Memo

TO
Mr. Andrew Karg
Michigan Department of Environment, Great Lakes, & Energy (EGLE)
Saginaw Bay District Office
401 Ketchum Street, Suite B
Bay City, Michigan 48708

SUBJECT
Addendum to the Annual Report: Supplemental PFAS Sampling
RACER Saginaw Malleable Industrial Land, Green Point Landfill and Peninsula Property
Saginaw, Michigan

DATE
February 9, 2023

PROJECT NUMBER
30169042

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This Per- and polyfluoroalkyl substances (PFAS) Sampling Summary Memo has been prepared as an addendum to the 2022 Annual Report by Arcadis of Michigan, LLC (Arcadis) for activities at the Saginaw Malleable Industrial Land (SMI), Green Point Landfill (GPL), and Peninsula Properties, collectively referred to as; Saginaw Malleable (Site, **Figure 1**) located at 77 West Center Street, Saginaw, Michigan.

During the annual Operation and Maintenance (O&M) event conducted in September 2022, samples from four monitoring wells located within SMI and nine monitoring wells located within GPL (**Figure 2**) were analyzed for per- and polyfluoroalkyl substances (PFAS).

Two supplemental sampling locations from those sampled during annual O&M event in September 2022 were identified in the 2021 Annual Report to be sampled for PFAS and include: MW-125WT and TW-242 which are located within GPL property, in the southwest corner of the Site. These locations were low-flow sampled for PFAS on January 17, 2023. Samples were submitted to SGS Laboratory in Orlando, Florida under chain-of-custody for analysis using EPA Method 537M QSM 5.3. There were no detections above EGLE Groundwater Surface water Interface or Drinking Water Criterion at these locations. The results from the PFAS sampling are summarized in **Table 1** and presented on **Figure 2**.

The analytical laboratory report is provided in **Attachment 1** and the low-flow groundwater sampling logs are provided in **Attachment 2**.

Based on the results from these wells, it is not warranted to include them in the annual groundwater monitoring program.

Andrew Karg
EGLE
February 9, 2023

Enclosures:

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1 PFAS Groundwater Analytical Summary Table

FIGURES

1 Site Location Map

2 PFAS Sampling Results

ATTACHMENTS

1 Field Sampling Logs
2 Laboratory Analytical Results

Table 1
PFAS Groundwater Analytical Summary Table
RACER Saginaw Malleable
Saginaw, Michigan

Analyte	Drinking Water Criteria	EGLE Drinking Water MCL	Groundwater Surface Water Interface Criteria	Well ID Sample Date Site Area Units	B-3R 12/18/2018 SMI	B-3R 8/11/2020 SMI	B-3R 8/19/2021 SMI	B-3R 9/26/2022 SMI	MW-108WT 12/18/2018 SMI	MW-108WT 8/13/2020 SMI	MW-108WT 8/19/2021 SMI	MW-117WT 8/13/2020 GPL	MW-117WT 8/17/2021 GPL	MW-117WT 9/22/2022 GPL	MW-117S1 8/13/2020 GPL	MW-117S1 8/17/2021 GPL	MW-117S1 9/21/2022 GPL	MW-118WT 8/14/2020 GPL	MW-118WT 8/17/2021 GPL	MW-118WT 9/22/2022 GPL	MW-118S1 12/18/2018 GPL
Perfluorobutanoic acid (PFBA)	--	--	--	ng/L	**2.3 J**	**11.3**	3.6 U	3.7 U [a]	**3.02 J**	**8.8**	**3.7 J**	**296**	**449** [a]	**269** [b]	3.7 U	3.6 U	3.7 U [a]	**18.2**	**49.4**	**48.8** [a]	**9.71**
Perfluoropentanoic acid (PFPeA)	--	--	--	ng/L	**1.68 J**	**13.4**	1.8 U	1.9 U [a]	**1.77 J**	**2.1 J**	**1.8 J**	**43.9**	**134** [a]	**47.3** [b]	1.9 U	8.9 U	1.9 U [a]	**4.8**	**23.0**	**11.8** [a]	**4.37**
Perfluorohexanoic acid (PFHxA)	--	400,000	--	ng/L	**1.26 J**	1.9 U	1.8 U	**2.1 J** [a]	2.0 U	**2.4 J**	**1.9 J**	**77.8**	**114** [a]	**84.1** [b]	1.9 U	1.8 U	1.9 U [a]	**7.6**	**21.1**	**19.4** [a]	**1.77 J**
Perfluoroheptanoic acid (PFHpA)	--	--	--	ng/L	2.0 U	**2.1 J**	**1.8 J**	1.9 U [a]	2.0 U	**1.2 J**	**1.9 J**	**9.7**	**18.7**	**10**	1.9 U	1.8 U	1.9 U [a]	**3.1 J**	**6.1 J**	**9.7** [a]	**1.93 J**
Perfluorooctanoic acid (PFOA)	70	8	170	ng/L	**5.58**	**2.7 J**	**2.7 J**	**2.7 J** [a]	**3.66 J**	**4.4**	**4.6**	**3.6 J**	**5.5**	1.9 U	1.9 U	1.8 U	1.9 U	**2.4 J**	**5.3**	**4.8**	**1.95 J**
Perfluorononanoic acid (PFNA)	--	6	--	ng/L	2.0 U	1.9 U	1.8 U	1.9 U [a]	2.0 U	1.9 U	**1.4 J**	1.9 U	8.9 U	1.9 U	1.9 U	1.8 U	1.9 U [a]	1.9 U	8.9 U	1.9 U [a]	2.0 U
Perfluorodecanoic acid (PFDA)	--	--	--	ng/L	2.0 U	1.9 U	1.8 U	1.9 U [a]	2.0 U	1.9 U	1.8 U	1.9 U	1.8 U	1.9 U	1.9 U	1.8 U	1.9 U [a]	1.9 U	1.8 U	1.9 U [a]	2.0 U
Perfluoroundecanoic acid (PFUnA)	--	--	--	ng/L	2.0 U	1.9 U	1.8 U	1.9 U	2.0 U	1.9 U	1.8 U	1.9 U	1.8 U	1.9 U	1.9 U	1.8 U	1.9 U	1.9 U	1.8 U	1.9 U	2.0 U
Perfluorododecanoic acid (PFDoA)	--	--	--	ng/L	2.0 U	1.9 U	1.8 U	1.9 U [a]	2.0 U	1.9 U	1.8 U	1.9 U	8.9 U [a]	1.9 U	1.9 U	8.9 U [a]	1.9 U [a]	1.9 U	8.9 U [b]	1.9 U [a]	2.0 U
Perfluorotridecanoic Acid (PFTriA)	--	--	--	ng/L	2.0 U	1.9 U [a]	1.8 U	1.9 U [a]	2.0 U	1.9 U	1.8 U	1.9 U	8.9 U [a]	1.9 U	1.9 U	8.9 U [a]	1.9 U [a]	1.9 U	8.9 U [b]	1.9 U [a]	2.0 U
Perfluorotetradecanoic acid (PFTeA)	--	--	--	ng/L	2.0 U	1.9 U [a]	1.8 U [a]	1.9 U [a]	2.0 U	1.9 U	1.8 U	1.9 U	8.9 U [a]	9.3 U [b]	1.9 U	8.9 U [a]	1.9 U [a]	1.9 U	8.9 U [b]	1.9 U [a]	2.0 U
Perfluorobutanesulfonic acid (PFBS)	--	420	670,000	ng/L	2.0 U	1.9 U	1.8 U	1.9 U [a]	2.0 U	**1.9 J**	1.8 U	1.9 U	8.9 U	9.3 U [b]	1.9 U	1.8 U	1.9 U [a]	**2.5 J**	1.8 U	1.9 U [a]	2.0 U
Perfluoropentanesulfonic acid (PFPeS)	--	--	--	ng/L	2.0 U	1.9 U	1.8 U	1.9 U [a]	2.0 U	1.9 U	1.8 U	1.9 U	8.9 U	9.3 U [b]	1.9 U	1.8 U	1.9 U [a]	1.9 U	1.8 U	1.9 U [a]	2.0 U
Perfluorohexanesulfonic acid (PFHxS)	--	51	--	ng/L	**1.13 J**	1.9 U	**0.98 J**	1.9 U [a]	**1.92 J**	**5.8**	**3.5 J**	1.9 U	1.8 U	1.9 U	1.9 U	1.8 U	1.9 U	1.9 U	1.8 U	1.9 U	2.0 U
Perfluoroheptanesulfonic Acid (PFHpS)	--	--	--	ng/L	2.0 U	1.9 U	1.8 U	1.9 U [a]	2.0 U	1.9 U	1.8 U	1.9 U	1.8 U	1.9 U [a]	1.9 U	1.8 U	1.9 U	1.9 U	1.8 U	1.9 U	2.0 U
Perfluorooctanesulfonic acid (PFOS)	70	16	12	ng/L	**15.6**	**14.4**	**13.7**	**14.3**	**2.63 J**	**17.1**	**15.1**	1.9 U	1.8 U	1.9 U [a]	1.9 U	1.8 U	1.9 U [a]	1.9 U	1.8 U	1.9 U [a]	4.0 U
Perfluorononanesulfonic acid (PFNS)	--	--	--	ng/L	2.0 U	1.9 U	1.8 U	1.9 U [a]	2.0 U	1.9 U	1.8 U	1.9 U	1.8 U	9.3 U [b]	1.9 U	1.8 U	1.9 U [a]	1.9 U	1.8 U	1.9 U [a]	2.0 U
Perfluorodecanesulfonic acid (PFDS)	--	--	--	ng/L	2.0 U	1.9 U	1.8 U	1.9 U	2.0 U	1.9 U	1.8 U	1.9 U	1.8 U	1.9 U	1.9 U	1.8 U	1.9 U	1.9 U	1.8 U	1.9 U	2.0 U
4:2 Flourotelemer Sulfonate (4:2 FTS)	--	--	--	ng/L	4.0 U	3.7 U	3.6 U	3.7 U [a]	4.0 U	3.7 U	3.6 U	3.7 U	18 U	19 U [b]	3.7 U	3.6 U	3.7 U [a]	3.7 U	3.6 U	3.7 U [a]	4.0 U
6:2 Flourotelemer Sulfonate (6:2 FTS)	--	--	--	ng/L	4.0 U	3.7 U	3.6 U	3.7 U	4.0 U	3.7 U	3.6 U	3.7 U	3.6 U	3.7 U	3.7 U	3.6 U	3.7 U	3.7 U	3.6 U	3.7 U	4.0 U
8:2 Flourotelemer Sulfonate (8:2 FTS)	--	--	--	ng/L	4.0 U	3.7 U	3.6 U	3.7 U [a]	4.0 U	3.7 U	3.6 U	3.7 U	3.6 U	3.7 U	3.7 U	3.6 U	3.7 U [a]	3.7 U	3.6 U	3.7 U [a]	4.0 U
acetic acid (MeFOSAA)	--	--	--	ng/L	8.0 U	7.4 U	3.6 U	3.7 U	8.0 U	7.4 U	3.6 U	7.4 U	3.6 U	3.7 U	7.4 U	3.6 U	3.7 U	7.4 U	3.6 U	3.7 U	8.0 U
acetic acid (EtFOSAA)	--	--	--	ng/L	8.0 U	7.4 U	3.6 U	3.7 U	8.0 U	7.4 U	3.6 U	7.4 U	3.6 U	3.7 U	7.4 U	3.6 U	3.7 U [a]	7.4 U	3.6 U	3.7 U	8.0 U
Perfluorooctane Sulfonamide (FOSA)	--	--	--	ng/L	2.0 U	1.9 U [a]	1.8 U [a]	1.9 U [a]	2.0 U	9.3 U	1.8 U [a]	1.9 U	8.9 U [a]	9.3 U [b]	1.9 U	8.9 U [a]	1.9 U [a]	9.3 U	8.9 U [b]	1.9 U [a]	2.0 U
HFPO-DA (GenX)		370	--	ng/L	--	9.3 U	3.6 U	3.7 U [a]	--	9.3 U	3.6 U	9.3 U	3.6 U	3.7 U	9.3 U	3.6 U	3.7 U [a]	9.3 U	3.6 U	3.7 U [a]	--
ADONA		--	--	ng/L	--	3.7 U	3.6 U	3.7 U [a]	--	3.7 U	3.6 U	3.7 U	3.6 U	3.7 U	3.7 U	3.6 U	3.7 U	3.7 U	3.6 U	3.7 U	--
9Cl-PF3ONS (F-53B Major)		--	--	ng/L	--	3.7 U	3.6 U	3.7 U [a]	--	3.7 U	3.6 U	3.7 U	3.6 U	3.7 U	3.7 U	3.6 U	3.7 U [a]	3.7 U	3.6 U	3.7 U [a]	--
11Cl-PF3OUdS (F-53B Minor)		--	--	ng/L	--	3.7 U	3.6 U	3.7 U [a]	--	3.7 U	3.6 U	3.7 U	18 U [a]	3.7 U	3.7 U	18 U [a]	3.7 U [a]	3.7 U	18 U [b]	3.7 U [a]	--
Total PFAS	--	**--**	**--**	ng/L	**27.55**	**43.9**	**19.18**	**19.1**	**13**	**43.7**	**33.9**	**431**	**721.2**	**410.4**	**0**	**0**	**0**	**38.6**	**104.9**	**94.5**	**19.73**

Notes:
All values are in nanograms per liter (ng/L).
Bold result denotes detection.
Shaded result denotes detection is above the EGLE Groundwater Surface Water Criteria.
Red result denotes detection is above EGLE Drinking Water Maximum Contaminant Limit (MCL).
For Total PFAS all detections were summed.

-- = not applicable
a = Associated ID Standard outside control limits. Confirmed by batch QC, re-extraction and/or reanalysis.
b = Result is from Run #2
U = not detected
J = estimated value between the limit of quantitation and the method detection limit.
[ ] = duplicate sample detections
EGLE = Environment Great Lakes and Energy

Table 1
PFAS Groundwater Analytical Summary Table
RACER Saginaw Malleable
Saginaw, Michigan

Analyte	Drinking Water Criteria	EGLE Drinking Water MCL	Groundwater Surface Water Interface Criteria	Well ID Sample Date Site Area Units	MW-122WT 8/18/2021 GPL	MW-122WT 9/23/2022 GPL	MW-125WT 9/8/2020 GPL	MW-125WT 1/17/2023 GPL	MW-131WT 12/18/2018 SMI	MW-131WT 8/11/2020 SMI	MW-131WT 8/19/2021 SMI	MW-131WT 9/26/2022 SMI	MW-134WT 12/18/2018 SMI	MW-134WT 8/11/2020 SMI	MW-134WT 8/19/2021 SMI	MW-134WT 9/27/2022 SMI	MW-183WT 12/19/2018 GPL	MW-183WT 8/18/2020 GPL	MW-183WT 8/24/2021 GPL
Perfluorobutanoic acid (PFBA)	--	--	--	ng/L	**51.3**	**79.1** [b]	**20.5**	**16.5**	**4.14 J**	**11.1**	**6.2 J**	**7.4** [a]	**5.64 J**	**5.9 J**	**3.0 J**	**6.4 J** [a]	**11.4**	**15.2**	**8.3**
Perfluoropentanoic acid (PFPeA)	--	--	--	ng/L	**6.4 J**	**7.3 J** [b]	**2.4 J**	**1.4 J**	**2.24 J**	1.9 U	**1.3 J**	**5.9** [a]	**3.54 J**	**2.7 J**	**1.0 J**	**5.0** [a]	2.0 U	**2.4 J**	**0.83 J**
Perfluorohexanoic acid (PFHxA)	--	400,000	--	ng/L	**2.6 J**	**5.6 J** [b]	**2.9 J**	**2.0 J** [a]	**1.14 J**	**0.99 J**	**1.8 J**	**1.6 J** [a]	**1.66 J**	**1.9 J**	1.8 U	**2.4 J** [a]	2.0 U	**2.5 J**	**1.0 J**
Perfluoroheptanoic acid (PFHpA)	--	--	--	ng/L	**2.2 J**	**1.7 J**	**1.5 J**	**1.1 J**	**1.2 J**	1.9 U	**1.6 J**	1.9 U [a]	**1.28 J**	**2.2 J**	1.8 U	1.9 U [a]	2.0 U	**2.5 J**	**1.10 J**
Perfluorooctanoic acid (PFOA)	70	8	170	ng/L	**3.1 J**	**2.4 J**	**4.3**	**2.9 J**	**2.38 J**	**3.6 J**	**3.7**	**3.3 J**	**3.0 J**	**2.0 J**	**1.7 J**	**3.6 J** [a]	**2.07 J**	**4.6**	**2.9 J**
Perfluorononanoic acid (PFNA)	--	6	--	ng/L	1.8 U	1.9 U	1.7 U	1.9 U	2.0 U	1.9 U	**1.3 J**	1.9 U [a]	2.0 U	1.9 U	1.8 U	1.9 U [a]	2.0 U	**1.1 J**	1.6 U
Perfluorodecanoic acid (PFDA)	--	--	--	ng/L	1.8 U	1.9 U	1.7 U	1.9 U	2.0 U	1.9 U	1.8 U	1.9 U [a]	2.0 U	1.9 U	1.8 U	1.9 U [a]	2.0 U	1.9 U	1.6 U
Perfluoroundecanoic acid (PFUnA)	--	--	--	ng/L	1.8 U	1.9 U	1.7 U	1.9 U	2.0 U	1.9 U	1.8 U	1.9 U [a]	2.0 U	1.9 U	1.8 U	1.9 U	2.0 U	1.9 U	1.6 U
Perfluorododecanoic acid (PFDoA)	--	--	--	ng/L	8.9 U [a]	1.9 U	1.7 U	1.9 U	2.0 U	1.9 U	1.8 U	1.9 U [a]	2.0 U	1.9 U	1.8 U	1.9 U [a]	2.0 U	1.9 U	1.6 U
Perfluorotridecanoic Acid (PFTriA)	--	--	--	ng/L	8.9 U [a]	1.9 U	1.7 U	1.9 U	2.0 U	1.9 U	1.8 U	1.9 U [a]	2.0 U	1.9 U	1.8 U	1.9 U [a]	2.0 U	1.9 U	1.6 U
Perfluorotetradecanoic acid (PFTeA)	--	--	--	ng/L	8.9 U [a]	9.3 U [b]	1.7 U	1.9 U	2.0 U	1.9 U	1.8 J [q]	1.9 U [a]	2.0 U	1.9 U	1.8 U	1.9 U [a]	2.0 U	1.9 U	16 U [a]
Perfluorobutanesulfonic acid (PFBS)	--	420	670,000	ng/L	**2.0 J**	**2.6 J** [a]	**3.0 J**	**2.7 J**	**1.72 J**	**3.0 J**	**2.0 J**	**3.0 J** [a]	**1.99 J**	1.9 U	**1.1 J**	1.9 U [a]	**1.66 J**	**2.2 J**	**1.1 J**
Perfluoropentanesulfonic acid (PFPeS)	--	--	--	ng/L	1.8 U	9.3 U [b]	**1.2 J**	**1.2 J**	2.0 U	**1.1 J**	**1.3 J**	**2.8 J** [a]	2.0 U	1.9 U	1.8 U	1.9 U [a]	2.0 U	1.9 U	1.6 U
Perfluorohexanesulfonic acid (PFHxS)	--	51	--	ng/L	1.8 U	1.9 U	**3.0 J**	**5.1**	**4.21**	**4.9**	**9.1 J**	**8.3**	2.0 U	1.9 U	1.8 U	1.9 U	**1.5 J**	**2.0 J**	**1.7 J**
Perfluoroheptanesulfonic Acid (PFHpS)	--	--	--	ng/L	1.8 U	1.9 U	1.7 U	1.9 U	2.0 U	1.9 U	1.8 U	1.9 U [a]	2.0 U	1.9 U	1.8 U	1.9 U	2.0 U	1.9 U	1.6 U
Perfluorooctanesulfonic acid (PFOS)	70	16	12	ng/L	**1.7 J**	1.9 U	1.7 U	1.9 U	**4.88 J**	**7.9**	**11.0**	**14.6** [a]	4.0 U	1.9 U	1.8 U	1.9 U [a]	4.0 U	**3.5 J**	**1.5 J**
Perfluorononanesulfonic acid (PFNS)	--	--	--	ng/L	1.8 U	1.9 U	1.7 U	1.9 U	2.0 U	1.9 U	1.8 U	1.9 U [a]	2.0 U	1.9 U	1.8 U	1.9 U [a]	2.0 U	1.9 U	1.6 U
Perfluorodecanesulfonic acid (PFDS)	--	--	--	ng/L	1.8 U	1.9 U	1.7 U	1.9 U	2.0 U	1.9 U	1.8 U	1.9 U	2.0 U	1.9 U	1.8 U	1.9 U	2.0 U	1.9 U	1.6 U
4:2 Flourotelemer Sulfonate (4:2 FTS)	--	--	--	ng/L	3.6 U	19 U [b]	3.4 U	19 U [b]	4.0 U	3.7 U	3.6 U	3.7 U [a]	4.0 U	3.7 U	3.6 U	3.7 U [a]	4.0 U	3.7 U	3.2 U
6:2 Flourotelemer Sulfonate (6:2 FTS)	--	--	--	ng/L	3.6 U	3.7 U	3.4 U	3.7 U	4.0 U	3.7 U	3.6 U	3.7 U	4.0 U	3.7 U	3.6 U	3.7 U	4.0 U	3.7 U	3.2 U
8:2 Flourotelemer Sulfonate (8:2 FTS)	--	--	--	ng/L	3.6 U	3.7 U	3.4 U	3.7 U	4.0 U	3.7 U	3.6 U	3.7 U [a]	4.0 U	3.7 U	3.6 U	3.7 U [a]	4.0 U	3.7 U	3.2 U
acetic acid (MeFOSAA)	--	--	--	ng/L	3.6 U	3.7 U	6.9 U	3.7 U	8.0 U	7.4 U	3.6 U	3.7 U	8.0 U	7.4 U	3.6 U	3.7 U	8.0 U	7.4 U	3.2 U
acetic acid (EtFOSAA)	--	--	--	ng/L	3.6 U	3.7 U	6.9 U	3.7 U	8.0 U	7.4 U	3.6 U	3.7 U	8.0 U	7.4 U	3.6 U	3.7 U	8.0 U	7.4 U	3.2 U
Perfluorooctane Sulfonamide (FOSA)	--	--	--	ng/L	8.9 U	1.9 U [a]	1.7 U	9.3 U [b]	2.0 U	1.9 U	1.8 U [a]	1.9 U [a]	2.0 U	9.3 U	1.8 U [a]	1.9 U [a]	2.0 U	1.9 U	16 U
HFPO-DA (GenX)		370	--	ng/L	3.6 U	19 U [b]	8.6 U	3.7 U	--	9.3 U	3.6 U	3.7 U [a]	--	9.3 U	3.6 U	3.7 U [a]	--	9.3 U	3.2 U
ADONA		--	--	ng/L	3.6 U	3.7 U	3.4 U	3.7 U	--	3.7 U	3.6 U	3.7 U	--	3.7 U	3.6 U	3.7 U [a]	--	3.7 U	3.2 U
9Cl-PF3ONS (F-53B Major)		--	--	ng/L	3.6 U	3.7 U	3.4 U	3.7 U	--	3.7 U	3.6 U	3.7 U [a]	--	3.7 U	3.6 U	3.7 U [a]	--	3.7 U	3.2 U
11Cl-PF3OUdS (F-53B Minor)		--	--	ng/L	18 U [a]	3.7 U	3.4 U	3.7 U	--	3.7 U	3.6 U	3.7 U [a]	--	3.7 U	3.6 U	3.7 U [a]	--	3.7 U	3.2 U
Total PFAS	--	--	--	ng/L	**69.3**	**98.7**	**38.8**	**32.9**	**21.91**	**32.59**	**39.3**	**46.9**	**17.11**	**14.7**	**6.8**	**17.4**	**16.63**	**36**	**18.43**

Notes:
All values are in nanograms per liter (ng/L).
Bold result denotes detection.
Shaded result denotes detection is above the EGLE Groundwater Surface Water Criteria.
Red result denotes detection is above EGLE Drinking Water Maximum Contaminant Limit (MCL).
For Total PFAS all detections were summed.

-- = not applicable
a = Associated ID Standard outside control limits. Confirmed by batch QC, re-extraction and/or reanalysis.
b = Result is from Run #2
U = not detected
J = estimated value between the limit of quantitation and the method detection limit.
[ ] = duplicate sample detections
EGLE = Environment Great Lakes and Energy

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Table 1
PFAS Groundwater Analytical Summary Table
RACER Saginaw Malleable
Saginaw, Michigan

Analyte	Drinking Water Criteria	EGLE Drinking Water MCL	Groundwater Surface Water Interface Criteria	Well ID Sample Date Site Area Units	MW-183WT 9/26/2022 GPL	MW97-105WT 12/18/2018 Peninsula	TW98-111WT 12/18/2018 Peninsula	QPTW-13R 12/18/2018 SMI	QPTW-13R 8/11/2020 SMI	QPTW-13R 8/19/2021 SMI	QPTW-13R 9/26/2022 SMI	TWW-1 9/8/2020 GPL	TWW-1 8/18/2021 GPL	TWW-1 9/23/2022 GPL	TW-242 1/17/2023 GPL	X-2A 12/18/2018 GPL	X-2A 9/8/2020 GPL	X-2A 8/18/2021 GPL
Perfluorobutanoic acid (PFBA)	--	--	--	ng/L	**11.4**	**65.7**	**39.9** [a]	**17**	**16.6 [17.7]**	**11.3** [a] **[12.9** [a]**]**	**16.2** [a] **[16.8** [a]**]**	**29.7 J**	**34.9 J**	**34.0 J** [b]	3.8 U [19 U [a,b]]	**34.1** [a] **[26.3** [a]**]**	**20.4** [a]	**14.3** [a] **[13.8** [a]**]**
Perfluoropentanoic acid (PFPeA)	--	--	--	ng/L	**3.4 J**	**20.8**	2.0 U	**16.4**	**38.4 [37.3]**	8.9 U [a] [8.9 U]	1.9 U [a] [1.9 U [a]]	**8.0**	**9.3 J**	**7.8 J** [b]	9.4 U [a,b] [9.3 U [a,b]]	**18.1 [14.4]**	1.7 U	1.8 U [1.8 U]
Perfluorohexanoic acid (PFHxA)	--	400,000	--	ng/L	**1.3 J**	**33.5**	**2.1 J**	**2.91 J**	**2.7 J [2.8 J]**	**1.9 J** [a] [1.8 U [a]]	1.9 U [a] [1.9 U [a]]	**8.9**	**11.4**	**11.3 J** [b]	9.4 U [a,b] [9.3 U [a,b]]	**6.46 [5.32]**	**4.4**	**2.9 J** [a] **[2.7 J]**
Perfluoroheptanoic acid (PFHpA)	--	--	--	ng/L	**1.4 J**	**17.5**	2.0 U	2.0 U	9.3 U **[1.9 J]**	**1.6 J** [a] **[2.1 J** [a]**]**	**5.1** [a] **[1.8 J** [a]**]**	**5.9**	**14.1**	**10.9 J** [b]	1.9 U [9.3 U [a,b]]	**4.93 [5.15]**	**3.1 J**	**3.8 [3.7]**
Perfluorooctanoic acid (PFOA)	70	8	170	ng/L	**4.0**	22.1	**6.36**	8.38	**4.7 J [5.1]**	**3.8** [a] **[4.0** [a]**]**	**3.9** [a] **[4.8** [a]**]**	11.0	27.1	19.7	1.9 U [9.3 U [b]]	50.6 **[46.5]**	29.9	29.6 **[27.7]**
Perfluorononanoic acid (PFNA)	--	6	--	ng/L	1.9 U	2.0 U	2.0 U	2.0 U	9.3 U **[1.5 J]**	1.8 U [a] [1.8 U [a]]	1.9 U [a] [1.9 U [a]]	1.8 U	**1.6 J**	**1.1 J**	1.9 U [1.9 U]	2.0 U [2.0 U]	**1.9 J**	1.8 U [1.8 U]
Perfluorodecanoic acid (PFDA)	--	--	--	ng/L	1.9 U	2.0 U	2.0 U	2.0 U	9.3 U [1.9 U]	1.8 U [a] [1.8 U [a]]	1.9 U [a] [1.9 U [a]]	1.8 U	1.8 U	1.9 U	1.9 U [1.9 U]	2.0 U [2.0 U]	1.7 U	1.8 U [1.8 U]
Perfluoroundecanoic acid (PFUnA)	--	--	--	ng/L	1.9 U	2.0 U	2.0 U	2.0 U	9.3 U [1.9 U]	1.8 U [a] [1.8 U [a]]	1.9 U [a] [1.9 U]	1.8 U	1.8 U	1.9 U	1.9 U [1.9 U]	2.0 U [2.0 U]	1.7 U	1.8 U [1.8 U]
Perfluorododecanoic acid (PFDoA)	--	--	--	ng/L	1.9 U	2.0 U	2.0 U	2.0 U	1.9 U [1.9 U]	1.8 U [a] [1.8 U [a]]	1.9 U [a] [1.9 U]	1.8 U	1.8 U	1.9 U	1.9 U [1.9 U]	2.0 U [2.0 U]	1.7 U	1.8 U [1.8 U]
Perfluorotridecanoic Acid (PFTriA)	--	--	--	ng/L	1.9 U	2.0 U	4.0 U	2.0 U	1.9 U [1.9 U]	1.8 U [a] [1.8 U [a]]	1.9 U [a] [1.9 U]	1.8 U	1.8 U	1.9 U	1.9 U [1.9 U]	2.0 U [2.0 U]	1.7 U	1.8 U [1.8 U]
Perfluorotetradecanoic acid (PFTeA)	--	--	--	ng/L	1.9 U	2.0 U	4.0 U	2.0 U	1.9 U [1.9 U]	1.8 U [a] [1.8 U [a]]	1.9 U [a] [1.9 U [a]]	1.8 U	8.9 [a]	1.9 U [a]	1.9 U [1.9 U]	2.0 U [2.0 U]	1.7 U	1.8 U [1.8 U]
Perfluorobutanesulfonic acid (PFBS)	--	420	670,000	ng/L	**2.5 J**	**9.29**	2.0 U	**3.54 J**	1.9 U [1.9 U]	1.8 U [1.8 U [a]]	1.9 U [a] [1.9 U [a]]	**1.9 J**	**4.0**	**2.9 J** [a]	9.4 U [a,b] [9.3 U [a,b]]	2.0 U **[4.91]**	**3.4**	1.8 U [1.8 U]
Perfluoropentanesulfonic acid (PFPeS)	--	--	--	ng/L	1.9 U	2.0 U	2.0 U	2.0 U	1.9 U [1.9 U]	1.8 U [1.8 U [a]]	1.9 U [a] [1.9 U [a]]	1.8 U	1.8 U	9.3 U [b]	9.4 U [a,b] [9.3 U [a,b]]	2.0 U [2.0 U]	1.7 U	1.8 U [1.8 U]
Perfluorohexanesulfonic acid (PFHxS)	--	51	--	ng/L	**2.1 J**	**4.12**	**4.76**	**1.92 J**	**3.7 [3.4 J]**	**1.9 J [1.5 J]**	1.9 U [a] **[2.6 J** [a]**]**	1.8 U	1.8 U	1.9 U	1.9 U [9.3 U [a,b]]	**7.73 [5.89]**	**4.7**	**5.6 [3.1 J]**
Perfluoroheptanesulfonic Acid (PFHpS)	--	--	--	ng/L	1.9 U	2.0 U	2.0 U	2.0 U	1.9 U [1.9 U]	1.8 U [1.8 U]	1.9 U [a] [1.9 U [a]]	1.8 U	1.8 U	1.9 U	1.9 U [1.9 U]	2.0 U [2.0 U]	1.7 U	1.8 U [1.8 U]
Perfluorooctanesulfonic acid (PFOS)	70	16	12	ng/L	1.9 U	**9.7**	18	**8.47**	**11.0 [10.6]**	**6.6 [8.4]**	**11.0 [12.8** [a]**]**	1.8 U	**1.7 J**	**3.6 J** [a]	1.9 U [1.9 U]	16.5 **[14.6]**	**14.5**	**15.8 [14.9]**
Perfluorononanesulfonic acid (PFNS)	--	--	--	ng/L	1.9 U	2.0 U	2.0 U	2.0 U	1.9 U [1.9 U]	1.8 U [1.8 U]	1.9 U [a] [1.9 U [a]]	1.8 U	1.8 U	9.3 U [b]	1.9 U [1.9 U]	2.0 U [2.0 U]	1.7 U	1.8 U [1.8 U]
Perfluorodecanesulfonic acid (PFDS)	--	--	--	ng/L	1.9 U	2.0 U	2.0 U	2.0 U	1.9 U [1.9 U]	1.8 U [a] [1.8 U [a]]	1.9 U [a] [1.9 U]	1.8 U	1.8 U	1.9 U	1.9 U [1.9 U]	2.0 U [2.0 U]	1.7 U	1.8 U [1.8 U]
4:2 Flourotelemer Sulfonate (4:2 FTS)	--	--	--	ng/L	3.7 U	4.0 U	4.0 U	4.0 U	3.7 U [3.7 U]	3.6 U [a] [3.6 U [a]]	3.7 U [a] [3.7 U [a]]	3.6 U	3.6 U	19 U [b]	19 U [a,b] [19 U [a,b]]	4.0 U [4.0 U]	3.4 U	3.6 U [3.6 U]
6:2 Flourotelemer Sulfonate (6:2 FTS)	--	--	--	ng/L	3.7 U	4.0 U	4.0 U [a]	4.0 U	3.7 U [3.7 U]	18 U [3.6 U]	3.7 U [a] [3.7 U [a]]	3.6 U	3.6 U	3.7 U	3.8 U [3.7 U]	4.0 U [4.0 U]	3.4 U	3.6 U [3.6 U]
8:2 Flourotelemer Sulfonate (8:2 FTS)	--	--	--	ng/L	3.7 U	4.0 U	4.0 U	4.0 U [c]	3.7 U [3.7 U]	18 U [3.6 U]	3.7 U [a] [3.7 U [a]]	3.6 U	3.6 U	19 U [b]	3.8 U [19 U [b]]	4.0 U [4.0 U]	3.4 U	3.6 U [3.6 U]
acetic acid (MeFOSAA)	--	--	--	ng/L	3.7 U	8.0 U	8.0 U	8.0 U	37 U [37 U]	18 U [3.6 U [a]]	3.7 U [a] [3.7 U [a]]	7.1 U	3.6 U	3.7 U	3.8 U [3.7 U]	8.0 U [8.0 U]	6.9 U	3.6 U [3.6 U]
acetic acid (EtFOSAA)	--	--	--	ng/L	3.7 U	8.0 U	8.0 U	8.0 U	37 U [37 U]	18 U [3.6 U [a]]	3.7 U [a] [3.7 U [a]]	7.1 U	3.6 U	3.7 U	3.8 U [3.7 U]	8.0 U [8.0 U]	6.9 U	3.6 U [3.6 U]
Perfluorooctane Sulfonamide (FOSA)	--	--	--	ng/L	9.3 U [b]	2.0 U [a]	2.0 U [a]	2.0 U [a]	9.3 U [a] [9.3 U [a]]	1.8 U [a] [1.8 U [a]]	1.9 U [a] [1.9 U [a]]	1.8 U	8.9 U [a]	1.9 U [a]	9.4 U [a,b] [9.3 U [b]]	2.0 U [a] [2.0 U [a]]	1.7 U [a]	1.8 U [a] [1.8 U [a]]
HFPO-DA (GenX)		370	--	ng/L	3.7 U [a]	--	--	--	9.3 U [9.3 U]	3.6 U [a] [3.6 U [a]]	3.7 U [a] [3.7 U [a]]	8.9 U	3.6 U	19 U [b]	19 U [b] [19 U [b]]	--	8.6 U	3.6 U [3.6 U]
ADONA		--	--	ng/L	3.7 U	--	--	--	3.7 U [3.7 U]	3.6 U [a] [3.6 U [a]]	3.7 U [a] [3.7 U [a]]	3.6 U	3.6 U	3.7 U	3.8 U [19 U [b]]	--	3.4 U	3.6 U [3.6 U]
9Cl-PF3ONS (F-53B Major)		--	--	ng/L	3.7 U	--	--	--	3.7 U [3.7 U]	3.6 U [a] [3.6 U [a]]	3.7 U [a] [3.7 U [a]]	3.6 U	3.6 U	3.7 U	3.8 U [3.7 U]	--	3.4 U	3.6 U [3.6 U]
11Cl-PF3OUdS (F-53B Minor)		--	--	ng/L	3.7 U	--	--	--	3.7 U [3.7 U]	3.6 U [a] [3.6 U [a]]	3.7 U [a] [3.7 U]	3.6 U	3.6 U	3.7 U	3.8 U [3.7 U]	--	3.4 U	3.6 U [3.6 U]
Total PFAS	**--**	**--**	**--**	ng/L	**26.1**	**182.71**	**71.12**	**58.62**	**77.1 [80.3]**	**27.1 [28.9]**	**36.2 [38.8]**	**65.4**	**104.1**	**91.3**	**0**	**138.42 [123.07]**	**82.3**	**72 [65.9]**

Notes:
All values are in nanograms per liter (ng/L).
Bold result denotes detection.
Shaded result denotes detection is above the EGLE Groundwater Surface Water Criteria.
Red result denotes detection is above EGLE Drinking Water Maximum Contaminant Limit (MCL).
For Total PFAS all detections were summed.

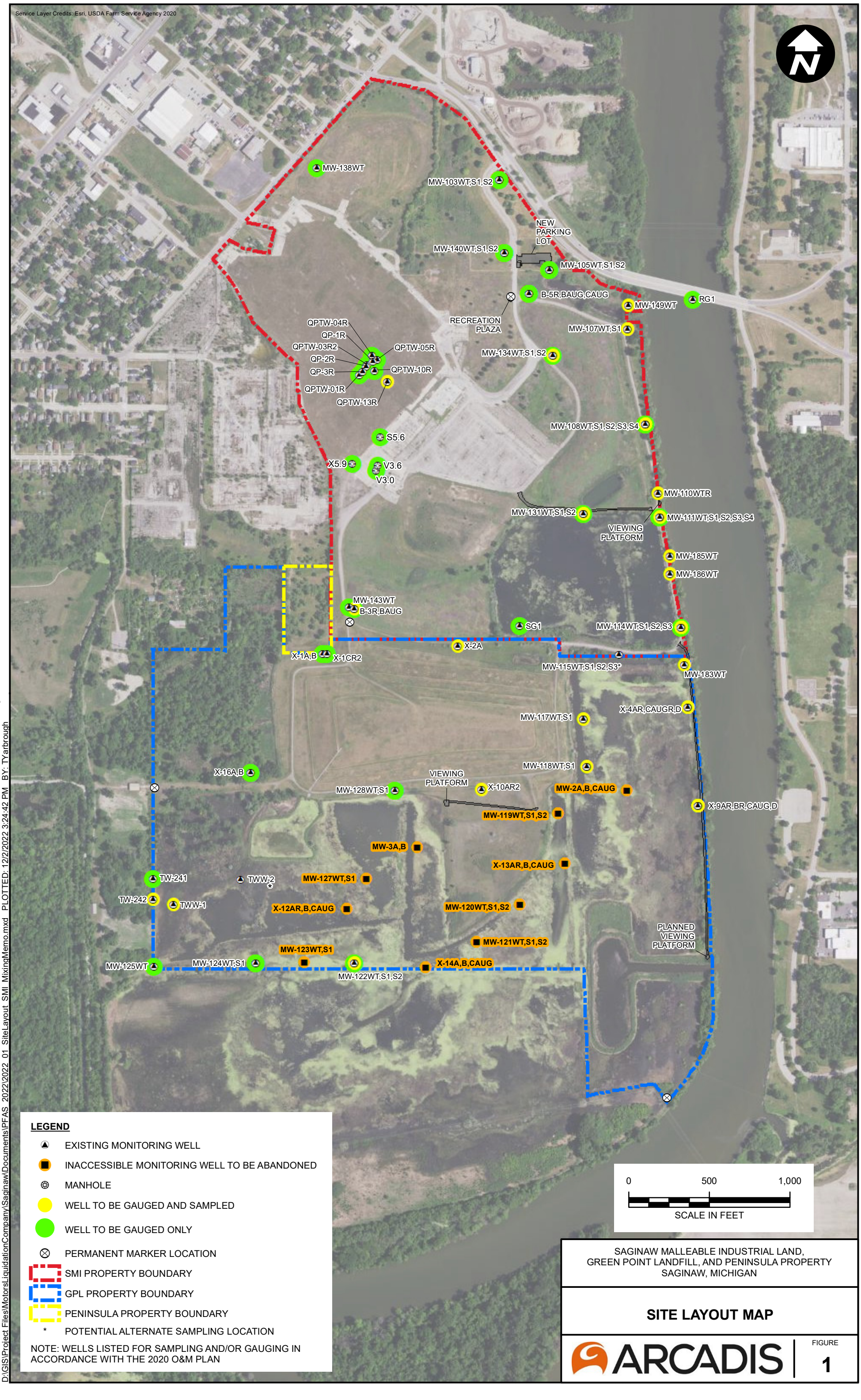
-- = not applicable
a = Associated ID Standard outside control limits. Confirmed by batch QC, re-extraction and/or reanalysis.
b = Result is from Run #2
U = not detected
J = estimated value between the limit of quantitation and the method detection limit.
[ ] = duplicate sample detections
EGLE = Environment Great Lakes and Energy

Table 1
PFAS Groundwater Analytical Summary Table
RACER Saginaw Malleable
Saginaw, Michigan

Analyte	Drinking Water Criteria	EGLE Drinking Water MCL	Groundwater Surface Water Interface Criteria	Well ID Sample Date Site Area Units	X-2A 9/21/2022 GPL	X-9AR 12/19/2018 GPL	X-9AR 8/17/2020 GPL	X-9AR 8/18/2021 GPL	X-9AR 9/22/2022 GPL	X-10AR2 12/18/2018 GPL	X-10AR2 9/8/2020 GPL	X-10AR2 8/18/2021 GPL	X-10AR2 9/22/2022 GPL
Perfluorobutanoic acid (PFBA)	--	--	--	ng/L	**11.5 [a] [11.0 [a]]**	**5.98 J**	**14.4**	**18.6**	**19.0**	4.0 U	**2.9 J [2.9 J]**	**4.4 J**	**4.3 J**
Perfluoropentanoic acid (PFPeA)	--	--	--	ng/L	1.9 U [a] [1.9 U [a]]	2.0 U	**4.4**	**1.3 J**	**2.0 J**	2.0 U	1.7 U [1.7 U]	**1.4 J**	1.9 U
Perfluorohexanoic acid (PFHxA)	--	400,000	--	ng/L	1.9 U [a] [1.9 U [a]]	2.0 U	**2.7 J**	**1.4 J**	**1.6 J**	2.0 U	1.7 U **[0.97 J]**	**1.1 J**	1.9 U
Perfluoroheptanoic acid (PFHpA)	--	--	--	ng/L	**1.8 J [a] [4.2 [a]]**	2.0 U	**2.5 J**	**1.8 J**	**1.6 J**	2.0 U	1.7 U [1.7 U]	1.8 U	1.9 U
Perfluorooctanoic acid (PFOA)	70	8	170	ng/L	**23.6 [a] [23.2 [a]]**	2.0 U	**2.5 J**	**1.5 J**	**1.3 J**	**2.13 J**	**5.8 [5.6]**	**6.1**	**6.3**
Perfluorononanoic acid (PFNA)	--	6	--	ng/L	1.9 U [a] [1.9 U [a]]	2.0 U	1.9 U	1.8 U	1.9 U	2.0 U	1.7 U [1.7 U]	1.8 U	1.9 U
Perfluorodecanoic acid (PFDA)	--	--	--	ng/L	1.9 U [a] [1.9 U [a]]	2.0 U	1.9 U	1.8 U	1.9 U	2.0 U	1.7 U [1.7 U]	1.8 U	1.9 U
Perfluoroundecanoic acid (PFUnA)	--	--	--	ng/L	1.9 U [1.9 U [a]]	2.0 U	1.9 U	1.8 U	1.9 U	2.0 U	1.7 U [1.7 U]	1.8 U	1.9 U
Perfluorododecanoic acid (PFDoA)	--	--	--	ng/L	1.9 U [1.9 U [a]]	2.0 U	1.9 U	8.9 U [a]	9.3 U [b]	2.0 U	1.7 U [1.7 U]	1.8 U	9.3 U [b]
Perfluorotridecanoic Acid (PFTriA)	--	--	--	ng/L	1.9 U [1.9 U [a]]	2.0 U	1.9 U	8.9 U [a]	9.3 U [b]	2.0 U	1.7 U [1.7 U]	1.8 U	9.3 U [b]
Perfluorotetradecanoic acid (PFTeA)	--	--	--	ng/L	1.9 U [a] [1.9 U [a]]	2.0 U	1.9 U	8.9 U [a]	1.9 U [a]	2.0 U	1.7 U [1.7 U]	1.8 U	1.9 U [a]
Perfluorobutanesulfonic acid (PFBS)	--	420	670,000	ng/L	1.9 U [a] [1.9 U [a]]	2.0 U	**1.6 J**	**1.5 J**	**1.4 J**	2.0 U	**1.1 J [1.0 J]**	**1.3 J**	**1.1 J**
Perfluoropentanesulfonic acid (PFPeS)	--	--	--	ng/L	1.9 U [a] [1.9 U [a]]	2.0 U	1.9 U	1.8 U	1.9 U	2.0 U	1.7 U [1.7 U]	1.8 U	1.9 U
Perfluorohexanesulfonic acid (PFHxS)	--	51	--	ng/L	**4.3 [a] [5.0 [a]]**	2.0 U	1.9 U	1.8 U	1.9 U	2.0 U	1.7 U [1.7 U]	1.8 U	1.9 U
Perfluoroheptanesulfonic Acid (PFHpS)	--	--	--	ng/L	1.9 U [a] [1.9 U [a]]	2.0 U	1.9 U	1.8 U	1.9 U	2.0 U	1.7 U [1.7 U]	1.8 U	1.9 U
Perfluorooctanesulfonic acid (PFOS)	70	16	12	ng/L	**20.9 [a] [21.2 [a]]**	4.0 U	1.9 U	1.8 U	1.9 U	4.0 U	1.7 U [1.7 U]	1.8 U	1.9 U
Perfluorononanesulfonic acid (PFNS)	--	--	--	ng/L	1.9 U [a] [1.9 U [a]]	2.0 U	1.9 U	1.8 U	1.9 U	2.0 U	1.7 U [1.7 U]	1.8 U	1.9 U
Perfluorodecanesulfonic acid (PFDS)	--	--	--	ng/L	1.9 U [1.9 U [a]]	2.0 U	1.9 U	1.8 U	1.9 U	2.0 U	1.7 U [1.7 U]	1.8 U	1.9 U
4:2 Flourotelemer Sulfonate (4:2 FTS)	--	--	--	ng/L	3.7 U [a] [3.7 U [a]]	4.0 U	3.7 U	3.6 U	3.7 U	4.0 U	3.4 U [3.4 U]	3.6 U	3.7 U
6:2 Flourotelemer Sulfonate (6:2 FTS)	--	--	--	ng/L	3.7 U [3.7 U [a]]	4.0 U	3.7 U	3.6 U	3.7 U	4.0 U	3.4 U [3.4 U]	3.6 U	3.7 U
8:2 Flourotelemer Sulfonate (8:2 FTS)	--	--	--	ng/L	3.7 U [3.7 U [a]]	4.0 U	3.7 U	3.6 U	3.7 U	4.0 U	3.4 U [3.4 U]	3.6 U	3.7 U
acetic acid (MeFOSAA)	--	--	--	ng/L	3.7 U [3.7 U]	8.0 U	7.4 U	3.6 U	3.7 U	8.0 U	6.9 U [6.9 U]	3.6 U	3.7 U
acetic acid (EtFOSAA)	--	--	--	ng/L	3.7 U [3.7 U]	8.0 U	7.4 U	3.6 U	3.7 U	8.0 U	6.9 U [6.9 U]	3.6 U	3.7 U
Perfluorooctane Sulfonamide (FOSA)	--	--	--	ng/L	1.9 U [a] [1.9 U [a]]	2.0 U	1.9 U	8.9 U [a]	1.9 U [a]	2.0 U	1.7 U [1.7 U]	1.8 U	1.9 U [a]
HFPO-DA (GenX)		370	--	ng/L	3.7 U [a] [3.7 U [a]]	--	9.3 U	3.6 U	3.7 U	--	8.6 U [8.6 U]	3.6 U	3.7 U
ADONA		--	--	ng/L	3.7 U [a] [3.7 U [a]]	--	3.7 U	3.6 U	3.7 U	--	3.4 U [3.4 U]	3.6 U	3.7 U
9Cl-PF3ONS (F-53B Major)		--	--	ng/L	3.7 U [a] [3.7 U [a]]	--	3.7 U	3.6 U	3.7 U	--	3.4 U [3.4 U]	3.6 U	3.7 U
11Cl-PF3OUdS (F-53B Minor)		--	--	ng/L	3.7 U [3.7 U [a]]	--	3.7 U	18 U [a]	19 U [b]	--	3.4 U [3.4 U]	3.6 U	19 U [b]
Total PFAS	--	**--**	**--**	ng/L	**62.1 [64.6]**	**5.98**	**28.1**	**26.1**	**26.9**	**2.13**	**9.8 [10.47]**	**14.3**	**11.7**

Notes:
All values are in nanograms per liter (ng/L).
Bold result denotes detection.
Shaded result denotes detection is above the EGLE Groundwater Surface Water Criteria.
Red result denotes detection is above EGLE Drinking Water Maximum Contaminant Limit (MCL).
For Total PFAS all detections were summed.

-- = not applicable
a = Associated ID Standard outside control limits. Confirmed by batch QC, re-extraction and/or reanalysis.
b = Result is from Run #2
U = not detected
J = estimated value between the limit of quantitation and the method detection limit.
[ ] = duplicate sample detections
EGLE = Environment Great Lakes and Energy


Service Layer Credits: Esri, USDA Farm Service Agency 2020
MW-138WT
MW-103WT,S1,S2
NEW PARKING LOT
MW-140WT,S1,S2
MW-105WT,S1,S2
B-5R,BAUG,CAUG
RG1
MW-149WT
RECREATION PLAZA
MW-107WT,S1
QPTW-04R
QP-1R
QPTW-03R2
QP-2R
QP-3R
QPTW-01R
QPTW-05R
QPTW-10R
QPTW-13R
MW-134WT,S1,S2
MW-108WT,S1,S2,S3,S4
S5.6
X5.9
V3.6
V3.0
MW-110WTR
MW-131WT,S1,S2
MW-111WT,S1,S2,S3,S4
VIEWING PLATFORM
MW-185WT
MW-186WT
MW-143WT
B-3R,BAUG
SG1
MW-114WT,S1,S2,S3
X-2A
X-1A,B
X-1CR2
MW-115WT,S1,S2,S3*
MW-183WT
X-4AR,CAUGR,D
MW-117WT,S1
MW-118WT,S1
X-16A,B
VIEWING PLATFORM
MW-128WT,S1
X-10AR2
MW-2A,B,CAUG
X-9AR,BR,CAUG,D
MW-119WT,S1,S2
MW-3A,B
X-13AR,B,CAUG
TW-241
TWW-2*
MW-127WT,S1
TW-242
TWW-1
X-12AR,B,CAUG
MW-120WT,S1,S2
MW-121WT,S1,S2
PLANNED VIEWING PLATFORM
MW-123WT,S1
MW-125WT
MW-124WT,S1
MW-122WT,S1,S2
X-14A,B,CAUG
LEGEND
EXISTING MONITORING WELL
INACCESSIBLE MONITORING WELL TO BE ABANDONED
MANHOLE
WELL TO BE GAUGED AND SAMPLED
WELL TO BE GAUGED ONLY
PERMANENT MARKER LOCATION
SMI PROPERTY BOUNDARY
GPL PROPERTY BOUNDARY
PENINSULA PROPERTY BOUNDARY
* POTENTIAL ALTERNATE SAMPLING LOCATION
NOTE: WELLS LISTED FOR SAMPLING AND/OR GAUGING IN ACCORDANCE WITH THE 2020 O&M PLAN
0
500
1,000
SCALE IN FEET
SAGINAW MALLEABLE INDUSTRIAL LAND,
GREEN POINT LANDFILL, AND PENINSULA PROPERTY
SAGINAW, MICHIGAN
SITE LAYOUT MAP
ARCADIS
FIGURE
1
CITY: NOVI, MI DIV: ENV DB: TRY PIC: J. Barrett PM: S. Clearwater TM: A. Robinson TR: PROJECT NUMBER: 30121470 COORDINATE SYSTEM: NAD 1983 StatePlane Michigan South FIPS 2113 Feet Intl
D:\GIS\Project Files\MotorsLiquidationCompany\SaginawDocuments\PFAS_2022\2022_01_SiteLayout_SMI_MixingMemo.mxd PLOTTED: 12/2/2022 3:24:42 PM BY: TYarbrough

Service Layer Credits: Esri, USDA Farm Service Agency 2020

MW-138WT
MW-103WT,S1,S2
NEW PARKING LOT
MW-140WT,S1,S2
MW-105WT,S1,S2
B-5R,BAUG,CAUG
RECREATION PLAZA
RG1
MW-149WT
MW-107WT,S1
MW-134WT,S1,S2
QPTW-05R
QPTW-04R
QP-1R
QPTW-03R2
QP-2R
QP-3R
QPTW-01R
QPTW-10R
QPTW-13R
MW-108WT,S1,S2,S3,S4
S5.6
X5.9
V3.6
V3.0
MW-110WTR
VIEWING PLATFORM
MW-131WT,S1,S2
MW-111WT,S1,S2,S3,S4
MW-185WT
MW-186WT
MW-114WT,S1,S2,S3
TW98-111WT
MW-143WT
B-3R,BAUG
MW97-105WT
SG1
X-2A
MW-115WT,S1,S2,S3*
X-1A,B
X-1CR2
MW-183WT
X-4AR,CAUGR,D
MW-117WT,S1
X-16A,B
MW-118WT,S1
VIEWING PLATFORM
MW-128WT,S1
X-10AR2
MW-2A,B,CAUG
X-9AR,BR,CAUG,D
MW-119WT,S1,S2
MW-3A,B
X-13AR,B,CAUG
TW-241
TWW-2*
MW-127WT,S1
TW-242
TWW-1
X-12AR,B,CAUG
MW-120WT,S1,S2
PLANNED VIEWING PLATFORM
MW-121WT,S1,S2
MW-123WT,S1
MW-122WT,S1,S2
X-14A,B,CAUG
MW-125WT
MW-124WT,S1

QPTW-13R				
Sample Date	12/18/2018	8/11/2020	8/19/2021	9/26/2022
PFOA	**8.38**	**4.7 J [5.1]**	**3.8 a [4.0 a]**	**3.9 a [4.8 a]**
PFOS	**8.47**	**11.0 [10.6]**	**6.6 [8.4]**	**11.0 [12.8 a]**

MW-134WT				
Sample Date	12/18/2018	8/11/2020	8/19/2021	9/27/2022
PFOA	**3.0 J**	**2.0 J**	**1.7 J**	**3.6 J a**
PFOS	4.0 U	1.9 U	1.8 U	1.9 U a

MW-108WT			
Sample Date	12/18/2018	8/13/2020	8/19/2021
PFOA	**3.66 J**	**4.4**	**4.6**
PFOS	**2.63 J**	**17.1**	**15.1**

MW-131WT				
Sample Date	12/18/2018	8/11/2020	8/19/2021	9/26/2022
PFOA	**2.38 J**	**3.6 J**	**3.7**	**3.3 J**
PFOS	**4.88 J**	**7.9**	**11.0**	**14.6 a**

TW98-111WT	
Sample Date	12/18/2018
PFOA	**6.36**
PFOS	**18**

B-3R				
Sample Date	12/18/2018	8/11/2020	8/19/2021	9/26/2022
PFOA	**5.58**	**2.7 J**	**2.7 J**	**2.7 J a**
PFOS	**15.6**	**14.4**	**13.7**	**14.3**

X-2A				
Sample Date	12/18/2018	9/8/2020	8/18/2021	9/21/2022
PFOA	**50.6 [46.5]**	**29.9**	**29.6 [27.7]**	**23.6 a [23.2 a]**
PFOS	**16.5 [14.6]**	**14.5**	**15.8 [14.9]**	**20.9 a [21.2 a]**

MW-183WT				
Sample Date	12/19/2018	8/18/2020	8/24/2021	9/26/2022
PFOA	**2.07 J**	**4.6**	**2.9 J**	**4.0**
PFOS	4.0 U	**3.5 J**	**1.5 J**	1.9 U

MW97-105WT	
Sample Date	12/18/2018
PFOA	**22.1**
PFOS	**9.7**

MW-117WT				MW-117S1		
Sample Date	8/13/2020	8/17/2021	9/22/2022	8/13/2020	8/17/2021	9/21/2022
PFOA	**3.6 J**	**5.5**	1.9 U	1.9 U	1.8 U	1.9 U
PFOS	1.9 U	1.8 U	1.9 U a	1.9 U	1.8 U	1.9 U a

MW-118WT				MW-118S1
Sample Date	8/14/2020	8/17/2021	9/22/2022	12/18/2018
PFOA	**2.4 J**	**5.3**	**4.8**	**1.95 J**
PFOS	1.9 U	1.8 U	1.9 U a	4.0 U

X-10AR2				
Sample Date	12/18/2018	9/8/2020	8/18/2021	9/22/2022
PFOA	**2.13 J**	**5.8 [5.6]**	**6.1**	**6.3**
PFOS	4.0 U	1.7 U [1.7 U]	1.8 U	1.9 U

X-9AR				
Sample Date	12/19/2018	8/17/2020	8/18/2021	9/22/2022
PFOA	2.0 U	**2.5 J**	**1.5 J**	**1.3 J**
PFOS	4.0 U	1.9 U	1.8 U	1.9 U

TW-242	
Sample Date	1/17/2023
PFOA	1.9 U [9.3 U b]
PFOS	1.9 U [1.9 U]

TWW-1			
Sample Date	9/8/2020	8/18/2021	9/23/2022
PFOA	**11.0**	**27.1**	**19.7**
PFOS	1.8 U	**1.7 J**	**3.6 J a**

MW-125WT		
Sample Date	9/8/2020	1/17/2023
PFOA	**4.3**	**2.9 J**
PFOS	1.7 U	1.9 U

MW-122WT		
Sample Date	8/18/2021	9/23/2022
PFOA	**3.1 J**	**2.4 J**
PFOS	**1.7 J**	1.9 U

LEGEND

- EXISTING MONITORING WELL
- INACCESSIBLE MONITORING WELL TO BE ABANDONED
- MANHOLE
- WELL TO BE GAUGED AND SAMPLED
- WELL TO BE GAUGED ONLY
- PERMANENT MARKER LOCATION
- SMI PROPERTY BOUNDARY
- GPL PROPERTY BOUNDARY
- PENINSULA PROPERTY BOUNDARY
- * POTENTIAL ALTERNATE SAMPLING LOCATION

MW-125WT	
Sample Date	9/8/2020
PFOA	**4.3**
PFOS	1.7 U

SAMPLE LOCATION
SAMPLING DATE
PFOA ANALYTICAL RESULT
PFOS ANALYTICAL RESULT

NOTES:

ALL VALUES ARE IN NANOGRAMS PER LITER (ng/L).

BOLD RESULT DENOTES DETECTION.

SHADED RESULT DENOTES DETECTION IS ABOVE THE EGLE GROUNDWATER SURFACE WATER CRITERIA.

RED RESULT DENOTES DETECTION IS ABOVE EGLE DRINKING WATER MAXIUMUM CONTAMINANT LIMIT (MCL).

a = ASSOCIATED ID STANDARD OUTSIDE CONTROL LIMITS. CONFIRMED BY BATCH QC, RE-EXTRACTION AND/OR REANALYSIS.
J = ESTIMATED VALUE BETWEEN THE LIMIT OF QUANTITATION AND THE METHOD DETECTION LIMIT.
U = NOT DETECTED.
[ ] = DUPLICATE SAMPLE DETECTIONS
EGLE = ENVIRONMENT GREAT LAKES AND ENERGY
PFOA = PERFLUOROOCTANOIC ACID
PFOS = PERFLUOROOCTANESULFONIC ACID

WELLS LISTED FOR SAMPLING AND/OR GAUGING IN ACCORDANCE WITH THE 2020 O&M PLAN

0 500 1,000
SCALE IN FEET

SAGINAW MALLEABLE INDUSTRIAL LAND,
GREEN POINT LANDFILL, AND PENINSULA PROPERTY
SAGINAW, MICHIGAN

PFAS SAMPLING RESULTS

ARCADIS

FIGURE 2

CITY: NOVI, MI DIV: ENV DB: TRY PIC: J. Barrett PM: S. Clearwater TM: A. Robinson TR: PROJECT NUMBER: 30121470 COORD SYSTEM: NAD 1983 StatePlane Michigan South FIPS 2113 Feet Intl
D:\GIS\Project Files\MotorsLiquidationCompany\SaginawDocuments\PFAS 2022\2023 01 PFAS Sampling.mxd PLOTTED: 2/6/2023 11:10:39 AM BY: TYarbrough

Groundwater Sampling Form

ARCADIS

Project Number	30121470	**Well ID**	MW-125WT			**Date**	01/17/2023
Project Name/Location	RACER Saginaw 2022		**Weather(°F)**	44.2 degrees F and Fog/Mist. The wind is blowing S at 9.2 mph.			
Measuring Pt. Description	Top of Inner Casing	**Screen Setting (ft-bmp)**	--	**Casing Diameter (in)**	2	**Well Casing Material**	PVC
Static Water Level (ft-bmp)	4.45	**Total Depth (ft-bmp)**	15.46	**Water Column(ft)**	11.01	**Gallons in Well**	1.79
MP Elevation		**Pump Intake (ft-bmp)**		**Purge Method**	Low-Flow	**Sample Method**	
Sample Time	11:06	**Volumes Purged**		**Sample ID**	MW-125WT_01172023	**Sampled by**	John Sidor
Purge Start	10:05	**Gallons Purged**		**Replicate/ Code No.**			
Purge End	11:05						

Time	Minutes Elapsed	Total Elapsed Minutes	Rate mL/min	Depth to Water (ft)	Gallons Purged	pH (standard units)	Conductivity (mS/cm)	Turbidity (NTU)	Dissolved Oxygen (mg/L)	Temperature °C	Redox (mV)	Appearance	
												Color	Odor
10:05	0	0	100	4.66	0.00	6.83	922.1	21.49	8.38	11.66	311.4	Clear	None
10:10	5	5	100	4.69	0.13	6.93	891.22	14.04	3.19	9.66	301.4	Clear	None
10:15	5	10	100	4.72	0.26	6.88	901.1	6.05	1.43	9.39	301.3	Clear	None
10:20	5	15	100	4.72	0.40	6.93	895.43	10.29	0.82	8.93	299.9	Clear	None
10:25	5	20	100	4.73	0.53	6.96	900.44	7.13	0.55	8.88	300.6	Clear	None
10:30	5	25	100	4.75	0.66	6.95	899.83	3.93	0.45	8.7	299	Clear	None
10:35	5	30	100	4.75	0.79	6.97	902.73	5.04	0.39	8.59	295.1	Clear	None
10:40	5	35	100	4.76	0.92	6.98	901.22	2.66	0.35	8.52	291.3	Clear	None
10:45	5	40	100	4.78	1.06	6.99	901.5	10.83	0.34	8.45	286.9	Clear	None
10:50	5	45	100	4.79	1.19	6.99	900.5	5.56	0.33	8.33	282.5	Clear	None
10:55	5	50	100	4.8	1.32	7	902.85	2.69	0.32	8.36	276.7	Clear	None
11:00	5	55	100	4.8	1.45	7.01	902.63	1.69	0.32	8.25	271.3	Clear	None
11:05	5	60	100	4.8	1.59	7.04	903.84	2.26	0.32	8.23	268.3	Clear	None

Constituent Sampled	Container	Number	Preservative
PFAS	250 mL Plastic	1	None

Comments:

Well Casing Volume Conversion

Well diameter (inches) = gallons per foot 1 = 0.04 1.5 = 0.09 2.5 = 0.26 3.5 = 0.50 6 = 1.47
1.25 = 0.06 2 = 0.16 3 = 0.37 4 = 0.65

Well Information

Well Location:
Well Locked at Arrival:
Condition of Well:
Well Locked at Departure:
Well Completion: NA
Key Number To Well: NA

ft-bmp = feet below measuring point
in = inches
ft = feet
mL/min = milliliters per minute
mS/cm = milliSiemens per centimeter
NTU = Nephelometric Turbidity Unit
mg/L = milligrams per liter
mV = millivolts
°F = degrees Fahrenheit
°C = degrees Celsius

Groundwater Sampling Form

ARCADIS

Project Number	30121470	**Well ID**	TW-242			**Date**	01/17/2023
Project Name/Location	RACER Saginaw 2022		**Weather(°F)**	46 °F, Overcast, NE winds at 10 mph.			
Measuring Pt. Description	Top of Inner Casing	**Screen Setting (ft-bmp)**	--	**Casing Diameter (in)**	2	**Well Casing Material**	PVC
Static Water Level (ft-bmp)	6.7	**Total Depth (ft-bmp)**	10.2	**Water Column(ft)**	3.5	**Gallons in Well**	0.57
MP Elevation		**Pump Intake (ft-bmp)**		**Purge Method**	Low-Flow	**Sample Method**	
Sample Time	11:51	**Volumes Purged**		**Sample ID**	TW-242_01172023	**Sampled by**	John Sidor
Purge Start	11:30	**Gallons Purged**		**Replicate/ Code No.**	FD-1_01172023		
Purge End	11:50						

Time	Minutes Elapsed	Total Elapsed Minutes	Rate mL/min	Depth to Water (ft)	Gallons Purged	pH (standard units)	Conductivity (mS/cm)	Turbidity (NTU)	Dissolved Oxygen (mg/L)	Temperature °C	Redox (mV)	Appearance	
												Color	Odor
11:30	0	0	100	6.83	0.00	7.52	845.08	0.16	9.35	7.44	270.9	Clear	None
11:35	5	5	100	6.91	0.13	7.59	824.55	0	8.43	7.21	270.5	Clear	None
11:40	5	10	100	6.97	0.26	7.61	823.18	0	8.12	7.03	272.1	Clear	None
11:45	5	15	100	7.05	0.40	7.6	823.98	0	8.13	6.94	272.9	Clear	None
11:50	5	20	100	7.14	0.53	7.6	831.41	0	8.03	6.88	274.2	Clear	None

Constituent Sampled	Container	Number	Preservative
PFAS	250 mL Plastic	1	None

Comments:

Well Casing Volume Conversion

Well diameter (inches) = gallons per foot 1 = 0.04 1.5 = 0.09 2.5 = 0.26 3.5 = 0.50 6 = 1.47
1.25 = 0.06 2 = 0.16 3 = 0.37 4 = 0.65

Well Information

Well Location:
Well Locked at Arrival:
Condition of Well:
Well Locked at Departure:
Well Completion: NA
Key Number To Well: NA

ft-bmp = feet below measuring point
in = inches
ft = feet
mL/min = milliliters per minute

mS/cm = milliSiemens per centimeter
NTU = Nephelometric Turbidity Unit
mg/L = milligrams per liter

mV = millivolts
°F = degrees Fahrenheit
°C = degrees Celsius

The results set forth herein are provided by SGS North America Inc.

e-Hardcopy 2.0
Automated Report

Technical Report for

Arcadis

Racer Saginaw; 77 W Center St, Saginaw, MI

30121470

SGS Job Number: FC1973

Sampling Date: 01/17/23

Report to:

Arcadis
28550 Cabot Dr Suite 500
Novi, MI 48377
scott.clearwater@arcadis.com; cindy.jeffers@arcadis.com;
amanda.robinson@arcadis.com; megan.humphrey@arcadis.com
ATTN: Scott Clearwater

Total number of pages in report: 30

Test results contained within this data package meet the requirements of the National Environmental Laboratory Accreditation Program and/or state specific certification programs as applicable.

Norm Farmer
Technical Director

Client Service contact: Andrea Colby 407-425-6700

Certifications: FL(E83510), LA(03051), KS(E-10327), NC(573), NJ(FL002), NY(12022), SC(96038001) DoD ELAP(ANAB L2229), AZ(AZ0806), CA(2937), TX(T104704404), PA(68-03573), VA(460177), AL, AK, AR, CT, IA, KY, MA, MI. MS, ND, NH, NV, OK, OR, IL, UT, VT, WA, WI, WV

Sections: 1 2 3 4 5

Table of Contents

Sample Summary

Arcadis

Job No: FC1973

Racer Saginaw; 77 W Center St, Saginaw, MI
Project No: 30121470

Sample Number	Collected Date	Time	By	Received	Matrix Code	Matrix Type	Client Sample ID
FC1973-1	01/17/23	11:06	JSJM	01/18/23	AQ	Ground Water	MW-125WT_01172023
FC1973-2	01/17/23	11:51	JSJM	01/18/23	AQ	Ground Water	TW-242_01172023
FC1973-3	01/17/23	00:00	JSJM	01/18/23	AQ	Ground Water	FD-1_01172023
FC1973-4	01/17/23	12:00	JSJM	01/18/23	AQ	Equipment Blank	EQUIPMENT BLANK_01172023

Summary of Hits

Job Number: FC1973
Account: Arcadis
Project: Racer Saginaw; 77 W Center St, Saginaw, MI
Collected: 01/17/23

Lab Sample ID / Analyte	Client Sample ID	Result/ Qual	LOQ	LOD	Units	Method
FC1973-1	**MW-125WT_01172023**					
Perfluorobutanoic acid [a]		16.5	7.4	3.7	ng/l	EPA 537M QSM5.3 B-15
Perfluoropentanoic acid [a]		1.4 J	3.7	1.9	ng/l	EPA 537M QSM5.3 B-15
Perfluorohexanoic acid [b]		2.0 J	3.7	1.9	ng/l	EPA 537M QSM5.3 B-15
Perfluoroheptanoic acid [a]		1.1 J	3.7	1.9	ng/l	EPA 537M QSM5.3 B-15
Perfluorooctanoic acid [a]		2.9 J	3.7	1.9	ng/l	EPA 537M QSM5.3 B-15
Perfluorobutanesulfonic acid [a]		2.7 J	3.7	1.9	ng/l	EPA 537M QSM5.3 B-15
Perfluoropentanesulfonic acid [a]		1.2 J	3.7	1.9	ng/l	EPA 537M QSM5.3 B-15
Perfluorohexanesulfonic acid [a]		5.1	3.7	1.9	ng/l	EPA 537M QSM5.3 B-15
FC1973-2	**TW-242_01172023**					
No hits reported in this sample.						
FC1973-3	**FD-1_01172023**					
No hits reported in this sample.						
FC1973-4	**EQUIPMENT BLANK_01172023**					
No hits reported in this sample.						

(a) Insufficient sample for re-extraction.
(b) Insufficient sample for re-extraction. Associated ID Standard outside control limits.

Sample Results

Report of Analysis

Report of Analysis

Client Sample ID: MW-125WT_01172023
Lab Sample ID: FC1973-1
Matrix: AQ - Ground Water
Method: EPA 537M QSM5.3 B-15 EPA 537 MOD
Project: Racer Saginaw; 77 W Center St, Saginaw, MI

Date Sampled: 01/17/23
Date Received: 01/18/23
Percent Solids: n/a

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1 [a]	3Q71806.D	1	01/28/23 00:47	JL	01/25/23 09:35	OP95129	S3Q983
Run #2 [b]	3Q71930.D	5	01/31/23 10:28	JL	01/25/23 09:35	OP95129	S3Q985

	Initial Volume	Final Volume
Run #1	270 ml	1.0 ml
Run #2	270 ml	1.0 ml

CAS No.	Compound	Result	LOQ	LOD	DL	Units	Q
PERFLUOROALKYLCARBOXYLIC ACIDS							
375-22-4	Perfluorobutanoic acid	16.5	7.4	3.7	1.9	ng/l	
2706-90-3	Perfluoropentanoic acid	1.4	3.7	1.9	0.93	ng/l	J
307-24-4	Perfluorohexanoic acid [c]	2.0	3.7	1.9	0.93	ng/l	J
375-85-9	Perfluoroheptanoic acid	1.1	3.7	1.9	0.93	ng/l	J
335-67-1	Perfluorooctanoic acid	2.9	3.7	1.9	0.93	ng/l	J
375-95-1	Perfluorononanoic acid	1.9 U	3.7	1.9	0.93	ng/l	
335-76-2	Perfluorodecanoic acid	1.9 U	3.7	1.9	0.93	ng/l	
2058-94-8	Perfluoroundecanoic acid	1.9 U	3.7	1.9	0.93	ng/l	
307-55-1	Perfluorododecanoic acid	1.9 U	3.7	1.9	0.93	ng/l	
72629-94-8	Perfluorotridecanoic acid	1.9 U	3.7	1.9	0.93	ng/l	
376-06-7	Perfluorotetradecanoic acid	1.9 U	3.7	1.9	0.93	ng/l	
PERFLUOROALKYLSULFONIC ACIDS							
375-73-5	Perfluorobutanesulfonic acid	2.7	3.7	1.9	0.93	ng/l	J
2706-91-4	Perfluoropentanesulfonic acid	1.2	3.7	1.9	0.93	ng/l	J
355-46-4	Perfluorohexanesulfonic acid	5.1	3.7	1.9	0.93	ng/l	
375-92-8	Perfluoroheptanesulfonic acid	1.9 U	3.7	1.9	0.93	ng/l	
1763-23-1	Perfluorooctanesulfonic acid	1.9 U	3.7	1.9	0.93	ng/l	
68259-12-1	Perfluorononanesulfonic acid	1.9 U	3.7	1.9	0.93	ng/l	
335-77-3	Perfluorodecanesulfonic acid	1.9 U	3.7	1.9	0.93	ng/l	
PERFLUOROOCTANESULFONAMIDES							
754-91-6	PFOSA	9.3 U [d]	19	9.3	4.6	ng/l	
PERFLUOROOCTANESULFONAMIDOACETIC ACIDS							
2355-31-9	MeFOSAA	3.7 U	7.4	3.7	1.9	ng/l	
2991-50-6	EtFOSAA	3.7 U	7.4	3.7	1.9	ng/l	
FLUOROTELOMER SULFONATES							
757124-72-4	4:2 Fluorotelomer sulfonate [c]	19 U [d]	37	19	9.3	ng/l	
27619-97-2	6:2 Fluorotelomer sulfonate	3.7 U	7.4	3.7	1.9	ng/l	

U = Not detected LOD = Limit of Detection J = Indicates an estimated value
LOQ = Limit of Quantitation DL = Detection Limit B = Indicates analyte found in associated method blank
E = Indicates value exceeds calibration range N = Indicates presumptive evidence of a compound

Report of Analysis

Client Sample ID:	MW-125WT_01172023		
Lab Sample ID:	FC1973-1	**Date Sampled:**	01/17/23
Matrix:	AQ - Ground Water	**Date Received:**	01/18/23
Method:	EPA 537M QSM5.3 B-15 EPA 537 MOD	**Percent Solids:**	n/a
Project:	Racer Saginaw; 77 W Center St, Saginaw, MI		

CAS No.	Compound	Result	LOQ	LOD	DL	Units	Q
39108-34-4	8:2 Fluorotelomer sulfonate	3.7 U	7.4	3.7	1.9	ng/l	
NEXT GENERATION PFAS ANALYTES							
13252-13-6	HFPO-DA (GenX)	3.7 U	7.4	3.7	1.9	ng/l	
919005-14-4	ADONA	3.7 U	7.4	3.7	1.9	ng/l	
756426-58-1	9Cl-PF3ONS (F-53B Major)	3.7 U	7.4	3.7	1.9	ng/l	
763051-92-9	11Cl-PF3OUdS (F-53B Minor)	3.7 U	7.4	3.7	1.9	ng/l	

CAS No.	ID Standard Recoveries	Run# 1	Run# 2	Limits
	13C4-PFBA	54%	50%	50-150%
	13C5-PFPeA	50%	50%	50-150%
	13C5-PFHxA	49% [e]	50%	50-150%
	13C4-PFHpA	51%	48% [e]	50-150%
	13C8-PFOA	56%	52%	50-150%
	13C9-PFNA	66%	55%	50-150%
	13C6-PFDA	67%	49% [e]	50-150%
	13C7-PFUnDA	63%	51%	50-150%
	13C2-PFDoDA	64%	51%	50-150%
	13C2-PFTeDA	57%	52%	50-150%
	13C3-PFBS	51%	50%	50-150%
	13C3-PFHxS	54%	53%	50-150%
	13C8-PFOS	65%	53%	50-150%
	13C8-FOSA	39% [e]	52%	50-150%
	d3-MeFOSAA	81%	57%	50-150%
	d5-EtFOSAA	80%	56%	50-150%
	13C2-4:2FTS	49% [e]	49% [e]	50-150%
	13C2-6:2FTS	63%	49% [e]	50-150%
	13C2-8:2FTS	60%	54%	50-150%
	13C3-HFPO-DA	50%	57%	50-150%

(a) Insufficient sample for re-extraction.
(b) Dilution required (ID recovery standard failure).
(c) Associated ID Standard outside control limits.
(d) Result is from Run# 2
(e) Outside control limits.

U = Not detected LOD = Limit of Detection J = Indicates an estimated value
LOQ = Limit of Quantitation DL = Detection Limit B = Indicates analyte found in associated method blank
E = Indicates value exceeds calibration range N = Indicates presumptive evidence of a compound

SGS North America Inc.

Report of Analysis

Client Sample ID: TW-242_01172023
Lab Sample ID: FC1973-2
Matrix: AQ - Ground Water
Method: EPA 537M QSM5.3 B-15 EPA 537 MOD
Project: Racer Saginaw; 77 W Center St, Saginaw, MI

Date Sampled: 01/17/23
Date Received: 01/18/23
Percent Solids: n/a

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1 [a]	3Q71810.D	1	01/28/23 02:00	JL	01/25/23 09:35	OP95129	S3Q983
Run #2 [b]	3Q71931.D	5	01/31/23 10:54	JL	01/25/23 09:35	OP95129	S3Q985

	Initial Volume	Final Volume
Run #1	265 ml	1.0 ml
Run #2	265 ml	1.0 ml

CAS No.	Compound	Result	LOQ	LOD	DL	Units	Q
PERFLUOROALKYLCARBOXYLIC ACIDS							
375-22-4	Perfluorobutanoic acid	3.8 U	7.5	3.8	1.9	ng/l	
2706-90-3	Perfluoropentanoic acid [c]	9.4 U [d]	19	9.4	4.7	ng/l	
307-24-4	Perfluorohexanoic acid [c]	9.4 U [d]	19	9.4	4.7	ng/l	
375-85-9	Perfluoroheptanoic acid	1.9 U	3.8	1.9	0.94	ng/l	
335-67-1	Perfluorooctanoic acid	1.9 U	3.8	1.9	0.94	ng/l	
375-95-1	Perfluorononanoic acid	1.9 U	3.8	1.9	0.94	ng/l	
335-76-2	Perfluorodecanoic acid	1.9 U	3.8	1.9	0.94	ng/l	
2058-94-8	Perfluoroundecanoic acid	1.9 U	3.8	1.9	0.94	ng/l	
307-55-1	Perfluorododecanoic acid	1.9 U	3.8	1.9	0.94	ng/l	
72629-94-8	Perfluorotridecanoic acid	1.9 U	3.8	1.9	0.94	ng/l	
376-06-7	Perfluorotetradecanoic acid	1.9 U	3.8	1.9	0.94	ng/l	
PERFLUOROALKYLSULFONIC ACIDS							
375-73-5	Perfluorobutanesulfonic acid [c]	9.4 U [d]	19	9.4	4.7	ng/l	
2706-91-4	Perfluoropentanesulfonic acid [c]	9.4 U [d]	19	9.4	4.7	ng/l	
355-46-4	Perfluorohexanesulfonic acid	1.9 U	3.8	1.9	0.94	ng/l	
375-92-8	Perfluoroheptanesulfonic acid	1.9 U	3.8	1.9	0.94	ng/l	
1763-23-1	Perfluorooctanesulfonic acid	1.9 U	3.8	1.9	0.94	ng/l	
68259-12-1	Perfluorononanesulfonic acid	1.9 U	3.8	1.9	0.94	ng/l	
335-77-3	Perfluorodecanesulfonic acid	1.9 U	3.8	1.9	0.94	ng/l	
PERFLUOROOCTANESULFONAMIDES							
754-91-6	PFOSA	9.4 U [d]	19	9.4	4.7	ng/l	
PERFLUOROOCTANESULFONAMIDOACETIC ACIDS							
2355-31-9	MeFOSAA	3.8 U	7.5	3.8	1.9	ng/l	
2991-50-6	EtFOSAA	3.8 U	7.5	3.8	1.9	ng/l	
FLUOROTELOMER SULFONATES							
757124-72-4	4:2 Fluorotelomer sulfonate [c]	19 U [d]	38	19	9.4	ng/l	
27619-97-2	6:2 Fluorotelomer sulfonate	3.8 U	7.5	3.8	1.9	ng/l	

U = Not detected LOD = Limit of Detection J = Indicates an estimated value
LOQ = Limit of Quantitation DL = Detection Limit B = Indicates analyte found in associated method blank
E = Indicates value exceeds calibration range N = Indicates presumptive evidence of a compound

Report of Analysis

Client Sample ID:	TW-242_01172023		
Lab Sample ID:	FC1973-2	**Date Sampled:**	01/17/23
Matrix:	AQ - Ground Water	**Date Received:**	01/18/23
Method:	EPA 537M QSM5.3 B-15 EPA 537 MOD	**Percent Solids:**	n/a
Project:	Racer Saginaw; 77 W Center St, Saginaw, MI		

CAS No.	Compound	Result	LOQ	LOD	DL	Units	Q
39108-34-4	8:2 Fluorotelomer sulfonate	3.8 U	7.5	3.8	1.9	ng/l	
NEXT GENERATION PFAS ANALYTES							
13252-13-6	HFPO-DA (GenX)	19 U [d]	38	19	9.4	ng/l	
919005-14-4	ADONA	3.8 U	7.5	3.8	1.9	ng/l	
756426-58-1	9Cl-PF3ONS (F-53B Major)	3.8 U	7.5	3.8	1.9	ng/l	
763051-92-9	11Cl-PF3OUdS (F-53B Minor)	3.8 U	7.5	3.8	1.9	ng/l	

CAS No.	ID Standard Recoveries	Run# 1	Run# 2	Limits
	13C4-PFBA	50%	49% [e]	50-150%
	13C5-PFPeA	47% [e]	49% [e]	50-150%
	13C5-PFHxA	46% [e]	49% [e]	50-150%
	13C4-PFHpA	50%	48% [e]	50-150%
	13C8-PFOA	56%	53%	50-150%
	13C9-PFNA	65%	55%	50-150%
	13C6-PFDA	65%	51%	50-150%
	13C7-PFUnDA	64%	52%	50-150%
	13C2-PFDoDA	64%	51%	50-150%
	13C2-PFTeDA	60%	47% [e]	50-150%
	13C3-PFBS	48% [e]	49% [e]	50-150%
	13C3-PFHxS	51%	49% [e]	50-150%
	13C8-PFOS	66%	56%	50-150%
	13C8-FOSA	38% [e]	54%	50-150%
	d3-MeFOSAA	86%	61%	50-150%
	d5-EtFOSAA	86%	55%	50-150%
	13C2-4:2FTS	46% [e]	48% [e]	50-150%
	13C2-6:2FTS	62%	49% [e]	50-150%
	13C2-8:2FTS	61%	54%	50-150%
	13C3-HFPO-DA	49% [e]	57%	50-150%

(a) Insufficient sample for re-extraction.
(b) Dilution required (ID recovery standard failure).
(c) Associated ID Standard outside control limits.
(d) Result is from Run# 2
(e) Outside control limits.

U = Not detected LOD = Limit of Detection J = Indicates an estimated value
LOQ = Limit of Quantitation DL = Detection Limit B = Indicates analyte found in associated method blank
E = Indicates value exceeds calibration range N = Indicates presumptive evidence of a compound

Report of Analysis

Client Sample ID:	FD-1_01172023		
Lab Sample ID:	FC1973-3	**Date Sampled:**	01/17/23
Matrix:	AQ - Ground Water	**Date Received:**	01/18/23
Method:	EPA 537M QSM5.3 B-15 EPA 537 MOD	**Percent Solids:**	n/a
Project:	Racer Saginaw; 77 W Center St, Saginaw, MI		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1 [a]	3Q71811.D	1	01/28/23 02:18	JL	01/25/23 09:35	OP95129	S3Q983
Run #2 [b]	3Q71932.D	5	01/31/23 11:12	JL	01/25/23 09:35	OP95129	S3Q985

	Initial Volume	Final Volume
Run #1	270 ml	1.0 ml
Run #2	270 ml	1.0 ml

CAS No.	Compound	Result	LOQ	LOD	DL	Units	Q
PERFLUOROALKYLCARBOXYLIC ACIDS							
375-22-4	Perfluorobutanoic acid [c]	19 U [d]	37	19	9.3	ng/l	
2706-90-3	Perfluoropentanoic acid [c]	9.3 U [d]	19	9.3	4.6	ng/l	
307-24-4	Perfluorohexanoic acid [c]	9.3 U [d]	19	9.3	4.6	ng/l	
375-85-9	Perfluoroheptanoic acid [c]	9.3 U [d]	19	9.3	4.6	ng/l	
335-67-1	Perfluorooctanoic acid	9.3 U [d]	19	9.3	4.6	ng/l	
375-95-1	Perfluorononanoic acid	1.9 U	3.7	1.9	0.93	ng/l	
335-76-2	Perfluorodecanoic acid	1.9 U	3.7	1.9	0.93	ng/l	
2058-94-8	Perfluoroundecanoic acid	1.9 U	3.7	1.9	0.93	ng/l	
307-55-1	Perfluorododecanoic acid	1.9 U	3.7	1.9	0.93	ng/l	
72629-94-8	Perfluorotridecanoic acid	1.9 U	3.7	1.9	0.93	ng/l	
376-06-7	Perfluorotetradecanoic acid	1.9 U	3.7	1.9	0.93	ng/l	
PERFLUOROALKYLSULFONIC ACIDS							
375-73-5	Perfluorobutanesulfonic acid [c]	9.3 U [d]	19	9.3	4.6	ng/l	
2706-91-4	Perfluoropentanesulfonic acid [c]	9.3 U [d]	19	9.3	4.6	ng/l	
355-46-4	Perfluorohexanesulfonic acid [c]	9.3 U [d]	19	9.3	4.6	ng/l	
375-92-8	Perfluoroheptanesulfonic acid	1.9 U	3.7	1.9	0.93	ng/l	
1763-23-1	Perfluorooctanesulfonic acid	1.9 U	3.7	1.9	0.93	ng/l	
68259-12-1	Perfluorononanesulfonic acid	1.9 U	3.7	1.9	0.93	ng/l	
335-77-3	Perfluorodecanesulfonic acid	1.9 U	3.7	1.9	0.93	ng/l	
PERFLUOROOCTANESULFONAMIDES							
754-91-6	PFOSA	9.3 U [d]	19	9.3	4.6	ng/l	
PERFLUOROOCTANESULFONAMIDOACETIC ACIDS							
2355-31-9	MeFOSAA	3.7 U	7.4	3.7	1.9	ng/l	
2991-50-6	EtFOSAA	3.7 U	7.4	3.7	1.9	ng/l	
FLUOROTELOMER SULFONATES							
757124-72-4	4:2 Fluorotelomer sulfonate [c]	19 U [d]	37	19	9.3	ng/l	
27619-97-2	6:2 Fluorotelomer sulfonate	3.7 U	7.4	3.7	1.9	ng/l	

U = Not detected LOD = Limit of Detection J = Indicates an estimated value
LOQ = Limit of Quantitation DL = Detection Limit B = Indicates analyte found in associated method blank
E = Indicates value exceeds calibration range N = Indicates presumptive evidence of a compound

Report of Analysis

Client Sample ID:	FD-1_01172023		
Lab Sample ID:	FC1973-3	**Date Sampled:**	01/17/23
Matrix:	AQ - Ground Water	**Date Received:**	01/18/23
Method:	EPA 537M QSM5.3 B-15 EPA 537 MOD	**Percent Solids:**	n/a
Project:	Racer Saginaw; 77 W Center St, Saginaw, MI		

CAS No.	Compound	Result	LOQ	LOD	DL	Units	Q
39108-34-4	8:2 Fluorotelomer sulfonate	19 U [d]	37	19	9.3	ng/l	
NEXT GENERATION PFAS ANALYTES							
13252-13-6	HFPO-DA (GenX)	19 U [d]	37	19	9.3	ng/l	
919005-14-4	ADONA	19 U [d]	37	19	9.3	ng/l	
756426-58-1	9Cl-PF3ONS (F-53B Major)	3.7 U	7.4	3.7	1.9	ng/l	
763051-92-9	11Cl-PF3OUdS (F-53B Minor)	3.7 U	7.4	3.7	1.9	ng/l	

CAS No.	ID Standard Recoveries	Run# 1	Run# 2	Limits
	13C4-PFBA	36% [e]	41% [e]	50-150%
	13C5-PFPeA	38% [e]	46% [e]	50-150%
	13C5-PFHxA	38% [e]	46% [e]	50-150%
	13C4-PFHpA	40% [e]	46% [e]	50-150%
	13C8-PFOA	46% [e]	52%	50-150%
	13C9-PFNA	54%	53%	50-150%
	13C6-PFDA	54%	49% [e]	50-150%
	13C7-PFUnDA	52%	50%	50-150%
	13C2-PFDoDA	53%	49% [e]	50-150%
	13C2-PFTeDA	51%	48% [e]	50-150%
	13C3-PFBS	40% [e]	49% [e]	50-150%
	13C3-PFHxS	43% [e]	48% [e]	50-150%
	13C8-PFOS	54%	56%	50-150%
	13C8-FOSA	35% [e]	58%	50-150%
	d3-MeFOSAA	68%	57%	50-150%
	d5-EtFOSAA	71%	58%	50-150%
	13C2-4:2FTS	38% [e]	47% [e]	50-150%
	13C2-6:2FTS	51%	48% [e]	50-150%
	13C2-8:2FTS	49% [e]	53%	50-150%
	13C3-HFPO-DA	40% [e]	52%	50-150%

(a) Insufficient sample for re-extraction.
(b) Dilution required (ID recovery standard failure).
(c) Associated ID Standard outside control limits.
(d) Result is from Run# 2
(e) Outside control limits.

U = Not detected LOD = Limit of Detection J = Indicates an estimated value
LOQ = Limit of Quantitation DL = Detection Limit B = Indicates analyte found in associated method blank
E = Indicates value exceeds calibration range N = Indicates presumptive evidence of a compound

Report of Analysis

Client Sample ID:	EQUIPMENT BLANK_01172023		
Lab Sample ID:	FC1973-4	**Date Sampled:**	01/17/23
Matrix:	AQ - Equipment Blank	**Date Received:**	01/18/23
Method:	EPA 537M QSM5.3 B-15 EPA 537 MOD	**Percent Solids:**	n/a
Project:	Racer Saginaw; 77 W Center St, Saginaw, MI		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	3Q71812.D	1	01/28/23 02:36	JL	01/25/23 09:35	OP95129	S3Q983
Run #2							

	Initial Volume	Final Volume
Run #1	260 ml	1.0 ml
Run #2		

CAS No.	Compound	Result	LOQ	LOD	DL	Units	Q
PERFLUOROALKYLCARBOXYLIC ACIDS							
375-22-4	Perfluorobutanoic acid	3.8 U	7.7	3.8	1.9	ng/l	
2706-90-3	Perfluoropentanoic acid	1.9 U	3.8	1.9	0.96	ng/l	
307-24-4	Perfluorohexanoic acid	1.9 U	3.8	1.9	0.96	ng/l	
375-85-9	Perfluoroheptanoic acid	1.9 U	3.8	1.9	0.96	ng/l	
335-67-1	Perfluorooctanoic acid	1.9 U	3.8	1.9	0.96	ng/l	
375-95-1	Perfluorononanoic acid	1.9 U	3.8	1.9	0.96	ng/l	
335-76-2	Perfluorodecanoic acid	1.9 U	3.8	1.9	0.96	ng/l	
2058-94-8	Perfluoroundecanoic acid	1.9 U	3.8	1.9	0.96	ng/l	
307-55-1	Perfluorododecanoic acid	1.9 U	3.8	1.9	0.96	ng/l	
72629-94-8	Perfluorotridecanoic acid	1.9 U	3.8	1.9	0.96	ng/l	
376-06-7	Perfluorotetradecanoic acid	1.9 U	3.8	1.9	0.96	ng/l	
PERFLUOROALKYLSULFONIC ACIDS							
375-73-5	Perfluorobutanesulfonic acid	1.9 U	3.8	1.9	0.96	ng/l	
2706-91-4	Perfluoropentanesulfonic acid	1.9 U	3.8	1.9	0.96	ng/l	
355-46-4	Perfluorohexanesulfonic acid	1.9 U	3.8	1.9	0.96	ng/l	
375-92-8	Perfluoroheptanesulfonic acid	1.9 U	3.8	1.9	0.96	ng/l	
1763-23-1	Perfluorooctanesulfonic acid	1.9 U	3.8	1.9	0.96	ng/l	
68259-12-1	Perfluorononanesulfonic acid	1.9 U	3.8	1.9	0.96	ng/l	
335-77-3	Perfluorodecanesulfonic acid	1.9 U	3.8	1.9	0.96	ng/l	
PERFLUOROOCTANESULFONAMIDES							
754-91-6	PFOSA	1.9 U	3.8	1.9	0.96	ng/l	
PERFLUOROOCTANESULFONAMIDOACETIC ACIDS							
2355-31-9	MeFOSAA	3.8 U	7.7	3.8	1.9	ng/l	
2991-50-6	EtFOSAA	3.8 U	7.7	3.8	1.9	ng/l	
FLUOROTELOMER SULFONATES							
757124-72-4	4:2 Fluorotelomer sulfonate	3.8 U	7.7	3.8	1.9	ng/l	
27619-97-2	6:2 Fluorotelomer sulfonate	3.8 U	7.7	3.8	1.9	ng/l	

U = Not detected LOD = Limit of Detection J = Indicates an estimated value
LOQ = Limit of Quantitation DL = Detection Limit B = Indicates analyte found in associated method blank
E = Indicates value exceeds calibration range N = Indicates presumptive evidence of a compound

Report of Analysis

Client Sample ID:	EQUIPMENT BLANK_01172023		
Lab Sample ID:	FC1973-4	**Date Sampled:**	01/17/23
Matrix:	AQ - Equipment Blank	**Date Received:**	01/18/23
Method:	EPA 537M QSM5.3 B-15 EPA 537 MOD	**Percent Solids:**	n/a
Project:	Racer Saginaw; 77 W Center St, Saginaw, MI		

CAS No.	Compound	Result	LOQ	LOD	DL	Units	Q
39108-34-4	8:2 Fluorotelomer sulfonate	3.8 U	7.7	3.8	1.9	ng/l	
NEXT GENERATION PFAS ANALYTES							
13252-13-6	HFPO-DA (GenX)	3.8 U	7.7	3.8	1.9	ng/l	
919005-14-4	ADONA	3.8 U	7.7	3.8	1.9	ng/l	
756426-58-1	9Cl-PF3ONS (F-53B Major)	3.8 U	7.7	3.8	1.9	ng/l	
763051-92-9	11Cl-PF3OUdS (F-53B Minor)	3.8 U	7.7	3.8	1.9	ng/l	

CAS No.	ID Standard Recoveries	Run# 1	Run# 2	Limits
	13C4-PFBA	60%		50-150%
	13C5-PFPeA	62%		50-150%
	13C5-PFHxA	62%		50-150%
	13C4-PFHpA	65%		50-150%
	13C8-PFOA	66%		50-150%
	13C9-PFNA	67%		50-150%
	13C6-PFDA	65%		50-150%
	13C7-PFUnDA	64%		50-150%
	13C2-PFDoDA	65%		50-150%
	13C2-PFTeDA	58%		50-150%
	13C3-PFBS	56%		50-150%
	13C3-PFHxS	64%		50-150%
	13C8-PFOS	67%		50-150%
	13C8-FOSA	74%		50-150%
	d3-MeFOSAA	73%		50-150%
	d5-EtFOSAA	77%		50-150%
	13C2-4:2FTS	57%		50-150%
	13C2-6:2FTS	61%		50-150%
	13C2-8:2FTS	58%		50-150%
	13C3-HFPO-DA	62%		50-150%

U = Not detected LOD = Limit of Detection J = Indicates an estimated value
LOQ = Limit of Quantitation DL = Detection Limit B = Indicates analyte found in associated method blank
E = Indicates value exceeds calibration range N = Indicates presumptive evidence of a compound

Misc. Forms

Custody Documents and Other Forms

Includes the following where applicable:

- Chain of Custody
- QC Evaluation: DOD QSM5.x Limits

SGS North America Inc - Orlando
Chain of Custody

FC1973

4405 Vineland Road, Suite C-15 Orlando, Fl 32811
TEL. 407-425-6700 FAX: 407-425-0707
www.sgs.com

SGS - ORLANDO JOB # : PAGE 1 OF 1

SGS - ORLANDO Quote #	SKIFF #

Client / Reporting Information

Company Name: Arcadis
Address: 28550 Cabbot Drive Suite 500
City: Novi State: MI Zip: 48377
Project Contact: Scott Clear Water Email: Scott.ClearWater@Arcadis.com
Phone #: 248 346 5970
Sampler(s) Name(s) (Printed)
Sampler 1: J. Sidor Sampler 2: J. McKimmon

Project Information

Project Name: Racer Saginaw
Street 77W Center St.
City Saginaw State MI
Project # 30121470
Fax #
Client Purchase Order #

Analytical Information

Matrix Codes

DW - Drinking Water
GW - Ground Water
WW - Water
SW - Surface Water
SO - Soil
SL- Sludge
OI - Oil
LIQ - Other Liquid
AIR - Air
SOL - Other Solid

SGS Orlando Sample #	Field ID / Point of Collection	COLLECTION DATE	TIME	SAMPLED BY:	MATRIX	TOTAL # OF BOTTLES	OTHER	NONE	HCl	NaOH	HNO3	H2SO4	MeOH+ZnAc	DI WATER	MEOH	PFAS	LAB USE ONLY
1	MW-125WT_01172023	1/17/23	1106	JS/JM	GW	1		X								X	
2	TW-242_01172023	1/17/23	1151	JS/JM	GW	1		X								X	
3	FD-1_01172023	1/17/23		JS/JM	GW	1		X								X	
4	Equipment blank_01172023	1/17/23	1200	JS/JM	WW	1		X								X	

Turnaround Time (Business days)

10 Day (Business)
7 Day
5 Day
3 Day *RUSH*
2 Day *RUSH*
1 Day *RUSH*
Other
Approved By: / Date:
Rush T/A Data Available VIA Email or Lablink

Data Deliverable Information

- [ ] COMMERCIAL "A" (RESULTS ONLY)
- [ ] COMMERCIAL "B" (RESULTS PLUS QC)
- [ ] REDT1 (EPA LEVEL 3)
- [ ] FULLT1 (EPA LEVEL 4)
- [ ] EDD'S

Comments / Remarks

INITIAL ASSESSMENT
LABEL VERIFICATION

Sample Custody must be documented below each time samples change possession, including courier delivery.

	Relinquished by Sampler/Affiliation	Date Time:	Received By/Affiliation	Relinquished By/Affiliation	Date Time:	Received By/Affiliation
1	John Sidor Arcadis	1/17/23 1405	2	3	1/18/23	4
	Relinquished by/Affiliation	Date Time:	Received By/Affiliation	Relinquished By/Affiliation	Date Time:	Received By/Affiliation
5			6	7		8

Lab Use Only : Cooler Temperature (s) Celsius (corrected): 2.8 2.7

http://www.sgs.com/en/terms-and-conditions

ORLD-SMT-0001-03-FORM-COC (4).xls Rev 031318

FC1973: Chain of Custody
Page 1 of 2

SGS Sample Receipt Summary

Job Number: FC1973 **Client:** RACER ARCADIS **Project:** RACER SAGINAW

Date / Time Received: 1/18/2023 9:30:00 AM **Delivery Method:** FX **Airbill #'s:** 613466051182

Therm ID: IR 1; **Therm CF:** 0.2; **# of Coolers:** 1

Cooler Temps (Raw Measured) °C: Cooler 1: (2.8);

Cooler Temps (Corrected) °C: Cooler 1: (3.0);

Cooler Information	Y	or	N
1. Custody Seals Present	☑		☐
2. Custody Seals Intact	☑		☐
3. Temp criteria achieved	☑		☐
4. Cooler temp verification	IR Gun		
5. Cooler media	Ice (Bag)		

Trip Blank Information	Y	or	N	N/A
1. Trip Blank present / cooler	☐		☐	☑
2. Trip Blank listed on COC	☐		☐	☑

	W	or	S	N/A
3. Type Of TB Received	☐		☐	☑

Sample Information	Y	or	N	N/A
1. Sample labels present on bottles	☑		☐	
2. Samples preserved properly	☑		☐	
3. Sufficient volume/containers recvd for analysis:	☑		☐	
4. Condition of sample	Intact			
5. Sample recvd within HT	☑		☐	
6. Dates/Times/IDs on COC match Sample Label	☑		☐	
7. VOCs have headspace	☐		☐	☑
8. Bottles received for unspecified tests	☐		☑	
9. Compositing instructions clear	☐		☐	☑
10. Voa Soil Kits/Jars received past 48hrs?	☐		☐	☑
11. % Solids Jar received?	☐		☐	☑
12. Residual Chlorine Present?	☐		☐	☑

Misc. Information

Number of Encores: 25-Gram _____ 5-Gram _____ Number of 5035 Field Kits: _____ Number of Lab Filtered Metals: _____

Test Strip Lot #s: pH 0-3 230315 pH 10-12 219813A Other: (Specify) _____ _____

Residual Chlorine Test Strip Lot #: _____

Comments

SM001
Rev. Date 05/24/17

Technician: NATHANS Date: 1/18/2023 9:30:00 AM Reviewer: _____ Date: _____

FC1973: Chain of Custody
Page 2 of 2

QC Evaluation: DOD QSM5.x Limits

Job Number: FC1973
Account: Arcadis
Project: Racer Saginaw; 77 W Center St, Saginaw, MI
Collected: 01/17/23

QC Sample ID	CAS#	Analyte	Sample Type	Result Type	Result	Units	Limits
OP95129	EPA 537M QSM5.3 B-15						
OP95129-BS	375-22-4	Perfluorobutanoic acid	BSP	REC	76	%	73-129
OP95129-BS	2706-90-3	Perfluoropentanoic acid	BSP	REC	76	%	72-129
OP95129-BS	307-24-4	Perfluorohexanoic acid	BSP	REC	76	%	72-129
OP95129-BS	375-85-9	Perfluoroheptanoic acid	BSP	REC	75	%	72-130
OP95129-BS	335-67-1	Perfluorooctanoic acid	BSP	REC	75	%	71-133
OP95129-BS	375-95-1	Perfluorononanoic acid	BSP	REC	74	%	69-130
OP95129-BS	335-76-2	Perfluorodecanoic acid	BSP	REC	75	%	71-129
OP95129-BS	2058-94-8	Perfluoroundecanoic acid	BSP	REC	75	%	69-133
OP95129-BS	307-55-1	Perfluorododecanoic acid	BSP	REC	77	%	72-134
OP95129-BS	72629-94-8	Perfluorotridecanoic acid	BSP	REC	71	%	65-144
OP95129-BS	376-06-7	Perfluorotetradecanoic acid	BSP	REC	75	%	71-132
OP95129-BS	375-73-5	Perfluorobutanesulfonic acid	BSP	REC	82	%	72-130
OP95129-BS	2706-91-4	Perfluoropentanesulfonic acid	BSP	REC	78	%	71-127
OP95129-BS	355-46-4	Perfluorohexanesulfonic acid	BSP	REC	77	%	68-131
OP95129-BS	375-92-8	Perfluoroheptanesulfonic acid	BSP	REC	75	%	69-134
OP95129-BS	1763-23-1	Perfluorooctanesulfonic acid	BSP	REC	74	%	65-140
OP95129-BS	68259-12-1	Perfluorononanesulfonic acid	BSP	REC	75	%	69-127
OP95129-BS	335-77-3	Perfluorodecanesulfonic acid	BSP	REC	74	%	53-142
OP95129-BS	754-91-6	PFOSA	BSP	REC	77	%	67-137
OP95129-BS	2355-31-9	MeFOSAA	BSP	REC	77	%	65-136
OP95129-BS	2991-50-6	EtFOSAA	BSP	REC	73	%	61-135
OP95129-BS	757124-72-4	4:2 Fluorotelomer sulfonate	BSP	REC	85	%	63-143
OP95129-BS	27619-97-2	6:2 Fluorotelomer sulfonate	BSP	REC	88	%	64-140
OP95129-BS	39108-34-4	8:2 Fluorotelomer sulfonate	BSP	REC	86	%	67-138
OP95129-MS*	375-22-4	Perfluorobutanoic acid	MS	REC	78	%	73-129
OP95129-MS*	2706-90-3	Perfluoropentanoic acid	MS	REC	75	%	72-129
OP95129-MS*	307-24-4	Perfluorohexanoic acid	MS	REC	78	%	72-129
OP95129-MS*	375-85-9	Perfluoroheptanoic acid	MS	REC	76	%	72-130
OP95129-MS*	335-67-1	Perfluorooctanoic acid	MS	REC	77	%	71-133
OP95129-MS*	375-95-1	Perfluorononanoic acid	MS	REC	75	%	69-130
OP95129-MS*	335-76-2	Perfluorodecanoic acid	MS	REC	75	%	71-129
OP95129-MS*	2058-94-8	Perfluoroundecanoic acid	MS	REC	75	%	69-133
OP95129-MS*	307-55-1	Perfluorododecanoic acid	MS	REC	78	%	72-134
OP95129-MS*	72629-94-8	Perfluorotridecanoic acid	MS	REC	74	%	65-144
OP95129-MS*	376-06-7	Perfluorotetradecanoic acid	MS	REC	75	%	71-132
OP95129-MS*	375-73-5	Perfluorobutanesulfonic acid	MS	REC	83	%	72-130
OP95129-MS*	2706-91-4	Perfluoropentanesulfonic acid	MS	REC	76	%	71-127
OP95129-MS*	355-46-4	Perfluorohexanesulfonic acid	MS	REC	77	%	68-131
OP95129-MS*	375-92-8	Perfluoroheptanesulfonic acid	MS	REC	78	%	69-134
OP95129-MS*	1763-23-1	Perfluorooctanesulfonic acid	MS	REC	75	%	65-140
OP95129-MS*	68259-12-1	Perfluorononanesulfonic acid	MS	REC	78	%	69-127
OP95129-MS*	335-77-3	Perfluorodecanesulfonic acid	MS	REC	78	%	53-142

* Sample used for QC is not from job FC1973

QC Evaluation: DOD QSM5.x Limits

Job Number: FC1973
Account: Arcadis
Project: Racer Saginaw; 77 W Center St, Saginaw, MI
Collected: 01/17/23

QC Sample ID	CAS#	Analyte	Sample Type	Result Type	Result	Units	Limits
OP95129-MS*	754-91-6	PFOSA	MS	REC	80	%	67-137
OP95129-MS*	2355-31-9	MeFOSAA	MS	REC	78	%	65-136
OP95129-MS*	2991-50-6	EtFOSAA	MS	REC	73	%	61-135
OP95129-MS*	757124-72-4	4:2 Fluorotelomer sulfonate	MS	REC	88	%	63-143
OP95129-MS*	27619-97-2	6:2 Fluorotelomer sulfonate	MS	REC	89	%	64-140
OP95129-MS*	39108-34-4	8:2 Fluorotelomer sulfonate	MS	REC	89	%	67-138
OP95129-MSD*	375-22-4	Perfluorobutanoic acid	MSD	REC	84	%	73-129
OP95129-MSD*	375-22-4	Perfluorobutanoic acid	MSD	RPD	8	%	30
OP95129-MSD*	2706-90-3	Perfluoropentanoic acid	MSD	REC	82	%	72-129
OP95129-MSD*	2706-90-3	Perfluoropentanoic acid	MSD	RPD	8	%	30
OP95129-MSD*	307-24-4	Perfluorohexanoic acid	MSD	REC	85	%	72-129
OP95129-MSD*	307-24-4	Perfluorohexanoic acid	MSD	RPD	9	%	30
OP95129-MSD*	375-85-9	Perfluoroheptanoic acid	MSD	REC	82	%	72-130
OP95129-MSD*	375-85-9	Perfluoroheptanoic acid	MSD	RPD	8	%	30
OP95129-MSD*	335-67-1	Perfluorooctanoic acid	MSD	REC	84	%	71-133
OP95129-MSD*	335-67-1	Perfluorooctanoic acid	MSD	RPD	9	%	30
OP95129-MSD*	375-95-1	Perfluorononanoic acid	MSD	REC	83	%	69-130
OP95129-MSD*	375-95-1	Perfluorononanoic acid	MSD	RPD	10	%	30
OP95129-MSD*	335-76-2	Perfluorodecanoic acid	MSD	REC	82	%	71-129
OP95129-MSD*	335-76-2	Perfluorodecanoic acid	MSD	RPD	9	%	30
OP95129-MSD*	2058-94-8	Perfluoroundecanoic acid	MSD	REC	83	%	69-133
OP95129-MSD*	2058-94-8	Perfluoroundecanoic acid	MSD	RPD	10	%	30
OP95129-MSD*	307-55-1	Perfluorododecanoic acid	MSD	REC	84	%	72-134
OP95129-MSD*	307-55-1	Perfluorododecanoic acid	MSD	RPD	8	%	30
OP95129-MSD*	72629-94-8	Perfluorotridecanoic acid	MSD	REC	80	%	65-144
OP95129-MSD*	72629-94-8	Perfluorotridecanoic acid	MSD	RPD	8	%	30
OP95129-MSD*	376-06-7	Perfluorotetradecanoic acid	MSD	REC	83	%	71-132
OP95129-MSD*	376-06-7	Perfluorotetradecanoic acid	MSD	RPD	10	%	30
OP95129-MSD*	375-73-5	Perfluorobutanesulfonic acid	MSD	REC	91	%	72-130
OP95129-MSD*	375-73-5	Perfluorobutanesulfonic acid	MSD	RPD	9	%	30
OP95129-MSD*	2706-91-4	Perfluoropentanesulfonic acid	MSD	REC	86	%	71-127
OP95129-MSD*	2706-91-4	Perfluoropentanesulfonic acid	MSD	RPD	12	%	30
OP95129-MSD*	355-46-4	Perfluorohexanesulfonic acid	MSD	REC	84	%	68-131
OP95129-MSD*	355-46-4	Perfluorohexanesulfonic acid	MSD	RPD	9	%	30
OP95129-MSD*	375-92-8	Perfluoroheptanesulfonic acid	MSD	REC	82	%	69-134
OP95129-MSD*	375-92-8	Perfluoroheptanesulfonic acid	MSD	RPD	5	%	30
OP95129-MSD*	1763-23-1	Perfluorooctanesulfonic acid	MSD	REC	82	%	65-140
OP95129-MSD*	1763-23-1	Perfluorooctanesulfonic acid	MSD	RPD	8	%	30
OP95129-MSD*	68259-12-1	Perfluorononanesulfonic acid	MSD	REC	83	%	69-127
OP95129-MSD*	68259-12-1	Perfluorononanesulfonic acid	MSD	RPD	5	%	30
OP95129-MSD*	335-77-3	Perfluorodecanesulfonic acid	MSD	REC	84	%	53-142
OP95129-MSD*	335-77-3	Perfluorodecanesulfonic acid	MSD	RPD	8	%	30
OP95129-MSD*	754-91-6	PFOSA	MSD	REC	88	%	67-137
OP95129-MSD*	754-91-6	PFOSA	MSD	RPD	9	%	30
OP95129-MSD*	2355-31-9	MeFOSAA	MSD	REC	85	%	65-136

* Sample used for QC is not from job FC1973

QC Evaluation: DOD QSM5.x Limits

Job Number: FC1973
Account: Arcadis
Project: Racer Saginaw; 77 W Center St, Saginaw, MI
Collected: 01/17/23

QC Sample ID	CAS#	Analyte	Sample Type	Result Type	Result	Units	Limits
OP95129-MSD*	2355-31-9	MeFOSAA	MSD	RPD	9	%	30
OP95129-MSD*	2991-50-6	EtFOSAA	MSD	REC	83	%	61-135
OP95129-MSD*	2991-50-6	EtFOSAA	MSD	RPD	13	%	30
OP95129-MSD*	757124-72-4	4:2 Fluorotelomer sulfonate	MSD	REC	94	%	63-143
OP95129-MSD*	757124-72-4	4:2 Fluorotelomer sulfonate	MSD	RPD	8	%	30
OP95129-MSD*	27619-97-2	6:2 Fluorotelomer sulfonate	MSD	REC	99	%	64-140
OP95129-MSD*	27619-97-2	6:2 Fluorotelomer sulfonate	MSD	RPD	11	%	30
OP95129-MSD*	39108-34-4	8:2 Fluorotelomer sulfonate	MSD	REC	96	%	67-138
OP95129-MSD*	39108-34-4	8:2 Fluorotelomer sulfonate	MSD	RPD	7	%	30

* Sample used for QC is not from job FC1973

MS Semi-volatiles

QC Data Summaries

Includes the following where applicable:

- Method Blank Summaries
- Blank Spike Summaries
- Matrix Spike and Duplicate Summaries

Instrument Blank

Job Number: FC1973
Account: ARCMIN Arcadis
Project: Racer Saginaw; 77 W Center St, Saginaw, MI

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
S3Q983-IBLK	3Q71769.D	1	01/27/23	JL	n/a	n/a	S3Q983

The QC reported here applies to the following samples: **Method:** EPA 537M QSM5.3 B-15

FC1973-1, FC1973-2, FC1973-3, FC1973-4

CAS No.	Compound	Result	RL	MDL	Units	Q
375-22-4	Perfluorobutanoic acid	ND	0.0080	0.0020	ug/l	
2706-90-3	Perfluoropentanoic acid	ND	0.0040	0.0010	ug/l	
307-24-4	Perfluorohexanoic acid	ND	0.0040	0.0010	ug/l	
375-85-9	Perfluoroheptanoic acid	ND	0.0040	0.0010	ug/l	
335-67-1	Perfluorooctanoic acid	ND	0.0040	0.0010	ug/l	
375-95-1	Perfluorononanoic acid	ND	0.0040	0.0010	ug/l	
335-76-2	Perfluorodecanoic acid	ND	0.0040	0.0010	ug/l	
2058-94-8	Perfluoroundecanoic acid	ND	0.0040	0.0010	ug/l	
307-55-1	Perfluorododecanoic acid	ND	0.0040	0.0010	ug/l	
72629-94-8	Perfluorotridecanoic acid	ND	0.0040	0.0010	ug/l	
376-06-7	Perfluorotetradecanoic acid	ND	0.0040	0.0010	ug/l	
375-73-5	Perfluorobutanesulfonic acid	ND	0.0040	0.0010	ug/l	
2706-91-4	Perfluoropentanesulfonic acid	ND	0.0040	0.0010	ug/l	
355-46-4	Perfluorohexanesulfonic acid	ND	0.0040	0.0010	ug/l	
375-92-8	Perfluoroheptanesulfonic acid	ND	0.0040	0.0010	ug/l	
1763-23-1	Perfluorooctanesulfonic acid	ND	0.0040	0.0010	ug/l	
68259-12-1	Perfluorononanesulfonic acid	ND	0.0040	0.0010	ug/l	
335-77-3	Perfluorodecanesulfonic acid	ND	0.0040	0.0010	ug/l	
754-91-6	PFOSA	ND	0.0040	0.0010	ug/l	
2355-31-9	MeFOSAA	ND	0.0080	0.0020	ug/l	
2991-50-6	EtFOSAA	ND	0.0080	0.0020	ug/l	
757124-72-4	4:2 Fluorotelomer sulfonate	ND	0.0080	0.0020	ug/l	
27619-97-2	6:2 Fluorotelomer sulfonate	ND	0.0080	0.0020	ug/l	
39108-34-4	8:2 Fluorotelomer sulfonate	ND	0.0080	0.0020	ug/l	
13252-13-6	HFPO-DA (GenX)	ND	0.0080	0.0020	ug/l	
919005-14-4	ADONA	ND	0.0080	0.0020	ug/l	
756426-58-1	9Cl-PF3ONS (F-53B Major)	ND	0.0080	0.0020	ug/l	
763051-92-9	11Cl-PF3OUdS (F-53B Minor)	ND	0.0080	0.0020	ug/l	

CAS No.	ID Standard Recoveries		Limits
	13C4-PFBA	85%	50-150%
	13C5-PFPeA	85%	50-150%
	13C5-PFHxA	85%	50-150%
	13C4-PFHpA	86%	50-150%

Instrument Blank

Job Number: FC1973
Account: ARCMIN Arcadis
Project: Racer Saginaw; 77 W Center St, Saginaw, MI

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
S3Q983-IBLK	3Q71769.D	1	01/27/23	JL	n/a	n/a	S3Q983

The QC reported here applies to the following samples: **Method:** EPA 537M QSM5.3 B-15

FC1973-1, FC1973-2, FC1973-3, FC1973-4

CAS No.	ID Standard Recoveries		Limits
	13C8-PFOA	87%	50-150%
	13C9-PFNA	87%	50-150%
	13C6-PFDA	89%	50-150%
	13C7-PFUnDA	86%	50-150%
	13C2-PFDoDA	85%	50-150%
	13C2-PFTeDA	84%	50-150%
	13C3-PFBS	86%	50-150%
	13C3-PFHxS	87%	50-150%
	13C8-PFOS	86%	50-150%
	13C8-FOSA	91%	50-150%
	d3-MeFOSA	89%	50-150%
	d3-MeFOSAA	90%	50-150%
	d5-EtFOSAA	94%	50-150%
	13C2-4:2FTS	73%	50-150%
	13C2-6:2FTS	78%	50-150%
	13C2-8:2FTS	76%	50-150%
	13C3-HFPO-DA	85%	50-150%

Instrument Blank

Job Number: FC1973
Account: ARCMIN Arcadis
Project: Racer Saginaw; 77 W Center St, Saginaw, MI

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
S3Q985-IBLK	3Q71881.D	1	01/30/23	JL	n/a	n/a	S3Q985

The QC reported here applies to the following samples: **Method:** EPA 537M QSM5.3 B-15

FC1973-1, FC1973-2, FC1973-3

CAS No.	Compound	Result	RL	MDL	Units	Q
375-22-4	Perfluorobutanoic acid	ND	0.0080	0.0020	ug/l	
2706-90-3	Perfluoropentanoic acid	ND	0.0040	0.0010	ug/l	
307-24-4	Perfluorohexanoic acid	ND	0.0040	0.0010	ug/l	
375-85-9	Perfluoroheptanoic acid	ND	0.0040	0.0010	ug/l	
335-67-1	Perfluorooctanoic acid	ND	0.0040	0.0010	ug/l	
375-73-5	Perfluorobutanesulfonic acid	ND	0.0040	0.0010	ug/l	
2706-91-4	Perfluoropentanesulfonic acid	ND	0.0040	0.0010	ug/l	
355-46-4	Perfluorohexanesulfonic acid	ND	0.0040	0.0010	ug/l	
754-91-6	PFOSA	ND	0.0040	0.0010	ug/l	
757124-72-4	4:2 Fluorotelomer sulfonate	ND	0.0080	0.0020	ug/l	
39108-34-4	8:2 Fluorotelomer sulfonate	ND	0.0080	0.0020	ug/l	
13252-13-6	HFPO-DA (GenX)	ND	0.0080	0.0020	ug/l	
919005-14-4	ADONA	ND	0.0080	0.0020	ug/l	

CAS No.	ID Standard Recoveries		Limits
	13C4-PFBA	96%	50-150%
	13C5-PFPeA	96%	50-150%
	13C5-PFHxA	96%	50-150%
	13C4-PFHpA	97%	50-150%
	13C8-PFOA	99%	50-150%
	13C9-PFNA	98%	50-150%
	13C6-PFDA	97%	50-150%
	13C7-PFUnDA	96%	50-150%
	13C2-PFDoDA	96%	50-150%
	13C2-PFTeDA	95%	50-150%
	13C3-PFBS	95%	50-150%
	13C3-PFHxS	96%	50-150%
	13C8-PFOS	98%	50-150%
	13C8-FOSA	103%	50-150%
	d3-MeFOSA	100%	50-150%
	d3-MeFOSAA	96%	50-150%
	d5-EtFOSAA	99%	50-150%
	13C2-4:2FTS	87%	50-150%
	13C2-6:2FTS	86%	50-150%

Instrument Blank

Job Number: FC1973
Account: ARCMIN Arcadis
Project: Racer Saginaw; 77 W Center St, Saginaw, MI

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
S3Q985-IBLK	3Q71881.D	1	01/30/23	JL	n/a	n/a	S3Q985

The QC reported here applies to the following samples: **Method:** EPA 537M QSM5.3 B-15

FC1973-1, FC1973-2, FC1973-3

CAS No.	ID Standard Recoveries		Limits
	13C2-8:2FTS	91%	50-150%
	13C3-HFPO-DA	94%	50-150%

Method Blank Summary

Job Number: FC1973
Account: ARCMIN Arcadis
Project: Racer Saginaw; 77 W Center St, Saginaw, MI

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
OP95129-MB	3Q71800.D	1	01/27/23	JL	01/25/23	OP95129	S3Q983

The QC reported here applies to the following samples: **Method:** EPA 537M QSM5.3 B-15

FC1973-1, FC1973-2, FC1973-3, FC1973-4

CAS No.	Compound	Result	RL	MDL	Units	Q
375-22-4	Perfluorobutanoic acid	ND	0.0080	0.0020	ug/l	
2706-90-3	Perfluoropentanoic acid	ND	0.0040	0.0010	ug/l	
307-24-4	Perfluorohexanoic acid	ND	0.0040	0.0010	ug/l	
375-85-9	Perfluoroheptanoic acid	ND	0.0040	0.0010	ug/l	
335-67-1	Perfluorooctanoic acid	ND	0.0040	0.0010	ug/l	
375-95-1	Perfluorononanoic acid	ND	0.0040	0.0010	ug/l	
335-76-2	Perfluorodecanoic acid	ND	0.0040	0.0010	ug/l	
2058-94-8	Perfluoroundecanoic acid	ND	0.0040	0.0010	ug/l	
307-55-1	Perfluorododecanoic acid	ND	0.0040	0.0010	ug/l	
72629-94-8	Perfluorotridecanoic acid	ND	0.0040	0.0010	ug/l	
376-06-7	Perfluorotetradecanoic acid	ND	0.0040	0.0010	ug/l	
375-73-5	Perfluorobutanesulfonic acid	ND	0.0040	0.0010	ug/l	
2706-91-4	Perfluoropentanesulfonic acid	ND	0.0040	0.0010	ug/l	
355-46-4	Perfluorohexanesulfonic acid	ND	0.0040	0.0010	ug/l	
375-92-8	Perfluoroheptanesulfonic acid	ND	0.0040	0.0010	ug/l	
1763-23-1	Perfluorooctanesulfonic acid	ND	0.0040	0.0010	ug/l	
68259-12-1	Perfluorononanesulfonic acid	ND	0.0040	0.0010	ug/l	
335-77-3	Perfluorodecanesulfonic acid	ND	0.0040	0.0010	ug/l	
754-91-6	PFOSA	ND	0.0040	0.0010	ug/l	
2355-31-9	MeFOSAA	ND	0.0080	0.0020	ug/l	
2991-50-6	EtFOSAA	ND	0.0080	0.0020	ug/l	
757124-72-4	4:2 Fluorotelomer sulfonate	ND	0.0080	0.0020	ug/l	
27619-97-2	6:2 Fluorotelomer sulfonate	ND	0.0080	0.0020	ug/l	
39108-34-4	8:2 Fluorotelomer sulfonate	ND	0.0080	0.0020	ug/l	
13252-13-6	HFPO-DA (GenX)	ND	0.0080	0.0020	ug/l	
919005-14-4	ADONA	ND	0.0080	0.0020	ug/l	
756426-58-1	9Cl-PF3ONS (F-53B Major)	ND	0.0080	0.0020	ug/l	
763051-92-9	11Cl-PF3OUdS (F-53B Minor)	ND	0.0080	0.0020	ug/l	

CAS No.	ID Standard Recoveries		Limits
	13C4-PFBA	99%	50-150%
	13C5-PFPeA	99%	50-150%
	13C5-PFHxA	100%	50-150%
	13C4-PFHpA	102%	50-150%

Method Blank Summary

Job Number: FC1973
Account: ARCMIN Arcadis
Project: Racer Saginaw; 77 W Center St, Saginaw, MI

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
OP95129-MB	3Q71800.D	1	01/27/23	JL	01/25/23	OP95129	S3Q983

The QC reported here applies to the following samples: **Method:** EPA 537M QSM5.3 B-15

FC1973-1, FC1973-2, FC1973-3, FC1973-4

CAS No.	ID Standard Recoveries		Limits
	13C8-PFOA	104%	50-150%
	13C9-PFNA	105%	50-150%
	13C6-PFDA	101%	50-150%
	13C7-PFUnDA	99%	50-150%
	13C2-PFDoDA	94%	50-150%
	13C2-PFTeDA	83%	50-150%
	13C3-PFBS	100%	50-150%
	13C3-PFHxS	102%	50-150%
	13C8-PFOS	104%	50-150%
	13C8-FOSA	98%	50-150%
	d3-MeFOSAA	114%	50-150%
	d5-EtFOSAA	116%	50-150%
	13C2-4:2FTS	93%	50-150%
	13C2-6:2FTS	97%	50-150%
	13C2-8:2FTS	96%	50-150%
	13C3-HFPO-DA	100%	50-150%

Blank Spike Summary

Job Number: FC1973
Account: ARCMIN Arcadis
Project: Racer Saginaw; 77 W Center St, Saginaw, MI

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
OP95129-BS	3Q71799.D	1	01/27/23	JL	01/25/23	OP95129	S3Q983

The QC reported here applies to the following samples: **Method:** EPA 537M QSM5.3 B-15

FC1973-1, FC1973-2, FC1973-3, FC1973-4

CAS No.	Compound	Spike ug/l	BSP ug/l	BSP %	Limits
375-22-4	Perfluorobutanoic acid	0.08	0.0607	76	73-129
2706-90-3	Perfluoropentanoic acid	0.08	0.0608	76	72-129
307-24-4	Perfluorohexanoic acid	0.08	0.0606	76	72-129
375-85-9	Perfluoroheptanoic acid	0.08	0.0601	75	72-130
335-67-1	Perfluorooctanoic acid	0.08	0.0599	75	71-133
375-95-1	Perfluorononanoic acid	0.08	0.0594	74	69-130
335-76-2	Perfluorodecanoic acid	0.08	0.0603	75	71-129
2058-94-8	Perfluoroundecanoic acid	0.08	0.0601	75	69-133
307-55-1	Perfluorododecanoic acid	0.08	0.0618	77	72-134
72629-94-8	Perfluorotridecanoic acid	0.08	0.0564	71	65-144
376-06-7	Perfluorotetradecanoic acid	0.08	0.0603	75	71-132
375-73-5	Perfluorobutanesulfonic acid	0.08	0.0657	82	72-130
2706-91-4	Perfluoropentanesulfonic acid	0.08	0.0620	78	71-127
355-46-4	Perfluorohexanesulfonic acid	0.08	0.0613	77	68-131
375-92-8	Perfluoroheptanesulfonic acid	0.08	0.0596	75	69-134
1763-23-1	Perfluorooctanesulfonic acid	0.08	0.0590	74	65-140
68259-12-1	Perfluorononanesulfonic acid	0.08	0.0598	75	69-127
335-77-3	Perfluorodecanesulfonic acid	0.08	0.0592	74	53-142
754-91-6	PFOSA	0.08	0.0613	77	67-137
2355-31-9	MeFOSAA	0.08	0.0612	77	65-136
2991-50-6	EtFOSAA	0.08	0.0584	73	61-135
757124-72-4	4:2 Fluorotelomer sulfonate	0.08	0.0682	85	63-143
27619-97-2	6:2 Fluorotelomer sulfonate	0.08	0.0700	88	64-140
39108-34-4	8:2 Fluorotelomer sulfonate	0.08	0.0688	86	67-138
13252-13-6	HFPO-DA (GenX)	0.08	0.0568	71	60-140
919005-14-4	ADONA	0.08	0.0584	73	60-140
756426-58-1	9Cl-PF3ONS (F-53B Major)	0.08	0.0624	78	60-140
763051-92-9	11Cl-PF3OUdS (F-53B Minor)	0.08	0.0594	74	60-140

CAS No.	ID Standard Recoveries	BSP	Limits
	13C4-PFBA	119%	50-150%
	13C5-PFPeA	118%	50-150%
	13C5-PFHxA	121%	50-150%
	13C4-PFHpA	122%	50-150%

* = Outside of Control Limits.

Blank Spike Summary

Job Number: FC1973
Account: ARCMIN Arcadis
Project: Racer Saginaw; 77 W Center St, Saginaw, MI

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
OP95129-BS	3Q71799.D	1	01/27/23	JL	01/25/23	OP95129	S3Q983

The QC reported here applies to the following samples: **Method:** EPA 537M QSM5.3 B-15

FC1973-1, FC1973-2, FC1973-3, FC1973-4

CAS No.	ID Standard Recoveries	BSP	Limits
	13C8-PFOA	121%	50-150%
	13C9-PFNA	126%	50-150%
	13C6-PFDA	119%	50-150%
	13C7-PFUnDA	119%	50-150%
	13C2-PFDoDA	115%	50-150%
	13C2-PFTeDA	104%	50-150%
	13C3-PFBS	121%	50-150%
	13C3-PFHxS	123%	50-150%
	13C8-PFOS	128%	50-150%
	13C8-FOSA	109%	50-150%
	d3-MeFOSAA	135%	50-150%
	d5-EtFOSAA	136%	50-150%
	13C2-4:2FTS	123%	50-150%
	13C2-6:2FTS	124%	50-150%
	13C2-8:2FTS	125%	50-150%
	13C3-HFPO-DA	119%	50-150%

* = Outside of Control Limits.

Matrix Spike/Matrix Spike Duplicate Summary

Job Number: FC1973
Account: ARCMIN Arcadis
Project: Racer Saginaw; 77 W Center St, Saginaw, MI

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
OP95129-MS	3Q71814.D	1	01/28/23	JL	01/25/23	OP95129	S3Q983
OP95129-MSD	3Q71815.D	1	01/28/23	JL	01/25/23	OP95129	S3Q983
FC2007-14 [a]	3Q71813.D	1	01/28/23	JL	01/25/23	OP95129	S3Q983
FC2007-14 [b]	3Q71994.D	5	02/01/23	JL	01/25/23	OP95129	S3Q986

The QC reported here applies to the following samples: **Method:** EPA 537M QSM5.3 B-15

FC1973-1, FC1973-2, FC1973-3, FC1973-4

CAS No.	Compound	FC2007-14 ug/l	Q	Spike ug/l	MS ug/l	MS %	Spike ug/l	MSD ug/l	MSD %	RPD	Limits Rec/RPD
375-22-4	Perfluorobutanoic acid	0.016	U	0.16	0.124	78	0.16	0.135	84	8	73-129/30
2706-90-3	Perfluoropentanoic acid	0.0046	J	0.16	0.125	75	0.16	0.136	82	8	72-129/30
307-24-4	Perfluorohexanoic acid	0.0080	U	0.16	0.124	78	0.16	0.136	85	9	72-129/30
375-85-9	Perfluoroheptanoic acid	0.0080	U	0.16	0.121	76	0.16	0.131	82	8	72-130/30
335-67-1	Perfluorooctanoic acid	0.0080	U	0.16	0.123	77	0.16	0.134	84	9	71-133/30
375-95-1	Perfluorononanoic acid	0.0080	U	0.16	0.120	75	0.16	0.132	83	10	69-130/30
335-76-2	Perfluorodecanoic acid	0.0080	U	0.16	0.120	75	0.16	0.131	82	9	71-129/30
2058-94-8	Perfluoroundecanoic acid	0.0080	U	0.16	0.120	75	0.16	0.132	83	10	69-133/30
307-55-1	Perfluorododecanoic acid	0.0080	U	0.16	0.124	78	0.16	0.135	84	8	72-134/30
72629-94-8	Perfluorotridecanoic acid	0.0080	U	0.16	0.118	74	0.16	0.128	80	8	65-144/30
376-06-7	Perfluorotetradecanoic acid	0.0080	U	0.16	0.120	75	0.16	0.132	83	10	71-132/30
375-73-5	Perfluorobutanesulfonic acid	0.0080	U	0.16	0.132	83	0.16	0.145	91	9	72-130/30
2706-91-4	Perfluoropentanesulfonic acid	0.0080	U	0.16	0.122	76	0.16	0.137	86	12	71-127/30
355-46-4	Perfluorohexanesulfonic acid	0.0069	J	0.16	0.130	77	0.16	0.142	84	9	68-131/30
375-92-8	Perfluoroheptanesulfonic acid	0.0080	U	0.16	0.125	78	0.16	0.131	82	5	69-134/30
1763-23-1	Perfluorooctanesulfonic acid	0.0096		0.16	0.130	75	0.16	0.141	82	8	65-140/30
68259-12-1	Perfluorononanesulfonic acid	0.0080	U	0.16	0.125	78	0.16	0.132	83	5	69-127/30
335-77-3	Perfluorodecanesulfonic acid	0.0080	U	0.16	0.124	78	0.16	0.134	84	8	53-142/30
754-91-6	PFOSA	0.0080	U	0.16	0.128	80	0.16	0.140	88	9	67-137/30
2355-31-9	MeFOSAA	0.016	U	0.16	0.124	78	0.16	0.136	85	9	65-136/30
2991-50-6	EtFOSAA	0.016	U	0.16	0.117	73	0.16	0.133	83	13	61-135/30
757124-72-4	4:2 Fluorotelomer sulfonate	0.016	U	0.16	0.140	88	0.16	0.151	94	8	63-143/30
27619-97-2	6:2 Fluorotelomer sulfonate	0.016	U	0.16	0.142	89	0.16	0.158	99	11	64-140/30
39108-34-4	8:2 Fluorotelomer sulfonate	0.016	U	0.16	0.142	89	0.16	0.153	96	7	67-138/30
13252-13-6	HFPO-DA (GenX)	0.016	U	0.16	0.116	73	0.16	0.123	77	6	60-140/30
919005-14-4	ADONA	0.016	U	0.16	0.121	76	0.16	0.130	81	7	60-140/30
756426-58-1	9Cl-PF3ONS (F-53B Major)	0.016	U	0.16	0.122	76	0.16	0.133	83	9	60-140/30
763051-92-9	11Cl-PF3OUdS (F-53B Minor)	0.016	U	0.16	0.122	76	0.16	0.135	84	10	60-140/30

CAS No.	ID Standard Recoveries	MS	MSD	FC2007-14	FC2007-14	Limits
	13C4-PFBA	66%	63%	51%	42%* [c]	50-150%
	13C5-PFPeA	66%	65%	52%	45%* [c]	50-150%
	13C5-PFHxA	66%	65%	52%	46%* [c]	50-150%
	13C4-PFHpA	68%	67%	53%	47%* [c]	50-150%

* = Outside of Control Limits.

Matrix Spike/Matrix Spike Duplicate Summary

Job Number: FC1973
Account: ARCMIN Arcadis
Project: Racer Saginaw; 77 W Center St, Saginaw, MI

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
OP95129-MS	3Q71814.D	1	01/28/23	JL	01/25/23	OP95129	S3Q983
OP95129-MSD	3Q71815.D	1	01/28/23	JL	01/25/23	OP95129	S3Q983
FC2007-14 [a]	3Q71813.D	1	01/28/23	JL	01/25/23	OP95129	S3Q983
FC2007-14 [b]	3Q71994.D	5	02/01/23	JL	01/25/23	OP95129	S3Q986

The QC reported here applies to the following samples: **Method:** EPA 537M QSM5.3 B-15

FC1973-1, FC1973-2, FC1973-3, FC1973-4

CAS No.	ID Standard Recoveries	MS	MSD	FC2007-14	FC2007-14	Limits
	13C8-PFOA	67%	67%	54%	45%* [c]	50-150%
	13C9-PFNA	70%	71%	56%	46%* [c]	50-150%
	13C6-PFDA	69%	70%	54%	45%* [c]	50-150%
	13C7-PFUnDA	65%	67%	53%	45%* [c]	50-150%
	13C2-PFDoDA	65%	67%	52%	44%* [c]	50-150%
	13C2-PFTeDA	57%	59%	45%* [c]	38%* [c]	50-150%
	13C3-PFBS	67%	65%	51%	46%* [c]	50-150%
	13C3-PFHxS	67%	68%	54%	50%	50-150%
	13C8-PFOS	70%	75%	57%	48%* [c]	50-150%
	13C8-FOSA	69%	62%	59%	49%* [c]	50-150%
	d3-MeFOSAA	72%	76%	58%	49%* [c]	50-150%
	d5-EtFOSAA	71%	72%	58%	47%* [c]	50-150%
	13C2-4:2FTS	66%	66%	47%* [c]	43%* [c]	50-150%
	13C2-6:2FTS	68%	68%	49%* [c]	43%* [c]	50-150%
	13C2-8:2FTS	63%	69%	49%* [c]	44%* [c]	50-150%
	13C3-HFPO-DA	64%	62%	53%	48%* [c]	50-150%

(a) Insufficient sample for re-extraction.
(b) Confirmation run.
(c) Outside control limits.

* = Outside of Control Limits.