.4	14.3	10	09/06/25 09:40	09/09/25 16:24	307-24-4	
PFBA	**1290**	ng/L	23.8	5.8	1	09/06/25 09:40	09/08/25 20:22	375-22-4	
PFDS	**<2.6**	ng/L	5.9	2.6	1	09/06/25 09:40	09/08/25 20:22	335-77-3	
PFDoS	**<1.3**	ng/L	5.9	1.3	1	09/06/25 09:40	09/08/25 20:22	79780-39-5	
PFEESA	**<2.6**	ng/L	11.9	2.6	1	09/06/25 09:40	09/08/25 20:22	113507-82-7	
PFHpS	**2.8J**	ng/L	5.9	1.7	1	09/06/25 09:40	09/08/25 20:22	375-92-8	
PFMBA	**3.6J**	ng/L	11.9	2.9	1	09/06/25 09:40	09/08/25 20:22	863090-89-5	
PFMPA	**2.9J**	ng/L	11.9	2.3	1	09/06/25 09:40	09/08/25 20:22	377-73-1	
PFNS	**<1.8**	ng/L	5.9	1.8	1	09/06/25 09:40	09/08/25 20:22	68259-12-1	
PFOSA	**<1.8**	ng/L	5.9	1.8	1	09/06/25 09:40	09/08/25 20:22	754-91-6	
PFPeA	**1940**	ng/L	11.9	3.5	1	09/06/25 09:40	09/08/25 20:22	2706-90-3	
PFPeS	**444**	ng/L	5.9	1.4	1	09/06/25 09:40	09/08/25 20:22	2706-91-4	
PFDoA	**<1.8**	ng/L	5.9	1.8	1	09/06/25 09:40	09/08/25 20:22	307-55-1	
PFHpA	**354**	ng/L	5.9	2.3	1	09/06/25 09:40	09/08/25 20:22	375-85-9	
PFHxS	**5780**	ng/L	59.4	15.2	10	09/06/25 09:40	09/09/25 16:24	355-46-4	
PFNA	**<1.9**	ng/L	5.9	1.9	1	09/06/25 09:40	09/08/25 20:22	375-95-1	
PFOS	**2.5J**	ng/L	5.9	1.5	1	09/06/25 09:40	09/08/25 20:22	1763-23-1	
PFOA	**9260**	ng/L	59.4	18.1	10	09/06/25 09:40	09/09/25 16:24	335-67-1	
PFTeDA	**<1.5**	ng/L	5.9	1.5	1	09/06/25 09:40	09/08/25 20:22	376-06-7	
PFTrDA	**<1.7**	ng/L	5.9	1.7	1	09/06/25 09:40	09/08/25 20:22	72629-94-8	
PFUnA	**<1.3**	ng/L	5.9	1.3	1	09/06/25 09:40	09/08/25 20:22	2058-94-8	
Surrogates									
13C2-PFDoA (S)	53	%.	10-130		1	09/06/25 09:40	09/08/25 20:22		
13C3HFPO-DA (S)	85	%.	40-130		1	09/06/25 09:40	09/08/25 20:22		
13C3-PFBS (S)	89	%.	40-135		1	09/06/25 09:40	09/08/25 20:22		
13C3-PFHxS (S)	67	%.	40-130		1	09/06/25 09:40	09/08/25 20:22		

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
1241 Bellevue Street - Suite 9
Green Bay, WI 54302
(920)469-2436

ANALYTICAL RESULTS

Project: DBP
Pace Project No.: 40300904

Sample: MW6 **Lab ID: 40300904004** Collected: 08/28/25 13:00 Received: 08/29/25 09:15 Matrix: Water

Parameters	Results	Units	LOQ	LOD	DF	Prepared	Analyzed	CAS No.	Qual
EPA 1633F Water	Analytical Method: EPA 1633 Preparation Method: EPA 1633 Pace Analytical Services - Minneapolis								
Surrogates									
13C4-PFBA (S)	80	%.	5-130		1	09/06/25 09:40	09/08/25 20:22		
13C4-PFHpA (S)	76	%.	40-130		1	09/06/25 09:40	09/08/25 20:22		
13C5-PFHxA (S)	71	%.	40-130		1	09/06/25 09:40	09/08/25 20:22		
13C5-PFPeA (S)	81	%.	40-130		1	09/06/25 09:40	09/08/25 20:22		
13C6-PFDA (S)	60	%.	40-130		1	09/06/25 09:40	09/08/25 20:22		
13C8-PFOA (S)	65	%.	40-130		1	09/06/25 09:40	09/08/25 20:22		
13C8-PFOS (S)	57	%.	40-130		1	09/06/25 09:40	09/08/25 20:22		
13C8-PFOSA (S)	51	%.	40-130		1	09/06/25 09:40	09/08/25 20:22		
13C9-PFNA (S)	67	%.	40-130		1	09/06/25 09:40	09/08/25 20:22		
d3-MeFOSAA (S)	49	%.	40-170		1	09/06/25 09:40	09/08/25 20:22		
d3-NMeFOSA (S)	47	%.	10-130		1	09/06/25 09:40	09/08/25 20:22		
d5-EtFOSAA (S)	51	%.	25-135		1	09/06/25 09:40	09/08/25 20:22		
d5-NEtFOSA (S)	45	%.	10-130		1	09/06/25 09:40	09/08/25 20:22		
d7-NMeFOSE (S)	41	%.	10-130		1	09/06/25 09:40	09/08/25 20:22		
d9-NEtFOSE (S)	39	%.	10-130		1	09/06/25 09:40	09/08/25 20:22		
13C2-PFTA (S)	52	%.	10-130		1	09/06/25 09:40	09/08/25 20:22		
13C7-PFUdA (S)	56	%.	30-130		1	09/06/25 09:40	09/08/25 20:22		
13C24:2FTS (S)	117	%.	40-200		1	09/06/25 09:40	09/08/25 20:22		
13C26:2FTS (S)	98	%.	40-200		1	09/06/25 09:40	09/08/25 20:22		
13C28:2FTS (S)	120	%.	40-300		1	09/06/25 09:40	09/08/25 20:22		
13C3-PFPrA (S)	49	%.	5-130		1	09/06/25 09:40	09/08/25 20:22		

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
1241 Bellevue Street - Suite 9
Green Bay, WI 54302
(920)469-2436

ANALYTICAL RESULTS

Project: DBP
Pace Project No.: 40300904

Sample: MW8 **Lab ID: 40300904005** Collected: 08/28/25 13:00 Received: 08/29/25 09:15 Matrix: Water

Parameters	Results	Units	LOQ	LOD	DF	Prepared	Analyzed	CAS No.	Qual
EPA 1633F Water	Analytical Method: EPA 1633 Preparation Method: EPA 1633								
	Pace Analytical Services - Minneapolis								
11Cl-PF3OUdS	**<1.9**	ng/L	6.2	1.9	1	09/06/25 09:40	09/08/25 20:33	763051-92-9	
3:3 FTCA	**<2.1**	ng/L	7.7	2.1	1	09/06/25 09:40	09/08/25 20:33	356-02-5	
4:2 FTS	**<1.5**	ng/L	6.2	1.5	1	09/06/25 09:40	09/08/25 20:33	757124-72-4	
5:3 FTCA	**<9.3**	ng/L	38.5	9.3	1	09/06/25 09:40	09/08/25 20:33	914637-49-3	
6:2 FTS	**7.4**	ng/L	6.2	1.8	1	09/06/25 09:40	09/08/25 20:33	27619-97-2	
7:3 FTCA	**<11.0**	ng/L	38.5	11.0	1	09/06/25 09:40	09/08/25 20:33	812-70-4	
8:2 FTS	**<1.6**	ng/L	6.2	1.6	1	09/06/25 09:40	09/08/25 20:33	39108-34-4	
9Cl-PF3ONS	**<1.6**	ng/L	6.2	1.6	1	09/06/25 09:40	09/08/25 20:33	756426-58-1	
ADONA	**<1.8**	ng/L	6.2	1.8	1	09/06/25 09:40	09/08/25 20:33	919005-14-4	
HFPO-DA	**<1.7**	ng/L	6.2	1.7	1	09/06/25 09:40	09/08/25 20:33	13252-13-6	
NEtFOSAA	**<0.64**	ng/L	1.5	0.64	1	09/06/25 09:40	09/08/25 20:33	2991-50-6	
NEtFOSA	**<0.49**	ng/L	1.5	0.49	1	09/06/25 09:40	09/08/25 20:33	4151-50-2	
NEtFOSE	**<4.0**	ng/L	15.4	4.0	1	09/06/25 09:40	09/08/25 20:33	1691-99-2	
NFDHA	**<1.3**	ng/L	3.1	1.3	1	09/06/25 09:40	09/08/25 20:33	151772-58-6	
NMeFOSAA	**<0.48**	ng/L	1.5	0.48	1	09/06/25 09:40	09/08/25 20:33	2355-31-9	
NMeFOSA	**<0.47**	ng/L	1.5	0.47	1	09/06/25 09:40	09/08/25 20:33	31506-32-8	
NMeFOSE	**<4.0**	ng/L	15.4	4.0	1	09/06/25 09:40	09/08/25 20:33	24448-09-7	
PFBS	**335**	ng/L	1.5	0.40	1	09/06/25 09:40	09/08/25 20:33	375-73-5	
PFDA	**0.58J**	ng/L	1.5	0.48	1	09/06/25 09:40	09/08/25 20:33	335-76-2	
PFHxA	**1400**	ng/L	15.4	3.7	10	09/06/25 09:40	09/09/25 16:54	307-24-4	
PFBA	**617**	ng/L	6.2	1.5	1	09/06/25 09:40	09/08/25 20:33	375-22-4	
PFDS	**<0.66**	ng/L	1.5	0.66	1	09/06/25 09:40	09/08/25 20:33	335-77-3	
PFDoS	**<0.33**	ng/L	1.5	0.33	1	09/06/25 09:40	09/08/25 20:33	79780-39-5	
PFEESA	**<0.67**	ng/L	3.1	0.67	1	09/06/25 09:40	09/08/25 20:33	113507-82-7	
PFHpS	**137**	ng/L	1.5	0.45	1	09/06/25 09:40	09/08/25 20:33	375-92-8	
PFMBA	**<0.75**	ng/L	3.1	0.75	1	09/06/25 09:40	09/08/25 20:33	863090-89-5	
PFMPA	**1.6J**	ng/L	3.1	0.60	1	09/06/25 09:40	09/08/25 20:33	377-73-1	
PFNS	**<0.45**	ng/L	1.5	0.45	1	09/06/25 09:40	09/08/25 20:33	68259-12-1	
PFOSA	**1.2J**	ng/L	1.5	0.47	1	09/06/25 09:40	09/08/25 20:33	754-91-6	
PFPeA	**1700**	ng/L	30.8	9.2	10	09/06/25 09:40	09/09/25 16:54	2706-90-3	
PFPeS	**793**	ng/L	15.4	3.7	10	09/06/25 09:40	09/09/25 16:54	2706-91-4	
PFDoA	**<0.47**	ng/L	1.5	0.47	1	09/06/25 09:40	09/08/25 20:33	307-55-1	
PFHpA	**693**	ng/L	15.4	5.9	10	09/06/25 09:40	09/09/25 16:54	375-85-9	
PFHxS	**31400**	ng/L	154	39.5	100	09/06/25 09:40	09/09/25 17:12	355-46-4	
PFNA	**461**	ng/L	1.5	0.50	1	09/06/25 09:40	09/08/25 20:33	375-95-1	
PFOS	**2990**	ng/L	15.4	3.8	10	09/06/25 09:40	09/09/25 16:54	1763-23-1	
PFOA	**3570**	ng/L	15.4	4.7	10	09/06/25 09:40	09/09/25 16:54	335-67-1	
PFTeDA	**<0.40**	ng/L	1.5	0.40	1	09/06/25 09:40	09/08/25 20:33	376-06-7	
PFTrDA	**<0.44**	ng/L	1.5	0.44	1	09/06/25 09:40	09/08/25 20:33	72629-94-8	
PFUnA	**<0.34**	ng/L	1.5	0.34	1	09/06/25 09:40	09/08/25 20:33	2058-94-8	
Surrogates									
13C2-PFDoA (S)	100	%.	10-130		1	09/06/25 09:40	09/08/25 20:33		
13C3HFPO-DA (S)	99	%.	40-130		1	09/06/25 09:40	09/08/25 20:33		
13C3-PFBS (S)	253	%.	40-135		1	09/06/25 09:40	09/08/25 20:33		S0
13C3-PFHxS (S)	52	%.	40-130		1	09/06/25 09:40	09/08/25 20:33		

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
1241 Bellevue Street - Suite 9
Green Bay, WI 54302
(920)469-2436

ANALYTICAL RESULTS

Project: DBP
Pace Project No.: 40300904

Sample: MW8 **Lab ID: 40300904005** Collected: 08/28/25 13:00 Received: 08/29/25 09:15 Matrix: Water

Parameters	Results	Units	LOQ	LOD	DF	Prepared	Analyzed	CAS No.	Qual
EPA 1633F Water	Analytical Method: EPA 1633 Preparation Method: EPA 1633 Pace Analytical Services - Minneapolis								
Surrogates									
13C4-PFBA (S)	101	%.	5-130		1	09/06/25 09:40	09/08/25 20:33		
13C4-PFHpA (S)	102	%.	40-130		1	09/06/25 09:40	09/08/25 20:33		
13C5-PFHxA (S)	95	%.	40-130		1	09/06/25 09:40	09/08/25 20:33		
13C5-PFPeA (S)	101	%.	40-130		1	09/06/25 09:40	09/08/25 20:33		
13C6-PFDA (S)	87	%.	40-130		1	09/06/25 09:40	09/08/25 20:33		
13C8-PFOA (S)	93	%.	40-130		1	09/06/25 09:40	09/08/25 20:33		
13C8-PFOS (S)	97	%.	40-130		1	09/06/25 09:40	09/08/25 20:33		
13C8-PFOSA (S)	122	%.	40-130		1	09/06/25 09:40	09/08/25 20:33		
13C9-PFNA (S)	92	%.	40-130		1	09/06/25 09:40	09/08/25 20:33		
d3-MeFOSAA (S)	67	%.	40-170		1	09/06/25 09:40	09/08/25 20:33		
d3-NMeFOSA (S)	101	%.	10-130		1	09/06/25 09:40	09/08/25 20:33		
d5-EtFOSAA (S)	72	%.	25-135		1	09/06/25 09:40	09/08/25 20:33		
d5-NEtFOSA (S)	100	%.	10-130		1	09/06/25 09:40	09/08/25 20:33		
d7-NMeFOSE (S)	98	%.	10-130		1	09/06/25 09:40	09/08/25 20:33		
d9-NEtFOSE (S)	95	%.	10-130		1	09/06/25 09:40	09/08/25 20:33		
13C2-PFTA (S)	99	%.	10-130		1	09/06/25 09:40	09/08/25 20:33		
13C7-PFUdA (S)	107	%.	30-130		1	09/06/25 09:40	09/08/25 20:33		
13C24:2FTS (S)	376	%.	40-200		1	09/06/25 09:40	09/08/25 20:33		S0
13C26:2FTS (S)	384	%.	40-200		1	09/06/25 09:40	09/08/25 20:33		S0
13C28:2FTS (S)	392	%.	40-300		1	09/06/25 09:40	09/08/25 20:33		S0
13C3-PFPrA (S)	7	%.	5-130		1	09/06/25 09:40	09/08/25 20:33		

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
1241 Bellevue Street - Suite 9
Green Bay, WI 54302
(920)469-2436

ANALYTICAL RESULTS

Project: DBP
Pace Project No.: 40300904

Sample: MW9 **Lab ID: 40300904006** Collected: 08/28/25 13:00 Received: 08/29/25 09:15 Matrix: Water

Parameters	Results	Units	LOQ	LOD	DF	Prepared	Analyzed	CAS No.	Qual
EPA 1633F Water	Analytical Method: EPA 1633 Preparation Method: EPA 1633 Pace Analytical Services - Minneapolis								
11Cl-PF3OUdS	**<7.3**	ng/L	24.1	7.3	1	09/06/25 09:40	09/08/25 20:44	763051-92-9	
3:3 FTCA	**<8.3**	ng/L	30.1	8.3	1	09/06/25 09:40	09/08/25 20:44	356-02-5	
4:2 FTS	**<6.0**	ng/L	24.1	6.0	1	09/06/25 09:40	09/08/25 20:44	757124-72-4	
5:3 FTCA	**<36.2**	ng/L	150	36.2	1	09/06/25 09:40	09/08/25 20:44	914637-49-3	
6:2 FTS	**28.9**	ng/L	24.1	7.0	1	09/06/25 09:40	09/08/25 20:44	27619-97-2	
7:3 FTCA	**<42.9**	ng/L	150	42.9	1	09/06/25 09:40	09/08/25 20:44	812-70-4	
8:2 FTS	**<6.2**	ng/L	24.1	6.2	1	09/06/25 09:40	09/08/25 20:44	39108-34-4	
9Cl-PF3ONS	**<6.4**	ng/L	24.1	6.4	1	09/06/25 09:40	09/08/25 20:44	756426-58-1	
ADONA	**<7.1**	ng/L	24.1	7.1	1	09/06/25 09:40	09/08/25 20:44	919005-14-4	
HFPO-DA	**<6.7**	ng/L	24.1	6.7	1	09/06/25 09:40	09/08/25 20:44	13252-13-6	
NEtFOSAA	**<2.5**	ng/L	6.0	2.5	1	09/06/25 09:40	09/08/25 20:44	2991-50-6	
NEtFOSA	**<1.9**	ng/L	6.0	1.9	1	09/06/25 09:40	09/08/25 20:44	4151-50-2	
NEtFOSE	**<15.5**	ng/L	60.2	15.5	1	09/06/25 09:40	09/08/25 20:44	1691-99-2	
NFDHA	**<4.9**	ng/L	12.0	4.9	1	09/06/25 09:40	09/08/25 20:44	151772-58-6	
NMeFOSAA	**<1.9**	ng/L	6.0	1.9	1	09/06/25 09:40	09/08/25 20:44	2355-31-9	
NMeFOSA	**<1.9**	ng/L	6.0	1.9	1	09/06/25 09:40	09/08/25 20:44	31506-32-8	
NMeFOSE	**<15.5**	ng/L	60.2	15.5	1	09/06/25 09:40	09/08/25 20:44	24448-09-7	
PFBS	**17.6**	ng/L	6.0	1.6	1	09/06/25 09:40	09/08/25 20:44	375-73-5	
PFDA	**<1.9**	ng/L	6.0	1.9	1	09/06/25 09:40	09/08/25 20:44	335-76-2	
PFHxA	**128**	ng/L	6.0	1.4	1	09/06/25 09:40	09/08/25 20:44	307-24-4	
PFBA	**116**	ng/L	24.1	5.8	1	09/06/25 09:40	09/08/25 20:44	375-22-4	
PFDS	**<2.6**	ng/L	6.0	2.6	1	09/06/25 09:40	09/08/25 20:44	335-77-3	
PFDoS	**<1.3**	ng/L	6.0	1.3	1	09/06/25 09:40	09/08/25 20:44	79780-39-5	
PFEESA	**<2.6**	ng/L	12.0	2.6	1	09/06/25 09:40	09/08/25 20:44	113507-82-7	
PFHpS	**<1.8**	ng/L	6.0	1.8	1	09/06/25 09:40	09/08/25 20:44	375-92-8	
PFMBA	**<2.9**	ng/L	12.0	2.9	1	09/06/25 09:40	09/08/25 20:44	863090-89-5	
PFMPA	**<2.3**	ng/L	12.0	2.3	1	09/06/25 09:40	09/08/25 20:44	377-73-1	
PFNS	**<1.8**	ng/L	6.0	1.8	1	09/06/25 09:40	09/08/25 20:44	68259-12-1	
PFOSA	**<1.8**	ng/L	6.0	1.8	1	09/06/25 09:40	09/08/25 20:44	754-91-6	
PFPeA	**117**	ng/L	12.0	3.6	1	09/06/25 09:40	09/08/25 20:44	2706-90-3	
PFPeS	**14.5**	ng/L	6.0	1.4	1	09/06/25 09:40	09/08/25 20:44	2706-91-4	
PFDoA	**<1.8**	ng/L	6.0	1.8	1	09/06/25 09:40	09/08/25 20:44	307-55-1	
PFHpA	**25.5**	ng/L	6.0	2.3	1	09/06/25 09:40	09/08/25 20:44	375-85-9	
PFHxS	**388**	ng/L	6.0	1.5	1	09/06/25 09:40	09/08/25 20:44	355-46-4	
PFNA	**<2.0**	ng/L	6.0	2.0	1	09/06/25 09:40	09/08/25 20:44	375-95-1	
PFOS	**5.5J**	ng/L	6.0	1.5	1	09/06/25 09:40	09/08/25 20:44	1763-23-1	
PFOA	**212**	ng/L	6.0	1.8	1	09/06/25 09:40	09/08/25 20:44	335-67-1	
PFTeDA	**<1.6**	ng/L	6.0	1.6	1	09/06/25 09:40	09/08/25 20:44	376-06-7	
PFTrDA	**<1.7**	ng/L	6.0	1.7	1	09/06/25 09:40	09/08/25 20:44	72629-94-8	
PFUnA	**<1.3**	ng/L	6.0	1.3	1	09/06/25 09:40	09/08/25 20:44	2058-94-8	
Surrogates									
13C2-PFDoA (S)	52	%.	10-130		1	09/06/25 09:40	09/08/25 20:44		
13C3HFPO-DA (S)	62	%.	40-130		1	09/06/25 09:40	09/08/25 20:44		
13C3-PFBS (S)	62	%.	40-135		1	09/06/25 09:40	09/08/25 20:44		
13C3-PFHxS (S)	56	%.	40-130		1	09/06/25 09:40	09/08/25 20:44		

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
1241 Bellevue Street - Suite 9
Green Bay, WI 54302
(920)469-2436

ANALYTICAL RESULTS

Project: DBP
Pace Project No.: 40300904

Sample: MW9 **Lab ID: 40300904006** Collected: 08/28/25 13:00 Received: 08/29/25 09:15 Matrix: Water

Parameters	Results	Units	LOQ	LOD	DF	Prepared	Analyzed	CAS No.	Qual
EPA 1633F Water	Analytical Method: EPA 1633 Preparation Method: EPA 1633 Pace Analytical Services - Minneapolis								
Surrogates									
13C4-PFBA (S)	68	%.	5-130		1	09/06/25 09:40	09/08/25 20:44		
13C4-PFHpA (S)	59	%.	40-130		1	09/06/25 09:40	09/08/25 20:44		
13C5-PFHxA (S)	60	%.	40-130		1	09/06/25 09:40	09/08/25 20:44		
13C5-PFPeA (S)	63	%.	40-130		1	09/06/25 09:40	09/08/25 20:44		
13C6-PFDA (S)	56	%.	40-130		1	09/06/25 09:40	09/08/25 20:44		
13C8-PFOA (S)	56	%.	40-130		1	09/06/25 09:40	09/08/25 20:44		
13C8-PFOS (S)	52	%.	40-130		1	09/06/25 09:40	09/08/25 20:44		
13C8-PFOSA (S)	48	%.	40-130		1	09/06/25 09:40	09/08/25 20:44		
13C9-PFNA (S)	58	%.	40-130		1	09/06/25 09:40	09/08/25 20:44		
d3-MeFOSAA (S)	48	%.	40-170		1	09/06/25 09:40	09/08/25 20:44		
d3-NMeFOSA (S)	45	%.	10-130		1	09/06/25 09:40	09/08/25 20:44		
d5-EtFOSAA (S)	47	%.	25-135		1	09/06/25 09:40	09/08/25 20:44		
d5-NEtFOSA (S)	45	%.	10-130		1	09/06/25 09:40	09/08/25 20:44		
d7-NMeFOSE (S)	43	%.	10-130		1	09/06/25 09:40	09/08/25 20:44		
d9-NEtFOSE (S)	41	%.	10-130		1	09/06/25 09:40	09/08/25 20:44		
13C2-PFTA (S)	49	%.	10-130		1	09/06/25 09:40	09/08/25 20:44		
13C7-PFUdA (S)	53	%.	30-130		1	09/06/25 09:40	09/08/25 20:44		
13C24:2FTS (S)	82	%.	40-200		1	09/06/25 09:40	09/08/25 20:44		
13C26:2FTS (S)	78	%.	40-200		1	09/06/25 09:40	09/08/25 20:44		
13C28:2FTS (S)	89	%.	40-300		1	09/06/25 09:40	09/08/25 20:44		
13C3-PFPrA (S)	32	%.	5-130		1	09/06/25 09:40	09/08/25 20:44		

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
1241 Bellevue Street - Suite 9
Green Bay, WI 54302
(920)469-2436

ANALYTICAL RESULTS

Project: DBP
Pace Project No.: 40300904

Sample: MW10 **Lab ID: 40300904007** Collected: 08/28/25 13:00 Received: 08/29/25 09:15 Matrix: Water

Parameters	Results	Units	LOQ	LOD	DF	Prepared	Analyzed	CAS No.	Qual
EPA 1633F Water	Analytical Method: EPA 1633 Preparation Method: EPA 1633 Pace Analytical Services - Minneapolis								
11Cl-PF3OUdS	**<1.9**	ng/L	6.1	1.9	1	09/06/25 09:40	09/08/25 20:54	763051-92-9	
3:3 FTCA	**3.1J**	ng/L	7.7	2.1	1	09/06/25 09:40	09/08/25 20:54	356-02-5	
4:2 FTS	**<1.5**	ng/L	6.1	1.5	1	09/06/25 09:40	09/08/25 20:54	757124-72-4	
5:3 FTCA	**<9.2**	ng/L	38.4	9.2	1	09/06/25 09:40	09/08/25 20:54	914637-49-3	
6:2 FTS	**62.9**	ng/L	6.1	1.8	1	09/06/25 09:40	09/08/25 20:54	27619-97-2	
7:3 FTCA	**<10.9**	ng/L	38.4	10.9	1	09/06/25 09:40	09/08/25 20:54	812-70-4	
8:2 FTS	**<1.6**	ng/L	6.1	1.6	1	09/06/25 09:40	09/08/25 20:54	39108-34-4	
9Cl-PF3ONS	**<1.6**	ng/L	6.1	1.6	1	09/06/25 09:40	09/08/25 20:54	756426-58-1	
ADONA	**<1.8**	ng/L	6.1	1.8	1	09/06/25 09:40	09/08/25 20:54	919005-14-4	
HFPO-DA	**<1.7**	ng/L	6.1	1.7	1	09/06/25 09:40	09/08/25 20:54	13252-13-6	
NEtFOSAA	**<0.64**	ng/L	1.5	0.64	1	09/06/25 09:40	09/08/25 20:54	2991-50-6	
NEtFOSA	**<0.49**	ng/L	1.5	0.49	1	09/06/25 09:40	09/08/25 20:54	4151-50-2	
NEtFOSE	**<4.0**	ng/L	15.4	4.0	1	09/06/25 09:40	09/08/25 20:54	1691-99-2	
NFDHA	**<1.3**	ng/L	3.1	1.3	1	09/06/25 09:40	09/08/25 20:54	151772-58-6	
NMeFOSAA	**<0.48**	ng/L	1.5	0.48	1	09/06/25 09:40	09/08/25 20:54	2355-31-9	
NMeFOSA	**<0.47**	ng/L	1.5	0.47	1	09/06/25 09:40	09/08/25 20:54	31506-32-8	
NMeFOSE	**<3.9**	ng/L	15.4	3.9	1	09/06/25 09:40	09/08/25 20:54	24448-09-7	
PFBS	**584**	ng/L	15.4	4.0	10	09/06/25 09:40	09/09/25 17:22	375-73-5	
PFDA	**0.96J**	ng/L	1.5	0.48	1	09/06/25 09:40	09/08/25 20:54	335-76-2	
PFHxA	**1060**	ng/L	15.4	3.7	10	09/06/25 09:40	09/09/25 17:22	307-24-4	
PFBA	**202**	ng/L	6.1	1.5	1	09/06/25 09:40	09/08/25 20:54	375-22-4	
PFDS	**<0.66**	ng/L	1.5	0.66	1	09/06/25 09:40	09/08/25 20:54	335-77-3	
PFDoS	**<0.33**	ng/L	1.5	0.33	1	09/06/25 09:40	09/08/25 20:54	79780-39-5	
PFEESA	**<0.66**	ng/L	3.1	0.66	1	09/06/25 09:40	09/08/25 20:54	113507-82-7	
PFHpS	**182**	ng/L	1.5	0.45	1	09/06/25 09:40	09/08/25 20:54	375-92-8	
PFMBA	**<0.74**	ng/L	3.1	0.74	1	09/06/25 09:40	09/08/25 20:54	863090-89-5	
PFMPA	**0.68J**	ng/L	3.1	0.60	1	09/06/25 09:40	09/08/25 20:54	377-73-1	
PFNS	**<0.45**	ng/L	1.5	0.45	1	09/06/25 09:40	09/08/25 20:54	68259-12-1	
PFOSA	**3.1**	ng/L	1.5	0.47	1	09/06/25 09:40	09/08/25 20:54	754-91-6	
PFPeA	**601**	ng/L	3.1	0.91	1	09/06/25 09:40	09/08/25 20:54	2706-90-3	
PFPeS	**243**	ng/L	15.4	3.6	10	09/06/25 09:40	09/09/25 17:22	2706-91-4	
PFDoA	**<0.47**	ng/L	1.5	0.47	1	09/06/25 09:40	09/08/25 20:54	307-55-1	
PFHpA	**445**	ng/L	15.4	5.9	10	09/06/25 09:40	09/09/25 17:22	375-85-9	
PFHxS	**5390**	ng/L	154	39.3	100	09/06/25 09:40	09/09/25 17:33	355-46-4	
PFNA	**9.3**	ng/L	1.5	0.50	1	09/06/25 09:40	09/08/25 20:54	375-95-1	
PFOS	**143**	ng/L	1.5	0.38	1	09/06/25 09:40	09/08/25 20:54	1763-23-1	
PFOA	**5980**	ng/L	154	46.7	100	09/06/25 09:40	09/09/25 17:33	335-67-1	
PFTeDA	**<0.40**	ng/L	1.5	0.40	1	09/06/25 09:40	09/08/25 20:54	376-06-7	
PFTrDA	**<0.43**	ng/L	1.5	0.43	1	09/06/25 09:40	09/08/25 20:54	72629-94-8	
PFUnA	**<0.34**	ng/L	1.5	0.34	1	09/06/25 09:40	09/08/25 20:54	2058-94-8	
Surrogates									
13C2-PFDoA (S)	68	%.	10-130		1	09/06/25 09:40	09/08/25 20:54		
13C3HFPO-DA (S)	99	%.	40-130		1	09/06/25 09:40	09/08/25 20:54		
13C3-PFBS (S)	128	%.	40-135		1	09/06/25 09:40	09/08/25 20:54		
13C3-PFHxS (S)	71	%.	40-130		1	09/06/25 09:40	09/08/25 20:54		

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
1241 Bellevue Street - Suite 9
Green Bay, WI 54302
(920)469-2436

ANALYTICAL RESULTS

Project: DBP
Pace Project No.: 40300904

Sample: MW10 **Lab ID: 40300904007** Collected: 08/28/25 13:00 Received: 08/29/25 09:15 Matrix: Water

Parameters	Results	Units	LOQ	LOD	DF	Prepared	Analyzed	CAS No.	Qual
EPA 1633F Water	Analytical Method: EPA 1633 Preparation Method: EPA 1633 Pace Analytical Services - Minneapolis								
Surrogates									
13C4-PFBA (S)	87	%.	5-130		1	09/06/25 09:40	09/08/25 20:54		
13C4-PFHpA (S)	87	%.	40-130		1	09/06/25 09:40	09/08/25 20:54		
13C5-PFHxA (S)	82	%.	40-130		1	09/06/25 09:40	09/08/25 20:54		
13C5-PFPeA (S)	94	%.	40-130		1	09/06/25 09:40	09/08/25 20:54		
13C6-PFDA (S)	82	%.	40-130		1	09/06/25 09:40	09/08/25 20:54		
13C8-PFOA (S)	79	%.	40-130		1	09/06/25 09:40	09/08/25 20:54		
13C8-PFOS (S)	81	%.	40-130		1	09/06/25 09:40	09/08/25 20:54		
13C8-PFOSA (S)	78	%.	40-130		1	09/06/25 09:40	09/08/25 20:54		
13C9-PFNA (S)	81	%.	40-130		1	09/06/25 09:40	09/08/25 20:54		
d3-MeFOSAA (S)	73	%.	40-170		1	09/06/25 09:40	09/08/25 20:54		
d3-NMeFOSA (S)	65	%.	10-130		1	09/06/25 09:40	09/08/25 20:54		
d5-EtFOSAA (S)	66	%.	25-135		1	09/06/25 09:40	09/08/25 20:54		
d5-NEtFOSA (S)	61	%.	10-130		1	09/06/25 09:40	09/08/25 20:54		
d7-NMeFOSE (S)	4	%.	10-130		1	09/06/25 09:40	09/08/25 20:54		S0
d9-NEtFOSE (S)	2	%.	10-130		1	09/06/25 09:40	09/08/25 20:54		S0
13C2-PFTA (S)	52	%.	10-130		1	09/06/25 09:40	09/08/25 20:54		
13C7-PFUdA (S)	75	%.	30-130		1	09/06/25 09:40	09/08/25 20:54		
13C24:2FTS (S)	171	%.	40-200		1	09/06/25 09:40	09/08/25 20:54		
13C26:2FTS (S)	148	%.	40-200		1	09/06/25 09:40	09/08/25 20:54		
13C28:2FTS (S)	191	%.	40-300		1	09/06/25 09:40	09/08/25 20:54		
13C3-PFPrA (S)	12	%.	5-130		1	09/06/25 09:40	09/08/25 20:54		

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
1241 Bellevue Street - Suite 9
Green Bay, WI 54302
(920)469-2436

ANALYTICAL RESULTS

Project: DBP
Pace Project No.: 40300904

Sample: PZ1 **Lab ID: 40300904008** Collected: 08/28/25 13:00 Received: 08/29/25 09:15 Matrix: Water

Parameters	Results	Units	LOQ	LOD	DF	Prepared	Analyzed	CAS No.	Qual
EPA 1633F Water	Analytical Method: EPA 1633 Preparation Method: EPA 1633 Pace Analytical Services - Minneapolis								
11Cl-PF3OUdS	**<3.8**	ng/L	12.5	3.8	1	09/06/25 09:40	09/08/25 21:05	763051-92-9	
3:3 FTCA	**<4.3**	ng/L	15.6	4.3	1	09/06/25 09:40	09/08/25 21:05	356-02-5	
4:2 FTS	**4.4J**	ng/L	12.5	3.1	1	09/06/25 09:40	09/08/25 21:05	757124-72-4	
5:3 FTCA	**<18.7**	ng/L	78.0	18.7	1	09/06/25 09:40	09/08/25 21:05	914637-49-3	
6:2 FTS	**454**	ng/L	12.5	3.6	1	09/06/25 09:40	09/08/25 21:05	27619-97-2	
7:3 FTCA	**<22.2**	ng/L	78.0	22.2	1	09/06/25 09:40	09/08/25 21:05	812-70-4	
8:2 FTS	**<3.2**	ng/L	12.5	3.2	1	09/06/25 09:40	09/08/25 21:05	39108-34-4	
9Cl-PF3ONS	**<3.3**	ng/L	12.5	3.3	1	09/06/25 09:40	09/08/25 21:05	756426-58-1	
ADONA	**<3.7**	ng/L	12.5	3.7	1	09/06/25 09:40	09/08/25 21:05	919005-14-4	
HFPO-DA	**<3.5**	ng/L	12.5	3.5	1	09/06/25 09:40	09/08/25 21:05	13252-13-6	
NEtFOSAA	**<1.3**	ng/L	3.1	1.3	1	09/06/25 09:40	09/08/25 21:05	2991-50-6	
NEtFOSA	**<0.99**	ng/L	3.1	0.99	1	09/06/25 09:40	09/08/25 21:05	4151-50-2	
NEtFOSE	**<8.1**	ng/L	31.2	8.1	1	09/06/25 09:40	09/08/25 21:05	1691-99-2	
NFDHA	**<2.6**	ng/L	6.2	2.6	1	09/06/25 09:40	09/08/25 21:05	151772-58-6	
NMeFOSAA	**<0.98**	ng/L	3.1	0.98	1	09/06/25 09:40	09/08/25 21:05	2355-31-9	
NMeFOSA	**<0.96**	ng/L	3.1	0.96	1	09/06/25 09:40	09/08/25 21:05	31506-32-8	
NMeFOSE	**<8.0**	ng/L	31.2	8.0	1	09/06/25 09:40	09/08/25 21:05	24448-09-7	
PFBS	**4040**	ng/L	31.2	8.2	10	09/06/25 09:40	09/09/25 17:43	375-73-5	
PFDA	**<0.97**	ng/L	3.1	0.97	1	09/06/25 09:40	09/08/25 21:05	335-76-2	
PFHxA	**12800**	ng/L	312	74.9	100	09/06/25 09:40	09/09/25 17:53	307-24-4	
PFBA	**2200**	ng/L	12.5	3.0	1	09/06/25 09:40	09/08/25 21:05	375-22-4	
PFDS	**<1.3**	ng/L	3.1	1.3	1	09/06/25 09:40	09/08/25 21:05	335-77-3	
PFDoS	**<0.67**	ng/L	3.1	0.67	1	09/06/25 09:40	09/08/25 21:05	79780-39-5	
PFEESA	**2.9J**	ng/L	6.2	1.3	1	09/06/25 09:40	09/08/25 21:05	113507-82-7	
PFHpS	**930**	ng/L	3.1	0.91	1	09/06/25 09:40	09/08/25 21:05	375-92-8	
PFMBA	**3.0J**	ng/L	6.2	1.5	1	09/06/25 09:40	09/08/25 21:05	863090-89-5	
PFMPA	**4.1J**	ng/L	6.2	1.2	1	09/06/25 09:40	09/08/25 21:05	377-73-1	
PFNS	**<0.92**	ng/L	3.1	0.92	1	09/06/25 09:40	09/08/25 21:05	68259-12-1	
PFOSA	**1.1J**	ng/L	3.1	0.95	1	09/06/25 09:40	09/08/25 21:05	754-91-6	
PFPeA	**9170**	ng/L	62.4	18.6	10	09/06/25 09:40	09/09/25 17:43	2706-90-3	
PFPeS	**7120**	ng/L	312	73.9	100	09/06/25 09:40	09/09/25 17:53	2706-91-4	
PFDoA	**<0.96**	ng/L	3.1	0.96	1	09/06/25 09:40	09/08/25 21:05	307-55-1	
PFHpA	**8060**	ng/L	312	120	100	09/06/25 09:40	09/09/25 17:53	375-85-9	
PFHxS	**145000**	ng/L	312	80.0	100	09/06/25 09:40	09/09/25 17:53	355-46-4	E
PFNA	**665**	ng/L	3.1	1.0	1	09/06/25 09:40	09/08/25 21:05	375-95-1	
PFOS	**6450**	ng/L	31.2	7.7	10	09/06/25 09:40	09/09/25 17:43	1763-23-1	
PFOA	**28800**	ng/L	312	95.0	100	09/06/25 09:40	09/09/25 17:53	335-67-1	
PFTeDA	**<0.81**	ng/L	3.1	0.81	1	09/06/25 09:40	09/08/25 21:05	376-06-7	
PFTrDA	**<0.88**	ng/L	3.1	0.88	1	09/06/25 09:40	09/08/25 21:05	72629-94-8	
PFUnA	**<0.69**	ng/L	3.1	0.69	1	09/06/25 09:40	09/08/25 21:05	2058-94-8	
Surrogates									
13C2-PFDoA (S)	80	%.	10-130		1	09/06/25 09:40	09/08/25 21:05		
13C3HFPO-DA (S)	115	%.	40-130		1	09/06/25 09:40	09/08/25 21:05		
13C3-PFBS (S)	121	%.	40-135		1	09/06/25 09:40	09/08/25 21:05		
13C3-PFHxS (S)	34	%.	40-130		1	09/06/25 09:40	09/08/25 21:05		S0

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
1241 Bellevue Street - Suite 9
Green Bay, WI 54302
(920)469-2436

ANALYTICAL RESULTS

Project: DBP
Pace Project No.: 40300904

Sample: PZ1 **Lab ID: 40300904008** Collected: 08/28/25 13:00 Received: 08/29/25 09:15 Matrix: Water

Parameters	Results	Units	LOQ	LOD	DF	Prepared	Analyzed	CAS No.	Qual
EPA 1633F Water	Analytical Method: EPA 1633 Preparation Method: EPA 1633 Pace Analytical Services - Minneapolis								
Surrogates									
13C4-PFBA (S)	83	%.	5-130		1	09/06/25 09:40	09/08/25 21:05		
13C4-PFHpA (S)	68	%.	40-130		1	09/06/25 09:40	09/08/25 21:05		
13C5-PFHxA (S)	63	%.	40-130		1	09/06/25 09:40	09/08/25 21:05		
13C5-PFPeA (S)	88	%.	40-130		1	09/06/25 09:40	09/08/25 21:05		
13C6-PFDA (S)	67	%.	40-130		1	09/06/25 09:40	09/08/25 21:05		
13C8-PFOA (S)	69	%.	40-130		1	09/06/25 09:40	09/08/25 21:05		
13C8-PFOS (S)	72	%.	40-130		1	09/06/25 09:40	09/08/25 21:05		
13C8-PFOSA (S)	79	%.	40-130		1	09/06/25 09:40	09/08/25 21:05		
13C9-PFNA (S)	67	%.	40-130		1	09/06/25 09:40	09/08/25 21:05		
d3-MeFOSAA (S)	54	%.	40-170		1	09/06/25 09:40	09/08/25 21:05		
d3-NMeFOSA (S)	69	%.	10-130		1	09/06/25 09:40	09/08/25 21:05		
d5-EtFOSAA (S)	61	%.	25-135		1	09/06/25 09:40	09/08/25 21:05		
d5-NEtFOSA (S)	64	%.	10-130		1	09/06/25 09:40	09/08/25 21:05		
d7-NMeFOSE (S)	68	%.	10-130		1	09/06/25 09:40	09/08/25 21:05		
d9-NEtFOSE (S)	67	%.	10-130		1	09/06/25 09:40	09/08/25 21:05		
13C2-PFTA (S)	91	%.	10-130		1	09/06/25 09:40	09/08/25 21:05		
13C7-PFUdA (S)	82	%.	30-130		1	09/06/25 09:40	09/08/25 21:05		
13C24:2FTS (S)	243	%.	40-200		1	09/06/25 09:40	09/08/25 21:05		S0
13C26:2FTS (S)	129	%.	40-200		1	09/06/25 09:40	09/08/25 21:05		
13C28:2FTS (S)	276	%.	40-300		1	09/06/25 09:40	09/08/25 21:05		
13C3-PFPrA (S)	23	%.	5-130		1	09/06/25 09:40	09/08/25 21:05		

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
1241 Bellevue Street - Suite 9
Green Bay, WI 54302
(920)469-2436

QUALITY CONTROL DATA

Project: DBP
Pace Project No.: 40300904

QC Batch: 1027765
QC Batch Method: EPA 1633
Analysis Method: EPA 1633
Analysis Description: EPA 1633F Water
Laboratory: Pace Analytical Services - Minneapolis
Associated Lab Samples: 40300904001, 40300904002, 40300904003, 40300904004, 40300904005, 40300904006, 40300904007, 40300904008

METHOD BLANK: 5353929
Matrix: Water
Associated Lab Samples: 40300904001, 40300904002, 40300904003, 40300904004, 40300904005, 40300904006, 40300904007, 40300904008

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
11Cl-PF3OUdS	ng/L	<1.9	6.4	09/08/25 17:42	
3:3 FTCA	ng/L	<2.2	8.0	09/08/25 17:42	
4:2 FTS	ng/L	<1.6	6.4	09/08/25 17:42	
5:3 FTCA	ng/L	<9.6	40.0	09/08/25 17:42	
6:2 FTS	ng/L	<1.8	6.4	09/08/25 17:42	
7:3 FTCA	ng/L	<11.4	40.0	09/08/25 17:42	
8:2 FTS	ng/L	<1.7	6.4	09/08/25 17:42	
9Cl-PF3ONS	ng/L	<1.7	6.4	09/08/25 17:42	
ADONA	ng/L	<1.9	6.4	09/08/25 17:42	
HFPO-DA	ng/L	<1.8	6.4	09/08/25 17:42	
NEtFOSA	ng/L	<0.51	1.6	09/08/25 17:42	
NEtFOSAA	ng/L	<0.66	1.6	09/08/25 17:42	
NEtFOSE	ng/L	<4.1	16.0	09/08/25 17:42	
NFDHA	ng/L	<1.3	3.2	09/08/25 17:42	
NMeFOSA	ng/L	<0.49	1.6	09/08/25 17:42	
NMeFOSAA	ng/L	<0.50	1.6	09/08/25 17:42	
NMeFOSE	ng/L	<4.1	16.0	09/08/25 17:42	
PFBA	ng/L	<1.6	6.4	09/08/25 17:42	
PFBS	ng/L	<0.42	1.6	09/08/25 17:42	
PFDA	ng/L	<0.50	1.6	09/08/25 17:42	
PFDoA	ng/L	<0.49	1.6	09/08/25 17:42	
PFDoS	ng/L	<0.34	1.6	09/08/25 17:42	
PFDS	ng/L	<0.69	1.6	09/08/25 17:42	
PFEESA	ng/L	<0.69	3.2	09/08/25 17:42	
PFHpA	ng/L	<0.62	1.6	09/08/25 17:42	
PFHpS	ng/L	<0.47	1.6	09/08/25 17:42	
PFHxA	ng/L	<0.38	1.6	09/08/25 17:42	
PFHxS	ng/L	<0.41	1.6	09/08/25 17:42	
PFMBA	ng/L	<0.78	3.2	09/08/25 17:42	
PFMPA	ng/L	<0.62	3.2	09/08/25 17:42	
PFNA	ng/L	<0.52	1.6	09/08/25 17:42	
PFNS	ng/L	<0.47	1.6	09/08/25 17:42	
PFOA	ng/L	<0.49	1.6	09/08/25 17:42	
PFOS	ng/L	<0.39	1.6	09/08/25 17:42	
PFOSA	ng/L	<0.49	1.6	09/08/25 17:42	
PFPeA	ng/L	<0.95	3.2	09/08/25 17:42	
PFPeS	ng/L	<0.38	1.6	09/08/25 17:42	
PFTeDA	ng/L	<0.41	1.6	09/08/25 17:42	
PFTrDA	ng/L	<0.45	1.6	09/08/25 17:42	

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REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
1241 Bellevue Street - Suite 9
Green Bay, WI 54302
(920)469-2436

QUALITY CONTROL DATA

Project: DBP
Pace Project No.: 40300904

METHOD BLANK: 5353929 Matrix: Water
Associated Lab Samples: 40300904001, 40300904002, 40300904003, 40300904004, 40300904005, 40300904006, 40300904007, 40300904008

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
PFUnA	ng/L	<0.36	1.6	09/08/25 17:42	
13C2-PFDoA (S)	%.	75	10-130	09/08/25 17:42	
13C2-PFTA (S)	%.	71	10-130	09/08/25 17:42	
13C24:2FTS (S)	%.	112	40-200	09/08/25 17:42	
13C26:2FTS (S)	%.	108	40-200	09/08/25 17:42	
13C28:2FTS (S)	%.	143	40-300	09/08/25 17:42	
13C3-PFBS (S)	%.	90	40-135	09/08/25 17:42	
13C3-PFHxS (S)	%.	82	40-130	09/08/25 17:42	
13C3-PFPrA (S)	%.	82	5-130	09/08/25 17:42	
13C3HFPO-DA (S)	%.	82	40-130	09/08/25 17:42	
13C4-PFBA (S)	%.	84	5-130	09/08/25 17:42	
13C4-PFHpA (S)	%.	79	40-130	09/08/25 17:42	
13C5-PFHxA (S)	%.	82	40-130	09/08/25 17:42	
13C5-PFPeA (S)	%.	83	40-130	09/08/25 17:42	
13C6-PFDA (S)	%.	82	40-130	09/08/25 17:42	
13C7-PFUdA (S)	%.	77	30-130	09/08/25 17:42	
13C8-PFOA (S)	%.	84	40-130	09/08/25 17:42	
13C8-PFOS (S)	%.	74	40-130	09/08/25 17:42	
13C8-PFOSA (S)	%.	73	40-130	09/08/25 17:42	
13C9-PFNA (S)	%.	83	40-130	09/08/25 17:42	
d3-MeFOSAA (S)	%.	83	40-170	09/08/25 17:42	
d3-NMeFOSA (S)	%.	61	10-130	09/08/25 17:42	
d5-EtFOSAA (S)	%.	83	25-135	09/08/25 17:42	
d5-NEtFOSA (S)	%.	61	10-130	09/08/25 17:42	
d7-NMeFOSE (S)	%.	67	10-130	09/08/25 17:42	
d9-NEtFOSE (S)	%.	67	10-130	09/08/25 17:42	

LABORATORY CONTROL SAMPLE: 5353930

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
11Cl-PF3OUdS	ng/L	75.2	76.9	102	55-160	
3:3 FTCA	ng/L	99.2	88.8	89	65-130	
4:2 FTS	ng/L	75.2	74.6	99	70-145	
5:3 FTCA	ng/L	496	482	97	70-135	
6:2 FTS	ng/L	76.8	78.9	103	65-155	
7:3 FTCA	ng/L	496	484	98	50-145	
8:2 FTS	ng/L	76.8	80.3	105	60-150	
9Cl-PF3ONS	ng/L	75.2	82.3	110	70-155	
ADONA	ng/L	75.2	78.3	104	65-145	
HFPO-DA	ng/L	80	75.0	94	70-140	
NEtFOSA	ng/L	19.2	19.1	99	65-145	
NEtFOSAA	ng/L	19.2	17.0	88	70-145	
NEtFOSE	ng/L	192	204	106	70-135	

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REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
1241 Bellevue Street - Suite 9
Green Bay, WI 54302
(920)469-2436

QUALITY CONTROL DATA

Project: DBP
Pace Project No.: 40300904

LABORATORY CONTROL SAMPLE: 5353930

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
NFDHA	ng/L	40	38.5	96	50-150	
NMeFOSA	ng/L	19.2	20.3	106	60-150	
NMeFOSAA	ng/L	19.2	18.8	98	50-140	
NMeFOSE	ng/L	192	192	100	70-145	
PFBA	ng/L	80	78.5	98	70-140	
PFBS	ng/L	17.6	17.0	96	60-145	
PFDA	ng/L	19.2	18.8	98	70-140	
PFDoA	ng/L	19.2	18.8	98	70-140	
PFDoS	ng/L	19.2	17.9	93	50-145	
PFDS	ng/L	19.2	19.2	100	60-145	
PFEESA	ng/L	35.2	33.4	95	70-140	
PFHpA	ng/L	19.2	18.3	95	70-150	
PFHpS	ng/L	19.2	18.0	94	70-150	
PFHxA	ng/L	19.2	19.5	102	70-145	
PFHxS	ng/L	17.6	16.7	95	65-145	
PFMBA	ng/L	40	40.2	100	60-150	
PFMPA	ng/L	40	38.7	97	55-140	
PFNA	ng/L	19.2	18.3	95	70-150	
PFNS	ng/L	19.2	18.7	97	65-145	
PFOA	ng/L	19.2	18.5	96	70-150	
PFOS	ng/L	19.2	17.1	89	55-150	
PFOSA	ng/L	19.2	18.1	95	70-145	
PFPeA	ng/L	40	37.0	93	65-135	
PFPeS	ng/L	19.2	18.1	94	65-140	
PFTeDA	ng/L	19.2	20.5	107	60-140	
PFTrDA	ng/L	19.2	17.9	93	65-140	
PFUnA	ng/L	19.2	19.5	102	70-145	
13C2-PFDoA (S)	%.			91	10-130	
13C2-PFTA (S)	%.			79	10-130	
13C24:2FTS (S)	%.			114	40-200	
13C26:2FTS (S)	%.			111	40-200	
13C28:2FTS (S)	%.			136	40-300	
13C3-PFBS (S)	%.			103	40-135	
13C3-PFHxS (S)	%.			102	40-130	
13C3-PFPrA (S)	%.			99	5-130	
13C3HFPO-DA (S)	%.			100	40-130	
13C4-PFBA (S)	%.			100	5-130	
13C4-PFHpA (S)	%.			99	40-130	
13C5-PFHxA (S)	%.			100	40-130	
13C5-PFPeA (S)	%.			99	40-130	
13C6-PFDA (S)	%.			95	40-130	
13C7-PFUdA (S)	%.			97	30-130	
13C8-PFOA (S)	%.			102	40-130	
13C8-PFOS (S)	%.			93	40-130	
13C8-PFOSA (S)	%.			88	40-130	
13C9-PFNA (S)	%.			98	40-130	
d3-MeFOSAA (S)	%.			101	40-170	

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REPORT OF LABORATORY ANALYSIS

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1241 Bellevue Street - Suite 9
Green Bay, WI 54302
(920)469-2436

QUALITY CONTROL DATA

Project: DBP
Pace Project No.: 40300904

LABORATORY CONTROL SAMPLE: 5353930

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
d3-NMeFOSA (S)	%.			77	10-130	
d5-EtFOSAA (S)	%.			100	25-135	
d5-NEtFOSA (S)	%.			76	10-130	
d7-NMeFOSE (S)	%.			80	10-130	
d9-NEtFOSE (S)	%.			79	10-130	

LABORATORY CONTROL SAMPLE: 5353931

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
11Cl-PF3OUdS	ng/L	12	12.4	103	55-160	
3:3 FTCA	ng/L	15.9	15.3	96	65-130	
4:2 FTS	ng/L	12	12.1	100	70-145	
5:3 FTCA	ng/L	79.4	74.9	94	70-135	
6:2 FTS	ng/L	12.3	12.9	105	65-155	
7:3 FTCA	ng/L	79.4	77.4	98	50-145	
8:2 FTS	ng/L	12.3	12.7	103	60-150	
9Cl-PF3ONS	ng/L	12	13.5	112	70-155	
ADONA	ng/L	12	13.2	110	65-145	
HFPO-DA	ng/L	12.8	12.1	95	70-140	
NEtFOSA	ng/L	3.1	3.2	105	65-145	
NEtFOSAA	ng/L	3.1	3.0	98	70-145	
NEtFOSE	ng/L	30.7	31.2	101	70-135	
NFDHA	ng/L	6.4	6.5	102	50-150	
NMeFOSA	ng/L	3.1	3.2	103	60-150	
NMeFOSAA	ng/L	3.1	3.0	97	50-140	
NMeFOSE	ng/L	30.7	30.7	100	70-145	
PFBA	ng/L	12.8	12.3	96	70-140	
PFBS	ng/L	2.8	2.8	101	60-145	
PFDA	ng/L	3.1	2.9	95	70-140	
PFDoA	ng/L	3.1	3.1	100	70-140	
PFDoS	ng/L	3.1	3.0	99	50-145	
PFDS	ng/L	3.1	3.1	100	60-145	
PFEESA	ng/L	5.6	5.4	95	70-140	
PFHpA	ng/L	3.1	3.0	96	70-150	
PFHpS	ng/L	3.1	3.0	99	70-150	
PFHxA	ng/L	3.1	3.0	99	70-145	
PFHxS	ng/L	2.8	2.9	102	65-145	
PFMBA	ng/L	6.4	6.3	98	60-150	
PFMPA	ng/L	6.4	6.4	99	55-140	
PFNA	ng/L	3.1	2.9	95	70-150	
PFNS	ng/L	3.1	3.1	101	65-145	
PFOA	ng/L	3.1	3.1	100	70-150	
PFOS	ng/L	3.1	2.8	92	55-150	
PFOSA	ng/L	3.1	3.2	104	70-145	
PFPeA	ng/L	6.4	6.1	95	65-135	

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REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
1241 Bellevue Street - Suite 9
Green Bay, WI 54302
(920)469-2436

QUALITY CONTROL DATA

Project: DBP
Pace Project No.: 40300904

LABORATORY CONTROL SAMPLE: 5353931

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
PFPeS	ng/L	3.1	3.2	105	65-140	
PFTeDA	ng/L	3.1	3.2	103	60-140	
PFTrDA	ng/L	3.1	2.9	96	65-140	
PFUnA	ng/L	3.1	3.1	102	70-145	
13C2-PFDoA (S)	%.			85	10-130	
13C2-PFTA (S)	%.			77	10-130	
13C24:2FTS (S)	%.			122	40-200	
13C26:2FTS (S)	%.			114	40-200	
13C28:2FTS (S)	%.			147	40-300	
13C3-PFBS (S)	%.			98	40-135	
13C3-PFHxS (S)	%.			90	40-130	
13C3-PFPrA (S)	%.			97	5-130	
13C3HFPO-DA (S)	%.			94	40-130	
13C4-PFBA (S)	%.			95	5-130	
13C4-PFHpA (S)	%.			92	40-130	
13C5-PFHxA (S)	%.			97	40-130	
13C5-PFPeA (S)	%.			96	40-130	
13C6-PFDA (S)	%.			93	40-130	
13C7-PFUdA (S)	%.			91	30-130	
13C8-PFOA (S)	%.			95	40-130	
13C8-PFOS (S)	%.			86	40-130	
13C8-PFOSA (S)	%.			86	40-130	
13C9-PFNA (S)	%.			99	40-130	
d3-MeFOSAA (S)	%.			100	40-170	
d3-NMeFOSA (S)	%.			71	10-130	
d5-EtFOSAA (S)	%.			98	25-135	
d5-NEtFOSA (S)	%.			71	10-130	
d7-NMeFOSE (S)	%.			78	10-130	
d9-NEtFOSE (S)	%.			78	10-130	

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REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
1241 Bellevue Street - Suite 9
Green Bay, WI 54302
(920)469-2436

QUALIFIERS

Project: DBP
Pace Project No.: 40300904

DEFINITIONS

DF - Dilution Factor, if reported, represents the factor applied to the reported data due to dilution of the sample aliquot.

ND - Not Detected at or above LOD.

J - The reported result is an estimated value.

LOD - Limit of Detection adjusted for dilution factor, percent moisture, initial weight and final volume.

LOQ - Limit of Quantitation adjusted for dilution factor, percent moisture, initial weight and final volume.

DL - Adjusted Method Detection Limit.

S - Surrogate

1,2-Diphenylhydrazine decomposes to and cannot be separated from Azobenzene using Method 8270. The result for each analyte is a combined concentration.

Consistent with EPA guidelines, unrounded data are displayed and have been used to calculate % recovery and RPD values.

LCS(D) - Laboratory Control Sample (Duplicate)

MS(D) - Matrix Spike (Duplicate)

DUP - Sample Duplicate

RPD - Relative Percent Difference

NC - Not Calculable.

SG - Silica Gel - Clean-Up

U - Analyte was not detected and is reported as less than the LOD or as defined by the customer.

N-Nitrosodiphenylamine decomposes and cannot be separated from Diphenylamine using Method 8270. The result reported for each analyte is a combined concentration.

Pace Analytical is TNI accredited. Contact your Pace PM for the current list of accredited analytes.

TNI - The NELAC Institute.

SAMPLE QUALIFIERS

Sample: 40300904005
[1] The ion ratio is outside of control limits for PFOSA.

Sample: 40300904007
[1] The ion ratio is outside of control limits for 3:3FTCA, PFNA, and PFOSA.

Sample: 40300904008
[1] The ion ratio is outside of control limits for PFOSA.

ANALYTE QUALIFIERS

E Analyte concentration exceeded the calibration range. The reported result is estimated.

S0 Surrogate recovery outside laboratory control limits.

Pace Analytical Services, LLC
1241 Bellevue Street - Suite 9
Green Bay, WI 54302
(920)469-2436

QUALITY CONTROL DATA CROSS REFERENCE TABLE

Project: DBP
Pace Project No.: 40300904

Lab ID	Sample ID	QC Batch Method	QC Batch	Analytical Method	Analytical Batch
40300904001	**MW3**	EPA 1633	1027765	EPA 1633	1028348
40300904002	**MW4**	EPA 1633	1027765	EPA 1633	1028348
40300904003	**MW5**	EPA 1633	1027765	EPA 1633	1028348
40300904004	**MW6**	EPA 1633	1027765	EPA 1633	1028348
40300904005	**MW8**	EPA 1633	1027765	EPA 1633	1028348
40300904006	**MW9**	EPA 1633	1027765	EPA 1633	1028348
40300904007	**MW10**	EPA 1633	1027765	EPA 1633	1028348
40300904008	**PZ1**	EPA 1633	1027765	EPA 1633	1028348

Pace Analytical®
www.pacelabs.com

UPPER MIDWEST REGION
MN: 612-607-1700 WI: 920-469-2436

COC No. 40300904

CHAIN OF CUSTODY

*Preservation Codes
A=None B=HCL C=H2SO4 D=HNO3 E=DI Water F=Methanol G=NaOH
H=Sodium Bisulfate Solution I=Sodium Thiosulfate J=Other

(Please Print Clearly)	
Company Name:	ORIN Technologies
Branch/Location:	
Project Contact:	Jacob Mirfield
Phone:	563-468-7645
Project Number:	
Project Name:	DBP
Project State:	WI
Sampled By (Print):	Jacob Mirfield
Sampled By (Sign):	
PO #:	Regulatory Program:

Quote #:	
Mail To Contact:	Jacob Mirfield
Mail To Company:	ORIN Technologies
Mail To Address:	405 Investment Ct. Verona, WI 53593
Invoice To Contact:	Same as above
Invoice To Company:	Same as above
Invoice To Address:	Same as above
Invoice To Phone:	

Data Package Options (billable)
☐ EPA Level III
☐ EPA Level IV

MS/MSD
☐ On your sample (billable)
☐ NOT needed on your sample

Matrix Codes
A = Air, W = Water, B = Biota, DW = Drinking Water, C = Charcoal, GW = Ground Water, O = Oil, SW = Surface Water, S = Soil, WW = Waste Water, SI = Sludge, WP = Wipe

FILTERED? (YES/NO) PRESERVATION (CODE)*

PACE LAB #	CLIENT FIELD ID	COLLECTION DATE	COLLECTION TIME	MATRIX	Y/N	Pick Letter	Analyses Requested: EPA 1633	CLIENT COMMENTS	LAB COMMENTS (Lab Use Only)	Profile #
001	MW3	8/28/25	1300	GW	N	A	X			
002	MW4	8/28/25	1300	GW			X			
003	MW5	8/28/25	1300	GW			X			
004	MW6	8/28/25	1300	GW			X			
005	MW8	8/28/25	1300	GW			X			
006	MW9	8/28/25	1300	GW			X			
007	MW10	8/28/25	1300	GW			X			
008	PZ1	8/28/25	1300	GW			X			

Rush Turnaround Time Requested - Prelims
(Rush TAT subject to approval/surcharge)
Date Needed:

Transmit Prelim Rush Results by (complete what you want):

Email #1:	jmirfield@orinrt.com
Email #2:	
Telephone:	
Fax:	

Samples on HOLD are subject to special pricing and release of liability

Relinquished By:	Date/Time:	Received By:	Date/Time:
[signature]	8/28/25 - 1630		
FedEx	8/29/25 0915	[signature] pace	8/29/25 0915

PACE Project No.

Receipt Temp = °C

Sample Receipt pH OK / Adjusted

Cooler Custody Seal Present / Not Present Intact / Not Intact

Version 6.0 06/14/06

Sample Preservation Receipt Form

Client Name: Orin Tech Project # 40300904

All containers needing preservation have been checked and noted below: ☐Yes ☐No ☒N/A Initial when completed: Date/ Time:

Lab Lot# of pH paper: Lab Std #ID of preservation (if pH adjusted):

Pace Lab #	Glass: AG1U	BG1U	AG1H	AG4S	AG5U	AG2S	BG3U	Plastic: BP1U	BP3U	BP3B	BP3N	BP3S	BP2Z	Vials: VG9C	DG9T	VG9U	VG9H	VG9M	VG9D	Jars: JGFU	JG9U	WGFU	WPFU	General: SP5T	ZPLC	GN 1	GN 2	VOA Vials (>6mm) *	H2SO4 pH ≤2	NaOH+Zn Act pH ≥9	NaOH pH ≥12	HNO3 pH ≤2	pH after adjusted	Volume (mL)
001																										2								2.5 / 5
002																										2								2.5 / 5
003																										2								2.5 / 5
004																										2								2.5 / 5
005																										2								2.5 / 5
006																										2								2.5 / 5
007																										2								2.5 / 5
008																										2								2.5 / 5
009																																		2.5 / 5
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014																																		2.5 / 5
015																																		2.5 / 5
016																																		2.5 / 5
017																																		2.5 / 5
018																																		2.5 / 5
019																																		2.5 / 5
020																																		2.5 / 5

Exceptions to preservation check: VOA, Coliform, TOC, TOX, TOH, O&G, WI DRO, Phenolics, Other: Headspace in VOA Vials (>6mm) : ☐Yes ☐No ☒N/A ***If yes look in headspace column**

AG1U	1 liter amber glass	BP1U	1 liter plastic unpres	VG9C	40 mL clear ascorbic w/ HCl	JGFU	4 oz amber jar unpres
BG1U	1 liter clear glass	BP3U	250 mL plastic unpres	DG9T	40 mL amber Na Thio	JG9U	9 oz amber jar unpres
AG1H	1 liter amber glass HCL	BP3B	250 mL plastic NaOH	VG9U	40 mL clear vial unpres	WGFU	4 oz clear jar unpres
AG4S	125 mL amber glass H2SO4	BP3N	250 mL plastic HNO3	VG9H	40 mL clear vial HCL	WPFU	4 oz plastic jar unpres
AG5U	100 mL amber glass unpres	BP3S	250 mL plastic H2SO4	VG9M	40 mL clear vial MeOH	SP5T	120 mL plastic Na Thiosulfate
AG2S	500 mL amber glass H2SO4	BP2Z	500 mL plastic NaOH + Zn	VG9D	40 mL clear vial DI	ZPLC	ziploc bag
BG3U	250 mL clear glass unpres					GN 1	250 mL plastic unpres NT
						GN 2	

Sample Condition Upon Receipt Form (SCUR)

Project #:

WO# : 40300904

40300904

Client Name: Orin Tech

Courier: ☐ CS Logistics ☒ Fed Ex ☐ Speedee ☐ UPS ☐ Purple Mountain ☐ Client ☐ Pace Other:

Tracking #: 8839 4503 0630

Custody Seal on Cooler/Box Present: ☐ yes ☒ no Seals intact: ☐ yes ☐ no

Custody Seal on Samples Present: ☐ yes ☒ no Seals intact: ☐ yes ☐ no

Packing Material: ☒ Bubble Wrap ☐ Bubble Bags ☐ None ☐ Other

Thermometer Used SR - 148 **Type of Ice:** (Wet) Blue Dry None ☐ Meltwater Only

Cooler Temperature Uncorr: 1.0 /Corr: 1.0

Temp Blank Present: ☐ yes ☒ no **Biological Tissue is Frozen:** ☐ yes ☐ no

Temp should be above freezing to 6°C.
Biota Samples may be received at ≤ 0°C if shipped on Dry Ice.

Person examining contents:
Date: 8/27/25 /Initials: MM

Labeled By Initials: MV

Chain of Custody Present:	☒Yes ☐No ☐N/A	1.
Chain of Custody Filled Out:	☒Yes ☐No ☐N/A	2.
Chain of Custody Relinquished:	☒Yes ☐No ☐N/A	3.
Sampler Name & Signature on COC:	☐Yes ☒No ☐N/A	4.
Samples Arrived within Hold Time:	☒Yes ☐No	5.
- DI VOA Samples frozen upon receipt	☐Yes ☐No	Date/Time:
Short Hold Time Analysis (<72hr):	☐Yes ☒No	6.
Rush Turn Around Time Requested:	☐Yes ☒No	7.
Sufficient Volume: For Analysis: ☒Yes ☐No MS/MSD:	☐Yes ☒No ☐N/A	8.
Correct Containers Used:	☒Yes ☐No	9.
Correct Type: Pace Green Bay, (Pace IR), Non-Pace		
Containers Intact:	☒Yes ☐No	10.
Filtered volume received for Dissolved tests	☐Yes ☐No ☒N/A	11.
Sample Labels match COC: -Includes date/time/ID/Analysis Matrix: W	☒Yes ☐No ☐N/A	12.
Trip Blank Present:	☐Yes ☐No ☒N/A	13.
Trip Blank Custody Seals Present	☐Yes ☐No ☒N/A	
Pace Trip Blank Lot # (if purchased):		

Client Notification/ Resolution: If checked, see attached form for additional comments ☐

Person Contacted: Date/Time:

Comments/ Resolution:

PM Review is documented electronically in LIMs. By releasing the project, the PM acknowledges they have reviewed the sample logir

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