Memo

TO
Christine Matlock, EGLE
Joe Rogers, EGLE
John McCabe, EGLE

DATE
January 4, 2022

DEPARTMENT
Environment

COPIES TO
Dave Favero, RACER Trust

SUBJECT
Plant 6 PFAS Off-Site Investigation Summary
RACER Trust Plant 6, Lansing, Michigan

PROJECT NUMBER
30075941

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The following provides a summary of the off-site investigation activities completed to delineate per- and polyfluoroalkyl substances (PFAS) at RACER Trust, Plant 6 located in the City of Lansing, Michigan (Site). The scope of work was provided to the Michigan Department of Energy Great Lakes and Environment (EGLE) on May 20, 2021, as the Plant 6 PFAS Monitoring Well Installation Summary and Off-site Investigation Work Plan, approved by EGLE on August 6, 2021 (Work Plan).

Previous investigation results for Plant 6 PFAS impacts are summarized in the PFAS Investigation Phase 1 Summary report (Arcadis 2019a) and the Plant 6 PFAS Investigation Summary – Phase 2 report (Arcadis 2019b). The phased investigation at Plant 6 identified concentrations of perfluorooctanoic acid (PFOA), perfluorooctane sulfonic acid (PFOS), and perfluorononanoic acid (PFNA) above the current Michigan Department of Environment, Great Lakes and Energy (EGLE) Drinking Water Criteria (EGLE 2020) along the eastern and southern Plant 6 property boundaries. Of these, only PFOA has been identified off-site at concentrations greater than DW Criteria (8 nanograms per liter [ng/L]).

PFOA is the primary PFAS resulting in off-site Part 201 Drinking Water (DW) Criteria exceedances east and northeast of Plant 6. The PFOA at the property boundary and off-site are detected within shallow more permeable sand and silty sand seams encountered at depths ranging from 5 to 35 feet below ground surface (bgs) (Arcadis 2019a, 2019b). Based on the previous investigation results, six monitoring wells were installed at the perimeter of Plant 6 and within the Michigan Avenue right-of-way (ROW) to verify PFAS concentrations and facilitate monitoring of PFAS impacts. Monitoring well construction details and analytical results are summarized in the Work Plan (Arcadis 2021). Results from the new wells confirmed the presence of DW Criteria exceedances near the eastern perimeter of Plant 6 and demonstrates that PFAS impacts do not extend south of Michigan Avenue.

This memorandum describes the off-site activities to delineate PFAS in groundwater consistent with the Work Plan (Arcadis 2021). The objective of this off-site investigation is to define the off-site extent of PFOA in groundwater at concentrations above the DW Criteria and determine locations for installation of sentinel monitoring well locations for future monitoring.

Christine Matlock, Joe Rogers, John McCabe
Michigan Department of Environment, Great Lakes and Energy
January 4, 2022

1. INVESTIGATION ACTIVITIES

The work completed consisted of eleven (11) vertical aquifer profile (VAP) groundwater samples collected from a total of eight (8) soil borings located in City of Lansing rights-of-way (ROWs) to the east and northeast of Plant 6. Sample locations are shown on **Figure 1.** The investigation was conducted from September 8 to September 10, and on September 27, 2021.

VAP groundwater samples were collected at each soil boring from the more permeable zones identified within the perched zone overburden. At each boring location one to two suitable intervals were identified for sampling and groundwater samples were collected.

Groundwater samples were sent to PACE Analytical Laboratory located in Columbia, South Carolina and analyzed for the 28 PFAS outlined in the EGLE PFAS Minimum Laboratory Analyte List using modified USEPA Method 537 with isotope dilution (DoD QSM 5.1). To avoid cross contamination, all sampling was conducted in accordance with the Arcadis PFAS Sampling Technical Guidance Instruction, available upon request.

2. RESULTS AND DISCUSSION

The analytical results for groundwater samples were compared to the Part 201 DW and Groundwater Surface Water Interface (GSI) Criteria. Groundwater sample locations and analytical results for PFAS with criteria are shown on **Figure 1**. Groundwater analytical results are compared to DW and GSI criteria on **Table 1** and Laboratory analytical reports are included as **Attachment 1**.

- Geology observed in soil borings completed during the investigation is generally consistent with observations from previous investigations. Boring logs are included as **Attachment 2**. The geology is generally dominated by clay with discontinuous layers of sand, silt and some shallow fill material. Perched water was encountered within the more permeable sand lenses; however, the permeable zones appear discontinuous. The interbedded clays, silts, and sand lenses are underlain by a dense glacial till, generally encountered at depths of 20 to 35 feet bgs. Several borings contained dry sands and silts within or below the perched zone.
- PFOA was detected at a concentration of 11 nanograms per liter (ng/L) in a groundwater sample collected from 11-15 ft bgs at SB-OS-KG312, exceeding the DW Criterion of 8 ng/L. SB-KG312 is located to the northeast of Plant 6 approximately 500 ft north of the previously completed VAP borings along Osborn Road (**Figure 1**) that contained PFOA concentrations ranging from 11.4 to 50.4 ng/L in shallow groundwater. A deeper groundwater sample at SB-OS-KG312, collected from the next encountered permeable sand seam at a depth of 23-27 ft bgs and was non-detect for PFOA.
- Other PFAS detected in the shallow groundwater at SB-OS-KG312 including PFBA, PFHxA, and PFPeA are consistent with detections observed in groundwater samples collected previously from monitoring wells and VAP borings in the northeast corner of Plant 6, suggesting that the PFOA exceedance observed in SB-OS-KG312 is related to on-site impacts.
- PFOA was detected in shallow groundwater samples at four borings in addition to SB-OS-KG312 at concentrations ranging from 2.1J ng/L to 4.8 ng/L (below the DW Criteria). PFOA was not detected in any of the four groundwater samples collected from deeper sample intervals (approximately 20-30 ft bgs).
- Various PFAS other than PFOA were detected in all groundwater samples at low concentrations. PFAS with Part 201 DW Criteria were below their criterium.

- Recent groundwater sampling has also shown PFOA exceedances at MW-20-131 and MW-20-132 near the Plant 6 entrance. To further define PFOA in this area a groundwater sample will be collected from MW-12-10R located along the Plant 6 boundary to the north (**Figure 1**).

3. PROPOSED ADDITIONAL ACTIVITIES

Based on the results of off-site VAP samples collected to delineate PFOA east and northeast of Plant 6, PFOA is delineated to DW criteria apart from the exceedance noted at SB-OS-KG312. Installation of permanent monitoring wells is proposed to complete delineation of PFOA to the north of Plant 6 (at SB-OS-KG312) and facilitate sentinel monitoring along the off-site boundary of PFOA impacts. The proposed monitoring wells are shown on **Figure 2**. The monitoring well installation scope of work includes the following:

- A total of eleven (11) additional monitoring wells will be installed using rotary drilling methods. The monitoring wells will be screened to target intervals identified during the Plant 6 off-site investigation. Most will be installed within the first encountered saturated seam. In addition, two deeper wells will target deeper saturated zones to provide sentinel monitoring for PFAS identified at the Plant 6 perimeter within the deeper zones above DW Criteria. Target depths of the monitoring wells are shown on **Figure 2** and include the following:
  - Five monitoring wells installed at five VAP sample locations to the east and northeast of Plant 6 to act as sentinels for PFOA migration where only a single water bearing zone was encountered.
  - Two paired monitoring wells (four wells total) at VAP locations SB-OS-QM379 and SB-OS-SW398 to act as sentinel wells for PFOA migration within the shallow and deep saturated sand zones.
  - One monitoring well screened within the shallow VAP intervals at SB-OS-KG312 to serve as sentinel monitoring point for PFAS impacts identified within the shallow zone at the northern Plant 6 perimeter. The well will be installed slightly downgradient of SB-OS-KG312 to help delineate/confirm exceedance noted in the VAP sample.
- Continuous soil cores will be obtained from the ground surface to the target well depth at each boring location. Arcadis will log and describe the soils in accordance with the Arcadis Soil Description Standard Operating Procedures included with the MDEQ-approved FSP (Arcadis 2011). Boring logs will be generated based on the field descriptions.
- Monitoring wells will be screened at a depth based on observed soil conditions and be constructed with a 5-foot stainless-steel wire-wrapped 0.010-slot screens and 2-inch PVC riser. An appropriate sand pack will be placed around the screen interval to a depth of 1 foot above the well screen followed by 1 to 2 feet of choker sand and then bentonite grout to grade.

The proposed additional wells will be integrated into the revised Interim Groundwater Monitoring Plan. The new monitoring wells will be sampled quarterly for one year and then re-evaluated to determine an appropriate long-term sampling frequency.

Please direct any questions to Dave Favero at 734-879-9525 or Patrick Curry at Arcadis at 810-225-1926.

Christine Matlock, Joe Rogers, John McCabe
Michigan Department of Environment, Great Lakes and Energy
January 4, 2022

References:

Arcadis. 2019a. Memorandum, PFAS Investigation Phase 1 Summary. RACER Trust Plant 6, Lansing, Michigan. January 29.

Arcadis. 2019b. Memorandum, Plant 6 PFAS Investigation Summary – Phase 2. RACER Trust Plant 6, Lansing, Michigan. August 23.

Arcadis. 2021. Plant 6 PFAS Monitoring Well Installation Summary and Off-site Investigation Work Plan, RACER Trust Plant 6, Lansing, Michigan. August 6.

Arcadis. 2019. 2019 Plant 6 Phase 2 PFAS Investigations Memo. RACER Trust Plant 6, Lansing, Michigan. August 23.

Arcadis. 2021a. *Plant 6 Monitoring Well Installation Summary and Off-site Investigation Work Plan*. RACER Trust Plant 6, Lansing, Michigan. May 20.

Arcadis. 2021b. 2020 Annual Groundwater Monitoring Report. Racer Trust Lansing Industrial Land, Lansing Michigan. May 7.

Enclosures:

TABLES

Table 1 Plant 6 Groundwater Analytical Results

FIGURES

Figure 1 Plant 6 Groundwater Sampling Locations and PFAS Analytical Results

ATTACHMENTS

Attachment 1 Laboratory Analytical Reports

Attachment 2 Soil Boring Logs

Tables

Table 1
Summary of Groundwater Analytical Results
2021 Plant 6 Off-Site PFAS Investigation Summary
RACER Trust Plant6
Lansing, Michigan

Location ID:	P201 Residential Drinking Water	P201 Groundwater Surface Water Interface	Units	SB-OS-KG312	SB-OS-KG312	SB-OS-LI335	SB-OS-OS376	SB-OS-QM379	SB-OS-QM379
Date Collected:				09/08/21	09/08/21	09/09/21	09/27/21	09/09/21	09/09/21
Sample Name:				SB-OS-KG312_11-15_20210908	SB-OS-KG312_23-27_20210908	SB-OS-LI335_14-18_20210909	SB-OS-OS376_6-10_20210927	SB-OS-QM379_8-12_20210909	SB-OS-QM379_25-29_20210909
Sample Depth (ft. bgs):				11 - 15	23 - 27	14 - 18	6 - 10	8 - 12	25 - 29
Per- and Polyfluoroalkyl Substances (PFAS) (via EPA Method 537 Modified)									
11Cl-PF3OUdS (F-53B Minor)	- -	- -	ng/L	<7.0	<6.9	<7.0	<6.8	<6.9	<8.8
4:2 FTS	- -	- -	ng/L	<7.0	<6.9	<7.0	<6.8	<6.9	<8.8
6:2 FTS	- -	- -	ng/L	<7.0	<6.9	<7.0	<6.8	<6.9	<8.8
8:2 FTS	- -	- -	ng/L	<7.0	<6.9	<7.0	<6.8	<6.9	<8.8
9Cl-PF3ONS (F-53B Major)	- -	- -	ng/L	<7.0	<6.9	<7.0	<6.8	<6.9	<8.8
ADONA	- -	- -	ng/L	<7.0	<6.9	<7.0	<6.8	<6.9	<8.8
Hexafluoropropylene oxide dimer acid (HFPO-DA) (GenX)	370	- -	ng/L	<7.0	<6.9	<7.0	<6.8	<6.9	<8.8
N-ethyl perfluorooctane sulfonamidoacetic acid (NEtFOSAA)	- -	- -	ng/L	<7.0	<6.9	<7.0	<6.8	<6.9	<8.8
N-methyl perfluorooctane sulfonamidoacetic acid (NMeFOSAA)	- -	- -	ng/L	<7.0	<6.9	<7.0	<6.8	<6.9	<8.8
Perfluorobutanesulfonic acid (PFBS)	420	- -	ng/L	**4.2**	<3.5	<3.5	**1.3 J**	**1.9 J**	**1.2 J**
Perfluorobutanoic acid (PFBA)	- -	- -	ng/L	**11**	**3.8**	**4.2**	**0.95 J**	**5.0**	<4.4
Perfluorodecanesulfonic acid (PFDS)	- -	- -	ng/L	<3.5	<3.5	<3.5	<3.4	<3.4	<4.4
Perfluorodecanoic acid (PFDA)	- -	- -	ng/L	<3.5	<3.5	<3.5	<3.4	<3.4	<4.4
Perfluorododecanoic acid (PFDoA)	- -	- -	ng/L	<3.5	<3.5	<3.5	<3.4	<3.4	<4.4
Perfluoroheptanesulfonic Acid (PFHpS)	- -	- -	ng/L	<3.5	<3.5	<3.5	<3.4	<3.4	<4.4
Perfluoroheptanoic acid (PFHpA)	- -	- -	ng/L	**8.5**	<3.5	<3.5	<3.4	**1.3 J**	<4.4
Perfluorohexanesulfonic acid (PFHxS)	51	- -	ng/L	**3.3 J**	<3.5	<3.5	**1.4 J**	**2.7 J**	<4.4
Perfluorohexanoic acid (PFHxA)	400,000	- -	ng/L	**23**	**2.1 J**	**1.3 J**	<3.4	**2.1 J**	<4.4
Perfluorononanesulfonic acid (PFNS)	- -	- -	ng/L	<3.5	<3.5	<3.5	<3.4	<3.4	<4.4
Perfluorononanoic acid (PFNA)	6	- -	ng/L	<3.5	<3.5	<3.5	<3.4	<3.4	<4.4
Perfluorooctane Sulfonamide (PFOSA)	- -	- -	ng/L	<3.5	<3.5	<3.5	<3.4	<3.4	<4.4
Perfluorooctane sulfonic acid (PFOS)	16	12	ng/L	<3.5	<3.5	<3.5	**2.8 J**	**1.6 J**	**1.3 J**
Perfluorooctanoic acid (PFOA)	8	12,000	ng/L	**11**	<3.5	<3.5	<3.4	**3.4**	<4.4
Perfluoropentanesulfonic acid (PFPeS)	- -	- -	ng/L	**0.94 J**	<3.5	<3.5	<3.4	<3.4	<4.4
Perfluoropentanoic acid (PFPeA)	- -	- -	ng/L	**29**	**4.5**	**2.6 J**	<3.4	**2.4 J**	<4.4
Perfluorotetradecanoic acid (PFTeA)	- -	- -	ng/L	<3.5	<3.4	<3.5	<3.4	<3.4	<4.4
Perfluorotridecanoic Acid (PFTriA)	- -	- -	ng/L	<3.5	<3.5	<3.5	<3.4	<3.4	<4.4
Perfluoroundecanoic acid (PFUnA)	- -	- -	ng/L	<3.5	<3.5	<3.5	<3.4	<3.4	<4.4

See notes on last page.

Table 1
Summary of Groundwater Analytical Results
2021 Plant 6 Off-Site PFAS Investigation Summary
RACER Trust Plant6
Lansing, Michigan

Location ID: Date Collected: Sample Name: Sample Depth (ft. bgs):	P201 Residential Drinking Water	P201 Groundwater Surface Water Interface	Units	SB-OS-LE285 09/08/21 SB-OS-LE285_11-15_20210908 11 - 15	SB-OS-RO398 09/10/21 SB-OS-RO398_6-10_20210910 6 - 10	SB-OS-SW386 09/10/21 SB-OS-SW386_11-15_20210910 11 - 15	SB-OS-SW386 09/10/21 SB-OS-SW386_20-24_20210910 20 - 24	SB-OS-TC335 09/27/21 SB-OS-TC335_26-30_20210927 26 - 30
Per- and Polyfluoroalkyl Substances (PFAS) (via EPA Method 537 Modified)								
11Cl-PF3OUdS (F-53B Minor)	- -	- -	ng/L	<6.8	<7.3	<6.9	<7.9	<6.9
4:2 FTS	- -	- -	ng/L	<6.8	<7.3	<6.9	<7.9	<6.9
6:2 FTS	- -	- -	ng/L	<6.8	<7.3	**20**	<7.9	<6.9
8:2 FTS	- -	- -	ng/L	<6.8	<7.3	<6.9	<7.9	<6.9
9Cl-PF3ONS (F-53B Major)	- -	- -	ng/L	<6.8	<7.3	<6.9	<7.9	<6.9
ADONA	- -	- -	ng/L	<6.8	<7.3	<6.9	<7.9	<6.9
Hexafluoropropylene oxide dimer acid (HFPO-DA) (GenX)	370	- -	ng/L	<6.8	<7.3	<6.9	<7.9	<6.9
N-ethyl perfluorooctane sulfonamidoacetic acid (NEtFOSAA)	- -	- -	ng/L	<6.8	<7.3	<6.9	<7.9	<6.9
N-methyl perfluorooctane sulfonamidoacetic acid (NMeFOSAA)	- -	- -	ng/L	<6.8	<7.3	<6.9	<7.9	<6.9
Perfluorobutanesulfonic acid (PFBS)	420	- -	ng/L	**2.4 J**	**2.7 J**	**1.7 J**	**1.1 J**	<3.4
Perfluorobutanoic acid (PFBA)	- -	- -	ng/L	**3.6**	**5.5**	**6.2**	**4.5**	**12**
Perfluorodecanesulfonic acid (PFDS)	- -	- -	ng/L	<3.4	<3.6	<3.5	<3.9	<3.4
Perfluorodecanoic acid (PFDA)	- -	- -	ng/L	<3.4	<3.6	<3.5	<3.9	<3.4
Perfluorododecanoic acid (PFDoA)	- -	- -	ng/L	<3.4	<3.6	<3.5	<3.9	<3.4
Perfluoroheptanesulfonic Acid (PFHpS)	- -	- -	ng/L	<3.4	<3.6	<3.5	<3.9	<3.4
Perfluoroheptanoic acid (PFHpA)	- -	- -	ng/L	<3.4	<3.6	**4.0**	**1.1 J**	**1.8 J**
Perfluorohexanesulfonic acid (PFHxS)	51	- -	ng/L	<3.4	<3.6	**1.4 J**	<3.9	<3.4
Perfluorohexanoic acid (PFHxA)	400,000	- -	ng/L	**2.1 J**	**1.4 J**	**6.9**	**2.8 J**	**18**
Perfluorononanesulfonic acid (PFNS)	- -	- -	ng/L	<3.4	<3.6	<3.5	<3.9	<3.4
Perfluorononanoic acid (PFNA)	6	- -	ng/L	<3.4	<3.6	<3.5	<3.9	<3.4
Perfluorooctane Sulfonamide (PFOSA)	- -	- -	ng/L	<3.4	<3.6	<3.5	<3.9	<3.4
Perfluorooctane sulfonic acid (PFOS)	16	12	ng/L	<3.4	**2.1 J**	<3.5	<3.9	<3.4
Perfluorooctanoic acid (PFOA)	8	12,000	ng/L	**2.9 J**	**2.1 J**	**4.8**	<3.9	<3.4
Perfluoropentanesulfonic acid (PFPeS)	- -	- -	ng/L	<3.4	<3.6	<3.5	<3.9	<3.4
Perfluoropentanoic acid (PFPeA)	- -	- -	ng/L	**2.2 J**	**0.97 J**	**7.1**	**3.1 J**	**23**
Perfluorotetradecanoic acid (PFTeA)	- -	- -	ng/L	<3.4	<3.6	<3.5	<3.9	<3.4
Perfluorotridecanoic Acid (PFTriA)	- -	- -	ng/L	<3.4	<3.6	<3.5	<3.9	<3.4
Perfluoroundecanoic acid (PFUnA)	- -	- -	ng/L	<3.4	<3.6	<3.5	<3.9	<3.4

See notes on last page.

Table 1
Summary of Groundwater Analytical Results
2021 Plant 6 PFAS Off-Site Investigation Summary
RACER Trust Plant 6
Lansing, Michigan

Data Flagging:

Bold font	represents data where detections were noted above the laboratory method detection limit.
Gray shading	represents result exceeding either or both the EGLE Part 201 Generic Cleanup Criteria and Screening Levels (dated January 10, 2018) or the EGLE GSI Criteria (Updated June 25, 2018)

Notes:

1. EGLE Part 201 Residential Drinking Water Criteria and Groundwater Surface Water Interface Criteria from the Generic Cleanup Criteria and Screening Levels (dated January 10, 2018) are used for comparison with all VOC and Inorganic data and revised criteria values (dated December 21, 2020) are used for comparison with all PFAS data.

Abbreviations:

- - = Not listed in the EGLE Criteria Tables.
* = Analyzed for low-level 1,4-Dioxane via EPA Method 522
Deg. C. = degrees Celsius
EGLE = Michigan Department of Environment, Great Lakes, and Energy
mg/L = milligrams per liter
NA = Not Analyzed
NR = Not Recorded
NTU = Nephelometric Turbidity Unit
s.u. = standard unit
ug/L = micrograms per liter
µS/cm = microSiemens per centimeter

Lab and Validation Data Qualifiers:

F1 = Matrix spike and/or matrix spike duplicate recovery is outside acceptance limits.
J = The compound was positively identified, however, the associated numerical value is an estimated concentration only.
Y = Elevated reporting limit due to high target concentration.

Figures

SB-OS-KG312
11-15 ft: 12 ng/L
23-27 ft: <0.86 ng/L

SB-OS-LI335
14-18 ft: <0.87 ng/L
35-38 ft: Dry

MW-12-10R

SB-OS-LE285
11-15 ft: 2.9 J ng/L
25-29 ft: Dry

MW-20-132
45.2 ng/L

MW-20-131
38.8 ng/L

MW-12-11
<3.4 ng/L

SB-P6-MF301
3 - 8 ft: 23.8 ng/L
20 - 25 ft: 1.6 J ng/L

SB-P6-MF311
8 - 13 ft: 11.4 ng/L
20 - 25 ft: 7.3 [6.2] ng/L

SB-P6-MF293
3 - 8 ft: 50.4 ng/L
20 - 25 ft: 41.5 ng/L

SB-P6-MF321
15 - 20 ft: 14.2 ng/L

MW-04-05(5)
23.9 ng/L

SB-P6-MP275
10 - 15 ft: 14.7 ng/L
20 - 25 ft: 34.1 ng/L

SB-P6-MK335
9 - 14 ft: 1.1 J ng/L
28 - 33 ft: 1.1 J ng/L

SB-P6-MQ289
15 - 20 ft: 94.6 [118] ng/L
27 - 32 ft: 28.8 ng/L

MW-12-12
91.2 ng/L

SB-P6-MQ312
5 - 10 ft: 226 ng/L

MW-14-70
7.4 ng/L

MW-03-05
49.1 ng/L

SB-P6-NF322
19.5 - 24.5 ft: <4.0 ng/L

MW-14-66
123 ng/L

MW-12-13
1.9 ng/L

SB-P6-NT322
19 - 24 ft: 5.8 ng/L

SB-P6-NS335
11 - 16 ft: <4.0 [<4.0] ng/L

SB-P6-NU322
11-16 ft: <4.0 ng/L

MW-03-06
6.5 ng/L

P6-SB-37
35.6 ng/L

SB-P6-OH322
10 - 15 ft: 68.8 ng/L
15 - 20 ft: 39.6 ng/L

P6-SB-35
45.0 ng/L

MW-13-36R
75.2 ng/L

SB-OS-OS376
6-10 ft: <0.86 ng/L

SB-P6-OS335
18.5 - 23.5 ft: 7.3 ng/L

SB-P6-OX322
18 - 23 ft: 65.6 ng/L

P6-SB-21
87.6 ng/L

SB-P6-PG322
23 - 28 ft: Dry

SB-P6-QA336
13 - 18 ft: 9.8 ng/L
30 - 35 ft: 11.1 ng/L

SB-P6-QH240
15-20 ft: 77.6 ng/L

SB-P6-QM322
15 - 20 ft: 189 ng/L

SB-OS-QM379
8-12 ft: 3.4 ng/L
25-29 ft: <1.1 ng/L

P6-SB-07
1,780 ng/L

SB-P6-QT226
13 - 18 ft: 12.2 ng/L

SB-P6-QT255
33.5 - 38.5 ft: Dry

SB-P6-QT239
15 - 20 ft: 449 ng/L

SB-OS-QR364
12.5 - 17.5 ft: 9.4 ng/L
22.5 - 27.5 ft: 8.3 ng/L

SB-P6-QQ322
10 - 15 ft: 74.1 [52.6] ng/L

MW-21-133
62.9 ng/L

SB-P6-RH241
13 - 18 ft: 253 ng/L

SB-P6-RQ322
13 - 18 ft: 157 ng/L
27 - 32 ft: 60.9 ng/L

SB-OS-RO398
6-10 ft: 2.1 J ng/L

MW-21-134
37.6 ng/L

SB-OS-RW339
18.5 - 23.5 ft: 37.0 ng/L

MW-21-135
48.3 ng/L

SB-P6-SG322
10 - 15 ft: 39.8 ng/L
25 - 30 ft: 91.1 ng/L

MWBP-12A-UST1-4
7.7 ng/L

SB-P6-TA242
8 - 13 ft: 119 ng/L
Deep interval dry

SB-P6-TA258
5 - 10 ft: 74.1 ng/L
25 - 30 ft: 18.7 ng/L

MW-12-14
25-30 ft: 11.5 ng/L

SB-OS-TC335
20-24 ft: Dry
26-30 ft: <0.86 ng/L

SB-OS-SW386
11-15 ft: 4.8 [4.7] ng/L
20-24 ft: <0.98 ng/L

P6-MW-01
25.1 ng/L

SB-P6-TA272
Shallow interval dry
29 - 34 ft: 75.6 ng/L

SB-P6-TA228
5 - 10 ft: 45.1 ng/L

MW-12-16
3.0 ng/L

MW-12-15
1.5 ng/L

MW-21-136
ND

MW-21-137
ND

MW-21-138
1.7 ng/L

LEGEND

- PROPOSED SHALLOW MONITORING WELL (<20 FT BELOW GRADE)
- PROPOSED INTERBEDDED ZONE MONITORING WELL (20-30 FT BELOW GRADE)
- MONITORING WELL
- VAP BORING
- WELL SAMPLED AND PFOA DOES NOT EXCEED DW CRITERIA
- WELL SAMPLED AND PFOA EXCEED DW CRITERIA
- STORM SEWER LOCATION
- ASSUMED/ESTIMATED STORM SEWER LOCATION
- PARCEL OUTLINE

APPROXIMATE PLANT BOUNDARIES

- PLANT 2
- PLANT 3
- PLANT 6

NOTES:

THE SAMPLES ARE PRESENTED IN UNITS OF ng/L.THE MOST RECENT SAMPLING DATA IS SHOWN.

ANALYTICAL RESULTS IN BRACKETS REPRESENT DUPLICATE SAMPLE RESULTS.

J - COMPOUND DETECTED ABOVE LABORATORY METHOD DETECTION LIMIT AND BELOW THE QUANITATIVE REPORTING LIMIT

ng/L - NANOGRAMS PER LITER

PFOA - PERFLUOROOCTANOIC ACID

ALL ANALYSES COMPLETED USING MODIFIED USEPA METHOD 537.

0 215 430
SCALE IN FEET

RACER TRUST
PLANT 6
LANSING, MICHIGAN

PFOA GROUNDWATER ANALYTICAL RESULTS AND PROPOSED MONITORING WELL LOCATIONS

ARCADIS

FIGURE
1

IGN, and the GIS User Commu

CITY: Novi DIV: ENV DB: TRY PIC: J.Barrett PM: R.Christensen TM: A.Villhauer TR: PROJECT NUMBER: COORDINATE SYSTEM: NAD 1983 StatePlane Michigan South FIPS 2113 Feet Intl
T:_ENV\RACER\Buffalo\MXDs\2021_PFAS\Figure 1 - PFAS GW Analytical Results_122221.mxd PLOTTED: 1/3/2022 3:49:10 PM BY: MJoye

Attachment 1

Laboratory Analytical Reports

Report of Analysis

Arcadis U.S., Inc.
630 Plaza Drive
Suite 600
Highlands Ranch, CO 80129
Attention: Tiffany Linder

Project Name: Racer Lansing

Project Number: 30075941.03100

Lot Number:**WI11005**

Date Completed:10/10/2021
Revision Date: 10/18/2021

Kathy Smith

10/18/2021 1:33 PM
Approved and released by:
Project Manager II: **Kathy E. Smith**

The electronic signature above is the equivalent of a handwritten signature.

Pace Analytical Services, LLC (*formerly Shealy Environmental Services, Inc.*)
106 Vantage Point Drive West Columbia, SC 29172
Tel: 803-791-9700 Fax: 803-791-9111 www.pacelabs.com

Case Narrative
Arcadis U.S., Inc.
Lot Number: WI11005

This Report of Analysis contains the analytical result(s) for the sample(s) listed on the Sample Summary following this Case Narrative. The sample receiving date is documented in the header information associated with each sample.

This report was revised on October 18, 2021 to update the sample IDs.

All results listed in this report relate only to the samples that are contained within this report.

Sample receipt, sample analysis, and data review have been performed in accordance with the Pace Quality Assurance Management Plan (QAMP), applicable Shealy standard operating procedures (SOPs), the 2003 NELAC standard, and Shealy policies. Additionally, the DoD QSM version 5.3 has been followed for these samples, and specifically Table B-15 was followed for all PFAS samples. Any exceptions to the QAMP, SOPs, NELAC standards, the DoD QSM, or policies are qualified on the results page or discussed below.

All QC associated with these samples was in compliance with DOD QSM 5.3 table B-15 and our PFAS SOP.

Correction factors (CF) are used to calculate the original sample concentration. The CF is the inverse of the concentration factor (sample volume / extract final volume) times the dilution factor (DF). For undiluted analysis. For undiluted analysis, the extract is prepared for injection by adding 182 uL of sample extract + 8 uL of reagent water + 10 uL of internal standard solution to a polypropylene autosampler vial. An extra correction factor of 0.91 (182 uL / 200 uL = 0.91) applies. The CF is calculated as follows:

CF = DF * FV / Vo

FV is volume of extract (mL)
Vo is initial sample volume (mL)
DF is dilution factor. For undiluted analysis, DF = 1/0.91.

Sample concentration for aqueous samples:
Concentration (ng/L) = Cs*CF,

$$C_s = \frac{\left(\frac{(A_s x C_{is})}{A_{is}}\right) - B}{M1}$$

Where

C_s is on column concentration of target analyte in the sample (ng/L)
C_{is} is concentration of internal standard in the sample (ng/L)
A_s is peak response of target analyte in the sample
A_{is} is peak response of internal standard in the sample

M1 is the average RF from ICAL or the slope from linear regression ICAL
B is the y-intercept from the ICAL

Pace is a TNI accredited laboratory; however, the following analyses are currently not listed on our TNI scope of accreditation:

Biological Tissue: All, Non-Potable Water: SGT-HEM EPA 1664B, Silica EPA 200.7, Boron, Calcium, Silicon, Strontium EPA 200.8, Bicarbonate, Carbonate, and Hydroxide Alkalinity SM 2320 B-2011, Fecal Coliform SM 9221 C E-2006 & SM 9222D-2006, Strontium SW-846 6010D, VOC SM 6200 B-2011, Drinking Water: VOC (excluding BTEX, MTBE, Naphthalene, & 1,2-dichloroethane) EPA 524.2, Solid Chemical Material: TOC Walkley-Black.

If you have any questions regarding this report please contact the Pace Project Manager listed on the cover page.

Samples WI11005-002, WI11005-003 had the surrogate 6:2FTS recovered outside of the acceptance limits. The sample was re-extracted and re-analyzed with passing surrogates. Both sets of data have been reported.

Sample WI11005-004, WI11005-005, WI11005-006, WI11005-009 had multiple surrogates recovered outside the acceptance limits due to confirmed matrix interference.

The LCS associated with batch 16953 had 6:2 FTS and PFDoA recovered above the acceptance limits. This demonstrates a high bias on analytical results. There were no detections for this compound in the samples associated with this batch; therefore, data quality is not impacted.

The LCS associated with batch 16970 had 6:2 FTS and PFFTeDA recovered outside the acceptance limits.

Sample Summary
Arcadis U.S., Inc.
Lot Number: WI11005
Project Name: Racer Lansing
Project Number: 30075941.03100

Sample Number	Sample ID	Matrix	Date Sampled	Date Received
001	SB-OS-LE285_11-15	Aqueous	09/08/2021 1315	09/11/2021
002	SB-OS-KG312_11-15	Aqueous	09/08/2021 1535	09/11/2021
003	SB-OS-KG312_23-27	Aqueous	09/08/2021 1635	09/11/2021
004	SB-OS-LI335_14-18	Aqueous	09/09/2021 1105	09/11/2021
005	SB-OS-QM379_8-12	Aqueous	09/09/2021 1510	09/11/2021
006	SB-OS-QM379_25-29	Aqueous	09/09/2021 1630	09/11/2021
007	SB-OS-RO398_6-10	Aqueous	09/10/2021 0955	09/11/2021
008	SB-OS-SW386_11-15	Aqueous	09/10/2021 1150	09/11/2021
009	SB-OS-SW386_20-24	Aqueous	09/10/2021 1225	09/11/2021
010	DUP-01_091021	Aqueous	09/10/2021	09/11/2021
011	EB-01_091021	Aqueous	09/10/2021 1330	09/11/2021

(11 samples)

Detection Summary

Arcadis U.S., Inc.

Lot Number: WI11005

Project Name: Racer Lansing

Project Number: 30075941.03100

Sample	Sample ID	Matrix	Parameter	Method	Result	Q	Units	Page
001	SB-OS-LE285_11-15	Aqueous	PFBS	PFAS by ID	2.4	J	ng/L	6
001	SB-OS-LE285_11-15	Aqueous	PFBA	PFAS by ID	3.6		ng/L	6
001	SB-OS-LE285_11-15	Aqueous	PFHxA	PFAS by ID	2.1	J	ng/L	6
001	SB-OS-LE285_11-15	Aqueous	PFOA	PFAS by ID	2.9	J	ng/L	6
001	SB-OS-LE285_11-15	Aqueous	PFPeA	PFAS by ID	2.2	J	ng/L	6
002	SB-OS-KG312_11-15	Aqueous	PFBS	PFAS by ID	4.2		ng/L	8
002	SB-OS-KG312_11-15	Aqueous	PFPeS	PFAS by ID	0.94	J	ng/L	8
002	SB-OS-KG312_11-15	Aqueous	PFHxS	PFAS by ID	3.3	J	ng/L	8
002	SB-OS-KG312_11-15	Aqueous	PFBA	PFAS by ID	11		ng/L	8
002	SB-OS-KG312_11-15	Aqueous	PFHpA	PFAS by ID	8.5		ng/L	8
002	SB-OS-KG312_11-15	Aqueous	PFHxA	PFAS by ID	23		ng/L	8
002	SB-OS-KG312_11-15	Aqueous	PFOA	PFAS by ID	11		ng/L	8
002	SB-OS-KG312_11-15	Aqueous	PFPeA	PFAS by ID	29		ng/L	8
003	SB-OS-KG312_23-27	Aqueous	PFBA	PFAS by ID	3.8		ng/L	12
003	SB-OS-KG312_23-27	Aqueous	PFHxA	PFAS by ID	2.1	J	ng/L	12
003	SB-OS-KG312_23-27	Aqueous	PFPeA	PFAS by ID	4.5		ng/L	12
004	SB-OS-LI335_14-18	Aqueous	PFBA	PFAS by ID	4.2		ng/L	16
004	SB-OS-LI335_14-18	Aqueous	PFHxA	PFAS by ID	1.3	J	ng/L	16
004	SB-OS-LI335_14-18	Aqueous	PFPeA	PFAS by ID	2.6	J	ng/L	16
005	SB-OS-QM379_8-12	Aqueous	PFBS	PFAS by ID	1.9	J	ng/L	18
005	SB-OS-QM379_8-12	Aqueous	PFHxS	PFAS by ID	2.7	J	ng/L	18
005	SB-OS-QM379_8-12	Aqueous	PFBA	PFAS by ID	5.0		ng/L	18
005	SB-OS-QM379_8-12	Aqueous	PFHpA	PFAS by ID	1.3	J	ng/L	18
005	SB-OS-QM379_8-12	Aqueous	PFHxA	PFAS by ID	2.1	J	ng/L	18
005	SB-OS-QM379_8-12	Aqueous	PFOA	PFAS by ID	3.4		ng/L	18
005	SB-OS-QM379_8-12	Aqueous	PFPeA	PFAS by ID	2.4	J	ng/L	18
005	SB-OS-QM379_8-12	Aqueous	PFOS	PFAS by ID	1.6	J	ng/L	18
006	SB-OS-QM379_25-29	Aqueous	PFBS	PFAS by ID	1.2	J	ng/L	20
006	SB-OS-QM379_25-29	Aqueous	PFOS	PFAS by ID	1.3	J	ng/L	20
007	SB-OS-RO398_6-10	Aqueous	PFBS	PFAS by ID	2.7	J	ng/L	22
007	SB-OS-RO398_6-10	Aqueous	PFBA	PFAS by ID	5.5		ng/L	22
007	SB-OS-RO398_6-10	Aqueous	PFHxA	PFAS by ID	1.4	J	ng/L	22
007	SB-OS-RO398_6-10	Aqueous	PFOA	PFAS by ID	2.1	J	ng/L	22
007	SB-OS-RO398_6-10	Aqueous	PFPeA	PFAS by ID	0.97	J	ng/L	22
007	SB-OS-RO398_6-10	Aqueous	PFOS	PFAS by ID	2.1	J	ng/L	22
008	SB-OS-SW386_11-15	Aqueous	6:2 FTS	PFAS by ID	20		ng/L	24
008	SB-OS-SW386_11-15	Aqueous	PFBS	PFAS by ID	1.7	J	ng/L	24
008	SB-OS-SW386_11-15	Aqueous	PFHxS	PFAS by ID	1.4	J	ng/L	24
008	SB-OS-SW386_11-15	Aqueous	PFBA	PFAS by ID	6.2		ng/L	24
008	SB-OS-SW386_11-15	Aqueous	PFHpA	PFAS by ID	4.0		ng/L	24
008	SB-OS-SW386_11-15	Aqueous	PFHxA	PFAS by ID	6.9		ng/L	24
008	SB-OS-SW386_11-15	Aqueous	PFOA	PFAS by ID	4.8		ng/L	24
008	SB-OS-SW386_11-15	Aqueous	PFPeA	PFAS by ID	7.1		ng/L	24

Detection Summary (Continued)

Lot Number: WI11005

Sample	Sample ID	Matrix	Parameter	Method	Result	Q	Units	Page
009	SB-OS-SW386_20-24	Aqueous	PFBS	PFAS by ID	1.1	J	ng/L	26
009	SB-OS-SW386_20-24	Aqueous	PFBA	PFAS by ID	4.5		ng/L	26
009	SB-OS-SW386_20-24	Aqueous	PFHpA	PFAS by ID	1.1	J	ng/L	26
009	SB-OS-SW386_20-24	Aqueous	PFHxA	PFAS by ID	2.8	J	ng/L	26
009	SB-OS-SW386_20-24	Aqueous	PFPeA	PFAS by ID	3.1	J	ng/L	26
010	DUP-01_091021	Aqueous	6:2 FTS	PFAS by ID	2.3	J	ng/L	28
010	DUP-01_091021	Aqueous	PFBS	PFAS by ID	1.4	J	ng/L	28
010	DUP-01_091021	Aqueous	PFHxS	PFAS by ID	1.3	J	ng/L	28
010	DUP-01_091021	Aqueous	PFBA	PFAS by ID	6.2		ng/L	28
010	DUP-01_091021	Aqueous	PFHpA	PFAS by ID	4.6		ng/L	28
010	DUP-01_091021	Aqueous	PFHxA	PFAS by ID	6.7		ng/L	28
010	DUP-01_091021	Aqueous	PFOA	PFAS by ID	4.7		ng/L	28
010	DUP-01_091021	Aqueous	PFPeA	PFAS by ID	6.8		ng/L	28

(56 detections)

PFAS by LC/MS/MS

Client: **Arcadis U.S., Inc.** Laboratory ID: **WI11005-001**
Description: **SB-OS-LE285_11-15** Matrix: **Aqueous**
Date Sampled: **09/08/2021 1315** Project Name: **Racer Lansing**
Date Received: **09/11/2021** Project Number: **30075941.03100**

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	SOP SPE	PFAS by ID SOP QSM B-15	1	09/30/2021 1609	JJG	09/29/2021 1247	16970

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
9-chlorohexadecafluoro-3-oxanone-1-sulfonic acid (9Cl-PF3ONS)	756426-58-1	PFAS by ID SOP	ND		6.8	1.7	ng/L	1
11-chloroeicosafluoro-3-oxaundecane-1-sulfonic acid (11Cl-PF3...)	763051-92-9	PFAS by ID SOP	ND		6.8	1.7	ng/L	1
1H, 1H, 2H, 2H-perfluorodecane sulfonic acid (8:2 FTS)	39108-34-4	PFAS by ID SOP	ND		6.8	1.7	ng/L	1
1H, 1H, 2H, 2H-perfluorooctane sulfonic acid (6:2 FTS)	27619-97-2	PFAS by ID SOP	ND		6.8	1.7	ng/L	1
1H,1H,2H,2H-perfluorohexane sulfonic acid (4:2 FTS)	757124-72-4	PFAS by ID SOP	ND		6.8	1.7	ng/L	1
Hexafluoropropylene oxide dimer acid (GenX)	13252-13-6	PFAS by ID SOP	ND		6.8	1.7	ng/L	1
4,8-dioxa-3H-perfluorononanoic acid (ADONA)	919005-14-4	PFAS by ID SOP	ND		6.8	1.7	ng/L	1
N-ethylperfluoro-1-octanesulfonamidoacetic acid (EtFOSAA)	2991-50-6	PFAS by ID SOP	ND		6.8	1.7	ng/L	1
N-methylperfluoro-1-octanesulfonamidoacetic acid (MeFOSAA)	2355-31-9	PFAS by ID SOP	ND		6.8	1.7	ng/L	1
Perfluoro-1-butanesulfonic acid (PFBS)	**375-73-5**	**PFAS by ID SOP**	**2.4**	**J**	**3.4**	**0.86**	**ng/L**	**1**
Perfluoro-1-decanesulfonic acid (PFDS)	335-77-3	PFAS by ID SOP	ND		3.4	0.86	ng/L	1
Perfluoro-1-heptanesulfonic acid (PFHpS)	375-92-8	PFAS by ID SOP	ND		3.4	0.86	ng/L	1
Perfluoro-1-nonanesulfonic acid (PFNS)	68259-12-1	PFAS by ID SOP	ND		3.4	0.86	ng/L	1
Perfluoro-1-octanesulfonamide (PFOSA)	754-91-6	PFAS by ID SOP	ND		3.4	0.86	ng/L	1
Perfluoro-1-pentanesulfonic acid (PFPeS)	2706-91-4	PFAS by ID SOP	ND		3.4	0.86	ng/L	1
Perfluorohexanesulfonic acid (PFHxS)	355-46-4	PFAS by ID SOP	ND		3.4	0.86	ng/L	1
Perfluoro-n-butanoic acid (PFBA)	**375-22-4**	**PFAS by ID SOP**	**3.6**		**3.4**	**0.86**	**ng/L**	**1**
Perfluoro-n-decanoic acid (PFDA)	335-76-2	PFAS by ID SOP	ND		3.4	0.86	ng/L	1
Perfluoro-n-dodecanoic acid (PFDoA)	307-55-1	PFAS by ID SOP	ND		3.4	0.86	ng/L	1
Perfluoro-n-heptanoic acid (PFHpA)	375-85-9	PFAS by ID SOP	ND		3.4	0.86	ng/L	1
Perfluoro-n-hexanoic acid (PFHxA)	**307-24-4**	**PFAS by ID SOP**	**2.1**	**J**	**3.4**	**0.86**	**ng/L**	**1**
Perfluoro-n-nonanoic acid (PFNA)	375-95-1	PFAS by ID SOP	ND		3.4	0.86	ng/L	1
Perfluoro-n-octanoic acid (PFOA)	**335-67-1**	**PFAS by ID SOP**	**2.9**	**J**	**3.4**	**0.86**	**ng/L**	**1**
Perfluoro-n-pentanoic acid (PFPeA)	**2706-90-3**	**PFAS by ID SOP**	**2.2**	**J**	**3.4**	**0.86**	**ng/L**	**1**
Perfluoro-n-tetradecanoic acid (PFTeDA)	376-06-7	PFAS by ID SOP	ND		3.4	0.86	ng/L	1
Perfluoro-n-tridecanoic acid (PFTrDA)	72629-94-8	PFAS by ID SOP	ND		3.4	0.86	ng/L	1
Perfluoro-n-undecanoic acid (PFUdA)	2058-94-8	PFAS by ID SOP	ND		3.4	0.86	ng/L	1
Perfluorooctanesulfonic acid (PFOS)	1763-23-1	PFAS by ID SOP	ND		3.4	0.86	ng/L	1

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
13C2_4:2FTS		102	50-150
13C2_6:2FTS		105	50-150
13C2_8:2FTS		93	50-150
13C2_PFDoA		72	50-150
13C2_PFTeDA		77	50-150
13C3_PFBS		89	50-150
13C3_PFHxS		94	50-150
13C3-HFPO-DA		96	50-150
13C4_PFBA		91	50-150
13C4_PFHpA		95	50-150
13C5_PFHxA		93	50-150
13C5_PFPeA		97	50-150
13C6_PFDA		93	50-150
13C7_PFUdA		87	50-150

LOQ = Limit of Quantitation
B = Detected in the method blank
E = Quantitation of compound exceeded the calibration range
DL = Detection Limit
Q = Surrogate failure
ND = Not detected at or above the DL
N = Recovery is out of criteria
P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
L = LCS/LCSD failure
H = Out of holding time
W = Reported on wet weight basis
S = MS/MSD failure

Pace Analytical Services, LLC *(formerly Shealy Environmental Services, Inc.)*
106 Vantage Point Drive West Columbia, SC 29172 (803) 791-9700 Fax (803) 791-9111 www.pacelabs.com

PFAS by LC/MS/MS

Client: **Arcadis U.S., Inc.**		Laboratory ID: **WI11005-001**
Description: **SB-OS-LE285_11-15**		Matrix: **Aqueous**
Date Sampled: **09/08/2021 1315**	Project Name: **Racer Lansing**	
Date Received: **09/11/2021**	Project Number: **30075941.03100**	

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
13C8_PFOA		96	50-150
13C8_PFOS		85	50-150
13C8_PFOSA		97	50-150
13C9_PFNA		94	50-150
d5-EtFOSAA		84	50-150
d3-MeFOSAA		93	50-150

LOQ = Limit of Quantitation	B = Detected in the method blank	E = Quantitation of compound exceeded the calibration range	DL = Detection Limit	Q = Surrogate failure
ND = Not detected at or above the DL	N = Recovery is out of criteria	P = The RPD between two GC columns exceeds 40%	J = Estimated result < LOQ and ≥ DL	L = LCS/LCSD failure
H = Out of holding time	W = Reported on wet weight basis			S = MS/MSD failure

PFAS by LC/MS/MS

Client: **Arcadis U.S., Inc.** Laboratory ID: **WI11005-002**

Description: **SB-OS-KG312_11-15** Matrix: **Aqueous**

Date Sampled: **09/08/2021 1535** Project Name: **Racer Lansing**

Date Received: **09/11/2021** Project Number: **30075941.03100**

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	SOP SPE	PFAS by ID SOP QSM B-15	1	09/30/2021 1630	JJG	09/29/2021 1247	16970
2	SOP SPE	PFAS by ID SOP QSM B-15	1	10/06/2021 1524	JJG	10/05/2021 1104	17652

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
9-chlorohexadecafluoro-3-oxanone-1-sulfonic acid (9Cl-PF3ONS)	756426-58-1	PFAS by ID SOP	ND		7.0	1.8	ng/L	1
11-chloroeicosafluoro-3-oxaundecane-1-sulfonic acid (11Cl-PF3...)	763051-92-9	PFAS by ID SOP	ND		7.0	1.8	ng/L	1
1H, 1H, 2H, 2H-perfluorodecane sulfonic acid (8:2 FTS)	39108-34-4	PFAS by ID SOP	ND		7.0	1.8	ng/L	1
1H, 1H, 2H, 2H-perfluorooctane sulfonic acid (6:2 FTS)	27619-97-2	PFAS by ID SOP	ND	Q	7.0	1.8	ng/L	1
1H,1H,2H,2H-perfluorohexane sulfonic acid (4:2 FTS)	757124-72-4	PFAS by ID SOP	ND		7.0	1.8	ng/L	1
Hexafluoropropylene oxide dimer acid (GenX)	13252-13-6	PFAS by ID SOP	ND		7.0	1.8	ng/L	1
4,8-dioxa-3H-perfluorononanoic acid (ADONA)	919005-14-4	PFAS by ID SOP	ND		7.0	1.8	ng/L	1
N-ethylperfluoro-1-octanesulfonamidoacetic acid (EtFOSAA)	2991-50-6	PFAS by ID SOP	ND		7.0	1.8	ng/L	1
N-methylperfluoro-1-octanesulfonamidoacetic acid (MeFOSAA)	2355-31-9	PFAS by ID SOP	ND		7.0	1.8	ng/L	1
Perfluoro-1-butanesulfonic acid (PFBS)	**375-73-5**	**PFAS by ID SOP**	**4.2**		**3.5**	**0.88**	**ng/L**	**1**
Perfluoro-1-decanesulfonic acid (PFDS)	335-77-3	PFAS by ID SOP	ND		3.5	0.88	ng/L	1
Perfluoro-1-heptanesulfonic acid (PFHpS)	375-92-8	PFAS by ID SOP	ND		3.5	0.88	ng/L	1
Perfluoro-1-nonanesulfonic acid (PFNS)	68259-12-1	PFAS by ID SOP	ND		3.5	0.88	ng/L	1
Perfluoro-1-octanesulfonamide (PFOSA)	754-91-6	PFAS by ID SOP	ND		3.5	0.88	ng/L	1
Perfluoro-1-pentanesulfonic acid (PFPeS)	**2706-91-4**	**PFAS by ID SOP**	**0.94**	**J**	**3.5**	**0.88**	**ng/L**	**1**
Perfluorohexanesulfonic acid (PFHxS)	**355-46-4**	**PFAS by ID SOP**	**3.3**	**J**	**3.5**	**0.88**	**ng/L**	**1**
Perfluoro-n-butanoic acid (PFBA)	**375-22-4**	**PFAS by ID SOP**	**11**		**3.5**	**0.88**	**ng/L**	**1**
Perfluoro-n-decanoic acid (PFDA)	335-76-2	PFAS by ID SOP	ND		3.5	0.88	ng/L	1
Perfluoro-n-dodecanoic acid (PFDoA)	307-55-1	PFAS by ID SOP	ND		3.5	0.88	ng/L	1
Perfluoro-n-heptanoic acid (PFHpA)	**375-85-9**	**PFAS by ID SOP**	**8.5**		**3.5**	**0.88**	**ng/L**	**1**
Perfluoro-n-hexanoic acid (PFHxA)	**307-24-4**	**PFAS by ID SOP**	**23**		**3.5**	**0.88**	**ng/L**	**1**
Perfluoro-n-nonanoic acid (PFNA)	375-95-1	PFAS by ID SOP	ND		3.5	0.88	ng/L	1
Perfluoro-n-octanoic acid (PFOA)	**335-67-1**	**PFAS by ID SOP**	**11**		**3.5**	**0.88**	**ng/L**	**1**
Perfluoro-n-pentanoic acid (PFPeA)	**2706-90-3**	**PFAS by ID SOP**	**29**		**3.5**	**0.88**	**ng/L**	**1**
Perfluoro-n-tetradecanoic acid (PFTeDA)	376-06-7	PFAS by ID SOP	ND		3.5	0.88	ng/L	1
Perfluoro-n-tridecanoic acid (PFTrDA)	72629-94-8	PFAS by ID SOP	ND		3.5	0.88	ng/L	1
Perfluoro-n-undecanoic acid (PFUdA)	2058-94-8	PFAS by ID SOP	ND		3.5	0.88	ng/L	1
Perfluorooctanesulfonic acid (PFOS)	1763-23-1	PFAS by ID SOP	ND		3.5	0.88	ng/L	1

Surrogate	Q	Run 1 % Recovery	Acceptance Limits	Q	Run 2 % Recovery	Acceptance Limits
13C2_4:2FTS		122	50-150		134	50-150
13C2_6:2FTS	N	345	50-150		130	50-150
13C2_8:2FTS		93	50-150		78	50-150
13C2_PFDoA		61	50-150		65	50-150
13C2_PFTeDA		66	50-150		59	50-150
13C3_PFBS		91	50-150		88	50-150
13C3_PFHxS		92	50-150		86	50-150
13C3-HFPO-DA		95	50-150		92	50-150
13C4_PFBA		85	50-150		81	50-150
13C4_PFHpA		97	50-150		92	50-150
13C5_PFHxA		95	50-150		89	50-150
13C5_PFPeA		99	50-150		90	50-150
13C6_PFDA		92	50-150		83	50-150

LOQ = Limit of Quantitation
B = Detected in the method blank
E = Quantitation of compound exceeded the calibration range
DL = Detection Limit
Q = Surrogate failure
ND = Not detected at or above the DL
N = Recovery is out of criteria
P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
L = LCS/LCSD failure
H = Out of holding time
W = Reported on wet weight basis
S = MS/MSD failure

PFAS by LC/MS/MS

Client: **Arcadis U.S., Inc.**		Laboratory ID: **WI11005-002**
Description: **SB-OS-KG312_11-15**		Matrix: **Aqueous**
Date Sampled: **09/08/2021 1535**	Project Name: **Racer Lansing**	
Date Received: **09/11/2021**	Project Number: **30075941.03100**	

Surrogate	Q	Run 1 % Recovery	Acceptance Limits	Q	Run 2 % Recovery	Acceptance Limits
13C7_PFUdA		84	50-150		75	50-150
13C8_PFOA		104	50-150		95	50-150
13C8_PFOS		85	50-150		82	50-150
13C8_PFOSA		95	50-150		87	50-150
13C9_PFNA		94	50-150		88	50-150
d5-EtFOSAA		74	50-150		77	50-150
d3-MeFOSAA		84	50-150		74	50-150

LOQ = Limit of Quantitation	B = Detected in the method blank	E = Quantitation of compound exceeded the calibration range	DL = Detection Limit	Q = Surrogate failure
ND = Not detected at or above the DL	N = Recovery is out of criteria	P = The RPD between two GC columns exceeds 40%	J = Estimated result < LOQ and ≥ DL	L = LCS/LCSD failure
H = Out of holding time	W = Reported on wet weight basis			S = MS/MSD failure

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PFAS by LC/MS/MS

Client: **Arcadis U.S., Inc.** Laboratory ID: **WI11005-002**

Description: **SB-OS-KG312_11-15** Matrix: **Aqueous**

Date Sampled: **09/08/2021 1535** Project Name: **Racer Lansing**

Date Received: **09/11/2021** Project Number: **30075941.03100**

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	SOP SPE	PFAS by ID SOP QSM B-15	1	09/30/2021 1630	JJG	09/29/2021 1247	16970
2	SOP SPE	PFAS by ID SOP QSM B-15	1	10/06/2021 1524	JJG	10/05/2021 1104	17652

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
9-chlorohexadecafluoro-3-oxanone-1-sulfonic acid (9Cl-PF3ONS)	756426-58-1	PFAS by ID SOP	ND		7.0	1.8	ng/L	2
11-chloroeicosafluoro-3-oxaundecane-1-sulfonic acid (11Cl-PF3...)	763051-92-9	PFAS by ID SOP	ND		7.0	1.8	ng/L	2
1H, 1H, 2H, 2H-perfluorodecane sulfonic acid (8:2 FTS)	39108-34-4	PFAS by ID SOP	ND		7.0	1.8	ng/L	2
1H, 1H, 2H, 2H-perfluorooctane sulfonic acid (6:2 FTS)	27619-97-2	PFAS by ID SOP	ND		7.0	1.8	ng/L	2
1H,1H,2H,2H-perfluorohexane sulfonic acid (4:2 FTS)	757124-72-4	PFAS by ID SOP	ND		7.0	1.8	ng/L	2
Hexafluoropropylene oxide dimer acid (GenX)	13252-13-6	PFAS by ID SOP	ND		7.0	1.8	ng/L	2
4,8-dioxa-3H-perfluorononanoic acid (ADONA)	919005-14-4	PFAS by ID SOP	ND		7.0	1.8	ng/L	2
N-ethylperfluoro-1-octanesulfonamidoacetic acid (EtFOSAA)	2991-50-6	PFAS by ID SOP	ND		7.0	1.8	ng/L	2
N-methylperfluoro-1-octanesulfonamidoacetic acid (MeFOSAA)	2355-31-9	PFAS by ID SOP	ND		7.0	1.8	ng/L	2
Perfluoro-1-butanesulfonic acid (PFBS)	**375-73-5**	**PFAS by ID SOP**	**4.7**		**3.5**	**0.88**	**ng/L**	**2**
Perfluoro-1-decanesulfonic acid (PFDS)	335-77-3	PFAS by ID SOP	ND		3.5	0.88	ng/L	2
Perfluoro-1-heptanesulfonic acid (PFHpS)	375-92-8	PFAS by ID SOP	ND		3.5	0.88	ng/L	2
Perfluoro-1-nonanesulfonic acid (PFNS)	68259-12-1	PFAS by ID SOP	ND		3.5	0.88	ng/L	2
Perfluoro-1-octanesulfonamide (PFOSA)	754-91-6	PFAS by ID SOP	ND		3.5	0.88	ng/L	2
Perfluoro-1-pentanesulfonic acid (PFPeS)	**2706-91-4**	**PFAS by ID SOP**	**1.1**	**J**	**3.5**	**0.88**	**ng/L**	**2**
Perfluorohexanesulfonic acid (PFHxS)	**355-46-4**	**PFAS by ID SOP**	**3.4**	**J**	**3.5**	**0.88**	**ng/L**	**2**
Perfluoro-n-butanoic acid (PFBA)	**375-22-4**	**PFAS by ID SOP**	**12**		**3.5**	**0.88**	**ng/L**	**2**
Perfluoro-n-decanoic acid (PFDA)	335-76-2	PFAS by ID SOP	ND		3.5	0.88	ng/L	2
Perfluoro-n-dodecanoic acid (PFDoA)	307-55-1	PFAS by ID SOP	ND		3.5	0.88	ng/L	2
Perfluoro-n-heptanoic acid (PFHpA)	**375-85-9**	**PFAS by ID SOP**	**9.9**		**3.5**	**0.88**	**ng/L**	**2**
Perfluoro-n-hexanoic acid (PFHxA)	**307-24-4**	**PFAS by ID SOP**	**24**		**3.5**	**0.88**	**ng/L**	**2**
Perfluoro-n-nonanoic acid (PFNA)	375-95-1	PFAS by ID SOP	ND		3.5	0.88	ng/L	2
Perfluoro-n-octanoic acid (PFOA)	**335-67-1**	**PFAS by ID SOP**	**12**		**3.5**	**0.88**	**ng/L**	**2**
Perfluoro-n-pentanoic acid (PFPeA)	**2706-90-3**	**PFAS by ID SOP**	**32**		**3.5**	**0.88**	**ng/L**	**2**
Perfluoro-n-tetradecanoic acid (PFTeDA)	376-06-7	PFAS by ID SOP	ND		3.5	0.88	ng/L	2
Perfluoro-n-tridecanoic acid (PFTrDA)	72629-94-8	PFAS by ID SOP	ND		3.5	0.88	ng/L	2
Perfluoro-n-undecanoic acid (PFUdA)	2058-94-8	PFAS by ID SOP	ND		3.5	0.88	ng/L	2
Perfluorooctanesulfonic acid (PFOS)	1763-23-1	PFAS by ID SOP	ND		3.5	0.88	ng/L	2

Surrogate	Q	Run 1 % Recovery	Acceptance Limits	Q	Run 2 % Recovery	Acceptance Limits
13C2_4:2FTS		122	50-150		134	50-150
13C2_6:2FTS	N	345	50-150		130	50-150
13C2_8:2FTS		93	50-150		78	50-150
13C2_PFDoA		61	50-150		65	50-150
13C2_PFTeDA		66	50-150		59	50-150
13C3_PFBS		91	50-150		88	50-150
13C3_PFHxS		92	50-150		86	50-150
13C3-HFPO-DA		95	50-150		92	50-150
13C4_PFBA		85	50-150		81	50-150
13C4_PFHpA		97	50-150		92	50-150
13C5_PFHxA		95	50-150		89	50-150
13C5_PFPeA		99	50-150		90	50-150
13C6_PFDA		92	50-150		83	50-150

LOQ = Limit of Quantitation
B = Detected in the method blank
E = Quantitation of compound exceeded the calibration range
DL = Detection Limit
Q = Surrogate failure
ND = Not detected at or above the DL
N = Recovery is out of criteria
P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
L = LCS/LCSD failure
H = Out of holding time
W = Reported on wet weight basis
S = MS/MSD failure

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PFAS by LC/MS/MS

Client: **Arcadis U.S., Inc.**		Laboratory ID: **WI11005-002**
Description: **SB-OS-KG312_11-15**		Matrix: **Aqueous**
Date Sampled: **09/08/2021 1535**	Project Name: **Racer Lansing**	
Date Received: **09/11/2021**	Project Number: **30075941.03100**	

Surrogate	Q	Run 1 % Recovery	Acceptance Limits	Q	Run 2 % Recovery	Acceptance Limits
13C7_PFUdA		84	50-150		75	50-150
13C8_PFOA		104	50-150		95	50-150
13C8_PFOS		85	50-150		82	50-150
13C8_PFOSA		95	50-150		87	50-150
13C9_PFNA		94	50-150		88	50-150
d5-EtFOSAA		74	50-150		77	50-150
d3-MeFOSAA		84	50-150		74	50-150

LOQ = Limit of Quantitation	B = Detected in the method blank	E = Quantitation of compound exceeded the calibration range	DL = Detection Limit	Q = Surrogate failure
ND = Not detected at or above the DL	N = Recovery is out of criteria	P = The RPD between two GC columns exceeds 40%	J = Estimated result < LOQ and ≥ DL	L = LCS/LCSD failure
H = Out of holding time	W = Reported on wet weight basis			S = MS/MSD failure

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PFAS by LC/MS/MS

Client: **Arcadis U.S., Inc.** Laboratory ID: **WI11005-003**

Description: **SB-OS-KG312_23-27** Matrix: **Aqueous**

Date Sampled: **09/08/2021 1635** Project Name: **Racer Lansing**

Date Received: **09/11/2021** Project Number: **30075941.03100**

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	SOP SPE	PFAS by ID SOP QSM B-15	1	09/30/2021 1641	JJG	09/29/2021 1247	16970
2	SOP SPE	PFAS by ID SOP QSM B-15	1	10/06/2021 1556	JJG	10/05/2021 1104	17652

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
9-chlorohexadecafluoro-3-oxanone-1-sulfonic acid (9Cl-PF3ONS)	756426-58-1	PFAS by ID SOP	ND		6.9	1.7	ng/L	1
11-chloroeicosafluoro-3-oxaundecane-1-sulfonic acid (11Cl-PF3...)	763051-92-9	PFAS by ID SOP	ND		6.9	1.7	ng/L	1
1H, 1H, 2H, 2H-perfluorodecane sulfonic acid (8:2 FTS)	39108-34-4	PFAS by ID SOP	ND		6.9	1.7	ng/L	1
1H, 1H, 2H, 2H-perfluorooctane sulfonic acid (6:2 FTS)	27619-97-2	PFAS by ID SOP	ND	Q	6.9	1.7	ng/L	1
1H,1H,2H,2H-perfluorohexane sulfonic acid (4:2 FTS)	757124-72-4	PFAS by ID SOP	ND		6.9	1.7	ng/L	1
Hexafluoropropylene oxide dimer acid (GenX)	13252-13-6	PFAS by ID SOP	ND		6.9	1.7	ng/L	1
4,8-dioxa-3H-perfluorononanoic acid (ADONA)	919005-14-4	PFAS by ID SOP	ND		6.9	1.7	ng/L	1
N-ethylperfluoro-1-octanesulfonamidoacetic acid (EtFOSAA)	2991-50-6	PFAS by ID SOP	ND		6.9	1.7	ng/L	1
N-methylperfluoro-1-octanesulfonamidoacetic acid (MeFOSAA)	2355-31-9	PFAS by ID SOP	ND		6.9	1.7	ng/L	1
Perfluoro-1-butanesulfonic acid (PFBS)	375-73-5	PFAS by ID SOP	ND		3.5	0.87	ng/L	1
Perfluoro-1-decanesulfonic acid (PFDS)	335-77-3	PFAS by ID SOP	ND		3.5	0.87	ng/L	1
Perfluoro-1-heptanesulfonic acid (PFHpS)	375-92-8	PFAS by ID SOP	ND		3.5	0.87	ng/L	1
Perfluoro-1-nonanesulfonic acid (PFNS)	68259-12-1	PFAS by ID SOP	ND		3.5	0.87	ng/L	1
Perfluoro-1-octanesulfonamide (PFOSA)	754-91-6	PFAS by ID SOP	ND		3.5	0.87	ng/L	1
Perfluoro-1-pentanesulfonic acid (PFPeS)	2706-91-4	PFAS by ID SOP	ND		3.5	0.87	ng/L	1
Perfluorohexanesulfonic acid (PFHxS)	355-46-4	PFAS by ID SOP	ND		3.5	0.87	ng/L	1
Perfluoro-n-butanoic acid (PFBA)	**375-22-4**	**PFAS by ID SOP**	**3.8**		**3.5**	**0.87**	**ng/L**	**1**
Perfluoro-n-decanoic acid (PFDA)	335-76-2	PFAS by ID SOP	ND		3.5	0.87	ng/L	1
Perfluoro-n-dodecanoic acid (PFDoA)	307-55-1	PFAS by ID SOP	ND		3.5	0.87	ng/L	1
Perfluoro-n-heptanoic acid (PFHpA)	375-85-9	PFAS by ID SOP	ND		3.5	0.87	ng/L	1
Perfluoro-n-hexanoic acid (PFHxA)	**307-24-4**	**PFAS by ID SOP**	**2.1**	**J**	**3.5**	**0.87**	**ng/L**	**1**
Perfluoro-n-nonanoic acid (PFNA)	375-95-1	PFAS by ID SOP	ND		3.5	0.87	ng/L	1
Perfluoro-n-octanoic acid (PFOA)	335-67-1	PFAS by ID SOP	ND		3.5	0.87	ng/L	1
Perfluoro-n-pentanoic acid (PFPeA)	**2706-90-3**	**PFAS by ID SOP**	**4.5**		**3.5**	**0.87**	**ng/L**	**1**
Perfluoro-n-tetradecanoic acid (PFTeDA)	376-06-7	PFAS by ID SOP	ND		3.5	0.87	ng/L	1
Perfluoro-n-tridecanoic acid (PFTrDA)	72629-94-8	PFAS by ID SOP	ND		3.5	0.87	ng/L	1
Perfluoro-n-undecanoic acid (PFUdA)	2058-94-8	PFAS by ID SOP	ND		3.5	0.87	ng/L	1
Perfluorooctanesulfonic acid (PFOS)	1763-23-1	PFAS by ID SOP	ND		3.5	0.87	ng/L	1

Surrogate	Q	Run 1 % Recovery	Run 1 Acceptance Limits	Q	Run 2 % Recovery	Run 2 Acceptance Limits
13C2_4:2FTS		121	50-150		94	50-150
13C2_6:2FTS	N	230	50-150		98	50-150
13C2_8:2FTS		97	50-150		77	50-150
13C2_PFDoA		66	50-150		61	50-150
13C2_PFTeDA		72	50-150		60	50-150
13C3_PFBS		94	50-150		80	50-150
13C3_PFHxS		92	50-150		82	50-150
13C3-HFPO-DA		96	50-150		89	50-150
13C4_PFBA		88	50-150		78	50-150
13C4_PFHpA		96	50-150		82	50-150
13C5_PFHxA		97	50-150		82	50-150
13C5_PFPeA		101	50-150		85	50-150
13C6_PFDA		87	50-150		71	50-150

LOQ = Limit of Quantitation
B = Detected in the method blank
E = Quantitation of compound exceeded the calibration range
DL = Detection Limit
Q = Surrogate failure
ND = Not detected at or above the DL
N = Recovery is out of criteria
P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
L = LCS/LCSD failure
H = Out of holding time
W = Reported on wet weight basis
S = MS/MSD failure

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PFAS by LC/MS/MS

Client: **Arcadis U.S., Inc.**		Laboratory ID: **WI11005-003**
Description: **SB-OS-KG312_23-27**		Matrix: **Aqueous**
Date Sampled: **09/08/2021 1635**	Project Name: **Racer Lansing**	
Date Received: **09/11/2021**	Project Number: **30075941.03100**	

Surrogate	Q	Run 1 % Recovery	Acceptance Limits	Q	Run 2 % Recovery	Acceptance Limits
13C7_PFUdA		84	50-150		71	50-150
13C8_PFOA		106	50-150		86	50-150
13C8_PFOS		84	50-150		79	50-150
13C8_PFOSA		92	50-150		77	50-150
13C9_PFNA		100	50-150		80	50-150
d5-EtFOSAA		76	50-150		66	50-150
d3-MeFOSAA		84	50-150		64	50-150

LOQ = Limit of Quantitation	B = Detected in the method blank	E = Quantitation of compound exceeded the calibration range	DL = Detection Limit	Q = Surrogate failure
ND = Not detected at or above the DL	N = Recovery is out of criteria	P = The RPD between two GC columns exceeds 40%	J = Estimated result < LOQ and ≥ DL	L = LCS/LCSD failure
H = Out of holding time	W = Reported on wet weight basis			S = MS/MSD failure

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PFAS by LC/MS/MS

Client: **Arcadis U.S., Inc.** Laboratory ID: **WI11005-003**

Description: **SB-OS-KG312_23-27** Matrix: **Aqueous**

Date Sampled: **09/08/2021 1635** Project Name: **Racer Lansing**

Date Received: **09/11/2021** Project Number: **30075941.03100**

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	SOP SPE	PFAS by ID SOP QSM B-15	1	09/30/2021 1641	JJG	09/29/2021 1247	16970
2	SOP SPE	PFAS by ID SOP QSM B-15	1	10/06/2021 1556	JJG	10/05/2021 1104	17652

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
9-chlorohexadecafluoro-3-oxanone-1-sulfonic acid (9Cl-PF3ONS)	756426-58-1	PFAS by ID SOP	ND		6.9	1.7	ng/L	2
11-chloroeicosafluoro-3-oxaundecane-1-sulfonic acid (11Cl-PF3...)	763051-92-9	PFAS by ID SOP	ND		6.9	1.7	ng/L	2
1H, 1H, 2H, 2H-perfluorodecane sulfonic acid (8:2 FTS)	39108-34-4	PFAS by ID SOP	ND		6.9	1.7	ng/L	2
1H, 1H, 2H, 2H-perfluorooctane sulfonic acid (6:2 FTS)	27619-97-2	PFAS by ID SOP	ND		6.9	1.7	ng/L	2
1H,1H,2H,2H-perfluorohexane sulfonic acid (4:2 FTS)	757124-72-4	PFAS by ID SOP	ND		6.9	1.7	ng/L	2
Hexafluoropropylene oxide dimer acid (GenX)	13252-13-6	PFAS by ID SOP	ND		6.9	1.7	ng/L	2
4,8-dioxa-3H-perfluorononanoic acid (ADONA)	919005-14-4	PFAS by ID SOP	ND		6.9	1.7	ng/L	2
N-ethylperfluoro-1-octanesulfonamidoacetic acid (EtFOSAA)	2991-50-6	PFAS by ID SOP	ND		6.9	1.7	ng/L	2
N-methylperfluoro-1-octanesulfonamidoacetic acid (MeFOSAA)	2355-31-9	PFAS by ID SOP	ND		6.9	1.7	ng/L	2
Perfluoro-1-butanesulfonic acid (PFBS)	375-73-5	PFAS by ID SOP	ND		3.4	0.86	ng/L	2
Perfluoro-1-decanesulfonic acid (PFDS)	335-77-3	PFAS by ID SOP	ND		3.4	0.86	ng/L	2
Perfluoro-1-heptanesulfonic acid (PFHpS)	375-92-8	PFAS by ID SOP	ND		3.4	0.86	ng/L	2
Perfluoro-1-nonanesulfonic acid (PFNS)	68259-12-1	PFAS by ID SOP	ND		3.4	0.86	ng/L	2
Perfluoro-1-octanesulfonamide (PFOSA)	754-91-6	PFAS by ID SOP	ND		3.4	0.86	ng/L	2
Perfluoro-1-pentanesulfonic acid (PFPeS)	2706-91-4	PFAS by ID SOP	ND		3.4	0.86	ng/L	2
Perfluorohexanesulfonic acid (PFHxS)	355-46-4	PFAS by ID SOP	ND		3.4	0.86	ng/L	2
Perfluoro-n-butanoic acid (PFBA)	**375-22-4**	**PFAS by ID SOP**	**4.1**		**3.4**	**0.86**	**ng/L**	**2**
Perfluoro-n-decanoic acid (PFDA)	335-76-2	PFAS by ID SOP	ND		3.4	0.86	ng/L	2
Perfluoro-n-dodecanoic acid (PFDoA)	307-55-1	PFAS by ID SOP	ND		3.4	0.86	ng/L	2
Perfluoro-n-heptanoic acid (PFHpA)	375-85-9	PFAS by ID SOP	ND		3.4	0.86	ng/L	2
Perfluoro-n-hexanoic acid (PFHxA)	**307-24-4**	**PFAS by ID SOP**	**2.3**	**J**	**3.4**	**0.86**	**ng/L**	**2**
Perfluoro-n-nonanoic acid (PFNA)	375-95-1	PFAS by ID SOP	ND		3.4	0.86	ng/L	2
Perfluoro-n-octanoic acid (PFOA)	335-67-1	PFAS by ID SOP	ND		3.4	0.86	ng/L	2
Perfluoro-n-pentanoic acid (PFPeA)	**2706-90-3**	**PFAS by ID SOP**	**4.9**		**3.4**	**0.86**	**ng/L**	**2**
Perfluoro-n-tetradecanoic acid (PFTeDA)	376-06-7	PFAS by ID SOP	ND		3.4	0.86	ng/L	2
Perfluoro-n-tridecanoic acid (PFTrDA)	72629-94-8	PFAS by ID SOP	ND		3.4	0.86	ng/L	2
Perfluoro-n-undecanoic acid (PFUdA)	2058-94-8	PFAS by ID SOP	ND		3.4	0.86	ng/L	2
Perfluorooctanesulfonic acid (PFOS)	1763-23-1	PFAS by ID SOP	ND		3.4	0.86	ng/L	2

Surrogate	Q	Run 1 % Recovery	Acceptance Limits	Q	Run 2 % Recovery	Acceptance Limits
13C2_4:2FTS		121	50-150		94	50-150
13C2_6:2FTS	N	230	50-150		98	50-150
13C2_8:2FTS		97	50-150		77	50-150
13C2_PFDoA		66	50-150		61	50-150
13C2_PFTeDA		72	50-150		60	50-150
13C3_PFBS		94	50-150		80	50-150
13C3_PFHxS		92	50-150		82	50-150
13C3-HFPO-DA		96	50-150		89	50-150
13C4_PFBA		88	50-150		78	50-150
13C4_PFHpA		96	50-150		82	50-150
13C5_PFHxA		97	50-150		82	50-150
13C5_PFPeA		101	50-150		85	50-150
13C6_PFDA		87	50-150		71	50-150

LOQ = Limit of Quantitation
B = Detected in the method blank
E = Quantitation of compound exceeded the calibration range
DL = Detection Limit
Q = Surrogate failure
ND = Not detected at or above the DL
N = Recovery is out of criteria
P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
L = LCS/LCSD failure
H = Out of holding time
W = Reported on wet weight basis
S = MS/MSD failure

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PFAS by LC/MS/MS

Client: **Arcadis U.S., Inc.**		Laboratory ID: **WI11005-003**
Description: **SB-OS-KG312_23-27**		Matrix: **Aqueous**
Date Sampled: **09/08/2021 1635**	Project Name: **Racer Lansing**	
Date Received: **09/11/2021**	Project Number: **30075941.03100**	

Surrogate	Q	Run 1 % Recovery	Acceptance Limits	Q	Run 2 % Recovery	Acceptance Limits
13C7_PFUdA		84	50-150		71	50-150
13C8_PFOA		106	50-150		86	50-150
13C8_PFOS		84	50-150		79	50-150
13C8_PFOSA		92	50-150		77	50-150
13C9_PFNA		100	50-150		80	50-150
d5-EtFOSAA		76	50-150		66	50-150
d3-MeFOSAA		84	50-150		64	50-150

LOQ = Limit of Quantitation	B = Detected in the method blank	E = Quantitation of compound exceeded the calibration range	DL = Detection Limit	Q = Surrogate failure
ND = Not detected at or above the DL	N = Recovery is out of criteria	P = The RPD between two GC columns exceeds 40%	J = Estimated result < LOQ and ≥ DL	L = LCS/LCSD failure
H = Out of holding time	W = Reported on wet weight basis			S = MS/MSD failure

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PFAS by LC/MS/MS

Client: **Arcadis U.S., Inc.** Laboratory ID: **WI11005-004**

Description: **SB-OS-LI335_14-18** Matrix: **Aqueous**

Date Sampled: **09/09/2021 1105** Project Name: **Racer Lansing**

Date Received: **09/11/2021** Project Number: **30075941.03100**

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	SOP SPE	PFAS by ID SOP QSM B-15	1	09/30/2021 1651	JJG	09/29/2021 1247	16970

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
9-chlorohexadecafluoro-3-oxanone-1-sulfonic acid (9Cl-PF3ONS)	756426-58-1	PFAS by ID SOP	ND		7.0	1.7	ng/L	1
11-chloroeicosafluoro-3-oxaundecane-1-sulfonic acid (11Cl-PF3...)	763051-92-9	PFAS by ID SOP	ND		7.0	1.7	ng/L	1
1H, 1H, 2H, 2H-perfluorodecane sulfonic acid (8:2 FTS)	39108-34-4	PFAS by ID SOP	ND		7.0	1.7	ng/L	1
1H, 1H, 2H, 2H-perfluorooctane sulfonic acid (6:2 FTS)	27619-97-2	PFAS by ID SOP	ND	Q	7.0	1.7	ng/L	1
1H,1H,2H,2H-perfluorohexane sulfonic acid (4:2 FTS)	757124-72-4	PFAS by ID SOP	ND	Q	7.0	1.7	ng/L	1
Hexafluoropropylene oxide dimer acid (GenX)	13252-13-6	PFAS by ID SOP	ND		7.0	1.7	ng/L	1
4,8-dioxa-3H-perfluorononanoic acid (ADONA)	919005-14-4	PFAS by ID SOP	ND		7.0	1.7	ng/L	1
N-ethylperfluoro-1-octanesulfonamidoacetic acid (EtFOSAA)	2991-50-6	PFAS by ID SOP	ND		7.0	1.7	ng/L	1
N-methylperfluoro-1-octanesulfonamidoacetic acid (MeFOSAA)	2355-31-9	PFAS by ID SOP	ND		7.0	1.7	ng/L	1
Perfluoro-1-butanesulfonic acid (PFBS)	375-73-5	PFAS by ID SOP	ND		3.5	0.87	ng/L	1
Perfluoro-1-decanesulfonic acid (PFDS)	335-77-3	PFAS by ID SOP	ND		3.5	0.87	ng/L	1
Perfluoro-1-heptanesulfonic acid (PFHpS)	375-92-8	PFAS by ID SOP	ND		3.5	0.87	ng/L	1
Perfluoro-1-nonanesulfonic acid (PFNS)	68259-12-1	PFAS by ID SOP	ND		3.5	0.87	ng/L	1
Perfluoro-1-octanesulfonamide (PFOSA)	754-91-6	PFAS by ID SOP	ND		3.5	0.87	ng/L	1
Perfluoro-1-pentanesulfonic acid (PFPeS)	2706-91-4	PFAS by ID SOP	ND		3.5	0.87	ng/L	1
Perfluorohexanesulfonic acid (PFHxS)	355-46-4	PFAS by ID SOP	ND		3.5	0.87	ng/L	1
Perfluoro-n-butanoic acid (PFBA)	**375-22-4**	**PFAS by ID SOP**	**4.2**		**3.5**	**0.87**	**ng/L**	**1**
Perfluoro-n-decanoic acid (PFDA)	335-76-2	PFAS by ID SOP	ND		3.5	0.87	ng/L	1
Perfluoro-n-dodecanoic acid (PFDoA)	307-55-1	PFAS by ID SOP	ND		3.5	0.87	ng/L	1
Perfluoro-n-heptanoic acid (PFHpA)	375-85-9	PFAS by ID SOP	ND		3.5	0.87	ng/L	1
Perfluoro-n-hexanoic acid (PFHxA)	**307-24-4**	**PFAS by ID SOP**	**1.3**	**J**	**3.5**	**0.87**	**ng/L**	**1**
Perfluoro-n-nonanoic acid (PFNA)	375-95-1	PFAS by ID SOP	ND		3.5	0.87	ng/L	1
Perfluoro-n-octanoic acid (PFOA)	335-67-1	PFAS by ID SOP	ND		3.5	0.87	ng/L	1
Perfluoro-n-pentanoic acid (PFPeA)	**2706-90-3**	**PFAS by ID SOP**	**2.6**	**J**	**3.5**	**0.87**	**ng/L**	**1**
Perfluoro-n-tetradecanoic acid (PFTeDA)	376-06-7	PFAS by ID SOP	ND		3.5	0.87	ng/L	1
Perfluoro-n-tridecanoic acid (PFTrDA)	72629-94-8	PFAS by ID SOP	ND		3.5	0.87	ng/L	1
Perfluoro-n-undecanoic acid (PFUdA)	2058-94-8	PFAS by ID SOP	ND		3.5	0.87	ng/L	1
Perfluorooctanesulfonic acid (PFOS)	1763-23-1	PFAS by ID SOP	ND		3.5	0.87	ng/L	1

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
13C2_4:2FTS	N	188	50-150
13C2_6:2FTS	N	237	50-150
13C2_8:2FTS		96	50-150
13C2_PFDoA		67	50-150
13C2_PFTeDA		70	50-150
13C3_PFBS		90	50-150
13C3_PFHxS		97	50-150
13C3-HFPO-DA		90	50-150
13C4_PFBA		63	50-150
13C4_PFHpA		94	50-150
13C5_PFHxA		96	50-150
13C5_PFPeA		89	50-150
13C6_PFDA		88	50-150
13C7_PFUdA		84	50-150

LOQ = Limit of Quantitation
B = Detected in the method blank
E = Quantitation of compound exceeded the calibration range
DL = Detection Limit
Q = Surrogate failure
ND = Not detected at or above the DL
N = Recovery is out of criteria
P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
L = LCS/LCSD failure
H = Out of holding time
W = Reported on wet weight basis
S = MS/MSD failure

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PFAS by LC/MS/MS

Client: **Arcadis U.S., Inc.**		Laboratory ID: **WI11005-004**
Description: **SB-OS-LI335_14-18**		Matrix: **Aqueous**
Date Sampled: **09/09/2021 1105**	Project Name: **Racer Lansing**	
Date Received: **09/11/2021**	Project Number: **30075941.03100**	

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
13C8_PFOA		103	50-150
13C8_PFOS		84	50-150
13C8_PFOSA		91	50-150
13C9_PFNA		91	50-150
d5-EtFOSAA		81	50-150
d3-MeFOSAA		82	50-150

LOQ = Limit of Quantitation	B = Detected in the method blank	E = Quantitation of compound exceeded the calibration range	DL = Detection Limit	Q = Surrogate failure
ND = Not detected at or above the DL	N = Recovery is out of criteria	P = The RPD between two GC columns exceeds 40%	J = Estimated result < LOQ and ≥ DL	L = LCS/LCSD failure
H = Out of holding time	W = Reported on wet weight basis			S = MS/MSD failure

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PFAS by LC/MS/MS

Client: **Arcadis U.S., Inc.** Laboratory ID: **WI11005-005**

Description: **SB-OS-QM379_8-12** Matrix: **Aqueous**

Date Sampled: **09/09/2021 1510** Project Name: **Racer Lansing**

Date Received: **09/11/2021** Project Number: **30075941.03100**

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	SOP SPE	PFAS by ID SOP QSM B-15	1	09/30/2021 1652	MMM	09/29/2021 1219	16953

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
9-chlorohexadecafluoro-3-oxanone-1-sulfonic acid (9Cl-PF3ONS)	756426-58-1	PFAS by ID SOP	ND		6.9	1.7	ng/L	1
11-chloroeicosafluoro-3-oxaundecane-1-sulfonic acid (11Cl-PF3...)	763051-92-9	PFAS by ID SOP	ND		6.9	1.7	ng/L	1
1H, 1H, 2H, 2H-perfluorodecane sulfonic acid (8:2 FTS)	39108-34-4	PFAS by ID SOP	ND		6.9	1.7	ng/L	1
1H, 1H, 2H, 2H-perfluorooctane sulfonic acid (6:2 FTS)	27619-97-2	PFAS by ID SOP	ND	L	6.9	1.7	ng/L	1
1H,1H,2H,2H-perfluorohexane sulfonic acid (4:2 FTS)	757124-72-4	PFAS by ID SOP	ND	Q	6.9	1.7	ng/L	1
Hexafluoropropylene oxide dimer acid (GenX)	13252-13-6	PFAS by ID SOP	ND		6.9	1.7	ng/L	1
4,8-dioxa-3H-perfluorononanoic acid (ADONA)	919005-14-4	PFAS by ID SOP	ND		6.9	1.7	ng/L	1
N-ethylperfluoro-1-octanesulfonamidoacetic acid (EtFOSAA)	2991-50-6	PFAS by ID SOP	ND		6.9	1.7	ng/L	1
N-methylperfluoro-1-octanesulfonamidoacetic acid (MeFOSAA)	2355-31-9	PFAS by ID SOP	ND		6.9	1.7	ng/L	1
Perfluoro-1-butanesulfonic acid (PFBS)	**375-73-5**	**PFAS by ID SOP**	**1.9**	**J**	**3.4**	**0.86**	**ng/L**	**1**
Perfluoro-1-decanesulfonic acid (PFDS)	335-77-3	PFAS by ID SOP	ND		3.4	0.86	ng/L	1
Perfluoro-1-heptanesulfonic acid (PFHpS)	375-92-8	PFAS by ID SOP	ND		3.4	0.86	ng/L	1
Perfluoro-1-nonanesulfonic acid (PFNS)	68259-12-1	PFAS by ID SOP	ND		3.4	0.86	ng/L	1
Perfluoro-1-octanesulfonamide (PFOSA)	754-91-6	PFAS by ID SOP	ND		3.4	0.86	ng/L	1
Perfluoro-1-pentanesulfonic acid (PFPeS)	2706-91-4	PFAS by ID SOP	ND		3.4	0.86	ng/L	1
Perfluorohexanesulfonic acid (PFHxS)	**355-46-4**	**PFAS by ID SOP**	**2.7**	**J**	**3.4**	**0.86**	**ng/L**	**1**
Perfluoro-n-butanoic acid (PFBA)	**375-22-4**	**PFAS by ID SOP**	**5.0**		**3.4**	**0.86**	**ng/L**	**1**
Perfluoro-n-decanoic acid (PFDA)	335-76-2	PFAS by ID SOP	ND		3.4	0.86	ng/L	1
Perfluoro-n-dodecanoic acid (PFDoA)	307-55-1	PFAS by ID SOP	ND	L	3.4	0.86	ng/L	1
Perfluoro-n-heptanoic acid (PFHpA)	**375-85-9**	**PFAS by ID SOP**	**1.3**	**J**	**3.4**	**0.86**	**ng/L**	**1**
Perfluoro-n-hexanoic acid (PFHxA)	**307-24-4**	**PFAS by ID SOP**	**2.1**	**J**	**3.4**	**0.86**	**ng/L**	**1**
Perfluoro-n-nonanoic acid (PFNA)	375-95-1	PFAS by ID SOP	ND		3.4	0.86	ng/L	1
Perfluoro-n-octanoic acid (PFOA)	**335-67-1**	**PFAS by ID SOP**	**3.4**		**3.4**	**0.86**	**ng/L**	**1**
Perfluoro-n-pentanoic acid (PFPeA)	**2706-90-3**	**PFAS by ID SOP**	**2.4**	**J**	**3.4**	**0.86**	**ng/L**	**1**
Perfluoro-n-tetradecanoic acid (PFTeDA)	376-06-7	PFAS by ID SOP	ND		3.4	0.86	ng/L	1
Perfluoro-n-tridecanoic acid (PFTrDA)	72629-94-8	PFAS by ID SOP	ND		3.4	0.86	ng/L	1
Perfluoro-n-undecanoic acid (PFUdA)	2058-94-8	PFAS by ID SOP	ND		3.4	0.86	ng/L	1
Perfluorooctanesulfonic acid (PFOS)	**1763-23-1**	**PFAS by ID SOP**	**1.6**	**J**	**3.4**	**0.86**	**ng/L**	**1**

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
13C2_4:2FTS	N	155	50-150
13C2_6:2FTS		139	50-150
13C2_8:2FTS		100	50-150
13C2_PFDoA		93	50-150
13C2_PFTeDA		92	50-150
13C3_PFBS		105	50-150
13C3_PFHxS		95	50-150
13C3-HFPO-DA		97	50-150
13C4_PFBA		85	50-150
13C4_PFHpA		100	50-150
13C5_PFHxA		98	50-150
13C5_PFPeA		100	50-150
13C6_PFDA		97	50-150
13C7_PFUdA		94	50-150

LOQ = Limit of Quantitation
B = Detected in the method blank
E = Quantitation of compound exceeded the calibration range
DL = Detection Limit
Q = Surrogate failure
ND = Not detected at or above the DL
N = Recovery is out of criteria
P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
L = LCS/LCSD failure
H = Out of holding time
W = Reported on wet weight basis
S = MS/MSD failure

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PFAS by LC/MS/MS

Client: **Arcadis U.S., Inc.**		Laboratory ID: **WI11005-005**
Description: **SB-OS-QM379_8-12**		Matrix: **Aqueous**
Date Sampled: **09/09/2021 1510**	Project Name: **Racer Lansing**	
Date Received: **09/11/2021**	Project Number: **30075941.03100**	

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
13C8_PFOA		113	50-150
13C8_PFOS		90	50-150
13C8_PFOSA		102	50-150
13C9_PFNA		100	50-150
d5-EtFOSAA		92	50-150
d3-MeFOSAA		102	50-150

LOQ = Limit of Quantitation	B = Detected in the method blank	E = Quantitation of compound exceeded the calibration range	DL = Detection Limit	Q = Surrogate failure
ND = Not detected at or above the DL	N = Recovery is out of criteria	P = The RPD between two GC columns exceeds 40%	J = Estimated result < LOQ and ≥ DL	L = LCS/LCSD failure
H = Out of holding time	W = Reported on wet weight basis			S = MS/MSD failure

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PFAS by LC/MS/MS

Client: **Arcadis U.S., Inc.** Laboratory ID: **WI11005-006**

Description: **SB-OS-QM379_25-29** Matrix: **Aqueous**

Date Sampled: **09/09/2021 1630** Project Name: **Racer Lansing**

Date Received: **09/11/2021** Project Number: **30075941.03100**

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	SOP SPE	PFAS by ID SOP QSM B-15	1	10/01/2021 1805	MMM	09/30/2021 1134	17150

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
9-chlorohexadecafluoro-3-oxanone-1-sulfonic acid (9Cl-PF3ONS)	756426-58-1	PFAS by ID SOP	ND		8.8	2.2	ng/L	1
11-chloroeicosafluoro-3-oxaundecane-1-sulfonic acid (11Cl-PF3...)	763051-92-9	PFAS by ID SOP	ND		8.8	2.2	ng/L	1
1H, 1H, 2H, 2H-perfluorodecane sulfonic acid (8:2 FTS)	39108-34-4	PFAS by ID SOP	ND		8.8	2.2	ng/L	1
1H, 1H, 2H, 2H-perfluorooctane sulfonic acid (6:2 FTS)	27619-97-2	PFAS by ID SOP	ND		8.8	2.2	ng/L	1
1H,1H,2H,2H-perfluorohexane sulfonic acid (4:2 FTS)	757124-72-4	PFAS by ID SOP	ND		8.8	2.2	ng/L	1
Hexafluoropropylene oxide dimer acid (GenX)	13252-13-6	PFAS by ID SOP	ND		8.8	2.2	ng/L	1
4,8-dioxa-3H-perfluorononanoic acid (ADONA)	919005-14-4	PFAS by ID SOP	ND		8.8	2.2	ng/L	1
N-ethylperfluoro-1-octanesulfonamidoacetic acid (EtFOSAA)	2991-50-6	PFAS by ID SOP	ND		8.8	2.2	ng/L	1
N-methylperfluoro-1-octanesulfonamidoacetic acid (MeFOSAA)	2355-31-9	PFAS by ID SOP	ND		8.8	2.2	ng/L	1
Perfluoro-1-butanesulfonic acid (PFBS)	**375-73-5**	**PFAS by ID SOP**	**1.2**	**J**	**4.4**	**1.1**	**ng/L**	**1**
Perfluoro-1-decanesulfonic acid (PFDS)	335-77-3	PFAS by ID SOP	ND		4.4	1.1	ng/L	1
Perfluoro-1-heptanesulfonic acid (PFHpS)	375-92-8	PFAS by ID SOP	ND		4.4	1.1	ng/L	1
Perfluoro-1-nonanesulfonic acid (PFNS)	68259-12-1	PFAS by ID SOP	ND		4.4	1.1	ng/L	1
Perfluoro-1-octanesulfonamide (PFOSA)	754-91-6	PFAS by ID SOP	ND		4.4	1.1	ng/L	1
Perfluoro-1-pentanesulfonic acid (PFPeS)	2706-91-4	PFAS by ID SOP	ND		4.4	1.1	ng/L	1
Perfluorohexanesulfonic acid (PFHxS)	355-46-4	PFAS by ID SOP	ND		4.4	1.1	ng/L	1
Perfluoro-n-butanoic acid (PFBA)	375-22-4	PFAS by ID SOP	ND		4.4	1.1	ng/L	1
Perfluoro-n-decanoic acid (PFDA)	335-76-2	PFAS by ID SOP	ND		4.4	1.1	ng/L	1
Perfluoro-n-dodecanoic acid (PFDoA)	307-55-1	PFAS by ID SOP	ND	Q	4.4	1.1	ng/L	1
Perfluoro-n-heptanoic acid (PFHpA)	375-85-9	PFAS by ID SOP	ND		4.4	1.1	ng/L	1
Perfluoro-n-hexanoic acid (PFHxA)	307-24-4	PFAS by ID SOP	ND		4.4	1.1	ng/L	1
Perfluoro-n-nonanoic acid (PFNA)	375-95-1	PFAS by ID SOP	ND		4.4	1.1	ng/L	1
Perfluoro-n-octanoic acid (PFOA)	335-67-1	PFAS by ID SOP	ND		4.4	1.1	ng/L	1
Perfluoro-n-pentanoic acid (PFPeA)	2706-90-3	PFAS by ID SOP	ND		4.4	1.1	ng/L	1
Perfluoro-n-tetradecanoic acid (PFTeDA)	376-06-7	PFAS by ID SOP	ND	Q	4.4	1.1	ng/L	1
Perfluoro-n-tridecanoic acid (PFTrDA)	72629-94-8	PFAS by ID SOP	ND	Q	4.4	1.1	ng/L	1
Perfluoro-n-undecanoic acid (PFUdA)	2058-94-8	PFAS by ID SOP	ND		4.4	1.1	ng/L	1
Perfluorooctanesulfonic acid (PFOS)	**1763-23-1**	**PFAS by ID SOP**	**1.3**	**J**	**4.4**	**1.1**	**ng/L**	**1**

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
13C2_4:2FTS		90	50-150
13C2_6:2FTS		96	50-150
13C2_8:2FTS		71	50-150
13C2_PFDoA	N	49	50-150
13C2_PFTeDA	N	45	50-150
13C3_PFBS		68	50-150
13C3_PFHxS		53	50-150
13C3-HFPO-DA		74	50-150
13C4_PFBA		71	50-150
13C4_PFHpA		71	50-150
13C5_PFHxA		76	50-150
13C5_PFPeA		75	50-150
13C6_PFDA		59	50-150
13C7_PFUdA		57	50-150

LOQ = Limit of Quantitation
B = Detected in the method blank
E = Quantitation of compound exceeded the calibration range
DL = Detection Limit
Q = Surrogate failure
ND = Not detected at or above the DL
N = Recovery is out of criteria
P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
L = LCS/LCSD failure
H = Out of holding time
W = Reported on wet weight basis
S = MS/MSD failure

PFAS by LC/MS/MS

Client: **Arcadis U.S., Inc.**		Laboratory ID: **WI11005-006**
Description: **SB-OS-QM379_25-29**		Matrix: **Aqueous**
Date Sampled: **09/09/2021 1630**	Project Name: **Racer Lansing**	
Date Received: **09/11/2021**	Project Number: **30075941.03100**	

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
13C8_PFOA		70	50-150
13C8_PFOS		62	50-150
13C8_PFOSA		77	50-150
13C9_PFNA		67	50-150
d5-EtFOSAA		57	50-150
d3-MeFOSAA		56	50-150

LOQ = Limit of Quantitation	B = Detected in the method blank	E = Quantitation of compound exceeded the calibration range	DL = Detection Limit	Q = Surrogate failure
ND = Not detected at or above the DL	N = Recovery is out of criteria	P = The RPD between two GC columns exceeds 40%	J = Estimated result < LOQ and ≥ DL	L = LCS/LCSD failure
H = Out of holding time	W = Reported on wet weight basis			S = MS/MSD failure

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PFAS by LC/MS/MS

Client: **Arcadis U.S., Inc.** Laboratory ID: **WI11005-007**

Description: **SB-OS-RO398_6-10** Matrix: **Aqueous**

Date Sampled: **09/10/2021 0955** Project Name: **Racer Lansing**

Date Received: **09/11/2021** Project Number: **30075941.03100**

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	SOP SPE	PFAS by ID SOP QSM B-15	1	10/01/2021 1816	MMM	09/30/2021 1134	17150

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
9-chlorohexadecafluoro-3-oxanone-1-sulfonic acid (9Cl-PF3ONS)	756426-58-1	PFAS by ID SOP	ND		7.3	1.8	ng/L	1
11-chloroeicosafluoro-3-oxaundecane-1-sulfonic acid (11Cl-PF3...)	763051-92-9	PFAS by ID SOP	ND		7.3	1.8	ng/L	1
1H, 1H, 2H, 2H-perfluorodecane sulfonic acid (8:2 FTS)	39108-34-4	PFAS by ID SOP	ND		7.3	1.8	ng/L	1
1H, 1H, 2H, 2H-perfluorooctane sulfonic acid (6:2 FTS)	27619-97-2	PFAS by ID SOP	ND		7.3	1.8	ng/L	1
1H,1H,2H,2H-perfluorohexane sulfonic acid (4:2 FTS)	757124-72-4	PFAS by ID SOP	ND		7.3	1.8	ng/L	1
Hexafluoropropylene oxide dimer acid (GenX)	13252-13-6	PFAS by ID SOP	ND		7.3	1.8	ng/L	1
4,8-dioxa-3H-perfluorononanoic acid (ADONA)	919005-14-4	PFAS by ID SOP	ND		7.3	1.8	ng/L	1
N-ethylperfluoro-1-octanesulfonamidoacetic acid (EtFOSAA)	2991-50-6	PFAS by ID SOP	ND		7.3	1.8	ng/L	1
N-methylperfluoro-1-octanesulfonamidoacetic acid (MeFOSAA)	2355-31-9	PFAS by ID SOP	ND		7.3	1.8	ng/L	1
Perfluoro-1-butanesulfonic acid (PFBS)	**375-73-5**	**PFAS by ID SOP**	**2.7**	**J**	**3.6**	**0.91**	**ng/L**	**1**
Perfluoro-1-decanesulfonic acid (PFDS)	335-77-3	PFAS by ID SOP	ND		3.6	0.91	ng/L	1
Perfluoro-1-heptanesulfonic acid (PFHpS)	375-92-8	PFAS by ID SOP	ND		3.6	0.91	ng/L	1
Perfluoro-1-nonanesulfonic acid (PFNS)	68259-12-1	PFAS by ID SOP	ND		3.6	0.91	ng/L	1
Perfluoro-1-octanesulfonamide (PFOSA)	754-91-6	PFAS by ID SOP	ND		3.6	0.91	ng/L	1
Perfluoro-1-pentanesulfonic acid (PFPeS)	2706-91-4	PFAS by ID SOP	ND		3.6	0.91	ng/L	1
Perfluorohexanesulfonic acid (PFHxS)	355-46-4	PFAS by ID SOP	ND		3.6	0.91	ng/L	1
Perfluoro-n-butanoic acid (PFBA)	**375-22-4**	**PFAS by ID SOP**	**5.5**		**3.6**	**0.91**	**ng/L**	**1**
Perfluoro-n-decanoic acid (PFDA)	335-76-2	PFAS by ID SOP	ND		3.6	0.91	ng/L	1
Perfluoro-n-dodecanoic acid (PFDoA)	307-55-1	PFAS by ID SOP	ND		3.6	0.91	ng/L	1
Perfluoro-n-heptanoic acid (PFHpA)	375-85-9	PFAS by ID SOP	ND		3.6	0.91	ng/L	1
Perfluoro-n-hexanoic acid (PFHxA)	**307-24-4**	**PFAS by ID SOP**	**1.4**	**J**	**3.6**	**0.91**	**ng/L**	**1**
Perfluoro-n-nonanoic acid (PFNA)	375-95-1	PFAS by ID SOP	ND		3.6	0.91	ng/L	1
Perfluoro-n-octanoic acid (PFOA)	**335-67-1**	**PFAS by ID SOP**	**2.1**	**J**	**3.6**	**0.91**	**ng/L**	**1**
Perfluoro-n-pentanoic acid (PFPeA)	**2706-90-3**	**PFAS by ID SOP**	**0.97**	**J**	**3.6**	**0.91**	**ng/L**	**1**
Perfluoro-n-tetradecanoic acid (PFTeDA)	376-06-7	PFAS by ID SOP	ND		3.6	0.91	ng/L	1
Perfluoro-n-tridecanoic acid (PFTrDA)	72629-94-8	PFAS by ID SOP	ND		3.6	0.91	ng/L	1
Perfluoro-n-undecanoic acid (PFUdA)	2058-94-8	PFAS by ID SOP	ND		3.6	0.91	ng/L	1
Perfluorooctanesulfonic acid (PFOS)	**1763-23-1**	**PFAS by ID SOP**	**2.1**	**J**	**3.6**	**0.91**	**ng/L**	**1**

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
13C2_4:2FTS		127	50-150
13C2_6:2FTS		88	50-150
13C2_8:2FTS		93	50-150
13C2_PFDoA		77	50-150
13C2_PFTeDA		59	50-150
13C3_PFBS		83	50-150
13C3_PFHxS		72	50-150
13C3-HFPO-DA		90	50-150
13C4_PFBA		74	50-150
13C4_PFHpA		87	50-150
13C5_PFHxA		90	50-150
13C5_PFPeA		94	50-150
13C6_PFDA		89	50-150
13C7_PFUdA		74	50-150

LOQ = Limit of Quantitation
B = Detected in the method blank
E = Quantitation of compound exceeded the calibration range
DL = Detection Limit
Q = Surrogate failure
ND = Not detected at or above the DL
N = Recovery is out of criteria
P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
L = LCS/LCSD failure
H = Out of holding time
W = Reported on wet weight basis
S = MS/MSD failure

PFAS by LC/MS/MS

Client: **Arcadis U.S., Inc.**		Laboratory ID: **WI11005-007**
Description: **SB-OS-RO398_6-10**		Matrix: **Aqueous**
Date Sampled: **09/10/2021 0955**	Project Name: **Racer Lansing**	
Date Received: **09/11/2021**	Project Number: **30075941.03100**	

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
13C8_PFOA		90	50-150
13C8_PFOS		80	50-150
13C8_PFOSA		107	50-150
13C9_PFNA		86	50-150
d5-EtFOSAA		89	50-150
d3-MeFOSAA		91	50-150

LOQ = Limit of Quantitation	B = Detected in the method blank	E = Quantitation of compound exceeded the calibration range	DL = Detection Limit	Q = Surrogate failure
ND = Not detected at or above the DL	N = Recovery is out of criteria	P = The RPD between two GC columns exceeds 40%	J = Estimated result < LOQ and ≥ DL	L = LCS/LCSD failure
H = Out of holding time	W = Reported on wet weight basis			S = MS/MSD failure

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PFAS by LC/MS/MS

Client: **Arcadis U.S., Inc.** Laboratory ID: **WI11005-008**

Description: **SB-OS-SW386_11-15** Matrix: **Aqueous**

Date Sampled: **09/10/2021 1150** Project Name: **Racer Lansing**

Date Received: **09/11/2021** Project Number: **30075941.03100**

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	SOP SPE	PFAS by ID SOP QSM B-15	1	10/01/2021 1826	MMM	09/30/2021 1134	17150

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
9-chlorohexadecafluoro-3-oxanone-1-sulfonic acid (9Cl-PF3ONS)	756426-58-1	PFAS by ID SOP	ND		6.9	1.7	ng/L	1
11-chloroeicosafluoro-3-oxaundecane-1-sulfonic acid (11Cl-PF3...)	763051-92-9	PFAS by ID SOP	ND		6.9	1.7	ng/L	1
1H, 1H, 2H, 2H-perfluorodecane sulfonic acid (8:2 FTS)	39108-34-4	PFAS by ID SOP	ND		6.9	1.7	ng/L	1
1H, 1H, 2H, 2H-perfluorooctane sulfonic acid (6:2 FTS)	**27619-97-2**	**PFAS by ID SOP**	**20**		**6.9**	**1.7**	**ng/L**	**1**
1H,1H,2H,2H-perfluorohexane sulfonic acid (4:2 FTS)	757124-72-4	PFAS by ID SOP	ND		6.9	1.7	ng/L	1
Hexafluoropropylene oxide dimer acid (GenX)	13252-13-6	PFAS by ID SOP	ND		6.9	1.7	ng/L	1
4,8-dioxa-3H-perfluorononanoic acid (ADONA)	919005-14-4	PFAS by ID SOP	ND		6.9	1.7	ng/L	1
N-ethylperfluoro-1-octanesulfonamidoacetic acid (EtFOSAA)	2991-50-6	PFAS by ID SOP	ND		6.9	1.7	ng/L	1
N-methylperfluoro-1-octanesulfonamidoacetic acid (MeFOSAA)	2355-31-9	PFAS by ID SOP	ND		6.9	1.7	ng/L	1
Perfluoro-1-butanesulfonic acid (PFBS)	**375-73-5**	**PFAS by ID SOP**	**1.7**	**J**	**3.5**	**0.87**	**ng/L**	**1**
Perfluoro-1-decanesulfonic acid (PFDS)	335-77-3	PFAS by ID SOP	ND		3.5	0.87	ng/L	1
Perfluoro-1-heptanesulfonic acid (PFHpS)	375-92-8	PFAS by ID SOP	ND		3.5	0.87	ng/L	1
Perfluoro-1-nonanesulfonic acid (PFNS)	68259-12-1	PFAS by ID SOP	ND		3.5	0.87	ng/L	1
Perfluoro-1-octanesulfonamide (PFOSA)	754-91-6	PFAS by ID SOP	ND		3.5	0.87	ng/L	1
Perfluoro-1-pentanesulfonic acid (PFPeS)	2706-91-4	PFAS by ID SOP	ND		3.5	0.87	ng/L	1
Perfluorohexanesulfonic acid (PFHxS)	**355-46-4**	**PFAS by ID SOP**	**1.4**	**J**	**3.5**	**0.87**	**ng/L**	**1**
Perfluoro-n-butanoic acid (PFBA)	**375-22-4**	**PFAS by ID SOP**	**6.2**		**3.5**	**0.87**	**ng/L**	**1**
Perfluoro-n-decanoic acid (PFDA)	335-76-2	PFAS by ID SOP	ND		3.5	0.87	ng/L	1
Perfluoro-n-dodecanoic acid (PFDoA)	307-55-1	PFAS by ID SOP	ND		3.5	0.87	ng/L	1
Perfluoro-n-heptanoic acid (PFHpA)	**375-85-9**	**PFAS by ID SOP**	**4.0**		**3.5**	**0.87**	**ng/L**	**1**
Perfluoro-n-hexanoic acid (PFHxA)	**307-24-4**	**PFAS by ID SOP**	**6.9**		**3.5**	**0.87**	**ng/L**	**1**
Perfluoro-n-nonanoic acid (PFNA)	375-95-1	PFAS by ID SOP	ND		3.5	0.87	ng/L	1
Perfluoro-n-octanoic acid (PFOA)	**335-67-1**	**PFAS by ID SOP**	**4.8**		**3.5**	**0.87**	**ng/L**	**1**
Perfluoro-n-pentanoic acid (PFPeA)	**2706-90-3**	**PFAS by ID SOP**	**7.1**		**3.5**	**0.87**	**ng/L**	**1**
Perfluoro-n-tetradecanoic acid (PFTeDA)	376-06-7	PFAS by ID SOP	ND		3.5	0.87	ng/L	1
Perfluoro-n-tridecanoic acid (PFTrDA)	72629-94-8	PFAS by ID SOP	ND		3.5	0.87	ng/L	1
Perfluoro-n-undecanoic acid (PFUdA)	2058-94-8	PFAS by ID SOP	ND		3.5	0.87	ng/L	1
Perfluorooctanesulfonic acid (PFOS)	1763-23-1	PFAS by ID SOP	ND		3.5	0.87	ng/L	1

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
13C2_4:2FTS		101	50-150
13C2_6:2FTS		139	50-150
13C2_8:2FTS		91	50-150
13C2_PFDoA		66	50-150
13C2_PFTeDA		62	50-150
13C3_PFBS		79	50-150
13C3_PFHxS		73	50-150
13C3-HFPO-DA		89	50-150
13C4_PFBA		84	50-150
13C4_PFHpA		84	50-150
13C5_PFHxA		90	50-150
13C5_PFPeA		91	50-150
13C6_PFDA		77	50-150
13C7_PFUdA		72	50-150

LOQ = Limit of Quantitation
B = Detected in the method blank
E = Quantitation of compound exceeded the calibration range
DL = Detection Limit
Q = Surrogate failure
ND = Not detected at or above the DL
N = Recovery is out of criteria
P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
L = LCS/LCSD failure
H = Out of holding time
W = Reported on wet weight basis
S = MS/MSD failure

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PFAS by LC/MS/MS

Client: **Arcadis U.S., Inc.**		Laboratory ID: **WI11005-008**
Description: **SB-OS-SW386_11-15**		Matrix: **Aqueous**
Date Sampled: **09/10/2021 1150**	Project Name: **Racer Lansing**	
Date Received: **09/11/2021**	Project Number: **30075941.03100**	

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
13C8_PFOA		87	50-150
13C8_PFOS		82	50-150
13C8_PFOSA		95	50-150
13C9_PFNA		82	50-150
d5-EtFOSAA		81	50-150
d3-MeFOSAA		81	50-150

LOQ = Limit of Quantitation	B = Detected in the method blank	E = Quantitation of compound exceeded the calibration range	DL = Detection Limit	Q = Surrogate failure
ND = Not detected at or above the DL	N = Recovery is out of criteria	P = The RPD between two GC columns exceeds 40%	J = Estimated result < LOQ and ≥ DL	L = LCS/LCSD failure
H = Out of holding time	W = Reported on wet weight basis			S = MS/MSD failure

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PFAS by LC/MS/MS

Client: **Arcadis U.S., Inc.** Laboratory ID: **WI11005-009**

Description: **SB-OS-SW386_20-24** Matrix: **Aqueous**

Date Sampled: **09/10/2021 1225** Project Name: **Racer Lansing**

Date Received: **09/11/2021** Project Number: **30075941.03100**

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	SOP SPE	PFAS by ID SOP QSM B-15	1	10/01/2021 1837	MMM	09/30/2021 1134	17150

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
9-chlorohexadecafluoro-3-oxanone-1-sulfonic acid (9Cl-PF3ONS)	756426-58-1	PFAS by ID SOP	ND		7.9	2.0	ng/L	1
11-chloroeicosafluoro-3-oxaundecane-1-sulfonic acid (11Cl-PF3...)	763051-92-9	PFAS by ID SOP	ND		7.9	2.0	ng/L	1
1H, 1H, 2H, 2H-perfluorodecane sulfonic acid (8:2 FTS)	39108-34-4	PFAS by ID SOP	ND		7.9	2.0	ng/L	1
1H, 1H, 2H, 2H-perfluorooctane sulfonic acid (6:2 FTS)	27619-97-2	PFAS by ID SOP	ND		7.9	2.0	ng/L	1
1H,1H,2H,2H-perfluorohexane sulfonic acid (4:2 FTS)	757124-72-4	PFAS by ID SOP	ND		7.9	2.0	ng/L	1
Hexafluoropropylene oxide dimer acid (GenX)	13252-13-6	PFAS by ID SOP	ND		7.9	2.0	ng/L	1
4,8-dioxa-3H-perfluorononanoic acid (ADONA)	919005-14-4	PFAS by ID SOP	ND		7.9	2.0	ng/L	1
N-ethylperfluoro-1-octanesulfonamidoacetic acid (EtFOSAA)	2991-50-6	PFAS by ID SOP	ND		7.9	2.0	ng/L	1
N-methylperfluoro-1-octanesulfonamidoacetic acid (MeFOSAA)	2355-31-9	PFAS by ID SOP	ND		7.9	2.0	ng/L	1
Perfluoro-1-butanesulfonic acid (PFBS)	**375-73-5**	**PFAS by ID SOP**	**1.1**	**J**	**3.9**	**0.98**	**ng/L**	**1**
Perfluoro-1-decanesulfonic acid (PFDS)	335-77-3	PFAS by ID SOP	ND		3.9	0.98	ng/L	1
Perfluoro-1-heptanesulfonic acid (PFHpS)	375-92-8	PFAS by ID SOP	ND		3.9	0.98	ng/L	1
Perfluoro-1-nonanesulfonic acid (PFNS)	68259-12-1	PFAS by ID SOP	ND		3.9	0.98	ng/L	1
Perfluoro-1-octanesulfonamide (PFOSA)	754-91-6	PFAS by ID SOP	ND		3.9	0.98	ng/L	1
Perfluoro-1-pentanesulfonic acid (PFPeS)	2706-91-4	PFAS by ID SOP	ND		3.9	0.98	ng/L	1
Perfluorohexanesulfonic acid (PFHxS)	355-46-4	PFAS by ID SOP	ND		3.9	0.98	ng/L	1
Perfluoro-n-butanoic acid (PFBA)	**375-22-4**	**PFAS by ID SOP**	**4.5**		**3.9**	**0.98**	**ng/L**	**1**
Perfluoro-n-decanoic acid (PFDA)	335-76-2	PFAS by ID SOP	ND		3.9	0.98	ng/L	1
Perfluoro-n-dodecanoic acid (PFDoA)	307-55-1	PFAS by ID SOP	ND	Q	3.9	0.98	ng/L	1
Perfluoro-n-heptanoic acid (PFHpA)	**375-85-9**	**PFAS by ID SOP**	**1.1**	**J**	**3.9**	**0.98**	**ng/L**	**1**
Perfluoro-n-hexanoic acid (PFHxA)	**307-24-4**	**PFAS by ID SOP**	**2.8**	**J**	**3.9**	**0.98**	**ng/L**	**1**
Perfluoro-n-nonanoic acid (PFNA)	375-95-1	PFAS by ID SOP	ND		3.9	0.98	ng/L	1
Perfluoro-n-octanoic acid (PFOA)	335-67-1	PFAS by ID SOP	ND		3.9	0.98	ng/L	1
Perfluoro-n-pentanoic acid (PFPeA)	**2706-90-3**	**PFAS by ID SOP**	**3.1**	**J**	**3.9**	**0.98**	**ng/L**	**1**
Perfluoro-n-tetradecanoic acid (PFTeDA)	376-06-7	PFAS by ID SOP	ND	Q	3.9	0.98	ng/L	1
Perfluoro-n-tridecanoic acid (PFTrDA)	72629-94-8	PFAS by ID SOP	ND	Q	3.9	0.98	ng/L	1
Perfluoro-n-undecanoic acid (PFUdA)	2058-94-8	PFAS by ID SOP	ND		3.9	0.98	ng/L	1
Perfluorooctanesulfonic acid (PFOS)	1763-23-1	PFAS by ID SOP	ND		3.9	0.98	ng/L	1

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
13C2_4:2FTS		102	50-150
13C2_6:2FTS		96	50-150
13C2_8:2FTS		79	50-150
13C2_PFDoA	N	48	50-150
13C2_PFTeDA	N	37	50-150
13C3_PFBS		80	50-150
13C3_PFHxS		69	50-150
13C3-HFPO-DA		80	50-150
13C4_PFBA		76	50-150
13C4_PFHpA		81	50-150
13C5_PFHxA		85	50-150
13C5_PFPeA		88	50-150
13C6_PFDA		78	50-150
13C7_PFUdA		59	50-150

LOQ = Limit of Quantitation
B = Detected in the method blank
E = Quantitation of compound exceeded the calibration range
DL = Detection Limit
Q = Surrogate failure
ND = Not detected at or above the DL
N = Recovery is out of criteria
P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
L = LCS/LCSD failure
H = Out of holding time
W = Reported on wet weight basis
S = MS/MSD failure

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PFAS by LC/MS/MS

Client: **Arcadis U.S., Inc.**		Laboratory ID: **WI11005-009**
Description: **SB-OS-SW386_20-24**		Matrix: **Aqueous**
Date Sampled: **09/10/2021 1225**	Project Name: **Racer Lansing**	
Date Received: **09/11/2021**	Project Number: **30075941.03100**	

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
13C8_PFOA		79	50-150
13C8_PFOS		75	50-150
13C8_PFOSA		81	50-150
13C9_PFNA		73	50-150
d5-EtFOSAA		52	50-150
d3-MeFOSAA		60	50-150

LOQ = Limit of Quantitation	B = Detected in the method blank	E = Quantitation of compound exceeded the calibration range	DL = Detection Limit	Q = Surrogate failure
ND = Not detected at or above the DL	N = Recovery is out of criteria	P = The RPD between two GC columns exceeds 40%	J = Estimated result < LOQ and ≥ DL	L = LCS/LCSD failure
H = Out of holding time	W = Reported on wet weight basis			S = MS/MSD failure

PFAS by LC/MS/MS

Client: **Arcadis U.S., Inc.** Laboratory ID: **WI11005-010**
Description: **DUP-01_091021** Matrix: **Aqueous**
Date Sampled: **09/10/2021** Project Name: **Racer Lansing**
Date Received: **09/11/2021** Project Number: **30075941.03100**

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	SOP SPE	PFAS by ID SOP QSM B-15	1	10/01/2021 1847	MMM	09/30/2021 1134	17150

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
9-chlorohexadecafluoro-3-oxanone-1-sulfonic acid (9Cl-PF3ONS)	756426-58-1	PFAS by ID SOP	ND		7.1	1.8	ng/L	1
11-chloroeicosafluoro-3-oxaundecane-1-sulfonic acid (11Cl-PF3...)	763051-92-9	PFAS by ID SOP	ND		7.1	1.8	ng/L	1
1H, 1H, 2H, 2H-perfluorodecane sulfonic acid (8:2 FTS)	39108-34-4	PFAS by ID SOP	ND		7.1	1.8	ng/L	1
1H, 1H, 2H, 2H-perfluorooctane sulfonic acid (6:2 FTS)	**27619-97-2**	**PFAS by ID SOP**	**2.3**	**J**	**7.1**	**1.8**	**ng/L**	**1**
1H,1H,2H,2H-perfluorohexane sulfonic acid (4:2 FTS)	757124-72-4	PFAS by ID SOP	ND		7.1	1.8	ng/L	1
Hexafluoropropylene oxide dimer acid (GenX)	13252-13-6	PFAS by ID SOP	ND		7.1	1.8	ng/L	1
4,8-dioxa-3H-perfluorononanoic acid (ADONA)	919005-14-4	PFAS by ID SOP	ND		7.1	1.8	ng/L	1
N-ethylperfluoro-1-octanesulfonamidoacetic acid (EtFOSAA)	2991-50-6	PFAS by ID SOP	ND		7.1	1.8	ng/L	1
N-methylperfluoro-1-octanesulfonamidoacetic acid (MeFOSAA)	2355-31-9	PFAS by ID SOP	ND		7.1	1.8	ng/L	1
Perfluoro-1-butanesulfonic acid (PFBS)	**375-73-5**	**PFAS by ID SOP**	**1.4**	**J**	**3.5**	**0.89**	**ng/L**	**1**
Perfluoro-1-decanesulfonic acid (PFDS)	335-77-3	PFAS by ID SOP	ND		3.5	0.89	ng/L	1
Perfluoro-1-heptanesulfonic acid (PFHpS)	375-92-8	PFAS by ID SOP	ND		3.5	0.89	ng/L	1
Perfluoro-1-nonanesulfonic acid (PFNS)	68259-12-1	PFAS by ID SOP	ND		3.5	0.89	ng/L	1
Perfluoro-1-octanesulfonamide (PFOSA)	754-91-6	PFAS by ID SOP	ND		3.5	0.89	ng/L	1
Perfluoro-1-pentanesulfonic acid (PFPeS)	2706-91-4	PFAS by ID SOP	ND		3.5	0.89	ng/L	1
Perfluorohexanesulfonic acid (PFHxS)	**355-46-4**	**PFAS by ID SOP**	**1.3**	**J**	**3.5**	**0.89**	**ng/L**	**1**
Perfluoro-n-butanoic acid (PFBA)	**375-22-4**	**PFAS by ID SOP**	**6.2**		**3.5**	**0.89**	**ng/L**	**1**
Perfluoro-n-decanoic acid (PFDA)	335-76-2	PFAS by ID SOP	ND		3.5	0.89	ng/L	1
Perfluoro-n-dodecanoic acid (PFDoA)	307-55-1	PFAS by ID SOP	ND		3.5	0.89	ng/L	1
Perfluoro-n-heptanoic acid (PFHpA)	**375-85-9**	**PFAS by ID SOP**	**4.6**		**3.5**	**0.89**	**ng/L**	**1**
Perfluoro-n-hexanoic acid (PFHxA)	**307-24-4**	**PFAS by ID SOP**	**6.7**		**3.5**	**0.89**	**ng/L**	**1**
Perfluoro-n-nonanoic acid (PFNA)	375-95-1	PFAS by ID SOP	ND		3.5	0.89	ng/L	1
Perfluoro-n-octanoic acid (PFOA)	**335-67-1**	**PFAS by ID SOP**	**4.7**		**3.5**	**0.89**	**ng/L**	**1**
Perfluoro-n-pentanoic acid (PFPeA)	**2706-90-3**	**PFAS by ID SOP**	**6.8**		**3.5**	**0.89**	**ng/L**	**1**
Perfluoro-n-tetradecanoic acid (PFTeDA)	376-06-7	PFAS by ID SOP	ND		3.5	0.89	ng/L	1
Perfluoro-n-tridecanoic acid (PFTrDA)	72629-94-8	PFAS by ID SOP	ND		3.5	0.89	ng/L	1
Perfluoro-n-undecanoic acid (PFUdA)	2058-94-8	PFAS by ID SOP	ND		3.5	0.89	ng/L	1
Perfluorooctanesulfonic acid (PFOS)	1763-23-1	PFAS by ID SOP	ND		3.5	0.89	ng/L	1

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
13C2_4:2FTS		113	50-150
13C2_6:2FTS		104	50-150
13C2_8:2FTS		90	50-150
13C2_PFDoA		70	50-150
13C2_PFTeDA		69	50-150
13C3_PFBS		82	50-150
13C3_PFHxS		69	50-150
13C3-HFPO-DA		87	50-150
13C4_PFBA		85	50-150
13C4_PFHpA		84	50-150
13C5_PFHxA		86	50-150
13C5_PFPeA		94	50-150
13C6_PFDA		86	50-150
13C7_PFUdA		74	50-150

LOQ = Limit of Quantitation
B = Detected in the method blank
E = Quantitation of compound exceeded the calibration range
DL = Detection Limit
Q = Surrogate failure
ND = Not detected at or above the DL
N = Recovery is out of criteria
P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
L = LCS/LCSD failure
H = Out of holding time
W = Reported on wet weight basis
S = MS/MSD failure

PFAS by LC/MS/MS

Client: **Arcadis U.S., Inc.**		Laboratory ID: **WI11005-010**
Description: **DUP-01_091021**		Matrix: **Aqueous**
Date Sampled: **09/10/2021**	Project Name: **Racer Lansing**	
Date Received: **09/11/2021**	Project Number: **30075941.03100**	

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
13C8_PFOA		86	50-150
13C8_PFOS		74	50-150
13C8_PFOSA		92	50-150
13C9_PFNA		83	50-150
d5-EtFOSAA		79	50-150
d3-MeFOSAA		83	50-150

LOQ = Limit of Quantitation	B = Detected in the method blank	E = Quantitation of compound exceeded the calibration range	DL = Detection Limit	Q = Surrogate failure
ND = Not detected at or above the DL	N = Recovery is out of criteria	P = The RPD between two GC columns exceeds 40%	J = Estimated result < LOQ and ≥ DL	L = LCS/LCSD failure
H = Out of holding time	W = Reported on wet weight basis			S = MS/MSD failure

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PFAS by LC/MS/MS

Client: **Arcadis U.S., Inc.** Laboratory ID: **WI11005-011**

Description: **EB-01_091021** Matrix: **Aqueous**

Date Sampled: **09/10/2021 1330** Project Name: **Racer Lansing**

Date Received: **09/11/2021** Project Number: **30075941.03100**

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	SOP SPE	PFAS by ID SOP QSM B-15	1	10/01/2021 1858	MMM	09/30/2021 1134	17150

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
9-chlorohexadecafluoro-3-oxanone-1-sulfonic acid (9Cl-PF3ONS)	756426-58-1	PFAS by ID SOP	ND		7.0	1.7	ng/L	1
11-chloroeicosafluoro-3-oxaundecane-1-sulfonic acid (11Cl-PF3...)	763051-92-9	PFAS by ID SOP	ND		7.0	1.7	ng/L	1
1H, 1H, 2H, 2H-perfluorodecane sulfonic acid (8:2 FTS)	39108-34-4	PFAS by ID SOP	ND		7.0	1.7	ng/L	1
1H, 1H, 2H, 2H-perfluorooctane sulfonic acid (6:2 FTS)	27619-97-2	PFAS by ID SOP	ND		7.0	1.7	ng/L	1
1H,1H,2H,2H-perfluorohexane sulfonic acid (4:2 FTS)	757124-72-4	PFAS by ID SOP	ND		7.0	1.7	ng/L	1
Hexafluoropropylene oxide dimer acid (GenX)	13252-13-6	PFAS by ID SOP	ND		7.0	1.7	ng/L	1
4,8-dioxa-3H-perfluorononanoic acid (ADONA)	919005-14-4	PFAS by ID SOP	ND		7.0	1.7	ng/L	1
N-ethylperfluoro-1-octanesulfonamidoacetic acid (EtFOSAA)	2991-50-6	PFAS by ID SOP	ND		7.0	1.7	ng/L	1
N-methylperfluoro-1-octanesulfonamidoacetic acid (MeFOSAA)	2355-31-9	PFAS by ID SOP	ND		7.0	1.7	ng/L	1
Perfluoro-1-butanesulfonic acid (PFBS)	375-73-5	PFAS by ID SOP	ND		3.5	0.87	ng/L	1
Perfluoro-1-decanesulfonic acid (PFDS)	335-77-3	PFAS by ID SOP	ND		3.5	0.87	ng/L	1
Perfluoro-1-heptanesulfonic acid (PFHpS)	375-92-8	PFAS by ID SOP	ND		3.5	0.87	ng/L	1
Perfluoro-1-nonanesulfonic acid (PFNS)	68259-12-1	PFAS by ID SOP	ND		3.5	0.87	ng/L	1
Perfluoro-1-octanesulfonamide (PFOSA)	754-91-6	PFAS by ID SOP	ND		3.5	0.87	ng/L	1
Perfluoro-1-pentanesulfonic acid (PFPeS)	2706-91-4	PFAS by ID SOP	ND		3.5	0.87	ng/L	1
Perfluorohexanesulfonic acid (PFHxS)	355-46-4	PFAS by ID SOP	ND		3.5	0.87	ng/L	1
Perfluoro-n-butanoic acid (PFBA)	375-22-4	PFAS by ID SOP	ND		3.5	0.87	ng/L	1
Perfluoro-n-decanoic acid (PFDA)	335-76-2	PFAS by ID SOP	ND		3.5	0.87	ng/L	1
Perfluoro-n-dodecanoic acid (PFDoA)	307-55-1	PFAS by ID SOP	ND		3.5	0.87	ng/L	1
Perfluoro-n-heptanoic acid (PFHpA)	375-85-9	PFAS by ID SOP	ND		3.5	0.87	ng/L	1
Perfluoro-n-hexanoic acid (PFHxA)	307-24-4	PFAS by ID SOP	ND		3.5	0.87	ng/L	1
Perfluoro-n-nonanoic acid (PFNA)	375-95-1	PFAS by ID SOP	ND		3.5	0.87	ng/L	1
Perfluoro-n-octanoic acid (PFOA)	335-67-1	PFAS by ID SOP	ND		3.5	0.87	ng/L	1
Perfluoro-n-pentanoic acid (PFPeA)	2706-90-3	PFAS by ID SOP	ND		3.5	0.87	ng/L	1
Perfluoro-n-tetradecanoic acid (PFTeDA)	376-06-7	PFAS by ID SOP	ND		3.5	0.87	ng/L	1
Perfluoro-n-tridecanoic acid (PFTrDA)	72629-94-8	PFAS by ID SOP	ND		3.5	0.87	ng/L	1
Perfluoro-n-undecanoic acid (PFUdA)	2058-94-8	PFAS by ID SOP	ND		3.5	0.87	ng/L	1
Perfluorooctanesulfonic acid (PFOS)	1763-23-1	PFAS by ID SOP	ND		3.5	0.87	ng/L	1

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
13C2_4:2FTS		124	50-150
13C2_6:2FTS		120	50-150
13C2_8:2FTS		120	50-150
13C2_PFDoA		88	50-150
13C2_PFTeDA		82	50-150
13C3_PFBS		100	50-150
13C3_PFHxS		82	50-150
13C3-HFPO-DA		98	50-150
13C4_PFBA		94	50-150
13C4_PFHpA		98	50-150
13C5_PFHxA		104	50-150
13C5_PFPeA		103	50-150
13C6_PFDA		99	50-150
13C7_PFUdA		91	50-150

LOQ = Limit of Quantitation
B = Detected in the method blank
E = Quantitation of compound exceeded the calibration range
DL = Detection Limit
Q = Surrogate failure
ND = Not detected at or above the DL
N = Recovery is out of criteria
P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
L = LCS/LCSD failure
H = Out of holding time
W = Reported on wet weight basis
S = MS/MSD failure

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PFAS by LC/MS/MS

Client: **Arcadis U.S., Inc.**		Laboratory ID: **WI11005-011**
Description: **EB-01_091021**		Matrix: **Aqueous**
Date Sampled: **09/10/2021 1330**	Project Name: **Racer Lansing**	
Date Received: **09/11/2021**	Project Number: **30075941.03100**	

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
13C8_PFOA		92	50-150
13C8_PFOS		102	50-150
13C8_PFOSA		101	50-150
13C9_PFNA		102	50-150
d5-EtFOSAA		97	50-150
d3-MeFOSAA		97	50-150

LOQ = Limit of Quantitation	B = Detected in the method blank	E = Quantitation of compound exceeded the calibration range	DL = Detection Limit	Q = Surrogate failure
ND = Not detected at or above the DL	N = Recovery is out of criteria	P = The RPD between two GC columns exceeds 40%	J = Estimated result < LOQ and ≥ DL	L = LCS/LCSD failure
H = Out of holding time	W = Reported on wet weight basis			S = MS/MSD failure

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QC Summary

PFAS by LC/MS/MS - MB

Sample ID: WQ16953-001
Batch: 16953
Analytical Method: PFAS by ID SOP QSM B-15
Matrix: Aqueous
Prep Method: SOP SPE
Prep Date: 09/29/2021 1219

Parameter	Result	Q	Dil	LOQ	DL	Units	Analysis Date
9Cl-PF3ONS	ND		1	8.0	2.0	ng/L	09/30/2021 1559
11Cl-PF3OUdS	ND		1	8.0	2.0	ng/L	09/30/2021 1559
8:2 FTS	ND		1	8.0	2.0	ng/L	09/30/2021 1559
6:2 FTS	ND		1	8.0	2.0	ng/L	09/30/2021 1559
4:2 FTS	ND		1	8.0	2.0	ng/L	09/30/2021 1559
GenX	ND		1	8.0	2.0	ng/L	09/30/2021 1559
ADONA	ND		1	8.0	2.0	ng/L	09/30/2021 1559
EtFOSAA	ND		1	8.0	2.0	ng/L	09/30/2021 1559
MeFOSAA	ND		1	8.0	2.0	ng/L	09/30/2021 1559
PFBS	ND		1	4.0	1.0	ng/L	09/30/2021 1559
PFDS	ND		1	4.0	1.0	ng/L	09/30/2021 1559
PFHpS	ND		1	4.0	1.0	ng/L	09/30/2021 1559
PFNS	ND		1	4.0	1.0	ng/L	09/30/2021 1559
PFOSA	ND		1	4.0	1.0	ng/L	09/30/2021 1559
PFPeS	ND		1	4.0	1.0	ng/L	09/30/2021 1559
PFHxS	ND		1	4.0	1.0	ng/L	09/30/2021 1559
PFBA	ND		1	4.0	1.0	ng/L	09/30/2021 1559
PFDA	ND		1	4.0	1.0	ng/L	09/30/2021 1559
PFDoA	ND		1	4.0	1.0	ng/L	09/30/2021 1559
PFHpA	ND		1	4.0	1.0	ng/L	09/30/2021 1559
PFHxA	ND		1	4.0	1.0	ng/L	09/30/2021 1559
PFNA	ND		1	4.0	1.0	ng/L	09/30/2021 1559
PFOA	ND		1	4.0	1.0	ng/L	09/30/2021 1559
PFPeA	ND		1	4.0	1.0	ng/L	09/30/2021 1559
PFTeDA	ND		1	4.0	1.0	ng/L	09/30/2021 1559
PFTrDA	ND		1	4.0	1.0	ng/L	09/30/2021 1559
PFUdA	ND		1	4.0	1.0	ng/L	09/30/2021 1559
PFOS	ND		1	4.0	1.0	ng/L	09/30/2021 1559

Surrogate	Q	% Rec	Acceptance Limit
13C2_4:2FTS		105	50-150
13C2_6:2FTS		101	50-150
13C2_8:2FTS		95	50-150
13C2_PFDoA		98	50-150
13C2_PFTeDA		100	50-150
13C3_PFBS		88	50-150
13C3_PFHxS		86	50-150
13C3-HFPO-DA		94	50-150
13C4_PFBA		93	50-150
13C4_PFHpA		94	50-150
13C5_PFHxA		93	50-150
13C5_PFPeA		90	50-150

LOQ = Limit of Quantitation
DL = Detection Limit
ND = Not detected at or above the DL
J = Estimated result < LOQ and ≥ DL
* = RSD is out of criteria
N = Recovery is out of criteria
P = The RPD between two GC columns exceeds 40%
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

PFAS by LC/MS/MS - MB

Sample ID: WQ16953-001
Batch: 16953
Analytical Method: PFAS by ID SOP QSM B-15

Matrix: Aqueous
Prep Method: SOP SPE
Prep Date: 09/29/2021 1219

Surrogate	Q	% Rec	Acceptance Limit
13C6_PFDA		95	50-150
13C7_PFUdA		88	50-150
13C8_PFOA		92	50-150
13C8_PFOS		92	50-150
13C8_PFOSA		96	50-150
13C9_PFNA		93	50-150
d5-EtFOSAA		96	50-150
d3-MeFOSAA		100	50-150

LOQ = Limit of Quantitation
DL = Detection Limit
ND = Not detected at or above the DL
J = Estimated result < LOQ and ≥ DL
* = RSD is out of criteria
N = Recovery is out of criteria
P = The RPD between two GC columns exceeds 40%
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

PFAS by LC/MS/MS - LCS

Sample ID: WQ16953-002
Batch: 16953
Analytical Method: PFAS by ID SOP QSM B-15
Matrix: Aqueous
Prep Method: SOP SPE
Prep Date: 09/29/2021 1219

Parameter	Spike Amount (ng/L)	Result (ng/L)	Q	Dil	% Rec	%Rec Limit	Analysis Date
9Cl-PF3ONS	15	17		1	112	70-150	09/30/2021 1609
11Cl-PF3OUdS	15	17		1	113	70-150	09/30/2021 1609
8:2 FTS	15	18		1	120	67-138	09/30/2021 1609
6:2 FTS	15	27	N	1	179	64-140	09/30/2021 1609
4:2 FTS	15	16		1	108	63-143	09/30/2021 1609
GenX	32	36		1	113	70-150	09/30/2021 1609
ADONA	15	19		1	125	70-150	09/30/2021 1609
EtFOSAA	16	20		1	125	61-135	09/30/2021 1609
MeFOSAA	16	19		1	120	65-136	09/30/2021 1609
PFBS	14	16		1	115	72-130	09/30/2021 1609
PFDS	15	18		1	116	53-142	09/30/2021 1609
PFHpS	15	18		1	116	69-134	09/30/2021 1609
PFNS	15	17		1	112	69-127	09/30/2021 1609
PFOSA	16	18		1	115	67-137	09/30/2021 1609
PFPeS	15	19		1	124	71-127	09/30/2021 1609
PFHxS	15	19		1	131	68-131	09/30/2021 1609
PFBA	16	21		1	129	73-129	09/30/2021 1609
PFDA	16	19		1	120	71-129	09/30/2021 1609
PFDoA	16	22	N	1	135	72-134	09/30/2021 1609
PFHpA	16	20		1	126	72-130	09/30/2021 1609
PFHxA	16	18		1	114	72-129	09/30/2021 1609
PFNA	16	20		1	123	69-130	09/30/2021 1609
PFOA	16	20		1	125	71-133	09/30/2021 1609
PFPeA	16	21		1	128	72-129	09/30/2021 1609
PFTeDA	16	20		1	125	71-132	09/30/2021 1609
PFTrDA	16	18		1	114	65-144	09/30/2021 1609
PFUdA	16	20		1	124	69-133	09/30/2021 1609
PFOS	15	19		1	131	65-140	09/30/2021 1609

Surrogate	Q	% Rec	Acceptance Limit
13C2_4:2FTS		77	50-150
13C2_6:2FTS		75	50-150
13C2_8:2FTS		74	50-150
13C2_PFDoA		72	50-150
13C2_PFTeDA		72	50-150
13C3_PFBS		70	50-150
13C3_PFHxS		69	50-150
13C3-HFPO-DA		74	50-150
13C4_PFBA		70	50-150
13C4_PFHpA		72	50-150
13C5_PFHxA		73	50-150
13C5_PFPeA		71	50-150

LOQ = Limit of Quantitation
DL = Detection Limit
ND = Not detected at or above the DL
J = Estimated result < LOQ and ≥ DL
* = RSD is out of criteria
N = Recovery is out of criteria
P = The RPD between two GC columns exceeds 40%
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

PFAS by LC/MS/MS - LCS

Sample ID: WQ16953-002
Batch: 16953
Analytical Method: PFAS by ID SOP QSM B-15

Matrix: Aqueous
Prep Method: SOP SPE
Prep Date: 09/29/2021 1219

Surrogate	Q	% Rec	Acceptance Limit
13C6_PFDA		77	50-150
13C7_PFUdA		70	50-150
13C8_PFOA		71	50-150
13C8_PFOS		71	50-150
13C8_PFOSA		69	50-150
13C9_PFNA		73	50-150
d5-EtFOSAA		72	50-150
d3-MeFOSAA		76	50-150

LOQ = Limit of Quantitation
DL = Detection Limit
ND = Not detected at or above the DL
J = Estimated result < LOQ and ≥ DL
* = RSD is out of criteria
N = Recovery is out of criteria
P = The RPD between two GC columns exceeds 40%
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

PFAS by LC/MS/MS - MB

Sample ID: WQ16970-001
Batch: 16970
Analytical Method: PFAS by ID SOP QSM B-15

Matrix: Aqueous
Prep Method: SOP SPE
Prep Date: 09/29/2021 1247

Parameter	Result	Q	Dil	LOQ	DL	Units	Analysis Date
9Cl-PF3ONS	ND		1	8.0	2.0	ng/L	09/30/2021 1506
11Cl-PF3OUdS	ND		1	8.0	2.0	ng/L	09/30/2021 1506
8:2 FTS	ND		1	8.0	2.0	ng/L	09/30/2021 1506
6:2 FTS	ND		1	8.0	2.0	ng/L	09/30/2021 1506
4:2 FTS	ND		1	8.0	2.0	ng/L	09/30/2021 1506
GenX	ND		1	8.0	2.0	ng/L	09/30/2021 1506
ADONA	ND		1	8.0	2.0	ng/L	09/30/2021 1506
EtFOSAA	ND		1	8.0	2.0	ng/L	09/30/2021 1506
MeFOSAA	ND		1	8.0	2.0	ng/L	09/30/2021 1506
PFBS	ND		1	4.0	1.0	ng/L	09/30/2021 1506
PFDS	ND		1	4.0	1.0	ng/L	09/30/2021 1506
PFHpS	ND		1	4.0	1.0	ng/L	09/30/2021 1506
PFNS	ND		1	4.0	1.0	ng/L	09/30/2021 1506
PFOSA	ND		1	4.0	1.0	ng/L	09/30/2021 1506
PFPeS	ND		1	4.0	1.0	ng/L	09/30/2021 1506
PFHxS	ND		1	4.0	1.0	ng/L	09/30/2021 1506
PFBA	ND		1	4.0	1.0	ng/L	09/30/2021 1506
PFDA	ND		1	4.0	1.0	ng/L	09/30/2021 1506
PFDoA	ND		1	4.0	1.0	ng/L	09/30/2021 1506
PFHpA	ND		1	4.0	1.0	ng/L	09/30/2021 1506
PFHxA	ND		1	4.0	1.0	ng/L	09/30/2021 1506
PFNA	ND		1	4.0	1.0	ng/L	09/30/2021 1506
PFOA	ND		1	4.0	1.0	ng/L	09/30/2021 1506
PFPeA	ND		1	4.0	1.0	ng/L	09/30/2021 1506
PFTeDA	ND		1	4.0	1.0	ng/L	09/30/2021 1506
PFTrDA	ND		1	4.0	1.0	ng/L	09/30/2021 1506
PFUdA	ND		1	4.0	1.0	ng/L	09/30/2021 1506
PFOS	ND		1	4.0	1.0	ng/L	09/30/2021 1506

Surrogate	Q	% Rec	Acceptance Limit
13C2_4:2FTS		96	50-150
13C2_6:2FTS		95	50-150
13C2_8:2FTS		82	50-150
13C2_PFDoA		68	50-150
13C2_PFTeDA		54	50-150
13C3_PFBS		82	50-150
13C3_PFHxS		81	50-150
13C3-HFPO-DA		85	50-150
13C4_PFBA		83	50-150
13C4_PFHpA		82	50-150
13C5_PFHxA		86	50-150
13C5_PFPeA		86	50-150

LOQ = Limit of Quantitation
DL = Detection Limit

ND = Not detected at or above the DL
J = Estimated result < LOQ and ≥ DL
* = RSD is out of criteria

N = Recovery is out of criteria
P = The RPD between two GC columns exceeds 40%
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

PFAS by LC/MS/MS - MB

Sample ID: WQ16970-001
Batch: 16970
Analytical Method: PFAS by ID SOP QSM B-15

Matrix: Aqueous
Prep Method: SOP SPE
Prep Date: 09/29/2021 1247

Surrogate	Q	% Rec	Acceptance Limit
13C6_PFDA		80	50-150
13C7_PFUdA		76	50-150
13C8_PFOA		85	50-150
13C8_PFOS		79	50-150
13C8_PFOSA		83	50-150
13C9_PFNA		85	50-150
d5-EtFOSAA		74	50-150
d3-MeFOSAA		75	50-150

LOQ = Limit of Quantitation
DL = Detection Limit
ND = Not detected at or above the DL
J = Estimated result < LOQ and ≥ DL
* = RSD is out of criteria
N = Recovery is out of criteria
P = The RPD between two GC columns exceeds 40%
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

PFAS by LC/MS/MS - LCS

Sample ID: WQ16970-002
Batch: 16970
Analytical Method: PFAS by ID SOP QSM B-15

Matrix: Aqueous
Prep Method: SOP SPE
Prep Date: 09/29/2021 1247

Parameter	Spike Amount (ng/L)	Result (ng/L)	Q	Dil	% Rec	%Rec Limit	Analysis Date
9Cl-PF3ONS	15	15		1	98	70-150	09/30/2021 1456
11Cl-PF3OUdS	15	13		1	87	70-150	09/30/2021 1456
8:2 FTS	15	16		1	106	67-138	09/30/2021 1456
6:2 FTS	15	12		1	81	64-140	09/30/2021 1456
4:2 FTS	15	14		1	94	63-143	09/30/2021 1456
GenX	32	30		1	92	70-150	09/30/2021 1456
ADONA	15	15		1	97	70-150	09/30/2021 1456
EtFOSAA	16	15		1	94	61-135	09/30/2021 1456
MeFOSAA	16	14		1	89	65-136	09/30/2021 1456
PFBS	14	13		1	89	72-130	09/30/2021 1456
PFDS	15	14		1	93	53-142	09/30/2021 1456
PFHpS	15	14		1	92	69-134	09/30/2021 1456
PFNS	15	16		1	102	69-127	09/30/2021 1456
PFOSA	16	15		1	93	67-137	09/30/2021 1456
PFPeS	15	14		1	93	71-127	09/30/2021 1456
PFHxS	15	13		1	92	68-131	09/30/2021 1456
PFBA	16	14		1	90	73-129	09/30/2021 1456
PFDA	16	15		1	95	71-129	09/30/2021 1456
PFDoA	16	16		1	98	72-134	09/30/2021 1456
PFHpA	16	15		1	93	72-130	09/30/2021 1456
PFHxA	16	15		1	95	72-129	09/30/2021 1456
PFNA	16	14		1	90	69-130	09/30/2021 1456
PFOA	16	15		1	93	71-133	09/30/2021 1456
PFPeA	16	15		1	94	72-129	09/30/2021 1456
PFTeDA	16	15		1	93	71-132	09/30/2021 1456
PFTrDA	16	13		1	84	65-144	09/30/2021 1456
PFUdA	16	16		1	102	69-133	09/30/2021 1456
PFOS	15	16		1	108	65-140	09/30/2021 1456

Surrogate	Q	% Rec	Acceptance Limit
13C2_4:2FTS		96	50-150
13C2_6:2FTS	N	232	50-150
13C2_8:2FTS		80	50-150
13C2_PFDoA		64	50-150
13C2_PFTeDA	N	45	50-150
13C3_PFBS		91	50-150
13C3_PFHxS		90	50-150
13C3-HFPO-DA		97	50-150
13C4_PFBA		94	50-150
13C4_PFHpA		93	50-150
13C5_PFHxA		91	50-150
13C5_PFPeA		94	50-150

LOQ = Limit of Quantitation
DL = Detection Limit
ND = Not detected at or above the DL
J = Estimated result < LOQ and ≥ DL
* = RSD is out of criteria
N = Recovery is out of criteria
P = The RPD between two GC columns exceeds 40%
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

PFAS by LC/MS/MS - LCS

Sample ID: WQ16970-002
Batch: 16970
Analytical Method: PFAS by ID SOP QSM B-15

Matrix: Aqueous
Prep Method: SOP SPE
Prep Date: 09/29/2021 1247

Surrogate	Q	% Rec	Acceptance Limit
13C6_PFDA		80	50-150
13C7_PFUdA		76	50-150
13C8_PFOA		99	50-150
13C8_PFOS		72	50-150
13C8_PFOSA		83	50-150
13C9_PFNA		87	50-150
d5-EtFOSAA		78	50-150
d3-MeFOSAA		79	50-150

LOQ = Limit of Quantitation
DL = Detection Limit
ND = Not detected at or above the DL
J = Estimated result < LOQ and ≥ DL
* = RSD is out of criteria
N = Recovery is out of criteria
P = The RPD between two GC columns exceeds 40%
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

PFAS by LC/MS/MS - Duplicate

Sample ID: WI11005-001DU
Batch: 16970
Analytical Method: PFAS by ID SOP QSM B-15
Matrix: Aqueous
Prep Method: SOP SPE
Prep Date: 09/29/2021 1247

Parameter	Sample Amount (ng/L)	Result (ng/L)	Q	Dil	% RPD	%RPD Limit	Analysis Date
9Cl-PF3ONS	ND	ND		1	0.00	20	09/30/2021 1620
11Cl-PF3OUdS	ND	ND		1	0.00	20	09/30/2021 1620
8:2 FTS	ND	ND		1	0.00	20	09/30/2021 1620
6:2 FTS	ND	ND		1	0.00	20	09/30/2021 1620
4:2 FTS	ND	ND		1	0.00	20	09/30/2021 1620
GenX	ND	ND		1	0.00	20	09/30/2021 1620
ADONA	ND	ND		1	0.00	20	09/30/2021 1620
EtFOSAA	ND	ND		1	0.00	20	09/30/2021 1620
MeFOSAA	ND	ND		1	0.00	20	09/30/2021 1620
PFBS	2.4	2.4	J	1	2.0	20	09/30/2021 1620
PFDS	ND	ND		1	0.00	20	09/30/2021 1620
PFHpS	ND	ND		1	0.00	20	09/30/2021 1620
PFNS	ND	ND		1	0.00	20	09/30/2021 1620
PFOSA	ND	ND		1	0.00	20	09/30/2021 1620
PFPeS	ND	ND		1	0.00	20	09/30/2021 1620
PFHxS	ND	1.0		1	200	20	09/30/2021 1620
PFBA	3.6	3.6		1	0.59	20	09/30/2021 1620
PFDA	ND	ND		1	0.00	20	09/30/2021 1620
PFDoA	ND	ND		1	0.00	20	09/30/2021 1620
PFHpA	ND	ND		1	0.00	20	09/30/2021 1620
PFHxA	2.1	2.0	J	1	3.1	20	09/30/2021 1620
PFNA	ND	ND		1	0.00	20	09/30/2021 1620
PFOA	2.9	2.8	J	1	2.0	20	09/30/2021 1620
PFPeA	2.2	2.3	J	1	3.0	20	09/30/2021 1620
PFTeDA	ND	ND		1	0.00	20	09/30/2021 1620
PFTrDA	ND	ND		1	0.00	20	09/30/2021 1620
PFUdA	ND	ND		1	0.00	20	09/30/2021 1620
PFOS	ND	ND		1	0.00	20	09/30/2021 1620

Surrogate	Q	% Rec	Acceptance Limit
13C2_4:2FTS		117	50-150
13C2_6:2FTS	N	223	50-150
13C2_8:2FTS		101	50-150
13C2_PFDoA		72	50-150
13C2_PFTeDA		77	50-150
13C3_PFBS		104	50-150
13C3_PFHxS		99	50-150
13C3-HFPO-DA		112	50-150
13C4_PFBA		104	50-150
13C4_PFHpA		109	50-150
13C5_PFHxA		108	50-150
13C5_PFPeA		113	50-150

LOQ = Limit of Quantitation
DL = Detection Limit
ND = Not detected at or above the DL
J = Estimated result < LOQ and ≥ DL
* = RSD is out of criteria
N = Recovery is out of criteria
P = The RPD between two GC columns exceeds 40%
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

PFAS by LC/MS/MS - Duplicate

Sample ID: WI11005-001DU
Batch: 16970
Analytical Method: PFAS by ID SOP QSM B-15

Matrix: Aqueous
Prep Method: SOP SPE
Prep Date: 09/29/2021 1247

Surrogate	Q	% Rec	Acceptance Limit
13C6_PFDA		106	50-150
13C7_PFUdA		89	50-150
13C8_PFOA		114	50-150
13C8_PFOS		93	50-150
13C8_PFOSA		108	50-150
13C9_PFNA		105	50-150
d5-EtFOSAA		86	50-150
d3-MeFOSAA		96	50-150

LOQ = Limit of Quantitation
DL = Detection Limit
ND = Not detected at or above the DL
J = Estimated result < LOQ and ≥ DL
* = RSD is out of criteria
N = Recovery is out of criteria
P = The RPD between two GC columns exceeds 40%
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

PFAS by LC/MS/MS - MB

Sample ID: WQ17150-001
Batch: 17150
Analytical Method: PFAS by ID SOP QSM B-15

Matrix: Aqueous
Prep Method: SOP SPE
Prep Date: 09/30/2021 1134

Parameter	Result	Q	Dil	LOQ	DL	Units	Analysis Date
9Cl-PF3ONS	ND		1	8.0	2.0	ng/L	10/01/2021 1744
11Cl-PF3OUdS	ND		1	8.0	2.0	ng/L	10/01/2021 1744
8:2 FTS	ND		1	8.0	2.0	ng/L	10/01/2021 1744
6:2 FTS	ND		1	8.0	2.0	ng/L	10/01/2021 1744
4:2 FTS	ND		1	8.0	2.0	ng/L	10/01/2021 1744
GenX	ND		1	8.0	2.0	ng/L	10/01/2021 1744
ADONA	ND		1	8.0	2.0	ng/L	10/01/2021 1744
EtFOSAA	ND		1	8.0	2.0	ng/L	10/01/2021 1744
MeFOSAA	ND		1	8.0	2.0	ng/L	10/01/2021 1744
PFBS	ND		1	4.0	1.0	ng/L	10/01/2021 1744
PFDS	ND		1	4.0	1.0	ng/L	10/01/2021 1744
PFHpS	ND		1	4.0	1.0	ng/L	10/01/2021 1744
PFNS	ND		1	4.0	1.0	ng/L	10/01/2021 1744
PFOSA	ND		1	4.0	1.0	ng/L	10/01/2021 1744
PFPeS	ND		1	4.0	1.0	ng/L	10/01/2021 1744
PFHxS	ND		1	4.0	1.0	ng/L	10/01/2021 1744
PFBA	ND		1	4.0	1.0	ng/L	10/01/2021 1744
PFDA	ND		1	4.0	1.0	ng/L	10/01/2021 1744
PFDoA	ND		1	4.0	1.0	ng/L	10/01/2021 1744
PFHpA	ND		1	4.0	1.0	ng/L	10/01/2021 1744
PFHxA	ND		1	4.0	1.0	ng/L	10/01/2021 1744
PFNA	ND		1	4.0	1.0	ng/L	10/01/2021 1744
PFOA	ND		1	4.0	1.0	ng/L	10/01/2021 1744
PFPeA	ND		1	4.0	1.0	ng/L	10/01/2021 1744
PFTeDA	ND		1	4.0	1.0	ng/L	10/01/2021 1744
PFTrDA	ND		1	4.0	1.0	ng/L	10/01/2021 1744
PFUdA	ND		1	4.0	1.0	ng/L	10/01/2021 1744
PFOS	ND		1	4.0	1.0	ng/L	10/01/2021 1744

Surrogate	Q	% Rec	Acceptance Limit
13C2_4:2FTS		103	50-150
13C2_6:2FTS		103	50-150
13C2_8:2FTS		100	50-150
13C2_PFDoA		89	50-150
13C2_PFTeDA		96	50-150
13C3_PFBS		86	50-150
13C3_PFHxS		77	50-150
13C3-HFPO-DA		92	50-150
13C4_PFBA		88	50-150
13C4_PFHpA		85	50-150
13C5_PFHxA		95	50-150
13C5_PFPeA		95	50-150

LOQ = Limit of Quantitation
DL = Detection Limit
ND = Not detected at or above the DL
J = Estimated result < LOQ and ≥ DL
* = RSD is out of criteria
N = Recovery is out of criteria
P = The RPD between two GC columns exceeds 40%
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

PFAS by LC/MS/MS - MB

Sample ID: WQ17150-001
Batch: 17150
Analytical Method: PFAS by ID SOP QSM B-15

Matrix: Aqueous
Prep Method: SOP SPE
Prep Date: 09/30/2021 1134

Surrogate	Q	% Rec	Acceptance Limit
13C6_PFDA		91	50-150
13C7_PFUdA		87	50-150
13C8_PFOA		88	50-150
13C8_PFOS		87	50-150
13C8_PFOSA		99	50-150
13C9_PFNA		87	50-150
d5-EtFOSAA		96	50-150
d3-MeFOSAA		92	50-150

LOQ = Limit of Quantitation
DL = Detection Limit
ND = Not detected at or above the DL
J = Estimated result < LOQ and ≥ DL
* = RSD is out of criteria
N = Recovery is out of criteria
P = The RPD between two GC columns exceeds 40%
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

PFAS by LC/MS/MS - LCS

Sample ID: WQ17150-002
Batch: 17150
Analytical Method: PFAS by ID SOP QSM B-15

Matrix: Aqueous
Prep Method: SOP SPE
Prep Date: 09/30/2021 1134

Parameter	Spike Amount (ng/L)	Result (ng/L)	Q	Dil	% Rec	%Rec Limit	Analysis Date
9Cl-PF3ONS	15	15		1	103	70-150	10/01/2021 1754
11Cl-PF3OUdS	15	14		1	94	70-150	10/01/2021 1754
8:2 FTS	15	13		1	85	67-138	10/01/2021 1754
6:2 FTS	15	19		1	124	64-140	10/01/2021 1754
4:2 FTS	15	14		1	95	63-143	10/01/2021 1754
GenX	32	31		1	96	70-150	10/01/2021 1754
ADONA	15	16		1	105	70-150	10/01/2021 1754
EtFOSAA	16	16		1	100	61-135	10/01/2021 1754
MeFOSAA	16	17		1	106	65-136	10/01/2021 1754
PFBS	14	12		1	86	72-130	10/01/2021 1754
PFDS	15	13		1	86	53-142	10/01/2021 1754
PFHpS	15	17		1	109	69-134	10/01/2021 1754
PFNS	15	19		1	121	69-127	10/01/2021 1754
PFOSA	16	15		1	91	67-137	10/01/2021 1754
PFPeS	15	15		1	100	71-127	10/01/2021 1754
PFHxS	15	15		1	102	68-131	10/01/2021 1754
PFBA	16	17		1	103	73-129	10/01/2021 1754
PFDA	16	15		1	93	71-129	10/01/2021 1754
PFDoA	16	17		1	106	72-134	10/01/2021 1754
PFHpA	16	19		1	120	72-130	10/01/2021 1754
PFHxA	16	17		1	105	72-129	10/01/2021 1754
PFNA	16	15		1	95	69-130	10/01/2021 1754
PFOA	16	17		1	104	71-133	10/01/2021 1754
PFPeA	16	17		1	104	72-129	10/01/2021 1754
PFTeDA	16	17		1	103	71-132	10/01/2021 1754
PFTrDA	16	15		1	94	65-144	10/01/2021 1754
PFUdA	16	16		1	99	69-133	10/01/2021 1754
PFOS	15	14		1	96	65-140	10/01/2021 1754

Surrogate	Q	% Rec	Acceptance Limit
13C2_4:2FTS		109	50-150
13C2_6:2FTS		104	50-150
13C2_8:2FTS		95	50-150
13C2_PFDoA		84	50-150
13C2_PFTeDA		88	50-150
13C3_PFBS		90	50-150
13C3_PFHxS		73	50-150
13C3-HFPO-DA		91	50-150
13C4_PFBA		87	50-150
13C4_PFHpA		80	50-150
13C5_PFHxA		93	50-150
13C5_PFPeA		92	50-150

LOQ = Limit of Quantitation
DL = Detection Limit
ND = Not detected at or above the DL
J = Estimated result < LOQ and ≥ DL
* = RSD is out of criteria
N = Recovery is out of criteria
P = The RPD between two GC columns exceeds 40%
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

PFAS by LC/MS/MS - LCS

Sample ID: WQ17150-002
Batch: 17150
Analytical Method: PFAS by ID SOP QSM B-15

Matrix: Aqueous
Prep Method: SOP SPE
Prep Date: 09/30/2021 1134

Surrogate	Q	% Rec	Acceptance Limit
13C6_PFDA		89	50-150
13C7_PFUdA		83	50-150
13C8_PFOA		88	50-150
13C8_PFOS		85	50-150
13C8_PFOSA		93	50-150
13C9_PFNA		87	50-150
d5-EtFOSAA		94	50-150
d3-MeFOSAA		89	50-150

LOQ = Limit of Quantitation
DL = Detection Limit
ND = Not detected at or above the DL
J = Estimated result < LOQ and ≥ DL
* = RSD is out of criteria
N = Recovery is out of criteria
P = The RPD between two GC columns exceeds 40%
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

PFAS by LC/MS/MS - MB

Sample ID: WQ17652-001
Batch: 17652
Analytical Method: PFAS by ID SOP QSM B-15
Matrix: Aqueous
Prep Method: SOP SPE
Prep Date: 10/05/2021 1104

Parameter	Result	Q	Dil	LOQ	DL	Units	Analysis Date
9Cl-PF3ONS	ND		1	8.0	2.0	ng/L	10/06/2021 1329
11Cl-PF3OUdS	ND		1	8.0	2.0	ng/L	10/06/2021 1329
8:2 FTS	ND		1	8.0	2.0	ng/L	10/06/2021 1329
6:2 FTS	ND		1	8.0	2.0	ng/L	10/06/2021 1329
4:2 FTS	ND		1	8.0	2.0	ng/L	10/06/2021 1329
GenX	ND		1	8.0	2.0	ng/L	10/06/2021 1329
ADONA	ND		1	8.0	2.0	ng/L	10/06/2021 1329
EtFOSAA	ND		1	8.0	2.0	ng/L	10/06/2021 1329
MeFOSAA	ND		1	8.0	2.0	ng/L	10/06/2021 1329
PFBS	ND		1	4.0	1.0	ng/L	10/06/2021 1329
PFDS	ND		1	4.0	1.0	ng/L	10/06/2021 1329
PFHpS	ND		1	4.0	1.0	ng/L	10/06/2021 1329
PFNS	ND		1	4.0	1.0	ng/L	10/06/2021 1329
PFOSA	ND		1	4.0	1.0	ng/L	10/06/2021 1329
PFPeS	ND		1	4.0	1.0	ng/L	10/06/2021 1329
PFHxS	ND		1	4.0	1.0	ng/L	10/06/2021 1329
PFBA	ND		1	4.0	1.0	ng/L	10/06/2021 1329
PFDA	ND		1	4.0	1.0	ng/L	10/06/2021 1329
PFDoA	ND		1	4.0	1.0	ng/L	10/06/2021 1329
PFHpA	ND		1	4.0	1.0	ng/L	10/06/2021 1329
PFHxA	ND		1	4.0	1.0	ng/L	10/06/2021 1329
PFNA	ND		1	4.0	1.0	ng/L	10/06/2021 1329
PFOA	ND		1	4.0	1.0	ng/L	10/06/2021 1329
PFPeA	ND		1	4.0	1.0	ng/L	10/06/2021 1329
PFTeDA	ND		1	4.0	1.0	ng/L	10/06/2021 1329
PFTrDA	ND		1	4.0	1.0	ng/L	10/06/2021 1329
PFUdA	ND		1	4.0	1.0	ng/L	10/06/2021 1329
PFOS	ND		1	4.0	1.0	ng/L	10/06/2021 1329

Surrogate	Q	% Rec	Acceptance Limit
13C2_4:2FTS		97	50-150
13C2_6:2FTS		90	50-150
13C2_8:2FTS		89	50-150
13C2_PFDoA		80	50-150
13C2_PFTeDA		84	50-150
13C3_PFBS		84	50-150
13C3_PFHxS		90	50-150
13C3-HFPO-DA		96	50-150
13C4_PFBA		88	50-150
13C4_PFHpA		89	50-150
13C5_PFHxA		83	50-150
13C5_PFPeA		87	50-150

LOQ = Limit of Quantitation
DL = Detection Limit
ND = Not detected at or above the DL
J = Estimated result < LOQ and ≥ DL
* = RSD is out of criteria
N = Recovery is out of criteria
P = The RPD between two GC columns exceeds 40%
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

PFAS by LC/MS/MS - MB

Sample ID: WQ17652-001
Batch: 17652
Analytical Method: PFAS by ID SOP QSM B-15

Matrix: Aqueous
Prep Method: SOP SPE
Prep Date: 10/05/2021 1104

Surrogate	Q	% Rec	Acceptance Limit
13C6_PFDA		90	50-150
13C7_PFUdA		84	50-150
13C8_PFOA		88	50-150
13C8_PFOS		89	50-150
13C8_PFOSA		86	50-150
13C9_PFNA		92	50-150
d5-EtFOSAA		85	50-150
d3-MeFOSAA		84	50-150

LOQ = Limit of Quantitation
DL = Detection Limit
ND = Not detected at or above the DL
J = Estimated result < LOQ and ≥ DL
* = RSD is out of criteria
N = Recovery is out of criteria
P = The RPD between two GC columns exceeds 40%
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

PFAS by LC/MS/MS - LCS

Sample ID: WQ17652-002
Batch: 17652
Analytical Method: PFAS by ID SOP QSM B-15
Matrix: Aqueous
Prep Method: SOP SPE
Prep Date: 10/05/2021 1104

Parameter	Spike Amount (ng/L)	Result (ng/L)	Q	Dil	% Rec	%Rec Limit	Analysis Date
9Cl-PF3ONS	15	15		1	99	70-150	10/06/2021 1339
11Cl-PF3OUdS	15	14		1	92	70-150	10/06/2021 1339
8:2 FTS	15	15		1	101	67-138	10/06/2021 1339
6:2 FTS	15	12		1	79	64-140	10/06/2021 1339
4:2 FTS	15	14		1	93	63-143	10/06/2021 1339
GenX	32	32		1	100	70-150	10/06/2021 1339
ADONA	15	16		1	107	70-150	10/06/2021 1339
EtFOSAA	16	15		1	95	61-135	10/06/2021 1339
MeFOSAA	16	14		1	90	65-136	10/06/2021 1339
PFBS	14	13		1	93	72-130	10/06/2021 1339
PFDS	15	15		1	95	53-142	10/06/2021 1339
PFHpS	15	15		1	96	69-134	10/06/2021 1339
PFNS	15	15		1	98	69-127	10/06/2021 1339
PFOSA	16	16		1	100	67-137	10/06/2021 1339
PFPeS	15	14		1	92	71-127	10/06/2021 1339
PFHxS	15	14		1	99	68-131	10/06/2021 1339
PFBA	16	16		1	98	73-129	10/06/2021 1339
PFDA	16	16		1	103	71-129	10/06/2021 1339
PFDoA	16	16		1	102	72-134	10/06/2021 1339
PFHpA	16	15		1	95	72-130	10/06/2021 1339
PFHxA	16	15		1	96	72-129	10/06/2021 1339
PFNA	16	17		1	106	69-130	10/06/2021 1339
PFOA	16	15		1	92	71-133	10/06/2021 1339
PFPeA	16	16		1	99	72-129	10/06/2021 1339
PFTeDA	16	16		1	100	71-132	10/06/2021 1339
PFTrDA	16	17		1	104	65-144	10/06/2021 1339
PFUdA	16	15		1	94	69-133	10/06/2021 1339
PFOS	15	15		1	102	65-140	10/06/2021 1339

Surrogate	Q	% Rec	Acceptance Limit
13C2_4:2FTS		91	50-150
13C2_6:2FTS		91	50-150
13C2_8:2FTS		85	50-150
13C2_PFDoA		73	50-150
13C2_PFTeDA		78	50-150
13C3_PFBS		83	50-150
13C3_PFHxS		81	50-150
13C3-HFPO-DA		91	50-150
13C4_PFBA		83	50-150
13C4_PFHpA		85	50-150
13C5_PFHxA		82	50-150
13C5_PFPeA		83	50-150

LOQ = Limit of Quantitation
DL = Detection Limit
ND = Not detected at or above the DL
J = Estimated result < LOQ and ≥ DL
* = RSD is out of criteria
N = Recovery is out of criteria
P = The RPD between two GC columns exceeds 40%
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

PFAS by LC/MS/MS - LCS

Sample ID: WQ17652-002
Batch: 17652
Analytical Method: PFAS by ID SOP QSM B-15

Matrix: Aqueous
Prep Method: SOP SPE
Prep Date: 10/05/2021 1104

Surrogate	Q	% Rec	Acceptance Limit
13C6_PFDA		77	50-150
13C7_PFUdA		79	50-150
13C8_PFOA		85	50-150
13C8_PFOS		88	50-150
13C8_PFOSA		86	50-150
13C9_PFNA		80	50-150
d5-EtFOSAA		85	50-150
d3-MeFOSAA		80	50-150

LOQ = Limit of Quantitation
DL = Detection Limit
ND = Not detected at or above the DL
J = Estimated result < LOQ and ≥ DL
* = RSD is out of criteria
N = Recovery is out of criteria
P = The RPD between two GC columns exceeds 40%
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

Chain of Custody
and
Miscellaneous Documents

Report EGLE 28 Compounds

Pace Analytical® Chain of Custody Record

Pace Analytical Services, LLC.
106 Vantage Point Drive
West Columbia, South Carolina 29172
Telephone No. (803) 791-9700 Fax No. (803) 791-9111
www.pacelabs.com

Number

Client: Arcadis	Report to Contact: Alex Vilhauer, Tiffany Linder	Telephone No. / E-mail: Alex.Vilhauer@arcadis.com, Tiffany.Linder@arcadis.com
Address: 28550 Cabot Drive, Suite 500	Sampler's Signature: x [signature]	Quote No.
City: Novi; State: MI; Zip Code: 48377	Printed Name: Austin Westhuis	Page 1 of 2
Project Name: RACER Lansing		W11005
Project Number: 30075941.03100	P.O. No.	Analysis (Attach list if more space is needed)

Sample ID / Description (Containers for each sample may be combined on one line)	Collection Date(s)	Collection Time (military)	G=Grab C=Composite	Aqueous	Solid	Non-Aqueous		Unpres.	H2SO4	HNO3	HCl	NaOH	5035 Kit	Field Filtered	PFAS via [illegible] w/ isotope dilution [illegible]	Remarks / Cooler I.D.
SB-05-LE285_11-15	9/9/21	1315	G	X				2							X	
SB-05-KG312_11-15	9/8/21	1535	G	X				2							X	
SB-05-KG312_23-27	9/8/21	1635	G	X				2							X	
SB-05-LI335_14-18	9/9/21	1105	G	X				2							X	
SB-05-QM379_8-12	9/9/21	1510	G	X				2							X	
SB-05-QM379_25-29	9/9/21	1630	G	X				2							X	
SB-05-RO398_6-10	9/10/21	0955	G	X				2							X	
SB-05-SW386_11-15	9/10/21	1150	G	X				2							X	
SB-05-SW386_20-24	9/10/21	1225	G	X				2							X	
Dup-01_091021	9/10/21	—	G	X				2							X	

Turn Around Time Required (Prior lab approval required for expedited TAT): ☒ Standard ☐ Rush (Please Specify)

Sample Disposal: ☐ Return to Client ☒ Disposal by Lab

Possible Hazard Identification (List any known hazards in the remarks): ☒ Non-Hazardous ☐ Flammable ☐ Skin Irritant ☐ SDS provided ☐ Unknown

QC Requirements

Relinquished by	Date	Time	Received by	Date	Time
1. [signature] / Arcadis	9/10/21	1530	1. FedEx	9/10/21	1530
2.			2.		
3.			3.		
4. FedEx	9/11/21	0940	4. Laboratory Received by: [signature]	9/11/21	0940

Note: All samples are retained for four weeks from receipt unless other arrangements are made

LAB USE ONLY
Received on Ice (Check) ☒ Y ☐ N ☐ Ice Pack
Receipt Temp: 7.9 °C
Temp. Blank: ☒ Y / ☐ N

Report EGLE 28 Compounds

Pace Analytical® Chain of Custody Record

Pace Analytical Services, LLC.
106 Vantage Point Drive
West Columbia, South Carolina 29172
Telephone No. (803) 791-9700 Fax No. (803) 791-9111
www.pacelabs.com

Number

Client: Arcadis	Report to Contact: Alex Vilhauer, Tiffany Linder	Telephone No. / E-mail: Alex.Vilhauer@arcadis.com, Tiffany.Linder@arcadis.com	Quote No.
Address: 28550 Cabot Drive, Suite 500	Sampler's Signature: x [signature]	Analysis (Attach list if more space is needed)	Page 2 of 2
City: Novi / State: MI / Zip Code: 48377	Printed Name: Austin Westhuis		
Project Name: RACER Lansing			
Project Number: 30075941.03100 / P.O. No.			

WI11005

KE92

Sample ID / Description (Containers for each sample may be combined on one line)	Collection Date(s)	Collection Time (military)	G=Grab C=Composite	Matrix: Aqueous	Matrix: Solid	Matrix: Non-Aqueous		No. of Containers by Preservative Type: Unpres.	H2SO4	HNO3	HCl	NaOH	5035 Kit	Field Filtered	PFAS via Method 537mod. w/isotope dilution per QSM 5.1							Remarks / Cooler I.D.
EB-01_091021	9/10/21	1330	G	X				2							X							

Turn Around Time Required (Prior lab approval required for expedited TAT): ☒ Standard ☐ Rush (Please Specify)

Sample Disposal: ☐ Return to Client ☒ Disposal by Lab

Possible Hazard Identification (List any known hazards in the remarks): ☒ Non-Hazardous ☐ Flammable ☐ Skin Irritant ☐ SDS provided ☐ Unknown

QC Requirements

Relinquished by	Date	Time	Received by	Date	Time
1. [signature] / Arcadis	9/10/21	1530	1. FedEx	9/10/21	1530
2.			2.		
3.			3.		
4. FedEx	9/11/21	0940	4. Laboratory Received by [signature]	9/11/21	0940

Note: All samples are retained for four weeks from receipt unless other arrangements are made

LAB USE ONLY: Received on Ice (Check) ☑ Y ☐ N ☐ Ice Pack | Receipt Temp 2.9 °C | Temp. Blank ☑ Y / ☐ N

Pace Analytical

Samples Receipt Checklist (SRC) (ME0018C-15)
Issuing Authority: Pace ENV - WCOL

Revised:9/29/2020
Page 1 of 1

Sample Receipt Checklist (SRC)

Client: ARCADIS Cooler Inspected by/date: JSH / 09/11/2021 Lot #: WT1005

Means of receipt: ☐ Pace ☐ Client: ☐ UPS ☑ FedEx ☐ Other: _____

☑ Yes	☐ No		1. Were custody seals present on the cooler?
☑ Yes	☐ No	☐ NA	2. If custody seals were present, were they intact and unbroken?

pH Strip ID: NA Chlorine Strip ID: NA Tested by: NA

Original temperature upon receipt / Derived (Corrected) temperature upon receipt %Solid Snap-Cup ID: NA

2.9 / 2.9 °C NA / NA °C NA / NA °C NA / NA °C

Method: ☑ Temperature Blank ☐ Against Bottles IR Gun ID: 5 IR Gun Correction Factor: 0 °C

Method of coolant: ☑ Wet Ice ☐ Ice Packs ☐ Dry Ice ☐ None

☐ Yes	☐ No	☑ NA	3. If temperature of any cooler exceeded 6.0°C, was Project Manager Notified? PM was Notified by: phone / email / face-to-face (circle one).
☑ Yes	☐ No	☐ NA	4. Is the commercial courier's packing slip attached to this form?
☑ Yes	☐ No		5. Were proper custody procedures (relinquished/received) followed?
☑ Yes	☐ No		6. Were sample IDs listed on the COC?
☑ Yes	☐ No		7. Were sample IDs listed on all sample containers?
☑ Yes	☐ No		8. Was collection date & time listed on the COC?
☑ Yes	☐ No		9. Was collection date & time listed on all sample containers?
☑ Yes	☐ No		10. Did all container label information (ID, date, time) agree with the COC?
☑ Yes	☐ No		11. Were tests to be performed listed on the COC?
☑ Yes	☐ No		12. Did all samples arrive in the proper containers for each test and/or in good condition (unbroken, lids on, etc.)?
☑ Yes	☐ No		13. Was adequate sample volume available?
☐ Yes	☑ No		14. Were all samples received within ½ the holding time or 48 hours, whichever comes first?
☐ Yes	☑ No		15. Were any samples containers missing/excess (circle one) samples Not listed on COC?
☐ Yes	☐ No	☑ NA	16. For VOA and RSK-175 samples, were bubbles present >"pea-size" (¼"or 6mm in diameter) in any of the VOA vials?
☐ Yes	☐ No	☑ NA	17. Were all DRO/metals/nutrient samples received at a pH of < 2?
☐ Yes	☐ No	☑ NA	18. Were all cyanide samples received at a pH > 12 and sulfide samples received at a pH > 9?
☐ Yes	☐ No	☑ NA	19. Were all applicable NH_3/TKN/cyanide/phenol/625.1/608.3 (< 0.5mg/L) samples free of residual chlorine?
☐ Yes	☐ No	☑ NA	20. Were client remarks/requests (i.e. requested dilutions, MS/MSD designations, etc...) correctly transcribed from the COC into the comment section in LIMS?
☐ Yes	☑ No		21. Was the quote number listed on the container label? If yes, Quote # NA

Sample Preservation (Must be completed for any sample(s) incorrectly preserved or with headspace.)

Sample(s) NA _____ were received incorrectly preserved and were adjusted accordingly in sample receiving with NA mL of circle one: H2SO4, HNO3, HCl, NaOH using SR # NA.

Time of preservation NA. If more than one preservative is needed, please note in the comments below.

Sample(s) NA _____ were received with bubbles >6 mm in diameter.

Samples(s) NA _____ were received with TRC > 0.5 mg/L (If #19 is *no*) and were adjusted accordingly in sample receiving with sodium thiosulfate ($Na_2S_2O_3$) with Shealy ID: NA.

SR barcode labels applied by: JRG2 Date: 09/11/2021

Comments:

Report of Analysis

Arcadis U.S., Inc.
630 Plaza Drive
Suite 600
Highlands Ranch, CO 80129
Attention: Tiffany Linder

Project Name: RACER Lansing

Project Number: 30075941.03100

Lot Number:**WI30029**

Date Completed:11/03/2021

11/04/2021 5:08 PM
Approved and released by:
Project Manager II: **Kathy E. Smith**

The electronic signature above is the equivalent of a handwritten signature.

Pace Analytical Services, LLC (*formerly Shealy Environmental Services, Inc.*)
106 Vantage Point Drive West Columbia, SC 29172
Tel: 803-791-9700 Fax: 803-791-9111 www.pacelabs.com

Case Narrative
Arcadis U.S., Inc.
Lot Number: WI30029

This Report of Analysis contains the analytical result(s) for the sample(s) listed on the Sample Summary following this Case Narrative. The sample receiving date is documented in the header information associated with each sample.

All results listed in this report relate only to the samples that are contained within this report.

Sample receipt, sample analysis, and data review have been performed in accordance with the Pace Quality Assurance Management Plan (QAMP), applicable Shealy standard operating procedures (SOPs), the 2003 NELAC standard, and Shealy policies. Additionally, the DoD QSM version 5.3 has been followed for these samples, and specifically Table B-15 was followed for all PFAS samples. Any exceptions to the QAMP, SOPs, NELAC standards, the DoD QSM, or policies are qualified on the results page or discussed below.

All QC associated with these samples was in compliance with DOD QSM 5.3 table B-15 and our PFAS SOP.

Correction factors (CF) are used to calculate the original sample concentration. The CF is the inverse of the concentration factor (sample volume / extract final volume) times the dilution factor (DF). For undiluted analysis. For undiluted analysis, the extract is prepared for injection by adding 182 uL of sample extract + 8 uL of reagent water + 10 uL of internal standard solution to a polypropylene autosampler vial. An extra correction factor of 0.91 (182 uL / 200 uL = 0.91) applies. The CF is calculated as follows:

CF = DF * FV / Vo

FV is volume of extract (mL)
Vo is initial sample volume (mL)
DF is dilution factor. For undiluted analysis, DF = 1/0.91.

Sample concentration for aqueous samples:
Concentration (ng/L) = Cs*CF,

$$C_s = \frac{\left(\frac{(A_s x C_{is})}{A_{is}}\right) - B}{M1}$$

Where

C_s is on column concentration of target analyte in the sample (ng/L)
C_{is} is concentration of internal standard in the sample (ng/L)
A_s is peak response of target analyte in the sample
A_{is} is peak response of internal standard in the sample
M1 is the average RF from ICAL or the slope from linear regression ICAL
B is the y-intercept from the ICAL

Pace is a TNI accredited laboratory; however, the following analyses are currently not listed on our TNI scope of accreditation:

Biological Tissue: All, Non-Potable Water: SGT-HEM EPA 1664B, Silica EPA 200.7, Boron, Calcium, Silicon, Strontium EPA 200.8, Bicarbonate, Carbonate, and Hydroxide Alkalinity SM 2320 B-2011, Fecal Coliform SM 9221 C E-2006 & SM 9222D-2006, Strontium SW-846 6010D, VOC SM 6200 B-2011, Drinking Water: VOC (excluding BTEX, MTBE, Naphthalene, & 1,2-dichloroethane) EPA 524.2, Solid Chemical Material: TOC Walkley-Black.

If you have any questions regarding this report please contact the Pace Project Manager listed on the cover page.

Surrogate recovery for the following samples was outside control limits: WI30029-001, WI30029-002. Evidence of matrix interference is present; therefore, re-extraction and/or re-analysis was not performed.

Sample Summary

Arcadis U.S., Inc.

Lot Number: WI30029

Project Name: RACER Lansing

Project Number: 30075941.03100

Sample Number	Sample ID	Matrix	Date Sampled	Date Received
001	SB-OS-OS376_6-10	Aqueous	09/27/2021 0955	09/29/2021
002	SB-OS-TC335_26-30	Aqueous	09/27/2021 1450	09/29/2021

(2 samples)

Detection Summary

Arcadis U.S., Inc.

Lot Number: WI30029

Project Name: RACER Lansing

Project Number: 30075941.03100

Sample	Sample ID	Matrix	Parameter	Method	Result	Q	Units	Page
001	SB-OS-OS376_6-10	Aqueous	PFBS	PFAS by ID	1.3	J	ng/L	5
001	SB-OS-OS376_6-10	Aqueous	PFHxS	PFAS by ID	1.4	J	ng/L	5
001	SB-OS-OS376_6-10	Aqueous	PFBA	PFAS by ID	0.95	J	ng/L	5
001	SB-OS-OS376_6-10	Aqueous	PFOS	PFAS by ID	2.8	J	ng/L	5
002	SB-OS-TC335_26-30	Aqueous	PFBA	PFAS by ID	12		ng/L	7
002	SB-OS-TC335_26-30	Aqueous	PFHpA	PFAS by ID	1.8	J	ng/L	7
002	SB-OS-TC335_26-30	Aqueous	PFHxA	PFAS by ID	18		ng/L	7
002	SB-OS-TC335_26-30	Aqueous	PFPeA	PFAS by ID	23		ng/L	7

(8 detections)

PFAS by LC/MS/MS

Client: **Arcadis U.S., Inc.** Laboratory ID: **WI30029-001**

Description: **SB-OS-OS376_6-10** Matrix: **Aqueous**

Date Sampled: **09/27/2021 0955** Project Name: **RACER Lansing**

Date Received: **09/29/2021** Project Number: **30075941.03100**

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	SOP SPE	PFAS by ID SOP QSM B-15	1	10/22/2021 1613	MMM	10/21/2021 1421	19670

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
9-chlorohexadecafluoro-3-oxanone-1-sulfonic acid (9Cl-PF3ONS)	756426-58-1	PFAS by ID SOP	ND		6.8	1.7	ng/L	1
11-chloroeicosafluoro-3-oxaundecane-1-sulfonic acid (11Cl-PF3...)	763051-92-9	PFAS by ID SOP	ND		6.8	1.7	ng/L	1
1H, 1H, 2H, 2H-perfluorodecane sulfonic acid (8:2 FTS)	39108-34-4	PFAS by ID SOP	ND		6.8	1.7	ng/L	1
1H, 1H, 2H, 2H-perfluorooctane sulfonic acid (6:2 FTS)	27619-97-2	PFAS by ID SOP	ND		6.8	1.7	ng/L	1
1H,1H,2H,2H-perfluorohexane sulfonic acid (4:2 FTS)	757124-72-4	PFAS by ID SOP	ND		6.8	1.7	ng/L	1
Hexafluoropropylene oxide dimer acid (GenX)	13252-13-6	PFAS by ID SOP	ND		6.8	1.7	ng/L	1
4,8-dioxa-3H-perfluorononanoic acid (ADONA)	919005-14-4	PFAS by ID SOP	ND		6.8	1.7	ng/L	1
N-ethylperfluoro-1-octanesulfonamidoacetic acid (EtFOSAA)	2991-50-6	PFAS by ID SOP	ND		6.8	1.7	ng/L	1
N-methylperfluoro-1-octanesulfonamidoacetic acid (MeFOSAA)	2355-31-9	PFAS by ID SOP	ND		6.8	1.7	ng/L	1
Perfluoro-1-butanesulfonic acid (PFBS)	**375-73-5**	**PFAS by ID SOP**	**1.3**	**J**	**3.4**	**0.86**	**ng/L**	**1**
Perfluoro-1-decanesulfonic acid (PFDS)	335-77-3	PFAS by ID SOP	ND		3.4	0.86	ng/L	1
Perfluoro-1-heptanesulfonic acid (PFHpS)	375-92-8	PFAS by ID SOP	ND		3.4	0.86	ng/L	1
Perfluoro-1-nonanesulfonic acid (PFNS)	68259-12-1	PFAS by ID SOP	ND		3.4	0.86	ng/L	1
Perfluoro-1-octanesulfonamide (PFOSA)	754-91-6	PFAS by ID SOP	ND		3.4	0.86	ng/L	1
Perfluoro-1-pentanesulfonic acid (PFPeS)	2706-91-4	PFAS by ID SOP	ND		3.4	0.86	ng/L	1
Perfluorohexanesulfonic acid (PFHxS)	**355-46-4**	**PFAS by ID SOP**	**1.4**	**J**	**3.4**	**0.86**	**ng/L**	**1**
Perfluoro-n-butanoic acid (PFBA)	**375-22-4**	**PFAS by ID SOP**	**0.95**	**J**	**3.4**	**0.86**	**ng/L**	**1**
Perfluoro-n-decanoic acid (PFDA)	335-76-2	PFAS by ID SOP	ND		3.4	0.86	ng/L	1
Perfluoro-n-dodecanoic acid (PFDoA)	307-55-1	PFAS by ID SOP	ND		3.4	0.86	ng/L	1
Perfluoro-n-heptanoic acid (PFHpA)	375-85-9	PFAS by ID SOP	ND		3.4	0.86	ng/L	1
Perfluoro-n-hexanoic acid (PFHxA)	307-24-4	PFAS by ID SOP	ND		3.4	0.86	ng/L	1
Perfluoro-n-nonanoic acid (PFNA)	375-95-1	PFAS by ID SOP	ND		3.4	0.86	ng/L	1
Perfluoro-n-octanoic acid (PFOA)	335-67-1	PFAS by ID SOP	ND		3.4	0.86	ng/L	1
Perfluoro-n-pentanoic acid (PFPeA)	2706-90-3	PFAS by ID SOP	ND		3.4	0.86	ng/L	1
Perfluoro-n-tetradecanoic acid (PFTeDA)	376-06-7	PFAS by ID SOP	ND	Q	3.4	0.86	ng/L	1
Perfluoro-n-tridecanoic acid (PFTrDA)	72629-94-8	PFAS by ID SOP	ND		3.4	0.86	ng/L	1
Perfluoro-n-undecanoic acid (PFUdA)	2058-94-8	PFAS by ID SOP	ND		3.4	0.86	ng/L	1
Perfluorooctanesulfonic acid (PFOS)	**1763-23-1**	**PFAS by ID SOP**	**2.8**	**J**	**3.4**	**0.86**	**ng/L**	**1**

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
13C2_4:2FTS		112	50-150
13C2_6:2FTS		98	50-150
13C2_8:2FTS		70	50-150
13C2_PFDoA		57	50-150
13C2_PFTeDA	N	36	50-150
13C3_PFBS		85	50-150
13C3_PFHxS		82	50-150
13C3-HFPO-DA		88	50-150
13C4_PFBA		85	50-150
13C4_PFHpA		87	50-150
13C5_PFHxA		88	50-150
13C5_PFPeA		80	50-150
13C6_PFDA		77	50-150
13C7_PFUdA		67	50-150

LOQ = Limit of Quantitation
B = Detected in the method blank
E = Quantitation of compound exceeded the calibration range
DL = Detection Limit
Q = Surrogate failure
ND = Not detected at or above the DL
N = Recovery is out of criteria
P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
L = LCS/LCSD failure
H = Out of holding time
W = Reported on wet weight basis
S = MS/MSD failure

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PFAS by LC/MS/MS

Client: **Arcadis U.S., Inc.**		Laboratory ID: **WI30029-001**
Description: **SB-OS-OS376_6-10**		Matrix: **Aqueous**
Date Sampled: **09/27/2021 0955**	Project Name: **RACER Lansing**	
Date Received: **09/29/2021**	Project Number: **30075941.03100**	

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
13C8_PFOA		83	50-150
13C8_PFOS		76	50-150
13C8_PFOSA		81	50-150
13C9_PFNA		79	50-150
d5-EtFOSAA		76	50-150
d3-MeFOSAA		67	50-150

LOQ = Limit of Quantitation	B = Detected in the method blank	E = Quantitation of compound exceeded the calibration range	DL = Detection Limit	Q = Surrogate failure
ND = Not detected at or above the DL	N = Recovery is out of criteria	P = The RPD between two GC columns exceeds 40%	J = Estimated result < LOQ and ≥ DL	L = LCS/LCSD failure
H = Out of holding time	W = Reported on wet weight basis			S = MS/MSD failure

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PFAS by LC/MS/MS

Client: **Arcadis U.S., Inc.** Laboratory ID: **WI30029-002**
Description: **SB-OS-TC335_26-30** Matrix: **Aqueous**
Date Sampled: **09/27/2021 1450** Project Name: **RACER Lansing**
Date Received: **09/29/2021** Project Number: **30075941.03100**

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	SOP SPE	PFAS by ID SOP QSM B-15	1	10/23/2021 1216	MMM	10/22/2021 1532	19809

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
9-chlorohexadecafluoro-3-oxanone-1-sulfonic acid (9Cl-PF3ONS)	756426-58-1	PFAS by ID SOP	ND		6.9	1.7	ng/L	1
11-chloroeicosafluoro-3-oxaundecane-1-sulfonic acid (11Cl-PF3...)	763051-92-9	PFAS by ID SOP	ND		6.9	1.7	ng/L	1
1H, 1H, 2H, 2H-perfluorodecane sulfonic acid (8:2 FTS)	39108-34-4	PFAS by ID SOP	ND		6.9	1.7	ng/L	1
1H, 1H, 2H, 2H-perfluorooctane sulfonic acid (6:2 FTS)	27619-97-2	PFAS by ID SOP	ND		6.9	1.7	ng/L	1
1H,1H,2H,2H-perfluorohexane sulfonic acid (4:2 FTS)	757124-72-4	PFAS by ID SOP	ND		6.9	1.7	ng/L	1
Hexafluoropropylene oxide dimer acid (GenX)	13252-13-6	PFAS by ID SOP	ND		6.9	1.7	ng/L	1
4,8-dioxa-3H-perfluorononanoic acid (ADONA)	919005-14-4	PFAS by ID SOP	ND		6.9	1.7	ng/L	1
N-ethylperfluoro-1-octanesulfonamidoacetic acid (EtFOSAA)	2991-50-6	PFAS by ID SOP	ND		6.9	1.7	ng/L	1
N-methylperfluoro-1-octanesulfonamidoacetic acid (MeFOSAA)	2355-31-9	PFAS by ID SOP	ND		6.9	1.7	ng/L	1
Perfluoro-1-butanesulfonic acid (PFBS)	375-73-5	PFAS by ID SOP	ND		3.4	0.86	ng/L	1
Perfluoro-1-decanesulfonic acid (PFDS)	335-77-3	PFAS by ID SOP	ND		3.4	0.86	ng/L	1
Perfluoro-1-heptanesulfonic acid (PFHpS)	375-92-8	PFAS by ID SOP	ND		3.4	0.86	ng/L	1
Perfluoro-1-nonanesulfonic acid (PFNS)	68259-12-1	PFAS by ID SOP	ND		3.4	0.86	ng/L	1
Perfluoro-1-octanesulfonamide (PFOSA)	754-91-6	PFAS by ID SOP	ND		3.4	0.86	ng/L	1
Perfluoro-1-pentanesulfonic acid (PFPeS)	2706-91-4	PFAS by ID SOP	ND		3.4	0.86	ng/L	1
Perfluorohexanesulfonic acid (PFHxS)	355-46-4	PFAS by ID SOP	ND		3.4	0.86	ng/L	1
Perfluoro-n-butanoic acid (PFBA)	**375-22-4**	**PFAS by ID SOP**	**12**		**3.4**	**0.86**	**ng/L**	**1**
Perfluoro-n-decanoic acid (PFDA)	335-76-2	PFAS by ID SOP	ND		3.4	0.86	ng/L	1
Perfluoro-n-dodecanoic acid (PFDoA)	307-55-1	PFAS by ID SOP	ND		3.4	0.86	ng/L	1
Perfluoro-n-heptanoic acid (PFHpA)	**375-85-9**	**PFAS by ID SOP**	**1.8**	**J**	**3.4**	**0.86**	**ng/L**	**1**
Perfluoro-n-hexanoic acid (PFHxA)	**307-24-4**	**PFAS by ID SOP**	**18**		**3.4**	**0.86**	**ng/L**	**1**
Perfluoro-n-nonanoic acid (PFNA)	375-95-1	PFAS by ID SOP	ND		3.4	0.86	ng/L	1
Perfluoro-n-octanoic acid (PFOA)	335-67-1	PFAS by ID SOP	ND		3.4	0.86	ng/L	1
Perfluoro-n-pentanoic acid (PFPeA)	**2706-90-3**	**PFAS by ID SOP**	**23**		**3.4**	**0.86**	**ng/L**	**1**
Perfluoro-n-tetradecanoic acid (PFTeDA)	376-06-7	PFAS by ID SOP	ND	Q	3.4	0.86	ng/L	1
Perfluoro-n-tridecanoic acid (PFTrDA)	72629-94-8	PFAS by ID SOP	ND		3.4	0.86	ng/L	1
Perfluoro-n-undecanoic acid (PFUdA)	2058-94-8	PFAS by ID SOP	ND		3.4	0.86	ng/L	1
Perfluorooctanesulfonic acid (PFOS)	1763-23-1	PFAS by ID SOP	ND		3.4	0.86	ng/L	1

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
13C2_4:2FTS		102	50-150
13C2_6:2FTS		79	50-150
13C2_8:2FTS		77	50-150
13C2_PFDoA		52	50-150
13C2_PFTeDA	N	28	50-150
13C3_PFBS		84	50-150
13C3_PFHxS		80	50-150
13C3-HFPO-DA		84	50-150
13C4_PFBA		67	50-150
13C4_PFHpA		82	50-150
13C5_PFHxA		81	50-150
13C5_PFPeA		81	50-150
13C6_PFDA		68	50-150
13C7_PFUdA		65	50-150

LOQ = Limit of Quantitation
B = Detected in the method blank
E = Quantitation of compound exceeded the calibration range
DL = Detection Limit
Q = Surrogate failure
ND = Not detected at or above the DL
N = Recovery is out of criteria
P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
L = LCS/LCSD failure
H = Out of holding time
W = Reported on wet weight basis
S = MS/MSD failure

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PFAS by LC/MS/MS

Client: **Arcadis U.S., Inc.**		Laboratory ID: **WI30029-002**
Description: **SB-OS-TC335_26-30**		Matrix: **Aqueous**
Date Sampled: **09/27/2021 1450**	Project Name: **RACER Lansing**	
Date Received: **09/29/2021**	Project Number: **30075941.03100**	

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
13C8_PFOA		78	50-150
13C8_PFOS		72	50-150
13C8_PFOSA		77	50-150
13C9_PFNA		82	50-150
d5-EtFOSAA		63	50-150
d3-MeFOSAA		57	50-150

LOQ = Limit of Quantitation	B = Detected in the method blank	E = Quantitation of compound exceeded the calibration range	DL = Detection Limit	Q = Surrogate failure
ND = Not detected at or above the DL	N = Recovery is out of criteria	P = The RPD between two GC columns exceeds 40%	J = Estimated result < LOQ and ≥ DL	L = LCS/LCSD failure
H = Out of holding time	W = Reported on wet weight basis			S = MS/MSD failure

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QC Summary

PFAS by LC/MS/MS - MB

Sample ID: WQ19670-001
Batch: 19670
Analytical Method: PFAS by ID SOP QSM B-15
Matrix: Aqueous
Prep Method: SOP SPE
Prep Date: 10/21/2021 1421

Parameter	Result	Q	Dil	LOQ	DL	Units	Analysis Date
9Cl-PF3ONS	ND		1	8.0	2.0	ng/L	10/22/2021 1427
11Cl-PF3OUdS	ND		1	8.0	2.0	ng/L	10/22/2021 1427
8:2 FTS	ND		1	8.0	2.0	ng/L	10/22/2021 1427
6:2 FTS	ND		1	8.0	2.0	ng/L	10/22/2021 1427
4:2 FTS	ND		1	8.0	2.0	ng/L	10/22/2021 1427
GenX	ND		1	8.0	2.0	ng/L	10/22/2021 1427
ADONA	ND		1	8.0	2.0	ng/L	10/22/2021 1427
EtFOSAA	ND		1	8.0	2.0	ng/L	10/22/2021 1427
MeFOSAA	ND		1	8.0	2.0	ng/L	10/22/2021 1427
PFBS	ND		1	4.0	1.0	ng/L	10/22/2021 1427
PFDS	ND		1	4.0	1.0	ng/L	10/22/2021 1427
PFHpS	ND		1	4.0	1.0	ng/L	10/22/2021 1427
PFNS	ND		1	4.0	1.0	ng/L	10/22/2021 1427
PFOSA	ND		1	4.0	1.0	ng/L	10/22/2021 1427
PFPeS	ND		1	4.0	1.0	ng/L	10/22/2021 1427
PFHxS	ND		1	4.0	1.0	ng/L	10/22/2021 1427
PFBA	ND		1	4.0	1.0	ng/L	10/22/2021 1427
PFDA	ND		1	4.0	1.0	ng/L	10/22/2021 1427
PFDoA	ND		1	4.0	1.0	ng/L	10/22/2021 1427
PFHpA	ND		1	4.0	1.0	ng/L	10/22/2021 1427
PFHxA	ND		1	4.0	1.0	ng/L	10/22/2021 1427
PFNA	ND		1	4.0	1.0	ng/L	10/22/2021 1427
PFOA	ND		1	4.0	1.0	ng/L	10/22/2021 1427
PFPeA	ND		1	4.0	1.0	ng/L	10/22/2021 1427
PFTeDA	ND		1	4.0	1.0	ng/L	10/22/2021 1427
PFTrDA	ND		1	4.0	1.0	ng/L	10/22/2021 1427
PFUdA	ND		1	4.0	1.0	ng/L	10/22/2021 1427
PFOS	ND		1	4.0	1.0	ng/L	10/22/2021 1427

Surrogate	Q	% Rec	Acceptance Limit
13C2_4:2FTS		98	50-150
13C2_6:2FTS		89	50-150
13C2_8:2FTS		91	50-150
13C2_PFDoA		76	50-150
13C2_PFTeDA		66	50-150
13C3_PFBS		84	50-150
13C3_PFHxS		79	50-150
13C3-HFPO-DA		87	50-150
13C4_PFBA		80	50-150
13C4_PFHpA		84	50-150
13C5_PFHxA		85	50-150
13C5_PFPeA		78	50-150

LOQ = Limit of Quantitation
DL = Detection Limit
ND = Not detected at or above the DL
J = Estimated result < LOQ and ≥ DL
* = RSD is out of criteria
N = Recovery is out of criteria
P = The RPD between two GC columns exceeds 40%
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

PFAS by LC/MS/MS - MB

Sample ID: WQ19670-001
Batch: 19670
Analytical Method: PFAS by ID SOP QSM B-15

Matrix: Aqueous
Prep Method: SOP SPE
Prep Date: 10/21/2021 1421

Surrogate	Q	% Rec	Acceptance Limit
13C6_PFDA		78	50-150
13C7_PFUdA		79	50-150
13C8_PFOA		78	50-150
13C8_PFOS		77	50-150
13C8_PFOSA		78	50-150
13C9_PFNA		75	50-150
d5-EtFOSAA		92	50-150
d3-MeFOSAA		76	50-150

LOQ = Limit of Quantitation
DL = Detection Limit
ND = Not detected at or above the DL
J = Estimated result < LOQ and ≥ DL
* = RSD is out of criteria
N = Recovery is out of criteria
P = The RPD between two GC columns exceeds 40%
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

PFAS by LC/MS/MS - LCS

Sample ID: WQ19670-002
Batch: 19670
Analytical Method: PFAS by ID SOP QSM B-15
Matrix: Aqueous
Prep Method: SOP SPE
Prep Date: 10/21/2021 1421

Parameter	Spike Amount (ng/L)	Result (ng/L)	Q	Dil	% Rec	%Rec Limit	Analysis Date
9Cl-PF3ONS	15	15		1	99	70-150	10/22/2021 1438
11Cl-PF3OUdS	15	14		1	95	70-150	10/22/2021 1438
8:2 FTS	15	18		1	117	67-138	10/22/2021 1438
6:2 FTS	15	14		1	96	64-140	10/22/2021 1438
4:2 FTS	15	15		1	102	63-143	10/22/2021 1438
GenX	32	30		1	93	70-150	10/22/2021 1438
ADONA	15	16		1	106	70-150	10/22/2021 1438
EtFOSAA	16	14		1	86	61-135	10/22/2021 1438
MeFOSAA	16	16		1	102	65-136	10/22/2021 1438
PFBS	14	15		1	104	72-130	10/22/2021 1438
PFDS	15	15		1	97	53-142	10/22/2021 1438
PFHpS	15	15		1	96	69-134	10/22/2021 1438
PFNS	15	15		1	97	69-127	10/22/2021 1438
PFOSA	16	16		1	103	67-137	10/22/2021 1438
PFPeS	15	16		1	108	71-127	10/22/2021 1438
PFHxS	15	15		1	105	68-131	10/22/2021 1438
PFBA	16	17		1	103	73-129	10/22/2021 1438
PFDA	16	15		1	94	71-129	10/22/2021 1438
PFDoA	16	17		1	106	72-134	10/22/2021 1438
PFHpA	16	16		1	99	72-130	10/22/2021 1438
PFHxA	16	16		1	101	72-129	10/22/2021 1438
PFNA	16	16		1	99	69-130	10/22/2021 1438
PFOA	16	16		1	99	71-133	10/22/2021 1438
PFPeA	16	16		1	98	72-129	10/22/2021 1438
PFTeDA	16	17		1	108	71-132	10/22/2021 1438
PFTrDA	16	15		1	93	65-144	10/22/2021 1438
PFUdA	16	18		1	115	69-133	10/22/2021 1438
PFOS	15	15		1	98	65-140	10/22/2021 1438

Surrogate	Q	% Rec	Acceptance Limit
13C2_4:2FTS		105	50-150
13C2_6:2FTS		90	50-150
13C2_8:2FTS		82	50-150
13C2_PFDoA		69	50-150
13C2_PFTeDA		57	50-150
13C3_PFBS		78	50-150
13C3_PFHxS		76	50-150
13C3-HFPO-DA		84	50-150
13C4_PFBA		80	50-150
13C4_PFHpA		82	50-150
13C5_PFHxA		83	50-150
13C5_PFPeA		78	50-150

LOQ = Limit of Quantitation
DL = Detection Limit
ND = Not detected at or above the DL
J = Estimated result < LOQ and ≥ DL
* = RSD is out of criteria
N = Recovery is out of criteria
P = The RPD between two GC columns exceeds 40%
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

PFAS by LC/MS/MS - LCS

Sample ID: WQ19670-002
Batch: 19670
Analytical Method: PFAS by ID SOP QSM B-15

Matrix: Aqueous
Prep Method: SOP SPE
Prep Date: 10/21/2021 1421

Surrogate	Q	% Rec	Acceptance Limit
13C6_PFDA		75	50-150
13C7_PFUdA		73	50-150
13C8_PFOA		84	50-150
13C8_PFOS		73	50-150
13C8_PFOSA		73	50-150
13C9_PFNA		78	50-150
d5-EtFOSAA		83	50-150
d3-MeFOSAA		74	50-150

LOQ = Limit of Quantitation
DL = Detection Limit
ND = Not detected at or above the DL
J = Estimated result < LOQ and ≥ DL
* = RSD is out of criteria
N = Recovery is out of criteria
P = The RPD between two GC columns exceeds 40%
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

PFAS by LC/MS/MS - MB

Sample ID: WQ19809-001
Batch: 19809
Analytical Method: PFAS by ID SOP QSM B-15
Matrix: Aqueous
Prep Method: SOP SPE
Prep Date: 10/22/2021 1532

Parameter	Result	Q	Dil	LOQ	DL	Units	Analysis Date
9Cl-PF3ONS	ND		1	8.0	2.0	ng/L	10/23/2021 1155
11Cl-PF3OUdS	ND		1	8.0	2.0	ng/L	10/23/2021 1155
8:2 FTS	ND		1	8.0	2.0	ng/L	10/23/2021 1155
6:2 FTS	ND		1	8.0	2.0	ng/L	10/23/2021 1155
4:2 FTS	ND		1	8.0	2.0	ng/L	10/23/2021 1155
GenX	ND		1	8.0	2.0	ng/L	10/23/2021 1155
ADONA	ND		1	8.0	2.0	ng/L	10/23/2021 1155
EtFOSAA	ND		1	8.0	2.0	ng/L	10/23/2021 1155
MeFOSAA	ND		1	8.0	2.0	ng/L	10/23/2021 1155
PFBS	ND		1	4.0	1.0	ng/L	10/23/2021 1155
PFDS	ND		1	4.0	1.0	ng/L	10/23/2021 1155
PFHpS	ND		1	4.0	1.0	ng/L	10/23/2021 1155
PFNS	ND		1	4.0	1.0	ng/L	10/23/2021 1155
PFOSA	ND		1	4.0	1.0	ng/L	10/23/2021 1155
PFPeS	ND		1	4.0	1.0	ng/L	10/23/2021 1155
PFHxS	ND		1	4.0	1.0	ng/L	10/23/2021 1155
PFBA	ND		1	4.0	1.0	ng/L	10/23/2021 1155
PFDA	ND		1	4.0	1.0	ng/L	10/23/2021 1155
PFDoA	ND		1	4.0	1.0	ng/L	10/23/2021 1155
PFHpA	ND		1	4.0	1.0	ng/L	10/23/2021 1155
PFHxA	ND		1	4.0	1.0	ng/L	10/23/2021 1155
PFNA	ND		1	4.0	1.0	ng/L	10/23/2021 1155
PFOA	ND		1	4.0	1.0	ng/L	10/23/2021 1155
PFPeA	ND		1	4.0	1.0	ng/L	10/23/2021 1155
PFTeDA	ND		1	4.0	1.0	ng/L	10/23/2021 1155
PFTrDA	ND		1	4.0	1.0	ng/L	10/23/2021 1155
PFUdA	ND		1	4.0	1.0	ng/L	10/23/2021 1155
PFOS	ND		1	4.0	1.0	ng/L	10/23/2021 1155

Surrogate	Q	% Rec	Acceptance Limit
13C2_4:2FTS		89	50-150
13C2_6:2FTS		88	50-150
13C2_8:2FTS		79	50-150
13C2_PFDoA		75	50-150
13C2_PFTeDA		60	50-150
13C3_PFBS		81	50-150
13C3_PFHxS		86	50-150
13C3-HFPO-DA		97	50-150
13C4_PFBA		83	50-150
13C4_PFHpA		86	50-150
13C5_PFHxA		82	50-150
13C5_PFPeA		83	50-150

LOQ = Limit of Quantitation
DL = Detection Limit
ND = Not detected at or above the DL
J = Estimated result < LOQ and ≥ DL
* = RSD is out of criteria
N = Recovery is out of criteria
P = The RPD between two GC columns exceeds 40%
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

PFAS by LC/MS/MS - MB

Sample ID: WQ19809-001
Batch: 19809
Analytical Method: PFAS by ID SOP QSM B-15

Matrix: Aqueous
Prep Method: SOP SPE
Prep Date: 10/22/2021 1532

Surrogate	Q	% Rec	Acceptance Limit
13C6_PFDA		74	50-150
13C7_PFUdA		76	50-150
13C8_PFOA		84	50-150
13C8_PFOS		73	50-150
13C8_PFOSA		76	50-150
13C9_PFNA		81	50-150
d5-EtFOSAA		74	50-150
d3-MeFOSAA		68	50-150

LOQ = Limit of Quantitation
DL = Detection Limit
ND = Not detected at or above the DL
J = Estimated result < LOQ and ≥ DL
* = RSD is out of criteria
N = Recovery is out of criteria
P = The RPD between two GC columns exceeds 40%
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

PFAS by LC/MS/MS - LCS

Sample ID: WQ19809-002
Batch: 19809
Analytical Method: PFAS by ID SOP QSM B-15
Matrix: Aqueous
Prep Method: SOP SPE
Prep Date: 10/22/2021 1532

Parameter	Spike Amount (ng/L)	Result (ng/L)	Q	Dil	% Rec	%Rec Limit	Analysis Date
9Cl-PF3ONS	15	16		1	110	70-150	10/23/2021 1205
11Cl-PF3OUdS	15	15		1	101	70-150	10/23/2021 1205
8:2 FTS	15	18		1	115	67-138	10/23/2021 1205
6:2 FTS	15	16		1	103	64-140	10/23/2021 1205
4:2 FTS	15	17		1	112	63-143	10/23/2021 1205
GenX	32	36		1	112	70-150	10/23/2021 1205
ADONA	15	17		1	113	70-150	10/23/2021 1205
EtFOSAA	16	16		1	102	61-135	10/23/2021 1205
MeFOSAA	16	15		1	93	65-136	10/23/2021 1205
PFBS	14	14		1	101	72-130	10/23/2021 1205
PFDS	15	16		1	105	53-142	10/23/2021 1205
PFHpS	15	16		1	105	69-134	10/23/2021 1205
PFNS	15	14		1	93	69-127	10/23/2021 1205
PFOSA	16	15		1	96	67-137	10/23/2021 1205
PFPeS	15	16		1	105	71-127	10/23/2021 1205
PFHxS	15	14		1	97	68-131	10/23/2021 1205
PFBA	16	16		1	103	73-129	10/23/2021 1205
PFDA	16	17		1	106	71-129	10/23/2021 1205
PFDoA	16	16		1	99	72-134	10/23/2021 1205
PFHpA	16	17		1	109	72-130	10/23/2021 1205
PFHxA	16	17		1	106	72-129	10/23/2021 1205
PFNA	16	17		1	104	69-130	10/23/2021 1205
PFOA	16	17		1	105	71-133	10/23/2021 1205
PFPeA	16	16		1	102	72-129	10/23/2021 1205
PFTeDA	16	16		1	101	71-132	10/23/2021 1205
PFTrDA	16	16		1	97	65-144	10/23/2021 1205
PFUdA	16	18		1	109	69-133	10/23/2021 1205
PFOS	15	15		1	100	65-140	10/23/2021 1205

Surrogate	Q	% Rec	Acceptance Limit
13C2_4:2FTS		88	50-150
13C2_6:2FTS		83	50-150
13C2_8:2FTS		76	50-150
13C2_PFDoA		79	50-150
13C2_PFTeDA		68	50-150
13C3_PFBS		82	50-150
13C3_PFHxS		88	50-150
13C3-HFPO-DA		94	50-150
13C4_PFBA		80	50-150
13C4_PFHpA		83	50-150
13C5_PFHxA		82	50-150
13C5_PFPeA		85	50-150

LOQ = Limit of Quantitation
DL = Detection Limit
ND = Not detected at or above the DL
J = Estimated result < LOQ and ≥ DL
* = RSD is out of criteria
N = Recovery is out of criteria
P = The RPD between two GC columns exceeds 40%
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

PFAS by LC/MS/MS - LCS

Sample ID: WQ19809-002
Batch: 19809
Analytical Method: PFAS by ID SOP QSM B-15

Matrix: Aqueous
Prep Method: SOP SPE
Prep Date: 10/22/2021 1532

Surrogate	Q	% Rec	Acceptance Limit
13C6_PFDA		75	50-150
13C7_PFUdA		69	50-150
13C8_PFOA		83	50-150
13C8_PFOS		76	50-150
13C8_PFOSA		79	50-150
13C9_PFNA		78	50-150
d5-EtFOSAA		77	50-150
d3-MeFOSAA		74	50-150

LOQ = Limit of Quantitation
DL = Detection Limit
ND = Not detected at or above the DL
J = Estimated result < LOQ and ≥ DL
* = RSD is out of criteria
N = Recovery is out of criteria
P = The RPD between two GC columns exceeds 40%
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

Chain of Custody
and
Miscellaneous Documents

Report EGLE 28 Compounds

Pace Analytical®

PACE ANALYTICAL SERVICES, LLC
106 Vantage Point Drive • West Columbia, SC 29172
~~Telephone No. 803-791-9700~~ Fax No. 803-791-9111
www.pacelabs.com

Number 125114

Client: Arcadis
Address: 28550 Cabot Drive, Suite 500
City: Novi | State: MI | Zip Code: 48377
Project Name: PACER Lansing
Project No.: 30075941.03100
P.O. No.:

Report to Contact: Alex Villhauer / Tiffany Linder
Sampler's Signature: [signature]
Printed Name: Austin Westhuis

Telephone No. / Email: 616-780-3277 / Alex.Villhauer@arcadis.com; 810-225-1928 / Tiffany.Linder@arcadis.com
Quote No.: [illegible]
Analysis (Attach list if more space is needed): PFAS via method 537 mod w/ isotope dilution [illegible]
Page 1 of 1

WI30029
KES2

Sample ID / Description (Containers for each sample may be combined on one line.)	Collection Date(s)	Collection Time (Military)	G=Grab C=Composite	Matrix: Aqueous	Matrix: Solid	Matrix: Non-Aqueous	No. of Containers by Preservative Type: Unpres	H_2SO_4	HNO_3	HCl	NaOH	5035 Kit	Field Filtered	PFAS via method 537 mod w/ isotope dilution	Remarks / Cooler I.D.
SB-05-05376_6-10	9/27/21	0955	G	X			2							X	
SB-05-TC335_26-30	9/27/21	1450	G	X			2							X	

Turn Around Time Required (Prior lab approval required for expedited TAT.): X Standard ☐ Rush (Specify)

Sample Disposal: ☐ Return to Client X Disposal by Lab

Possible Hazard Identification: X Non-Hazard ☐ Flammable ☐ Skin Irritant ☐ Poison ☐ Unknown

QC Requirements (Specify):

Relinquished by	Date	Time	Received by	Date	Time
1. [signature] / Austin Westhuis	9/28/21	1130	1. FedEx	9/28/21	1130
2.			2.		
3.			3.		
4. FedEx	9/29/21	0945	4. Laboratory received by [signature]	9/29/21	0945

Note: All samples are retained for four weeks from receipt unless other arrangements are made.

LAB USE ONLY
Received on ice (Circle): (Yes) No Ice Pack
Receipt Temp. 3.7 °C
Temp Blank ☑ Y ☐ N

DISTRIBUTION: WHITE & YELLOW-Return to laboratory with Sample(s); PINK-Field/Client Copy

Document Number: ME003N8-01

Pace Analytical

Samples Receipt Checklist (SRC) (ME0018C-15)
Issuing Authority: Pace ENV - WCOL

Revised:9/29/2020
Page 1 of 1

Sample Receipt Checklist (SRC)

Client: ARCADIS Cooler Inspected by/date: KDRW / 9/30/2021 Lot #: WI20029

Means of receipt: ☐ Pace ☐ Client ☐ UPS ☑ FedEx ☐ Other:

☑ Yes	☐ No		1. Were custody seals present on the cooler?
☑ Yes	☐ No	☐ NA	2. If custody seals were present, were they intact and unbroken?

pH Strip ID: NA Chlorine Strip ID: NA Tested by: NA

Original temperature upon receipt / Derived (Corrected) temperature upon receipt %Solid Snap-Cup ID: NA

3.7 / 3.7 °C NA / NA °C NA / NA °C NA / NA °C

Method: ☑ Temperature Blank ☐ Against Bottles IR Gun ID: 5 IR Gun Correction Factor: 0 °C

Method of coolant: ☑ Wet Ice ☐ Ice Packs ☐ Dry Ice ☐ None

☐ Yes	☐ No	☑ NA	3. If temperature of any cooler exceeded 6.0°C, was Project Manager Notified? PM was Notified by: phone / email / face-to-face (circle one).
☑ Yes	☐ No	☐ NA	4. Is the commercial courier's packing slip attached to this form?
☑ Yes	☐ No		5. Were proper custody procedures (relinquished/received) followed?
☑ Yes	☐ No		6. Were sample IDs listed on the COC?
☑ Yes	☐ No		7. Were sample IDs listed on all sample containers?
☑ Yes	☐ No		8. Was collection date & time listed on the COC?
☑ Yes	☐ No		9. Was collection date & time listed on all sample containers?
☑ Yes	☐ No		10. Did all container label information (ID, date, time) agree with the COC?
☑ Yes	☐ No		11. Were tests to be performed listed on the COC?
☑ Yes	☐ No		12. Did all samples arrive in the proper containers for each test and/or in good condition (unbroken, lids on, etc.)?
☑ Yes	☐ No		13. Was adequate sample volume available?
☑ Yes	☐ No		14. Were all samples received within ½ the holding time or 48 hours, whichever comes first?
☐ Yes	☑ No		15. Were any samples containers missing/excess (circle one) samples Not listed on COC?
☐ Yes	☐ No	☑ NA	16. For VOA and RSK-175 samples, were bubbles present >"pea-size" (¼"or 6mm in diameter) in any of the VOA vials?
☐ Yes	☐ No	☑ NA	17. Were all DRO/metals/nutrient samples received at a pH of < 2?
☐ Yes	☐ No	☑ NA	18. Were all cyanide samples received at a pH > 12 and sulfide samples received at a pH > 9?
☐ Yes	☐ No	☑ NA	19. Were all applicable NH_3/TKN/cyanide/phenol/625.1/608.3 (< 0.5mg/L) samples free of residual chlorine?
☐ Yes	☐ No	☑ NA	20. Were client remarks/requests (i.e. requested dilutions, MS/MSD designations, etc...) correctly transcribed from the COC into the comment section in LIMS?
☐ Yes	☑ No		21. Was the quote number listed on the container label? If yes, Quote #

Sample Preservation (Must be completed for any sample(s) incorrectly preserved or with headspace.)

Sample(s) NA were received incorrectly preserved and were adjusted accordingly in sample receiving with NA mL of circle one: H2SO4, HNO3, HCl, NaOH using SR # NA.
Time of preservation: NA. If more than one preservative is needed, please note in the comments below.

Sample(s) NA were received with bubbles >6 mm in diameter.

Samples(s) NA were received with TRC > 0.5 mg/L (If #19 is *no*) and were adjusted accordingly in sample receiving with sodium thiosulfate ($Na_2S_2O_3$) with Shealy ID: NA.

SR barcode labels applied by: KDRW Date: 9/30/2021

Comments:

Attachment 2

Soil Boring Logs

ARCADIS Design & Consultancy for natural and built assets

Soil Boring Log

Boring No.: SB-OS-KG312

Sheet: 1 of 2

Project Name: RACER Lansing
Project Number: 30042872
Project Location: Lansing, MI

Date Started: 09/08/2021
Date Completed: 09/08/2021

Logger: A. Westhuis
Editor: C. Cisco
Weather Conditions: 70° F, Sunny

Depth (feet)	Sample Interval	Blow Counts	Recovery (in.)	Sample ID	PID (ppm)	USCS Class	Description	Construction Details	Well
1			78		NR		(0.0-2.0') GRASS/TOPSOIL.	(0.0-30.0') Backfilled with bentonite	
2					NR				
3					NR		(2.0-5.5') CLAY, low plasticity, no dilatancy; some silt; little sand, very fine to fine, subrounded; trace granules, subrounded; trace pebbles, small, subrounded; dry to moist; stiff; light brownish gray (10YR 6/2).		
4					NR				
5					NR				
6					NR		(5.5-9.0') CLAY, medium plasticity, no dilatancy; little silt; trace sand, very fine to fine, subrounded; moist; medium stiff; grayish brown (10YR 5/2).		
7			36		NR				
8					NR				
9					NR				
10					NR		(9.0-9.8') SILT, nonplastic to low plasticity, slow dilatancy; little sand, very fine; trace clay; well sorted; moist; soft; brown (10YR 5/3).		
11			42	SB-OS-KG312_11-15 @ 1535	NR		(9.8-10.5') SAND, very fine to fine, subrounded; little sand, medium to coarse, subrounded; trace silt; poorly sorted; wet; pale brown (10YR 6/3).		
12					NR		(10.5-11.5') CLAY, low to medium plasticity, no dilatancy; little silt; trace sand, very fine to fine, subrounded; trace granules, subrounded; trace pebbles, small to medium, subrounded; moist; stiff; grayish brown (10YR 5/2).		
13					NR		(11.5-12.5') SAND, medium to coarse, subrounded; trace to sand, very fine to fine, subrounded; trace silt; poorly sorted; wet; grayish brown (10YR 5/2).		
14					NR		(12.5-20.0') CLAY, medium plasticity, no dilatancy; little silt; trace sand, fine, subrounded; trace granules, subrounded; trace pebbles, small to medium, subrounded; moist; stiff; grayish brown (10YR 5/2).		
15					NR				
16			46		NR				
17					NR				
18					NR				
19					NR				
20					NR				

Drilling Co.: Fibertec
Driller: Nick Wiseman
Drilling Method: Hand Auger / Direct Push
Drilling Fluid: None
Remarks: bgs = below ground surface.

Sampling Method: 5.0' Macro Core
Sampling Interval: Continuous
Water Level Start (ft. bgs.): NA
Water Level Finish (ft. btoc.): NA
Converted to Well: ☐ Yes ☒ No
Surface Elev.: NA
North Coor:
East Coor:

SOIL BORING LOG_2013 \\ARCADIS-US.COM\OFFICE\DATA\NOVI-MI\COMMON\RACER LANSING\WORKING DATA ANALYSIS\BORING LOGS\RACER LANSING MASTER DATABASE_101921.GPJ ARCADIS_2013.GDT 10/20/21

ARCADIS Design & Consultancy for natural and built assets

Soil Boring Log

Boring No.: SB-OS-KG312

Sheet: 2 of 2

Project Name: RACER Lansing
Project Number: 30042872
Project Location: Lansing, MI

Date Started: 09/08/2021
Date Completed: 09/08/2021

Logger: A. Westhuis
Editor: C. Cisco
Weather Conditions: 70° F, Sunny

Depth (feet)	Sample Interval	Blow Counts	Recovery (in.)	Sample ID	PID (ppm)	USCS Class	Description	Construction Details	Well
21					NR		(20.0-21.0') SAND, fine, subrounded; trace silt; well sorted; wet; pale brown (10YR 6/3).		
22					NR		(21.0-22.5') CLAY, medium plasticity, no dilatancy; little silt; trace sand, very fine to fine, subrounded; trace granules, subrounded; trace pebbles, small to medium, subrounded; moist; stiff; grayish brown (10YR 5/2).		
23			44		NR		(22.5-26.0') SAND, fine to medium, subrounded; trace silt; well sorted; brown (10YR 5/3).		
24					NR				
25					NR			(0.0-30.0') Backfilled with bentonite	
26				SB-OS-KG312_23-27 @ 1635	NR				
27					NR		(26.0-27.0') SAND, very fine; and SILT, nonplastic, rapid dilatancy; well sorted; wet; soft; grayish brown (10YR 5/2).		
28			48		NR		(27.0-28.0') SILT, nonplastic, slow dilatancy; and SAND, very fine; well sorted; moist to wet; soft; grayish brown (10YR 5/2).		
29					NR		(28.0-30.0') CLAY, medium plasticity, no dilatancy; some silt; trace sand, fine, subrounded; trace granules, subrounded; trace pebbles, small to medium, subrounded; dry to moist; stiff; gray (10YR 5/1).		
30					NR		End of boring at 30.0' bgs.		
31									
32									
33									
34									
35									
36									
37									
38									
39									
40									
41									

Remarks:

ARCADIS Design & Consultancy for natural and built assets

Boring No.: SB-OS-LE285

Soil Boring Log

Sheet: 1 of 2

Project Name: RACER Lansing
Project Number: 30042872
Project Location: Lansing, MI

Date Started: 09/08/2021
Date Completed: 09/08/2021

Logger: A. Westhuis
Editor: C. Cisco
Weather Conditions: 70° F, Sunny

Depth (feet)	Sample Interval	Blow Counts	Recovery (in.)	Sample ID	PID (ppm)	USCS Class	Description	Construction Details	Well
1			78		NR		(0.0-2.0') GRASS/TOPSOIL.	(0.0-40.0') Backfilled with bentonite	
2					NR				
3					NR		(2.0-5.0') CLAY, low plasticity, no dilatancy; some silt; trace to little sand, very fine to fine, subrounded; trace granules, subrounded; trace pebbles, small, subrounded; dry to moist; stiff; light brownish gray (10YR 6/2).		
4					NR				
5					NR				
6					NR		(5.0-9.7') CLAY, medium to high plasticity, no dilatancy; little silt; trace sand, very fine; moist; medium stiff; grayish brown (10YR 5/2).		
7			42		NR				
8					NR				
9					NR				
10					NR		(9.7-10.0') SAND, very fine to fine, subrounded; and SILT, nonplastic, slow dilatancy; wet sorted; wet; soft; brown (10YR 5/3).		
11			41	SB-OS-LE285_11-15 @ 1315	NR		(10.0-11.0') CLAY, low to medium plasticity; little to some silt; little sand, fine, subrounded; trace granules, subrounded; trace pebbles, small, subrounded; moist; medium stiff; grayish brown (10YR 5/2).		
12					NR		(11.0-11.8') SAND, very fine to medium, subrounded; little silt; trace to little sand, coarse, subrounded; poorly sorted; wet; gray (10YR 5/1).		
13					NR		(11.8-12.3') CLAY, medium to high plasticity, no dilatancy; little silt; trace sand, fine, subrounded; trace granules, subrounded; trace pebbles, small, subrounded; moist; stiff; gray (10YR 5/1).		
14					NR		(12.3-13.0') SAND, medium to coarse, subrounded; trace to sand, very fine to fine, subrounded; little silt; poorly sorted; wet; gray (10YR 5/1).		
15					NR		(13.0-13.5') CLAY, medium plasticity, no dilatancy; some silt; moist; stiff; gray (10YR 5/1).		
16					NR		(13.5-14.5') SAND, fine to medium, subrounded; trace sand, coarse to very coarse, subrounded; little silt; poorly sorted; wet; gray (10YR 5/1).		
17			42		NR		(14.5-20.5') CLAY, medium plasticity, no dilatancy; some silt; little sand, very fine to fine, subrounded; trace granules, subrounded; trace pebbles, small to medium, subrounded; moist; stiff; grayish brown (10YR 5/2).		
18					NR				
19					NR				
20					NR				

Drilling Co.: Fibertec
Driller: Nick Wiseman
Drilling Method: Hand Auger / Direct Push
Drilling Fluid: None
Remarks: bgs = below ground surface. Attempted to collect water from 25-29' interval, but well was dry.

Sampling Method: 5.0' Macro Core
Sampling Interval: Continuous
Water Level Start (ft. bgs.): NA
Water Level Finish (ft. btoc.): NA
Converted to Well: ☐ Yes ☒ No
Surface Elev.: NA
North Coor:
East Coor:

SOIL BORING LOG_2013 \\ARCADIS-US.COM\OFFICE\DATA\NOVI-MI\COMMON\RACER LANSING\WORKING DATA ANALYSIS\BORING LOGS\RACER LANSING MASTER DATABASE_121621.GPJ ARCADIS_2013.GDT 12/20/21

ARCADIS Design & Consultancy for natural and built assets

Soil Boring Log

Boring No.: SB-OS-LE285

Sheet: 2 of 2

Project Name: RACER Lansing
Project Number: 30042872
Project Location: Lansing, MI

Date Started: 09/08/2021
Date Completed: 09/08/2021

Logger: A. Westhuis
Editor: C. Cisco
Weather Conditions: 70° F, Sunny

Depth (feet)	Sample Interval	Blow Counts	Recovery (in.)	Sample ID	PID (ppm)	USCS Class	Description	Construction Details	Well
21			46		NR		(20.5-20.6') SILT, no dilatancy to slow dilatancy; and SAND, very fine; well sorted; moist to wet; soft; grayish brown (10YR 5/2).		
22					NR		(20.6-25.5') CLAY, medium to high plasticity, no dilatancy; little silt; trace sand, very fine to fine, subrounded; trace granules, subrounded; trace pebbles, small to medium, subrounded; dry to moist; stiff; grayish brown (10YR 5/2).		
23					NR				
24					NR				
25					NR				
26			44		NR		(25.5-29.0') SILT, nonplastic, rapid dilatancy; and SAND, very fine; well sorted; dry; soft; grayish brown (10YR 5/2).		
27					NR				
28					NR				
29					NR				
30					NR		(29.0-40.0') CLAY, low plasticity, no dilatancy; some silt; trace to little sand, very fine to fine, subrounded; trace granules, subrounded; trace pebbles, small to large, subrounded; dry to moist; stiff to very stiff; grayish brown (10YR 5/2).	(0.0-40.0') Backfilled with bentonite	
31			43		NR				
32					NR				
33					NR				
34					NR				
35					NR				
36			42		NR				
37					NR				
38					NR				
39					NR				
40					NR		End of boring at 40.0' bgs.		
41									

Remarks:

ARCADIS Design & Consultancy for natural and built assets

Soil Boring Log

Boring No.: SB-OS-LI335

Sheet: 1 of 2

Project Name: RACER Lansing
Project Number: 30042872
Project Location: Lansing, MI

Date Started: 09/09/2021
Date Completed: 09/09/2021

Logger: A. Westhuis
Editor: C. Cisco
Weather Conditions: 70° F, Sunny

Depth (feet)	Sample Interval	Blow Counts	Recovery (in.)	Sample ID	PID (ppm)	USCS Class	Description	Construction Details	Well
1					NR		(0.0-2.0') GRASS/TOPSOIL.		
2					NR				
3			78		NR		(2.0-5.0') SAND, fine to medium, subrounded; little silt; trace sand, very fine; trace granules, subrounded; trace pebbles, small to medium, subrounded; poorly sorted; dry; yellowish brown (10YR 5/4).		
4					NR				
5					NR				
6					NR		(5.0-8.0') CLAY, medium plasticity, no dilatancy; some silt; trace to little sand, very fine to fine, subrounded; dry to moist; stiff; brown (10YR 5/3).		
7					NR				
8			42		NR		(8.0-15.0') CLAY, medium to high plasticity, no dilatancy; little to some silt; trace sand, very fine to fine, subrounded; trace granules, subrounded; trace pebbles, small, subrounded; dry to moist; stiff; grayish brown (10YR 5/2).	(0.0-40.0') Backfilled with bentonite	
9					NR				
10					NR				
11					NR				
12					NR				
13			56		NR				
14					NR				
15					NR				
16				SB-OS-LI335_14-18 @ 1105	NR		(15.0-16.5') SAND, medium to coarse, subrounded; little silt; trace to little sand, very fine to fine, subrounded; poorly sorted; wet; pale brown (10YR 6/3).		
17					NR		(16.5-20.0') CLAY, medium to high plasticity, no dilatancy; little silt; trace sand, very fine to fine, subrounded; trace granules, subrounded; trace pebbles, small to large, subrounded; dry to moist; stiff; grayish brown (10YR 5/2).		
18			48		NR				
19					NR				
20					NR				

Drilling Co.: Fibertec
Driller: Kody Neal
Drilling Method: Hand Auger / Direct Push
Drilling Fluid: None
Remarks: bgs = below ground surface. Attempted to collect water from 35-39' interval, but well was dry.

Sampling Method: 5.0' Macro Core
Sampling Interval: Continuous
Water Level Start (ft. bgs.): NA
Water Level Finish (ft. btoc.): NA
Converted to Well: ☐ Yes ☒ No
Surface Elev.: NA
North Coor:
East Coor:

ARCADIS Design & Consultancy for natural and built assets

Soil Boring Log

Boring No.: SB-OS-LI335

Sheet: 2 of 2

Project Name: RACER Lansing
Project Number: 30042872
Project Location: Lansing, MI

Date Started: 09/09/2021
Date Completed: 09/09/2021

Logger: A. Westhuis
Editor: C. Cisco
Weather Conditions: 70° F, Sunny

Depth (feet)	Sample Interval	Blow Counts	Recovery (in.)	Sample ID	PID (ppm)	USCS Class	Description	Construction Details	Well
21			18		NR		(20.0-20.5') SAND, very fine; well sorted; dry; light gray (10YR 7/2).	(0.0-40.0') Backfilled with bentonite	
22					NR		(20.5-21.0') SILT, nonplastic, no dilatancy; little to some sand, very fine; well sorted; dry to moist; soft; light gray (10YR 7/2).		
23					NR		(21.0-32.0') CLAY, low to medium plasticity, no dilatancy; some silt; trace sand, very fine to fine, subrounded; trace granules, subrounded; trace pebbles, small, subrounded; dry to moist; stiff; grayish brown (10YR 5/2).		
24					NR				
25					NR				
26			36		NR				
27					NR				
28					NR				
29					NR				
30					NR				
31			18		NR				
32					NR				
33					NR		(32.0-35.0') SAND, very fine to fine, subrounded; trace silt; well sorted; dry; pale brown (10YR 6/3).		
34					NR				
35					NR				
36			33		NR		(35.0-40.0') SAND, very fine; and SILT, nonplastic, no dilatancy to slow dilatancy; trace pebbles, medium, subrounded; dry to moist; stiff; gray (10YR 5/1).		
37					NR				
38					NR				
39					NR				
40					NR		End of boring at 40.0' bgs.		
41									

Remarks:

ARCADIS Design & Consultancy for natural and built assets

Soil Boring Log

Boring No.: SB-OS-OS376

Sheet: 1 of 2

Project Name: RACER Lansing
Project Number: 30042872
Project Location: Lansing, MI

Date Started: 09/27/2021
Date Completed: 09/27/2021

Logger: A. Westhuis
Editor: C. Cisco
Weather Conditions: 65° F, Sunny

Depth (feet)	Sample Interval	Blow Counts	Recovery (in.)	Sample ID	PID (ppm)	USCS Class	Description	Construction Details	Well
1					NR		(0.0-1.5') GRASS/TOPSOIL.		
2					NR		(1.5-9.0') CLAY, low to medium plasticity, no dilatancy; some silt; little sand, very fine to fine, subrounded; trace granules, subrounded; trace pebbles, small to large, subrounded; dry; stiff; light brownish gray (10YR 6/2).		
3					NR				
4					NR				
5			114		NR				
6					NR				
7					NR				
8				SB-OS-OS376_6-10 @ 0955	NR				
9					NR		(9.0-9.5') SAND, very fine to fine, subrounded; and SILT, nonplastic, rapid dilatancy; well sorted; wet; yellowish brown (10YR 5/4).		
10					NR		(9.5-22.0') CLAY, medium to high plasticity, no dilatancy; little to some silt; trace sand, very fine to fine, subrounded; trace granules, subrounded; trace pebbles, small to medium, subrounded; dry to moist; medium stiff to stiff; grayish brown (10YR 5/2).	(0.0-40.0') Backfilled with bentonite	
11					NR				
12					NR				
13			60		NR				
14					NR				
15					NR				
16					NR				
17					NR				
18			30		NR				
19					NR				
20					NR				

Drilling Co.: Fibertec
Driller: Nick Wiseman
Drilling Method: Hand Auger / Direct Push
Drilling Fluid: None
Remarks: bgs = below ground surface.

Sampling Method: 5.0' Macro Core
Sampling Interval: Continuous
Water Level Start (ft. bgs.): 9.0
Water Level Finish (ft. btoc.): NA
Converted to Well: ☐ Yes ☒ No
Surface Elev.: NA
North Coor:
East Coor:

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ARCADIS Design & Consultancy for natural and built assets

Soil Boring Log

Boring No.: SB-OS-OS376

Sheet: 2 of 2

Project Name: RACER Lansing
Project Number: 30042872
Project Location: Lansing, MI

Date Started: 09/27/2021
Date Completed: 09/27/2021

Logger: A. Westhuis
Editor: C. Cisco
Weather Conditions: 65° F, Sunny

Depth (feet)	Sample Interval	Blow Counts	Recovery (in.)	Sample ID	PID (ppm)	USCS Class	Description	Construction Details	Well
21					NR		(9.5-22.0') CLAY, medium to high plasticity, no dilatancy; little to some silt; trace sand, very fine to fine, subrounded; trace granules, subrounded; trace pebbles, small to medium, subrounded; dry to moist; medium stiff to stiff; grayish brown (10YR 5/2).		
22					NR				
23			37		NR		(22.0-23.0') SAND, fine, subrounded; trace silt; well sorted; dry; pale brown (10YR 6/3).		
24					NR		(23.0-31.0') SILT, nonplastic to low plasticity, no dilatancy; trace clay; well sorted; dry; gray (10YR 5/1).		
25					NR				
26					NR				
27					NR				
28			35		NR				
29					NR				
30					NR			(0.0-40.0') Backfilled with bentonite	
31					NR				
32					NR		(31.0-33.6') CLAY, medium plasticity, no dilatancy; little silt; trace sand, very fine to fine, subrounded; trace granules, subrounded; trace pebbles, small, subrounded; dry to moist.		
33			54		NR				
34					NR		(33.6-34.5') SILT, nonplastic, no dilatancy; trace clay; trace sand, very fine; well sorted; dry; light brownish gray (10YR 6/2).		
35					NR		(34.5-40.0') CLAY, medium to high plasticity, no dilatancy; little silt; trace sand, very fine to fine, subrounded; trace granules, subrounded; trace pebbles, small to medium, subrounded; dry to moist; stiff; grayish brown (10YR 5/2).		
36					NR				
37					NR				
38			44		NR				
39					NR				
40					NR		End of boring at 40.0' bgs.		
41									

Remarks:

ARCADIS Design & Consultancy for natural and built assets

Soil Boring Log

Boring No.: SB-OS-QM379

Sheet: 1 of 2

Project Name: RACER Lansing
Project Number: 30042872
Project Location: Lansing, MI

Date Started: 09/09/2021
Date Completed: 09/09/2021

Logger: A. Westhuis
Editor: C. Cisco
Weather Conditions: 70° F, Sunny

Depth (feet)	Sample Interval	Blow Counts	Recovery (in.)	Sample ID	PID (ppm)	USCS Class	Description	Construction Details	Well
1					NR		(0.0-1.5') GRASS/TOPSOIL.		
2					NR		(1.5-6.0') CLAY, low to medium plasticity, no dilatancy; some silt; little sand, very fine to fine, subrounded; trace granules, subrounded; trace pebbles, small to large, subrounded; dry; stiff; light brownish gray (10YR 6/2).		
3			78		NR				
4					NR				
5					NR				
6					NR				
7					NR		(6.0-7.0') SAND, very fine to fine, subrounded; and SILT, nonplastic, no dilatancy; well sorted; dry to moist; yellowish brown (10YR 5/4).		
8			42		NR		(7.0-11.0') SAND, very fine to fine, subrounded; little to some silt, nonplastic, slow to rapid dilatancy; well sorted; moist to wet; yellowish brown (10YR 5/4). Note: Wet at 7.5' bgs.		
9					NR				
10					NR			(0.0-30.0') Backfilled with bentonite	
11				SB-OS-QM379_8-12 @ 1510	NR		(11.0-13.5') SAND, very fine to fine, subrounded; and SILT, nonplastic to low plasticity, rapid dilatancy; little clay; well sorted; wet; soft; yellowish brown (10YR 5/4).		
12					NR				
13			48		NR				
14					NR		(13.5-13.7') SAND, medium to coarse, subrounded; little sand, very fine to fine, subrounded; little silt; poorly sorted; wet; yellowish brown (10YR 5/4).		
15					NR		(13.7-15.0') SAND, very fine to fine, subrounded; and SILT, nonplastic, slow dilatancy; little clay; well sorted; wet; soft; yellowish brown (10YR 5/4).		
16					NR		(15.0-19.7') CLAY, high plasticity, no dilatancy; little silt; trace sand, very fine to fine, subrounded; trace granules, subrounded; trace pebbles, small to medium, subrounded; dry to moist; medium stiff to stiff; grayish brown (10YR 5/2).		
17					NR				
18			36		NR				
19					NR				
20					NR				

Drilling Co.: Fibertec
Driller: Kody Neal
Drilling Method: Hand Auger / Direct Push
Drilling Fluid: None
Remarks: bgs = below ground surface.

Sampling Method: 5.0' Macro Core
Sampling Interval: Continuous
Water Level Start (ft. bgs.): 7.5
Water Level Finish (ft. btoc.): NA
Converted to Well: ☐ Yes ☒ No
Surface Elev.: NA
North Coor:
East Coor:

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ARCADIS Design & Consultancy for natural and built assets

Soil Boring Log

Boring No.: SB-OS-QM379

Sheet: 2 of 2

Project Name: RACER Lansing
Project Number: 30042872
Project Location: Lansing, MI

Date Started: 09/09/2021
Date Completed: 09/09/2021

Logger: A. Westhuis
Editor: C. Cisco
Weather Conditions: 70° F, Sunny

Depth (feet)	Sample Interval	Blow Counts	Recovery (in.)	Sample ID	PID (ppm)	USCS Class	Description	Construction Details	Well
21			36		NR		(19.7-20.2') SILT, nonplastic, no dilatancy; little sand, very fine, subrounded; dry to moist; gray (10YR 5/1).	(0.0-30.0') Backfilled with bentonite	
22					NR		(20.2-25.5') SAND, very fine to fine, subrounded; little silt; well sorted; moist to wet; pale brown (10YR 6/3).		
23					NR				
24					NR				
25					NR				
26			36	SB-OS-QM379_25-29 @ 1630	NR		(25.5-25.8') SAND, very fine; and SILT; well sorted; moist; brown (10YR 5/3).		
27					NR		(25.8-28.5') SAND, very fine to fine, subrounded; little sand, medium to coarse, subrounded; trace to little silt; poorly sorted; wet; pale brown (10YR 6/3).		
28					NR				
29					NR				
30					NR		(28.5-30.0') CLAY, medium to high plasticity, no dilatancy; little silt; trace sand, very fine to fine, subrounded; trace granules, subrounded; trace pebbles, small to medium, subrounded; dry to moist; stiff; grayish brown (10YR 5/2). End of boring at 30.0' bgs.		
31									
32									
33									
34									
35									
36									
37									
38									
39									
40									
41									

Remarks:

ARCADIS Design & Consultancy for natural and built assets

Soil Boring Log

Boring No.: SB-OS-RO398

Sheet: 1 of 2

Project Name: RACER Lansing
Project Number: 30042872
Project Location: Lansing, MI

Date Started: 09/10/2021
Date Completed: 09/10/2021

Logger: A. Westhuis
Editor: C. Cisco
Weather Conditions: 70° F, Sunny

Depth (feet)	Sample Interval	Blow Counts	Recovery (in.)	Sample ID	PID (ppm)	USCS Class	Description	Construction Details	Well
1			78		NR		(0.0-1.5') GRASS/TOPSOIL.	(0.0-40.0') Backfilled with bentonite	
2					NR		(1.5-7.5') CLAY, low to medium plasticity, no dilatancy; some silt; little sand, very fine to fine, subrounded; trace granules, subrounded; trace pebbles, small to large, subrounded; dry; stiff; light brownish gray (10YR 6/2).		
3					NR				
4					NR				
5					NR				
6					NR				
7			42	SB-OS-RO398_6-10 @ 0955	NR		(7.5-7.6') SAND, very fine to fine, subrounded; little silt; well sorted; wet; yellowish brown (10YR 5/4).		
8					NR		(7.6-9.0') CLAY, high plasticity, no dilatancy; little silt; trace sand, very fine; trace granules, subrounded; trace pebbles, small to medium, subrounded; dry to moist; stiff; brown (10YR 5/3).		
9									
10					NR		(9.0-9.3') SAND, very fine to fine, subrounded; little silt; well sorted; wet; brown (10YR 5/3).		
11			36		NR		(9.3-12.0') CLAY, high plasticity, no dilatancy; little silt; trace sand, very fine to fine, subrounded; trace granules, subrounded; trace pebbles, small, subrounded; moist; stiff; brown (10YR 5/3).		
12					NR				
13					NR		(12.0-21.0') CLAY, medium plasticity, no dilatancy; some silt; trace sand, very fine to fine, subrounded; trace granules, subrounded; trace pebbles, small to large subrounded; moist; stiff; grayish brown (10YR 5/2).		
14					NR				
15					NR				
16			36		NR				
17					NR				
18					NR				
19					NR				
20									

Drilling Co.: Fibertec
Driller: Nick Wiseman
Drilling Method: Hand Auger / Direct Push
Drilling Fluid: None
Remarks: bgs = below ground surface.

Sampling Method: 5.0' Macro Core
Sampling Interval: Continuous
Water Level Start (ft. bgs.): NA
Water Level Finish (ft. btoc.): NA
Converted to Well: ☐ Yes ☒ No
Surface Elev.: NA
North Coor:
East Coor:

SOIL BORING LOG_2013 \\ARCADIS-US.COM\OFFICE\DATA\NOV1-MI\COMMON\RACER LANSING\WORKING DATA ANALYSIS\BORING LOGS\RACER LANSING MASTER DATABASE_101921.GPJ ARCADIS_2013.GDT 10/20/21

ARCADIS Design & Consultancy for natural and built assets

Soil Boring Log

Boring No.: SB-OS-RO398

Sheet: 2 of 2

Project Name: RACER Lansing
Project Number: 30042872
Project Location: Lansing, MI

Date Started: 09/10/2021
Date Completed: 09/10/2021

Logger: A. Westhuis
Editor: C. Cisco
Weather Conditions: 70° F, Sunny

Depth (feet)	Sample Interval	Blow Counts	Recovery (in.)	Sample ID	PID (ppm)	USCS Class	Description	Construction Details	Well
21			60		NR		(21.0-31.0') CLAY, low plasticity, no dilatancy; some silt; trace sand, very fine to fine, subrounded; trace granules, subrounded; trace pebbles, small to large, subrounded; dry to moist; stiff to very stiff; grayish brown (10YR 5/2).	(0.0-40.0') Backfilled with bentonite	
22					NR				
23					NR				
24					NR				
25					NR				
26			48		NR				
27					NR				
28					NR				
29					NR				
30					NR				
31			33		NR		(31.0-31.5') SAND, very fine to fine, subrounded; trace silt; well sorted; dry; pale brown (10YR 6/3).		
32					NR		(31.5-35.0') CLAY, low to medium plasticity, no dilatancy; and SILT; trace sand, very fine to fine, subrounded; dry; medium stiff to stiff; gray (10YR 5/1).		
33					NR				
34					NR				
35					NR				
36			36		NR		(35.0-40.0') SAND, very fine to fine, subrounded; trace silt; well sorted; dry; pale brown (10YR 6/3).		
37					NR				
38					NR				
39					NR				
40					NR		End of boring at 40.0' bgs.		
41									

Remarks:

ARCADIS Design & Consultancy for natural and built assets

Soil Boring Log

Boring No.: SB-OS-SW386

Sheet: 1 of 2

Project Name: RACER Lansing
Project Number: 30042872
Project Location: Lansing, MI

Date Started: 09/10/2021
Date Completed: 09/10/2021

Logger: A. Westhuis
Editor: C. Cisco
Weather Conditions: 70° F, Sunny

Depth (feet)	Sample Interval	Blow Counts	Recovery (in.)	Sample ID	PID (ppm)	USCS Class	Description	Construction Details	Well
1					NR		(0.0-1.5') GRASS/TOPSOIL.		
2					NR		(1.5-6.5') CLAY, low to medium plasticity, no dilatancy; some silt; little sand, very fine to fine, subrounded; trace granules, subrounded; trace pebbles, small to large, subrounded; dry; stiff; light brownish gray (10YR 6/2).		
3			78		NR				
4					NR				
5					NR				
6					NR				
7					NR		(6.5-10.0') CLAY, high plasticity, no dilatancy; little silt; trace sand, very fine to fine, subrounded; trace granules, subrounded; trace pebbles, small to large, subrounded; moist; medium stiff to stiff; yellowish brown (10YR 5/4).	(0.0-25.0') Backfilled with bentonite	
8			42		NR				
9									
10					NR		(10.0-12.0') SAND, medium to coarse, subrounded; little sand, very fine to fine, subrounded; little silt; trace granules, subrounded; trace pebbles, small to medium, subrounded; poorly sorted; moist; yellowish brown (10YR 5/4).		
11					NR				
12					NR		(12.0-13.5') CLAY, high plasticity, no dilatancy; little silt; trace sand, very fine to fine, subrounded; trace granules, subrounded; trace pebbles, small to medium, subrounded; moist; stiff; gray (10YR 5/1).		
13			60	SB-OS-SW386_11-15 @ 1150 and DUP-01_091021 collected	NR				
14					NR		(13.5-15.5') SAND, very fine to fine, subrounded; little silt; well sorted; wet; yellowish brown (10YR 5/4) to pale brown (10YR 6/3).		
15									
16					NR		(15.5-20.0') CLAY, medium plasticity, no dilatancy; some silt; trace sand, very fine to fine, subrounded; trace granules, subrounded; trace pebbles, small to large, subrounded; moist; stiff; grayish brown (10YR 5/2).		
17					NR				
18			48		NR				
19					NR				
20									

Drilling Co.: Fibertec
Driller: Nick Wiseman
Drilling Method: Hand Auger / Direct Push
Drilling Fluid: None
Remarks: bgs = below ground surface.

Sampling Method: 5.0' Macro Core
Sampling Interval: Continuous
Water Level Start (ft. bgs.): NA
Water Level Finish (ft. btoc.): NA
Converted to Well: ☐ Yes ☒ No
Surface Elev.: NA
North Coor:
East Coor:

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ARCADIS Design & Consultancy for natural and built assets

Soil Boring Log

Boring No.: SB-OS-SW386

Sheet: 2 of 2

Project Name: RACER Lansing
Project Number: 30042872
Project Location: Lansing, MI

Date Started: 09/10/2021
Date Completed: 09/10/2021

Logger: A. Westhuis
Editor: C. Cisco
Weather Conditions: 70° F, Sunny

Depth (feet)	Sample Interval	Blow Counts	Recovery (in.)	Sample ID	PID (ppm)	USCS Class	Description	Construction Details	Well
21			48	SB-OS-SW386_20-24 @ 1225	NR		(20.0-20.4') SAND, fine to medium, subrounded; little silt; trace sand, coarse, subrounded; poorly sorted; wet; gray (10YR 5/4).	(0.0-25.0') Backfilled with bentonite	
22					NR		(20.4-22.0') CLAY, low to medium plasticity, no dilatancy; some silt; little sand, very fine to fine, subrounded; trace granules, subrounded; trace pebbles, small to large, subrounded; moist; medium stiff; grayish brown (10YR 5/2).		
23					NR		(22.0-22.3') SAND, very fine to fine, subrounded; little silt; well sorted; wet; pale brown (10YR 6/3).		
24					NR		(22.3-25.0') CLAY, medium to high plasticity, no dilatancy; little silt; trace sand, very fine to fine, subrounded; trace granules, subrounded; trace pebbles, small to large, subrounded; moist; stiff; gray (10YR 5/1).		
25							End of boring at 25.0' bgs.		
26									
27									
28									
29									
30									
31									
32									
33									
34									
35									
36									
37									
38									
39									
40									
41									

Remarks:

ARCADIS Design & Consultancy for natural and built assets

Soil Boring Log

Boring No.: SB-OS-TC335

Sheet: 1 of 2

Project Name: RACER Lansing
Project Number: 30042872
Project Location: Lansing, MI

Date Started: 09/27/2021
Date Completed: 09/27/2021

Logger: A. Westhuis
Editor: C. Cisco
Weather Conditions: 75° F, Sunny

Depth (feet)	Sample Interval	Blow Counts	Recovery (in.)	Sample ID	PID (ppm)	USCS Class	Description	Construction Details	Well
1					NR		(0.0-1.5') GRASS/TOPSOIL.		
2					NR		(1.5-7.0') CLAY, low to medium plasticity, no dilatancy; some silt; little sand, very fine to fine, subrounded; trace granules, subrounded; trace pebbles, small to large, subrounded; dry; stiff; light brownish gray (10YR 6/2).		
3			78		NR				
4					NR				
5					NR				
6					NR				
7					NR				
8			42		NR		(7.0-8.0') CLAY, low plasticity, no dilatancy; some silt; trace sand, very fine to fine, subrounded; trace granules, subrounded; trace pebbles, small, subrounded; moist; soft; light brownish gray (10YR 6/2).		
9					NR		(8.0-19.0') CLAY, low to medium plasticity, no dilatancy; some silt; trace sand, very fine to fine, subrounded; trace granules, subrounded; trace pebbles, small to large, subrounded; dry; stiff; gray (10YR 5/1).		
10					NR			(0.0-40.0') Backfilled with bentonite	
11					NR				
12			60		NR				
13					NR				
14					NR				
15					NR				
16					NR				
17			50		NR				
18					NR				
19					NR				
20					NR		(19.0-24.0') CLAY, nonplastic to low plasticity, no dilatancy; and SILT; moist; medium stiff; gray (10YR 5/1).		

Drilling Co.: Fibertec
Driller: Nick Wiseman
Drilling Method: Hand Auger / Direct Push
Drilling Fluid: None
Remarks: bgs = below ground surface. Attempted to collect water from 20-24' interval, but well was dry.

Sampling Method: 5.0' Macro Core
Sampling Interval: Continuous
Water Level Start (ft. bgs.): 9.0
Water Level Finish (ft. btoc.): NA
Converted to Well: ☐ Yes ☒ No
Surface Elev.: NA
North Coor:
East Coor:

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ARCADIS Design & Consultancy for natural and built assets

Soil Boring Log

Boring No.: SB-OS-TC335

Sheet: 2 of 2

Project Name: RACER Lansing
Project Number: 30042872
Project Location: Lansing, MI

Date Started: 09/27/2021
Date Completed: 09/27/2021

Logger: A. Westhuis
Editor: C. Cisco
Weather Conditions: 75° F, Sunny

Depth (feet)	Sample Interval	Blow Counts	Recovery (in.)	Sample ID	PID (ppm)	USCS Class	Description	Construction Details	Well
21					NR		(19.0-24.0') CLAY, nonplastic to low plasticity, no dilatancy; and SILT; moist; medium stiff; gray (10YR 5/1).		
22					NR				
23			52		NR		Note: Lenses of silt and very fine sand present at 22.0' bgs, moist.		
24					NR				
25					NR		(24.0-28.5') CLAY, low plasticity, no dilatancy; some silt; trace to little sand, very fine to fine, subrounded; trace granules, subrounded; trace pebbles, small to medium, subrounded; moist; stiff; gray (10YR 5/1).		
26					NR				
27					NR				
28			43	SB-OS-TC335_26-30 @ 1450	NR				
29					NR		(28.5-29.5') SAND, fine to coarse, subrounded; trace to little silt; poorly sorted; wet; pale brown (10YR 6/3).		
30					NR		(29.5-40.0') CLAY, low to medium plasticity, no dilatancy; some silt; trace sand, very fine to fine, subrounded; trace granules, subrounded; trace pebbles, small to large, subrounded; very stiff; gray (10YR 5/1).	(0.0-40.0') Backfilled with bentonite	
31					NR				
32					NR				
33			42		NR				
34					NR				
35					NR				
36					NR				
37					NR				
38			46		NR				
39					NR				
40					NR		End of boring at 40.0' bgs.		
41									

Remarks: