

MEMORANDUM

TO: Richard Conforti
FROM: Clifford Yantz
RE: PFAS Delineation Investigation - Supplement
FILE: 15388/68545/5
DATE: November 27, 2018

cc: Mr. Joseph Rogers - MDEQ
Mr. John McCabe – MDEQ
Mr. Grant Trigger – RACER Trust
Mr. David Favero – RACER Trust
Mr. Kevin Schneider – O’Brien & Gere

This technical memorandum has been prepared on behalf of the Revitalizing Auto Communities Environmental Response Trust (RACER Trust) to provide documentation for the per- and polyfluorinated alkyl substances (PFAS) groundwater delineation investigation and sampling activities conducted in September and October 2018 at Coldwater Road Landfill facility located in Flint, Michigan (Site) not available for the previous PFAS Delineation Investigation Technical Memorandum dated November 3, 2018. The table, figure, and attachment number system from the original technical memorandum have been maintained in this technical memorandum; therefore, revised tables, figures, and attachments use the same numbers as in the November 3, 2018 report and new tables or figures continue from the numbering sequence previously utilized.

BACKGROUND

Since the submittal of the PFAS Delineation Investigation Technical Memorandum on November 3, 2018 the analytical results for monitoring wells OBG MW-12D, OBG MW-15D, OBG MW-16D, OBG MW-17D, and OBG MW-19D, and associated quality control data were received from the laboratory (see [Attachment 3](#)). [Table 3](#) has been updated to include the newly available analytical data. [Figure 4](#) has also been updated to present the data for the aforementioned wells. This data completes the reporting of the data from the September/October 2018 sampling activities.

In addition, a round of water levels was taken on November 5, 2018 from the available monitoring wells at the Site (see [Table 5](#)), and were used to create updated groundwater contour maps. The contours are shown on [Figures 3A](#) and [3B](#) for the perched zone, and [Figure 4](#) for the Drift aquifer. Furthermore, new [Figures 9](#) and [10](#) provide the groundwater contours and water level elevation data for November 5, 2018 for the perched zone and Drift aquifer, respectively.

SUMMARY

The newly available Drift aquifer analytical results were all non-detect confirming the previous monitoring well and temporary well data for the Site, with the exception of the data obtained at B-2D, and confirms that it does not appear that concentrations of PFAS above drinking water criteria are migrating off-Site within the Drift (regional glacial) aquifer. The water level data confirms that the groundwater flow direction in the Drift aquifer at the Site is towards the south with a slight easterly flow component ([Figure 10](#)).

The groundwater flow direction in the perched zone is complicated and may vary because the conceptual site model (CSM) for the Site includes discontinuous perched saturated zones within the otherwise clayey matrix. [Figure 9](#) provides interpreted contours for the November 5, 2018 groundwater elevation data. Based on these contours, the groundwater flow direction in the perched zone appears to be predominantly toward the northwest.

The presence of PFAS in B-2D appear to be anomalous for the Drift aquifer monitoring wells. MDEQ hypothesized that the seal on the well may be leaking, which could be the case. The well was installed in 1979. For years, a partial obstruction (or possibly kink) in the well casing has been encountered at about 30 to 40 feet below grade. Stainless steel bailers and longer pumps have been difficult to get down this well past the kink; therefore, about eight years ago a dedicated bladder pump was placed down this well so that a submersible pump would not have to be lowered and removed from this well each sampling event. We are surmising that

there indeed might be an issue with this well at the kink. Whether this is a separation at one of the well casing joints, or something else, the well appears to be compromised and should be taken out of service. Newly installed monitoring well OBG MW-16D should be able to act as a replacement well for this location and, as we previously proposed, we hope to establish that OBG MW-16D will be a suitable replacement well for B-2D in the landfill monitoring program after evaluating the recent semiannual sampling results.

As approved by MDEQ further delineation activities are in progress and the results will be reported to MDEQ after they have been evaluated and summarized. If you have any questions or comments concerning this technical memorandum, please feel free to contact me at 313.333.0211 or Dave Favero at 734.879.9525.

Very truly yours,

O'BRIEN & GERE ENGINEERS, INC.



Clifford S. Yantz, PG
Senior Hydrogeologist

ENCLOSURES:

Table 3 – PFAS Analytical Results – Monitoring Well Results

Table 5 – Depth to Groundwater Levels in Monitoring Wells

Figure 3A – Perched Monitoring Wells/Pre-September 2018 PFAS Sample Locations

Figure 3B – Perched Monitoring Wells and Surface Water Sample Locations/Post-September 2018 PFAS Sample Locations

Figure 4 – Drift Aquifer Monitoring Wells/PFAS Sample Locations

Figure 9 – Shallow Groundwater Elevation Map – November 5, 2018

Figure 10 – Drift Aquifer Groundwater Elevation Map – November 5, 2018

Attachment 3 – Analytical Laboratory Reports



TABLES

TABLE 3

RACER Trust - Coldwater Road Landfill & Peregrine Facilities

Per-and Polyfluoroalkyl Substances Sampling Results - September/October 2018 Monitoring Well Sampling

Coldwater Rd Monitoring Wells - Perched Aquifer														
Perfluorinated Compound	Well/Sample ID:	OBG MW-6	OBG MW-7	OBG MW-8	OBG MW-9	OBG MW-9 REPLICATE 01	OBG MW-13	OBG MW-14	OBG MW-20					
	Sample Date:	9/20/2018	9/20/2018	9/20/2018	9/20/2018	9/20/2018	10/19/2018	10/19/2018	Not Sampled Dry					
Perfluorobutanoic Acid (PFBA)		30	<20	<20	<20	<20	<20	<20	NS					
Perfluoropentanoic Acid (PFPeA)		<10	<10	<10	<10	<10	<10	<10	NS					
4:2 Fluorotelomer Sulfonic Acid (4:2 FTSA)		<10	<10	<10	<10	<10	<10	<10	NS					
Perfluorohexanoic Acid (PFHxA)		<10	<10	<10	<10	<10	<10	<10	NS					
Perfluorobutane Sulfonic Acid (PFBS)		<10	<10	<10	<10	<10	<10	10	NS					
Perfluoroheptanoic Acid (PFHpA)		<10	<10	<10	<10	<10	<10	<10	NS					
Perfluoropentane Sulfonic Acid (PFPeS)		<10	<10	<10	<10	<10	<10	20	NS					
6:2 Fluorotelomer Sulfonic Acid (6:2 FTSA)		<10	<10	<10	<10	<10	<10	<10	NS					
Perfluorooctanoic Acid (PFOA)		<10	<10	20	<10	<10	<10	20	NS					
Perfluorohexane Sulfonic Acid (PFHxS)		<10	<10	70	<10	<10	<10	100	NS					
Perfluorohexane Sulfonic Acid - LN (PFHxS-LN)		<10	<10	60	<10	<10	<10	100	NS					
Perfluorohexane Sulfonic Acid - BR (PFHxS-BR)		<10	<10	<10	<10	<10	<10	10	NS					
Perfluorononanoic Acid (PFNA)		<10	<10	<10	<10	<10	<10	<10	NS					
8:2 Fluorotelomer Sulfonic Acid (8:2 FTSA)		<10	<10	<10	<10	<10	<10	<10	NS					
Perfluoroheptane Sulfonic Acid (PFHpS)		<10	<10	30	<10	<10	<10	20	NS					
Perfluorodecanoic Acid (PFDA)		<10	<10	<10	<10	<10	<20	<20	NS					
N-methyl Perfluorooctanesulfonamidoacetic Acid (N-MeFOS)		<10	<10	<10	<10	<10	<10	<10	NS					
N-Ethyl Perfluorooctane Sulfonamidoacetic Acid (EtFOSAA)		<10	<10	<10	<10	<10	<10	<10	NS					
Perfluorooctane Sulfonic Acid (PFOS)		<10	<10	2,710	<10	<10	<10	540	NS					
Perfluorooctane Sulfonic Acid (PFOS-LN)		<10	<10	1,570	<10	<10	<10	230	NS					
Perfluorooctane Sulfonic Acid (PFOS-BR)		<10	<10	1,270	<10	<10	<10	300	NS					
Perfluoroundecanoic Acid (PFUnDA)		<10	<10	<10	<10	<10	<10	<10	NS					
Perfluorononane Sulfonic Acid (PFNS)		<10	<10	<10	<10	<10	<10	<10	NS					
Perfluorododecanoic Acid (PFDoDA)		<10	<10	<10	<10	<10	<10	<10	NS					
Perfluorodecane Sulfonic Acid (PFDS)		<10	<10	<10	<10	<10	<10	<10	NS					
Perfluorotridecanoic Acid (PFTTrDA)		<10	<10	<10	<10	<10	<10	<10	NS					
Perfluorooctane Sulfonamide (FOSA)		<10	<10	<10	<10	<10	<10	<10	NS					
Perfluorotetradecanoic Acid (PFTeDA)		<10	<10	<10	<10	<10	<10	<10	NS					
Coldwater Rd Monitoring Wells - Drift Aquifer														
Perfluorinated Compound	Well/Sample ID:	B-20D	B-21D	B-23Dr	B-23Dr (DUP-01-GW)	MW-15-10	PFW-1	OBG MW-12D	OBG MW-15D	OBG MW-15D (DUP-1)	OBG MW-16D	OBG MW-17D	OBG MW-18D	OBG MW-19D
	Sample Date:	9/19/2018	9/19/2018	9/21/2018	9/21/2018	9/21/2018	9/21/2018	10/22/2018	10/23/2018	10/23/2018	10/22/2018	10/22/2018	10/19/2018	10/23/2018
Perfluorobutanoic Acid (PFBA)		<20	<20	<20	<20	<20	<20	<20	<20	<20	<20	<20	<20	<20
Perfluoropentanoic Acid (PFPeA)		<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10
4:2 Fluorotelomer Sulfonic Acid (4:2 FTSA)		<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10
Perfluorohexanoic Acid (PFHxA)		<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10
Perfluorobutane Sulfonic Acid (PFBS)		<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10
Perfluoroheptanoic Acid (PFHpA)		<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10
Perfluoropentane Sulfonic Acid (PFPeS)		<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10
6:2 Fluorotelomer Sulfonic Acid (6:2 FTSA)		<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10
Perfluorooctanoic Acid (PFOA)		<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10
Perfluorohexane Sulfonic Acid (PFHxS)		<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10
Perfluorohexane Sulfonic Acid - LN (PFHxS-LN)		<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10
Perfluorohexane Sulfonic Acid - BR (PFHxS-BR)		<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10
Perfluorononanoic Acid (PFNA)		<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10
8:2 Fluorotelomer Sulfonic Acid (8:2 FTSA)		<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10
Perfluoroheptane Sulfonic Acid (PFHpS)		<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10
Perfluorodecanoic Acid (PFDA)		<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<20	<10
N-methyl Perfluorooctanesulfonamidoacetic Acid (N-MeFOS)		<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10
N-Ethyl Perfluorooctane Sulfonamidoacetic Acid (EtFOSAA)		<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10
Perfluorooctane Sulfonic Acid (PFOS)		<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10
Perfluorooctane Sulfonic Acid (PFOS-LN)		<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10
Perfluorooctane Sulfonic Acid (PFOS-BR)		<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10
Perfluoroundecanoic Acid (PFUnDA)		<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10
Perfluorononane Sulfonic Acid (PFNS)		<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10
Perfluorododecanoic Acid (PFDoDA)		<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10
Perfluorodecane Sulfonic Acid (PFDS)		<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10
Perfluorotridecanoic Acid (PFTTrDA)		<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10
Perfluorooctane Sulfonamide (FOSA)		<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10
Perfluorotetradecanoic Acid (PFTeDA)		<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10



TABLE 3													
RACER Trust - Coldwater Road Landfill & Peregrine Facilities													
Per-and Polyfluoroalkyl Substances Sampling Results - September/October 2018 Monitoring Well Sampling													
Quality Assurance / Quality Control Samples													
Perfluorinated Compound	Well/Sample ID:	EB-01-GW (Whale Pump)	EB-02-GW (Bladder Pump)	FB-01-GW (Field Blank)	FB-02-GW (Field Blank)	EB-01 (Bladder Pump)	FB-01 (Field Blank)	FB-02 (Field Blank)					
	Sample Date:	9/21/2018	9/21/2018	9/20/2018	9/21/2018	10/23/2018	10/19/2018	10/23/2018					
Perfluorobutanoic Acid (PFBA)		<20	<20	<20	<20	<20	<20	<20					
Perfluoropentanoic Acid (PFPeA)		<10	<10	<10	<10	<10	<10	<10					
4:2 Fluorotelomer Sulfonic Acid (4:2 FTSA)		<10	<10	<10	<10	<10	<10	<10					
Perfluorohexanoic Acid (PFHxA)		<10	<10	<10	<10	<10	<10	<10					
Perfluorobutane Sulfonic Acid (PFBS)		<10	<10	<10	<10	<10	<10	<10					
Perfluoroheptanoic Acid (PFHpA)		<10	<10	<10	<10	<10	<10	<10					
Perfluoropentane Sulfonic Acid (PFPeS)		<10	<10	<10	<10	<10	<10	<10					
6:2 Fluorotelomer Sulfonic Acid (6:2 FTSA)		<10	<10	<10	<10	<10	<10	<10					
Perfluorooctanoic Acid (PFOA)		<10	<10	<10	<10	<10	<10	<10					
Perfluorohexane Sulfonic Acid (PFHxS)		<10	<10	<10	<10	<10	<10	<10					
Perfluorohexane Sulfonic Acid - LN (PFHxS-LN)		<10	<10	<10	<10	<10	<10	<10					
Perfluorohexane Sulfonic Acid - BR (PFHxS-BR)		<10	<10	<10	<10	<10	<10	<10					
Perfluorononanoic Acid (PFNA)		<10	<10	<10	<10	<10	<10	<10					
8:2 Fluorotelomer Sulfonic Acid (8:2 FTSA)		<10	<10	<10	<10	<10	<10	<10					
Perfluoroheptane Sulfonic Acid (PFHpS)		<10	<10	<10	<10	<10	<10	<10					
Perfluorodecanoic Acid (PFDA)		<10	<10	<10	<10	<10	<20	<10					
N-methyl Perfluorooctanesulfonamidoacetic Acid (N-MeFOS)		<10	<10	<10	<10	<10	<10	<10					
N-Ethyl Perfluorooctane Sulfonamidoacetic Acid (EtFOSAA)		<10	<10	<10	<10	<10	<10	<10					
Perfluorooctane Sulfonic Acid (PFOS)		<10	<10	<10	<10	<10	<10	<10					
Perfluorooctane Sulfonic Acid (PFOS-LN)		<10	<10	<10	<10	<10	<10	<10					
Perfluorooctane Sulfonic Acid (PFOS-BR)		<10	<10	<10	<10	<10	<10	<10					
Perfluoroundecanoic Acid (PFUnDA)		<10	<10	<10	<10	<10	<10	<10					
Perfluorononane Sulfonic Acid (PFNS)		<10	<10	<10	<10	<10	<10	<10					
Perfluorododecanoic Acid (PFDoDA)		<10	<10	<10	<10	<10	<10	<10					
Perfluorodecane Sulfonic Acid (PFDS)		<10	<10	<10	<10	<10	<10	<10					
Perfluorotridecanoic Acid (PFTTrDA)		<10	<10	<10	<10	<10	<10	<10					
Perfluorooctane Sulfonamide (FOSA)		<10	<10	<10	<10	<10	<10	<10					
Perfluorotetradecanoic Acid (PFTeDA)		<10	<10	<10	<10	<10	<10	<10					

- Notes
- 1) Concentrations in ng/L.
 - 2) < = Not detected at specified reporting limit.
 - 3) -- = Not analyzed.
 - 4) * Indicates Drift Aquifer monitoring well.
 - 5) Dup = Duplicate sample.
 - 6) B = Compound was found in the blank and the sample.
 - 7) Cl = The peak identified in the data system exhibited chromatographic interference that could not be resolved. There is reason to suspect there may be high bias.
 - 8) H = Sample was Prepped or analyzed beyond the specified holding time.
 - 9) J - Result is less than the RL but greater than or equal to the MDL and the concentration is an approximate value.
 - 10) JN - Indicates that the traget analyte has been "tentatively identified" as present and the associated numerical value is the estimated concentration in the sample.
 - 11) U - Indicates that the analyte was not detected and the sample RL is presented. This qualifier is alsoused to signify blank excursions.
 - 12) F1 - MS and/or MSD Recovery is outside acceptance limits.
 - 13) Concentrations above the USEPA advisory level (70 ng/L PFOA+PFOS) and/or MDEQ proposed drinking water criteria (70 ng/L PFOA+PFOS) are highlighted in yellow.
 - 14) NS = Not Sampled - MW-20 had about five feet of water in it when it was developed on September 26, 2018, but was purged dry during development and had not recovered when attempted to be sampled on October 19, 2018.



TABLE 5
RACER Trust - Coldwater Road Landfill Facility
Depth to Groundwater Levels in Monitoring Wells
November 5, 2018

<i>Well</i>	<i>Top of Casing Elev. (ft)</i>	<i>Depth to Water(ft)</i>	<i>Static Water Elev. (ft)</i>
B-2D	803.80	55.92	747.88
B-7	813.63	20.83	792.80
B-9	807.45	6.52	800.93
B-18A	810.85	24.83	786.02
B-19A	812.66	9.10	803.56
B-19AR	811.80	39.30	772.50
B-20D	815.14	71.39	743.75
B-21D	821.07	81.41	739.66
B-22D	822.15	85.30	736.85
B-23DR	812.12	81.44	730.68
B-24R	816.04	13.15	802.89
B-27D	812.70	76.51	736.19
B-28	816.46	5.30	811.16
OBG MW-1	811.56	7.90	803.66
OBG MW-2	813.77	11.10	802.67
OBG MW-3	810.09	7.69	802.40
OBG MW-4	812.66	14.50	798.16
OBG MW-5	816.04	10.81	805.23
OBG MW-6	815.75	17.58	798.17
OBG MW-7	813.47	12.80	800.67
OBG MW-8	817.50	11.15	806.35
OBG MW-9	809.97	5.39	804.58
OBG MW-10	811.54	6.91	804.63
OBG MW-11	801.94	10.93	791.01
OBG MW-12D	797.13	49.05	748.08
OBG MW-13	801.81	14.71	787.10
OBG MW-14	810.98	9.86	801.12
OBG MW-15D	810.68	80.04	730.64
OBG MW-16D	807.43	59.60	747.83
OBG MW-17D	800.09	52.15	747.94
OBG MW-18D	800.17	51.93	748.24
OBG MW-19D	795.37	48.15	747.22
OBG MW-20	783.93	DRY - Total Depth 27.25	756.68 - DRY Total Depth Elev.
MW-15-10	808.15	76.96	731.19
MW-16-10	798.64	67.20	731.44
PFW-1	809.51	78.15	731.36



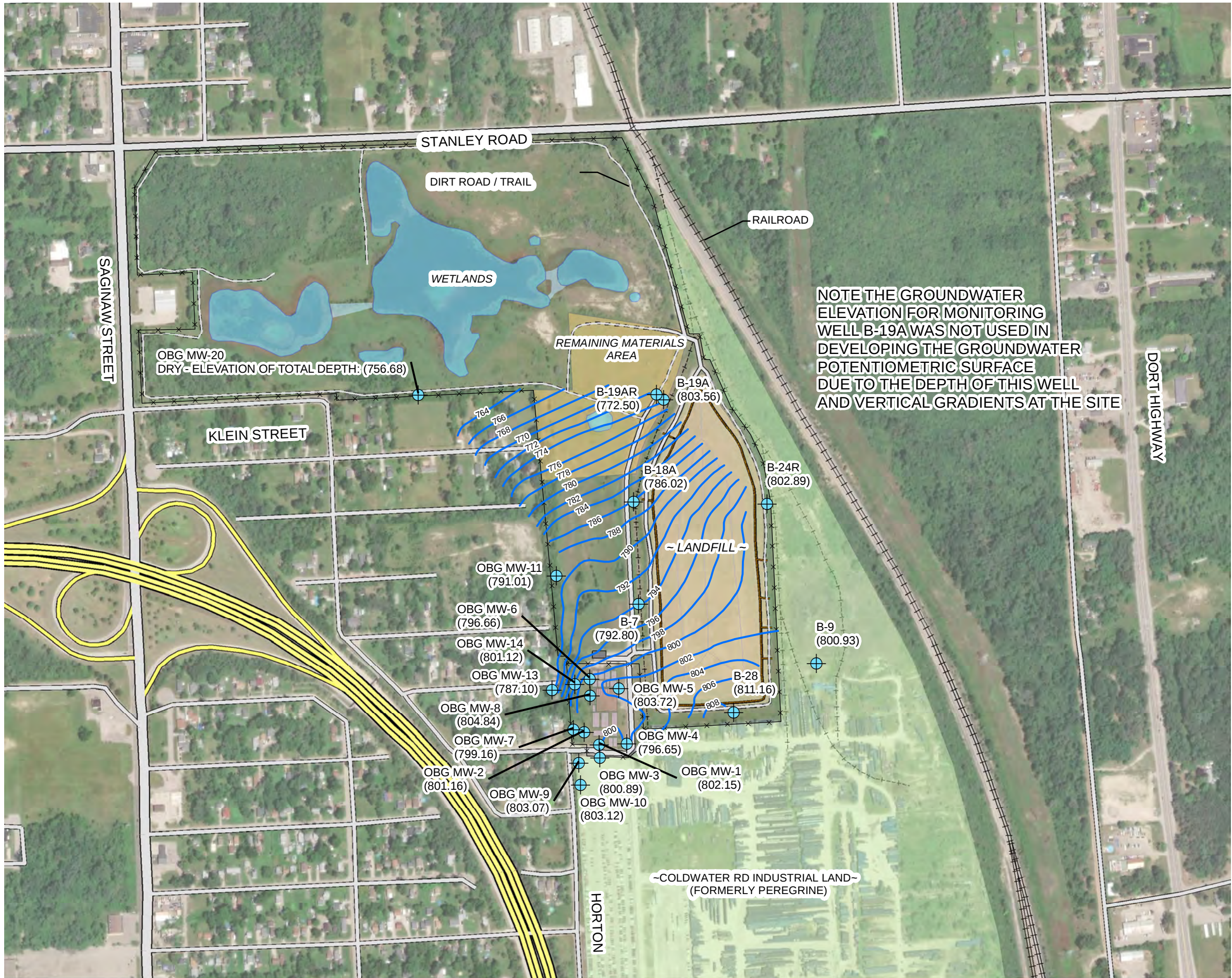
FIGURES





PLOT DATE: 11/01/18 10:02:35 AM MonetA NT

I:\Racer-Trust\15388\68545 Coldwater-Rd-LIDocs\Reports\PFAS Reports\Sept-Oct 2018\009 - Figure 9 - Shallow GWE November 5 2018 2.mxd

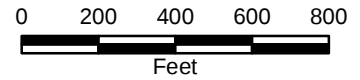


LEGEND

- PERCHED MONITORING WELL
- GROUNDWATER CONTOUR (NOVEMBER 5, 2018)
- (800.93) GROUNDWATER ELEVATION

RACER TRUST
COLDWATER ROAD
LANDFILL FACILITY
FLINT, MICHIGAN

**SHALLOW
GROUNDWATER
ELEVATION MAP
NOVEMBER 5, 2018**



NOVEMBER 2018
15388/68545/003



O'BRIEN & GERE ENGINEERS, INC.

PLOTDATE: 11/27/18 1:25:11 PM Monet\NT

I:\Racer-Trust_15388\68545_Coldwater-Rd-LI\Docs\Reports\PFAS Reports\Sept-Oct 2018\010 - Figure 10 - Drift Aquifer GWE November 5 2018_2.mxd



LEGEND

- DRIFT MONITORING WELL
- GROUNDWATER CONTOUR (NOVEMBER 5, 2018)
- GROUNDWATER ELEVATION (800.93)

NOTES: 1) THE GROUNDWATER ELEVATIONS FOR MONITORING WELLS B-23DR AND OBG MW-15D WERE NOT USED IN DEVELOPING THE GROUNDWATER POTENTIOMETRIC SURFACE DUE TO THE DEPTH OF THESE WELLS AND APPARENT VERTICAL GRADIENT WITHIN THE DRIFT AQUIFER

RACER TRUST
COLDWATER ROAD
LANDFILL FACILITY
FLINT, MICHIGAN

**DRIFT AQUIFER
GROUNDWATER
ELEVATION MAP
NOVEMBER 5, 2018**

0 250 500 750 1,000
Feet

NOVEMBER 2018
15388/68545/004



O'BRIEN & GERE ENGINEERS, INC.

ATTACHMENT 3
*Analytical Laboratory
Reports*



Analytical Laboratory Report

Report ID: S95907.01(01)
Generated on 11/08/2018

Report to

Attention: Clifford Yantz
O'Brien & Gere Engineers, Inc.
2260 E Saginaw St
East Lansing, MI 48823

Phone: 248-477-5701 FAX:
Email: Clifford.Yantz@obg.com

Report produced by

Merit Laboratories, Inc.
2680 East Lansing Drive
East Lansing, MI 48823

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Contacts for report questions:
John Lavery (johnlavery@meritlabs.com)
Barbara Ball (bball@meritlabs.com)

Report Summary

Lab Sample ID(s): S95907.01-S95907.08
Project: RACER Coldwater Rd LF - PFAS
Collected Date: 10/22/2018 - 10/23/2018
Submitted Date/Time: 10/23/2018 15:30
Sampled by: Kevin Schneider
P.O. #: PO

Table of Contents

Cover Page (Page 1)
General Report Notes (Page 2)
Report Narrative (Page 2)
Laboratory Certifications (Page 3)
Qualifier Descriptions (Page 3)
Glossary of Abbreviations (Page 3)
Method Summary (Page 4)
Sample Summary (Page 5)

Maya Murshak
Technical Director



Analytical Laboratory Report

General Report Notes

Analytical results relate only to the samples tested, in the condition received by the laboratory.

Methods may be modified for improved performance.

Results reported on a dry weight basis where applicable.

'Not detected' indicates that parameter was not found at a level equal to or greater than the reporting limit (RL).

40 CFR Part 136 Table II Required Containers, Preservation Techniques and Holding Times for the Clean Water Act specify that samples for acrolein and acrylonitrile need to be preserved at a pH in the range of 4 to 5 or if not preserved, analyzed within 3 days of sampling.

QA/QC corresponding to this analytical report is a separate document with the same Merit ID reference and is available upon request.

Full accreditation certificates are available upon request. Starred (*) analytes are not NELAP accredited.

Samples are held by the lab for 30 days from the final report date unless a written request to hold longer is provided by the client.

Report shall not be reproduced except in full, without the written approval of Merit Laboratories, Inc.

Limits for drinking water samples, are listed as the MCL Limits (Maximum Contaminant Level Concentrations)

Report Narrative

There is no additional narrative for this analytical report



Analytical Laboratory Report

Laboratory Certifications

Authority	Certification ID
Michigan DEQ	#9956
DOD ELAP/ISO 17025	#69699
WBENC	#2005110032
Ohio VAP	#CL0002
Indiana DOH	#C-MI-07
New York NELAC	#11814
North Carolina DENR	#680
North Carolina DOH	#26702
Alaska CSLAP	#17-001

Qualifier Descriptions

Qualifier	Description
!	Result is outside of stated limit criteria
B	Compound also found in associated method blank
E	Concentration exceeds calibration range
F	Analysis run outside of holding time
G	Estimated result due to extraction run outside of holding time
H	Sample submitted and run outside of holding time
I	Matrix interference with internal standard
J	Estimated value less than reporting limit, but greater than MDL
L	Elevated reporting limit due to low sample amount
M	Result reported to MDL not RDL
O	Analysis performed by outside laboratory. See attached report.
R	Preliminary result
S	Surrogate recovery outside of control limits
T	No correction for total solids
X	Elevated reporting limit due to matrix interference
Y	Elevated reporting limit due to high target concentration
b	Value detected less than reporting limit, but greater than MDL
e	Reported value estimated due to interference
j	Analyte also found in associated method blank
p	Benzo(b)Fluoranthene and Benzo(k)Fluoranthene integrated as one peak.
x	Preserved from bulk sample

Glossary of Abbreviations

Abbreviation	Description
RL/RDL	Reporting Limit
MDL	Method Detection Limit
MS	Matrix Spike
MSD	Matrix Spike Duplicate
SW	EPA SW 846 (Soil and Wastewater) Methods
E	EPA Methods
SM	Standard Methods
LN	Linear
BR	Branched

Method Summary

Method	Version
ASTMD7979-17M	ASTM Method D7979 - 17 Modified (Isotopic Dilution)

Parameter Summary

Parameter	Synonym	Cas #
PFBA	Perfluorobutanoic Acid	375-22-4
PFPeA	Perfluoropentanoic Acid	2706-90-3
4:2 FTSA	4:2 Fluorotelomer Sulfonic Acid	757124-72-4
PFHxA	Perfluorohexanoic Acid	307-24-4
PFBS	Perfluorobutane sulfonic Acid	375-73-5
PFHpA	Perfluoroheptanoic Acid	375-85-9
PFPeS	Perfluoropentane Sulfonic Acid	2706-91-4
6:2 FTSA	6:2 Fluorotelomer Sulfonic Acid	27619-97-2
PFOA	Perfluorooctanoic Acid	335-67-1
PFHxS	Perfluorohexane Sulfonic Acid	355-46-4
PFHxS-LN	Perfluorohexane Sulfonic Acid - LN	355-46-4-LN
PFHxS-BR	Perfluorohexane Sulfonic Acid - BR	355-46-4-BR
PFNA	Perfluorononanoic Acid	375-95-1
8:2 FTSA	8:2 Fluorotelomer Sulfonic Acid	39108-34-4
PFHpS	Perfluoroheptane Sulfonic Acid	375-92-8
PFDA	Perfluorodecanoic Acid	335-76-2
N-MeFOSAA	N-methyl perfluorooctanesulfonamidoacetic acid	2355-31-9
EtFOSAA	N-Ethyl Perfluorooctane Sulfonamidoacetic Acid	2991-50-6
PFOS	Perfluorooctane Sulfonic Acid	1763-23-1
PFOS-LN	Perfluorooctane Sulfonic Acid - LN	1763-23-1-LN
PFOS-BR	Perfluorooctane Sulfonic Acid - BR	1763-23-1-BR
PFUnDA	Perfluoroundecanoic Acid	2058-94-8
PFNS	Perfluorononane Sulfonic Acid	474511-07-4
PFDoDA	Perfluorododecanoic Acid	307-55-1
PFDS	Perfluorodecane Sulfonic Acid	335-77-3
PFTTrDA	Perfluorotridecanoic Acid	72629-94-8
FOSA	Perfluorooctane Sulfonamide	754-91-6
PFTeDA	Perfluorotetradecanoic Acid	376-06-7



Analytical Laboratory Report

Sample Summary (8 samples)

Sample ID	Sample Tag	Matrix	Collected Date/Time
S95907.01	OBG MW-12D	Groundwater	10/22/18 11:00
S95907.02	OBG MW-17D	Groundwater	10/22/18 14:00
S95907.03	OBG MW-16D	Groundwater	10/22/18 16:00
S95907.04	OBG MW-19D	Groundwater	10/23/18 10:50
S95907.05	OBG MW-15D	Groundwater	10/23/18 12:45
S95907.06	FB-02	Water	10/23/18 12:50
S95907.07	EB-01	Water	10/23/18 13:10
S95907.08	DUP-1	Groundwater	10/23/18 00:01



Analytical Laboratory Report

Lab Sample ID: S95907.01

Sample Tag: OBG MW-12D

Collected Date/Time: 10/22/2018 11:00

Matrix: Groundwater

COC Reference: 111369

Sample Containers

#	Type	Preservative(s)	Refrigerated?	Arrival Temp. (C)	Thermometer #
1	15ml Centrifuge Tube	None	Yes	5.2	IR

Organics

24 PFAs, Method: ASTMD7979-17M, Run Date: 11/01/18 23:10, Analyst: PL

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
PFBA*	Not detected	20		ng/L	2.0147	375-22-4	
PFPeA*	Not detected	10		ng/L	2.0147	2706-90-3	
4:2 FTSA*	Not detected	10		ng/L	2.0147	757124-72-4	
PFHxA*	Not detected	10		ng/L	2.0147	307-24-4	
PFBS*	Not detected	10		ng/L	2.0147	375-73-5	
PFHpA*	Not detected	10		ng/L	2.0147	375-85-9	
PFPeS*	Not detected	10		ng/L	2.0147	2706-91-4	
6:2 FTSA*	Not detected	10		ng/L	2.0147	27619-97-2	
PFOA*	Not detected	10		ng/L	2.0147	335-67-1	
PFHxS*	Not detected	10		ng/L	2.0147	355-46-4	
PFHxS-LN*	Not detected	10		ng/L	2.0147	355-46-4-LN	
PFHxS-BR*	Not detected	10		ng/L	2.0147	355-46-4-BR	
PFNA*	Not detected	10		ng/L	2.0147	375-95-1	
8:2 FTSA*	Not detected	10		ng/L	2.0147	39108-34-4	
PFHpS*	Not detected	10		ng/L	2.0147	375-92-8	
PFDA*	Not detected	10		ng/L	2.0147	335-76-2	
N-MeFOSAA*	Not detected	10		ng/L	2.0147	2355-31-9	
EtFOSAA*	Not detected	10		ng/L	2.0147	2991-50-6	
PFOS*	Not detected	10		ng/L	2.0147	1763-23-1	
PFOS-LN*	Not detected	10		ng/L	2.0147	1763-23-1-LN	
PFOS-BR*	Not detected	10		ng/L	2.0147	1763-23-1-BR	
PFUnDA*	Not detected	10		ng/L	2.0147	2058-94-8	
PFNS*	Not detected	10		ng/L	2.0147	474511-07-4	
PFDODA*	Not detected	10		ng/L	2.0147	307-55-1	
PFDS*	Not detected	10		ng/L	2.0147	335-77-3	
PFTTrDA*	Not detected	10		ng/L	2.0147	72629-94-8	
FOSA*	Not detected	10		ng/L	2.0147	754-91-6	
PFTeDA*	Not detected	10		ng/L	2.0147	376-06-7	



Analytical Laboratory Report

Lab Sample ID: S95907.02

Sample Tag: OBG MW-17D

Collected Date/Time: 10/22/2018 14:00

Matrix: Groundwater

COC Reference: 111369

Sample Containers

#	Type	Preservative(s)	Refrigerated?	Arrival Temp. (C)	Thermometer #
1	15ml Centrifuge Tube	None	Yes	5.2	IR

Organics

24 PFAs, Method: ASTMD7979-17M, Run Date: 11/01/18 23:29, Analyst: PL

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
PFBA*	Not detected	20		ng/L	1.9892	375-22-4	
PFPeA*	Not detected	10		ng/L	1.9892	2706-90-3	
4:2 FTSA*	Not detected	10		ng/L	1.9892	757124-72-4	
PFHxA*	Not detected	10		ng/L	1.9892	307-24-4	
PFBS*	Not detected	10		ng/L	1.9892	375-73-5	
PFHpA*	Not detected	10		ng/L	1.9892	375-85-9	
PFPeS*	Not detected	10		ng/L	1.9892	2706-91-4	
6:2 FTSA*	Not detected	10		ng/L	1.9892	27619-97-2	
PFOA*	Not detected	10		ng/L	1.9892	335-67-1	
PFHxS*	Not detected	10		ng/L	1.9892	355-46-4	
PFHxS-LN*	Not detected	10		ng/L	1.9892	355-46-4-LN	
PFHxS-BR*	Not detected	10		ng/L	1.9892	355-46-4-BR	
PFNA*	Not detected	10		ng/L	1.9892	375-95-1	
8:2 FTSA*	Not detected	10		ng/L	1.9892	39108-34-4	
PFHpS*	Not detected	10		ng/L	1.9892	375-92-8	
PFDA*	Not detected	10		ng/L	1.9892	335-76-2	
N-MeFOSAA*	Not detected	10		ng/L	1.9892	2355-31-9	
EtFOSAA*	Not detected	10		ng/L	1.9892	2991-50-6	
PFOS*	Not detected	10		ng/L	1.9892	1763-23-1	
PFOS-LN*	Not detected	10		ng/L	1.9892	1763-23-1-LN	
PFOS-BR*	Not detected	10		ng/L	1.9892	1763-23-1-BR	
PFUnDA*	Not detected	10		ng/L	1.9892	2058-94-8	
PFNS*	Not detected	10		ng/L	1.9892	474511-07-4	
PFDODA*	Not detected	10		ng/L	1.9892	307-55-1	
PFDS*	Not detected	10		ng/L	1.9892	335-77-3	
PFTTrDA*	Not detected	10		ng/L	1.9892	72629-94-8	
FOSA*	Not detected	10		ng/L	1.9892	754-91-6	
PFTeDA*	Not detected	10		ng/L	1.9892	376-06-7	



Analytical Laboratory Report

Lab Sample ID: S95907.03

Sample Tag: OBG MW-16D

Collected Date/Time: 10/22/2018 16:00

Matrix: Groundwater

COC Reference: 111369

Sample Containers

#	Type	Preservative(s)	Refrigerated?	Arrival Temp. (C)	Thermometer #
1	15ml Centrifuge Tube	None	Yes	5.2	IR

Organics

24 PFAs, Method: ASTMD7979-17M, Run Date: 11/01/18 23:48, Analyst: PL

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
PFBA*	Not detected	20		ng/L	2.011	375-22-4	
PFPeA*	Not detected	10		ng/L	2.011	2706-90-3	
4:2 FTSA*	Not detected	10		ng/L	2.011	757124-72-4	
PFHxA*	Not detected	10		ng/L	2.011	307-24-4	
PFBS*	Not detected	10		ng/L	2.011	375-73-5	
PFHpA*	Not detected	10		ng/L	2.011	375-85-9	
PFPeS*	Not detected	10		ng/L	2.011	2706-91-4	
6:2 FTSA*	Not detected	10		ng/L	2.011	27619-97-2	
PFOA*	Not detected	10		ng/L	2.011	335-67-1	
PFHxS*	Not detected	10		ng/L	2.011	355-46-4	
PFHxS-LN*	Not detected	10		ng/L	2.011	355-46-4-LN	
PFHxS-BR*	Not detected	10		ng/L	2.011	355-46-4-BR	
PFNA*	Not detected	10		ng/L	2.011	375-95-1	
8:2 FTSA*	Not detected	10		ng/L	2.011	39108-34-4	
PFHpS*	Not detected	10		ng/L	2.011	375-92-8	
PFDA*	Not detected	10		ng/L	2.011	335-76-2	
N-MeFOSAA*	Not detected	10		ng/L	2.011	2355-31-9	
EtFOSAA*	Not detected	10		ng/L	2.011	2991-50-6	
PFOS*	Not detected	10		ng/L	2.011	1763-23-1	
PFOS-LN*	Not detected	10		ng/L	2.011	1763-23-1-LN	
PFOS-BR*	Not detected	10		ng/L	2.011	1763-23-1-BR	
PFUnDA*	Not detected	10		ng/L	2.011	2058-94-8	
PFNS*	Not detected	10		ng/L	2.011	474511-07-4	
PFDoDA*	Not detected	10		ng/L	2.011	307-55-1	
PFDS*	Not detected	10		ng/L	2.011	335-77-3	
PFTTrDA*	Not detected	10		ng/L	2.011	72629-94-8	
FOSA*	Not detected	10		ng/L	2.011	754-91-6	
PFTeDA*	Not detected	10		ng/L	2.011	376-06-7	



Analytical Laboratory Report

Lab Sample ID: S95907.04

Sample Tag: OBG MW-19D

Collected Date/Time: 10/23/2018 10:50

Matrix: Groundwater

COC Reference: 111369

Sample Containers

#	Type	Preservative(s)	Refrigerated?	Arrival Temp. (C)	Thermometer #
1	15ml Centrifuge Tube	None	Yes	5.2	IR

Organics

24 PFAs, Method: ASTMD7979-17M, Run Date: 11/02/18 00:08, Analyst: PL

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
PFBA*	Not detected	20		ng/L	1.9231	375-22-4	
PFPeA*	Not detected	10		ng/L	1.9231	2706-90-3	
4:2 FTSA*	Not detected	10		ng/L	1.9231	757124-72-4	
PFHxA*	Not detected	10		ng/L	1.9231	307-24-4	
PFBS*	Not detected	10		ng/L	1.9231	375-73-5	
PFHpA*	Not detected	10		ng/L	1.9231	375-85-9	
PFPeS*	Not detected	10		ng/L	1.9231	2706-91-4	
6:2 FTSA*	Not detected	10		ng/L	1.9231	27619-97-2	
PFOA*	Not detected	10		ng/L	1.9231	335-67-1	
PFHxS*	Not detected	10		ng/L	1.9231	355-46-4	
PFHxS-LN*	Not detected	10		ng/L	1.9231	355-46-4-LN	
PFHxS-BR*	Not detected	10		ng/L	1.9231	355-46-4-BR	
PFNA*	Not detected	10		ng/L	1.9231	375-95-1	
8:2 FTSA*	Not detected	10		ng/L	1.9231	39108-34-4	
PFHpS*	Not detected	10		ng/L	1.9231	375-92-8	
PFDA*	Not detected	10		ng/L	1.9231	335-76-2	
N-MeFOSAA*	Not detected	10		ng/L	1.9231	2355-31-9	
EtFOSAA*	Not detected	10		ng/L	1.9231	2991-50-6	
PFOS*	Not detected	10		ng/L	1.9231	1763-23-1	
PFOS-LN*	Not detected	10		ng/L	1.9231	1763-23-1-LN	
PFOS-BR*	Not detected	10		ng/L	1.9231	1763-23-1-BR	
PFUnDA*	Not detected	10		ng/L	1.9231	2058-94-8	
PFNS*	Not detected	10		ng/L	1.9231	474511-07-4	
PFDODA*	Not detected	10		ng/L	1.9231	307-55-1	
PFDS*	Not detected	10		ng/L	1.9231	335-77-3	
PFTTrDA*	Not detected	10		ng/L	1.9231	72629-94-8	
FOSA*	Not detected	10		ng/L	1.9231	754-91-6	
PFTeDA*	Not detected	10		ng/L	1.9231	376-06-7	



Analytical Laboratory Report

Lab Sample ID: S95907.05

Sample Tag: OBG MW-15D

Collected Date/Time: 10/23/2018 12:45

Matrix: Groundwater

COC Reference: 111369

Sample Containers

#	Type	Preservative(s)	Refrigerated?	Arrival Temp. (C)	Thermometer #
1	15ml Centrifuge Tube	None	Yes	5.2	IR

Organics

24 PFAs, Method: ASTMD7979-17M, Run Date: 11/02/18 00:27, Analyst: PL

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
PFBA*	Not detected	20		ng/L	2.0333	375-22-4	
PFPeA*	Not detected	10		ng/L	2.0333	2706-90-3	
4:2 FTSA*	Not detected	10		ng/L	2.0333	757124-72-4	
PFHxA*	Not detected	10		ng/L	2.0333	307-24-4	
PFBS*	Not detected	10		ng/L	2.0333	375-73-5	
PFHpA*	Not detected	10		ng/L	2.0333	375-85-9	
PFPeS*	Not detected	10		ng/L	2.0333	2706-91-4	
6:2 FTSA*	Not detected	10		ng/L	2.0333	27619-97-2	
PFOA*	Not detected	10		ng/L	2.0333	335-67-1	
PFHxS*	Not detected	10		ng/L	2.0333	355-46-4	
PFHxS-LN*	Not detected	10		ng/L	2.0333	355-46-4-LN	
PFHxS-BR*	Not detected	10		ng/L	2.0333	355-46-4-BR	
PFNA*	Not detected	10		ng/L	2.0333	375-95-1	
8:2 FTSA*	Not detected	10		ng/L	2.0333	39108-34-4	
PFHpS*	Not detected	10		ng/L	2.0333	375-92-8	
PFDA*	Not detected	10		ng/L	2.0333	335-76-2	
N-MeFOSAA*	Not detected	10		ng/L	2.0333	2355-31-9	
EtFOSAA*	Not detected	10		ng/L	2.0333	2991-50-6	
PFOS*	Not detected	10		ng/L	2.0333	1763-23-1	
PFOS-LN*	Not detected	10		ng/L	2.0333	1763-23-1-LN	
PFOS-BR*	Not detected	10		ng/L	2.0333	1763-23-1-BR	
PFUnDA*	Not detected	10		ng/L	2.0333	2058-94-8	
PFNS*	Not detected	10		ng/L	2.0333	474511-07-4	
PFDODA*	Not detected	10		ng/L	2.0333	307-55-1	
PFDS*	Not detected	10		ng/L	2.0333	335-77-3	
PFTTrDA*	Not detected	10		ng/L	2.0333	72629-94-8	
FOSA*	Not detected	10		ng/L	2.0333	754-91-6	
PFTeDA*	Not detected	10		ng/L	2.0333	376-06-7	



Analytical Laboratory Report

Lab Sample ID: S95907.06

Sample Tag: FB-02

Collected Date/Time: 10/23/2018 12:50

Matrix: Water

COC Reference: 111369

Sample Containers

#	Type	Preservative(s)	Refrigerated?	Arrival Temp. (C)	Thermometer #
1	15ml Centrifuge Tube	None	Yes	5.2	IR

Organics

24 PFAs, Method: ASTMD7979-17M, Run Date: 11/02/18 00:47, Analyst: PL

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
PFBA*	Not detected	20		ng/L	1.8762	375-22-4	
PFPeA*	Not detected	10		ng/L	1.8762	2706-90-3	
4:2 FTSA*	Not detected	10		ng/L	1.8762	757124-72-4	
PFHxA*	Not detected	10		ng/L	1.8762	307-24-4	
PFBS*	Not detected	10		ng/L	1.8762	375-73-5	
PFHpA*	Not detected	10		ng/L	1.8762	375-85-9	
PFPeS*	Not detected	10		ng/L	1.8762	2706-91-4	
6:2 FTSA*	Not detected	10		ng/L	1.8762	27619-97-2	
PFOA*	Not detected	10		ng/L	1.8762	335-67-1	
PFHxS*	Not detected	10		ng/L	1.8762	355-46-4	
PFHxS-LN*	Not detected	10		ng/L	1.8762	355-46-4-LN	
PFHxS-BR*	Not detected	10		ng/L	1.8762	355-46-4-BR	
PFNA*	Not detected	10		ng/L	1.8762	375-95-1	
8:2 FTSA*	Not detected	10		ng/L	1.8762	39108-34-4	
PFHpS*	Not detected	10		ng/L	1.8762	375-92-8	
PFDA*	Not detected	10		ng/L	1.8762	335-76-2	
N-MeFOSAA*	Not detected	10		ng/L	1.8762	2355-31-9	
EtFOSAA*	Not detected	10		ng/L	1.8762	2991-50-6	
PFOS*	Not detected	10		ng/L	1.8762	1763-23-1	
PFOS-LN*	Not detected	10		ng/L	1.8762	1763-23-1-LN	
PFOS-BR*	Not detected	10		ng/L	1.8762	1763-23-1-BR	
PFUnDA*	Not detected	10		ng/L	1.8762	2058-94-8	
PFNS*	Not detected	10		ng/L	1.8762	474511-07-4	
PFDoDA*	Not detected	10		ng/L	1.8762	307-55-1	
PFDS*	Not detected	10		ng/L	1.8762	335-77-3	
PFTTrDA*	Not detected	10		ng/L	1.8762	72629-94-8	
FOSA*	Not detected	10		ng/L	1.8762	754-91-6	
PFTeDA*	Not detected	10		ng/L	1.8762	376-06-7	



Analytical Laboratory Report

Lab Sample ID: S95907.07

Sample Tag: EB-01

Collected Date/Time: 10/23/2018 13:10

Matrix: Water

COC Reference: 111369

Sample Containers

#	Type	Preservative(s)	Refrigerated?	Arrival Temp. (C)	Thermometer #
1	15ml Centrifuge Tube	None	Yes	5.2	IR

Organics

24 PFAs, Method: ASTMD7979-17M, Run Date: 11/02/18 01:06, Analyst: PL

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
PFBA*	Not detected	20		ng/L	2.0036	375-22-4	
PFPeA*	Not detected	10		ng/L	2.0036	2706-90-3	
4:2 FTSA*	Not detected	10		ng/L	2.0036	757124-72-4	
PFHxA*	Not detected	10		ng/L	2.0036	307-24-4	
PFBS*	Not detected	10		ng/L	2.0036	375-73-5	
PFHpA*	Not detected	10		ng/L	2.0036	375-85-9	
PFPeS*	Not detected	10		ng/L	2.0036	2706-91-4	
6:2 FTSA*	Not detected	10		ng/L	2.0036	27619-97-2	
PFOA*	Not detected	10		ng/L	2.0036	335-67-1	
PFHxS*	Not detected	10		ng/L	2.0036	355-46-4	
PFHxS-LN*	Not detected	10		ng/L	2.0036	355-46-4-LN	
PFHxS-BR*	Not detected	10		ng/L	2.0036	355-46-4-BR	
PFNA*	Not detected	10		ng/L	2.0036	375-95-1	
8:2 FTSA*	Not detected	10		ng/L	2.0036	39108-34-4	
PFHpS*	Not detected	10		ng/L	2.0036	375-92-8	
PFDA*	Not detected	10		ng/L	2.0036	335-76-2	
N-MeFOSAA*	Not detected	10		ng/L	2.0036	2355-31-9	
EtFOSAA*	Not detected	10		ng/L	2.0036	2991-50-6	
PFOS*	Not detected	10		ng/L	2.0036	1763-23-1	
PFOS-LN*	Not detected	10		ng/L	2.0036	1763-23-1-LN	
PFOS-BR*	Not detected	10		ng/L	2.0036	1763-23-1-BR	
PFUnDA*	Not detected	10		ng/L	2.0036	2058-94-8	
PFNS*	Not detected	10		ng/L	2.0036	474511-07-4	
PFDODA*	Not detected	10		ng/L	2.0036	307-55-1	
PFDS*	Not detected	10		ng/L	2.0036	335-77-3	
PFTTrDA*	Not detected	10		ng/L	2.0036	72629-94-8	
FOSA*	Not detected	10		ng/L	2.0036	754-91-6	
PFTeDA*	Not detected	10		ng/L	2.0036	376-06-7	



Analytical Laboratory Report

Lab Sample ID: S95907.08

Sample Tag: DUP-1

Collected Date/Time: 10/23/2018 00:01

Matrix: Groundwater

COC Reference: 111369

Sample Containers

#	Type	Preservative(s)	Refrigerated?	Arrival Temp. (C)	Thermometer #
1	15ml Centrifuge Tube	None	Yes	5.2	IR

Organics

24 PFAs, Method: ASTMD7979-17M, Run Date: 11/02/18 01:26, Analyst: PL

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
PFBA*	Not detected	20		ng/L	1.9678	375-22-4	
PFPeA*	Not detected	10		ng/L	1.9678	2706-90-3	
4:2 FTSA*	Not detected	10		ng/L	1.9678	757124-72-4	
PFHxA*	Not detected	10		ng/L	1.9678	307-24-4	
PFBS*	Not detected	10		ng/L	1.9678	375-73-5	
PFHpA*	Not detected	10		ng/L	1.9678	375-85-9	
PFPeS*	Not detected	10		ng/L	1.9678	2706-91-4	
6:2 FTSA*	Not detected	10		ng/L	1.9678	27619-97-2	
PFOA*	Not detected	10		ng/L	1.9678	335-67-1	
PFHxS*	Not detected	10		ng/L	1.9678	355-46-4	
PFHxS-LN*	Not detected	10		ng/L	1.9678	355-46-4-LN	
PFHxS-BR*	Not detected	10		ng/L	1.9678	355-46-4-BR	
PFNA*	Not detected	10		ng/L	1.9678	375-95-1	
8:2 FTSA*	Not detected	10		ng/L	1.9678	39108-34-4	
PFHpS*	Not detected	10		ng/L	1.9678	375-92-8	
PFDA*	Not detected	10		ng/L	1.9678	335-76-2	
N-MeFOSAA*	Not detected	10		ng/L	1.9678	2355-31-9	
EtFOSAA*	Not detected	10		ng/L	1.9678	2991-50-6	
PFOS*	Not detected	10		ng/L	1.9678	1763-23-1	
PFOS-LN*	Not detected	10		ng/L	1.9678	1763-23-1-LN	
PFOS-BR*	Not detected	10		ng/L	1.9678	1763-23-1-BR	
PFUnDA*	Not detected	10		ng/L	1.9678	2058-94-8	
PFNS*	Not detected	10		ng/L	1.9678	474511-07-4	
PFDODA*	Not detected	10		ng/L	1.9678	307-55-1	
PFDS*	Not detected	10		ng/L	1.9678	335-77-3	
PFTTrDA*	Not detected	10		ng/L	1.9678	72629-94-8	
FOSA*	Not detected	10		ng/L	1.9678	754-91-6	
PFTeDA*	Not detected	10		ng/L	1.9678	376-06-7	

Merit Laboratories Login Checklist

Lab Set ID:S95907

Client:OBG02 (O'Brien & Gere Engineers, Inc.)

Project: RACER Coldwater Rd LF - PFAS

Submitted: 10/23/2018 15:30 Login User: MMC

Attention: Clifford Yantz

Address: O'Brien & Gere Engineers, Inc.
2260 E Saginaw St
East Lansing, MI 48823

Phone: 248-477-5701 FAX:

Email: Clifford.Yantz@obg.com

Selection	Description	Note
Sample Receiving		
01.	☒ Yes ☐ No ☐ N/A	Samples are received at 4C +/- 2C Thermometer # IR 5.2
02.	☒ Yes ☐ No ☐ N/A	Received on ice/ cooling process begun
03.	☐ Yes ☒ No ☐ N/A	Samples shipped
04.	☐ Yes ☒ No ☐ N/A	Samples left in 24 hr. drop box
05.	☐ Yes ☐ No ☒ N/A	Are there custody seals/tape or is the drop box locked
Chain of Custody		
06.	☒ Yes ☐ No ☐ N/A	COC adequately filled out
07.	☒ Yes ☐ No ☐ N/A	COC signed and relinquished to the lab
08.	☒ Yes ☐ No ☐ N/A	Sample tag on bottles match COC
09.	☐ Yes ☒ No ☐ N/A	Subcontracting needed? Subcontacted to:
Preservation		
10.	☒ Yes ☐ No ☐ N/A	Do sample have correct chemical preservation
11.	☐ Yes ☐ No ☒ N/A	Completed pH checks on preserved samples? (no VOAs)
12.	☐ Yes ☒ No ☐ N/A	Did any samples need to be preserved in the lab?
Bottle Conditions		
13.	☒ Yes ☐ No ☐ N/A	All bottles intact
14.	☒ Yes ☐ No ☐ N/A	Appropriate analytical bottles are used
15.	☒ Yes ☐ No ☐ N/A	Merit bottles used
16.	☒ Yes ☐ No ☐ N/A	Sufficient sample volume received
17.	☐ Yes ☒ No ☐ N/A	Samples require laboratory filtration
18.	☒ Yes ☐ No ☐ N/A	Samples submitted within holding time
19.	☐ Yes ☐ No ☒ N/A	Do water VOC or TOX bottles contain headspace

Corrective action for all exceptions is to call the client and to notify the project manager.

Client Review By: _____ Date: _____

REPORT TO

CONTACT NAME				clifford Yantz			
COMPANY				obrien & gere			
ADDRESS							
2260 East Saginaw							
CITY						STATE	ZIP CODE
East Lansing						MI	48823
PHONE NO.				FAX NO.		P.O. NO.	
313-333-0211							
E-MAIL ADDRESS						QUOTE NO.	
clifford.yantz@obg.com							

CHAIN OF CUSTODY RECORD

CONTACT NAME		X SAME	
COMPANY			
ADDRESS			
CITY		STATE	ZIP CODE
PHONE NO.	E-MAIL ADDRESS		

INVOICE TO

PROJECT NO./NAME	BAKER Coldwater RLF - PFAS	SAMPLER(S) - PLEASE PRINT/SIGN NAME	Kevin Schneider <i>KS</i>
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TURNAROUND TIME REQUIRED ☐ 1 DAY ☐ 2 DAYS ☐ 3 DAYS ☒ STANDARD ☐ OTHER

DELIVERABLES REQUIRED ☐ STD ☐ LEVEL II ☒ LEVEL III ☐ LEVEL IV ☐ EDD ☐ OTHER

MATRIX CODE:	GW=GROUNDWATER	WW=WASTEWATER	S=SOIL	L=LIQUID	SD=SOLID
	SL=SLUDGE	DW=DRINKING WATER	O=OIL	WP=WIPE	A=AIR
					W=WASTE

Containers & Preservatives

Certifications

☐ OHIO VAP ☐ Drinking Water☐ DoD ☐ NPDES

Project Locations

☐ Detroit ☐ New York☐ Other

Special Instructions

MERIT LAB NO. FOR LAB USE ONLY	YEAR		SAMPLE TAG IDENTIFICATION-DESCRIPTION	MATRIX	# OF BOTTLES	NONE	HCl	HNO ₃	H ₂ SO ₄	NaOH	MeOH	OTHER	PFA	Other _____	Special Instructions
	DATE	TIME													
95907.01	10/22/18	1100	OBG MW-12D	GW	3	3							X		
.02	↓	1400	OBG MW-17D	↓	↓	↓							X		
.03	↓	1600	OBG MW-16D	↓	↓	↓							X		
.04	10/23/18	1050	OBG MW-19D	↓	↓	↓							X		
.05	↓	1245	OBG MW-15D	↓	↓	↓							X		
.06	↓	1250	FB-02	QC	2	2							X		Field Blank
.07	↓	1310	EB-01	QC	3	3							X		Equipment Blank
.08	↓	—	DUP-1	GW	3	3							X		
10/23/18															

RELINQUISHED BY:
SIGNATURE/ORGANIZATION

RECEIVED BY:
SIGNATURE/ORGANIZATION

RELINQUISHED BY:
SIGNATURE/ORGANIZATION

RECEIVED BY:
SIGNATURE/ORGANIZATION

RELINQUISHED BY:
SIGNATURE/ORGANIZATION

RECEIVED BY:
SIGNATURE/ORGANIZATION

SEAL NO.	SEAL INTACT YES ☐ NO ☐	INITIALS
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SEAL NO.	SEAL INTACT YES ☐ NO ☐	INITIALS
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DATE	TIME
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DATE	TIME
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NOTES: TEMP. ON ARRIVAL

5.2