

Revitalizing Auto Communities Environmental Response
Trust

Hamilton Avenue Sanitary and Storm Sewer Permanent Plug Work Plan

**Buick City Site
Flint, Michigan**

November 2021

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1 Introduction

This memo for the Outfall 011 Storm and Hamilton Avenue Sanitary Sewer was prepared by Arcadis on behalf of Revitalizing Auto Communities Environmental Response Trust (RACER) for the Buick City Site (Site) located in Flint, Michigan (**Figure 1**). This memo outlines activities to reduce with the goal of eliminating the Site's contribution of PFAS to the Sanitary Sewer, Storm Sewer, and the Flint River.

2 Background Information

As part of the Buick City PFAS investigation, elevated PFAS concentrations were detected in the Outfall 011 storm and Hamilton Ave. sanitary sewer system and at the outfall discharge to the Flint River. Previous investigations have shown that blocking the existing sanitary and storm sewers, both on a permanent and temporary basis, has led to a reduction of PFAS contribution from the Site. The latest sampling data is provided in **Table 1**. This is documented up update memos to the City of Flint, **Appendix A**.

3 Permanent Sewer Plug Plan

RACER plans to implement the activities below in order to address PFAS contributions from the Site to the Outfall 011 storm (**Figure 2**) and Hamilton Avenue Sanitary Sewer (**Figure 3**). Following the implementation of each activity there will be a sampling and observation period to evaluate the effect of the changes.

3.1 Outfall 011 Permanent Plug

The installation of a permanent bulkhead in Manhole 11-6 and permanent plugs in Manholes 11-6-2 and 11-6-3 (**Figure 2**) are expected to eliminate or significantly reduce the Site's contribution of PFAS to the Flint River. Permanent plugs (**Attachment 1**) will be placed at the north lateral in Manhole 11-6, which is the storm line from Outfall 009. Additional permanent plugs (**Appendix B**) will be installed on the northwest trending laterals in manhole 11-6-2 and 11-6-3.

3.2 Sanitary Sewer Permanent Plug

The installation of a permanent plug in the sanitary sewer main in Hamilton Avenue between Manhole H-1 and Manhole H-1A (**Figure 3**) is expected to reduce the Site's contribution of PFAS to the City of Flint wastewater treatment plant. Permanent plugs (**Appendix B**) will be placed at the upgradient line of Manhole H-1A and down gradient at Manhole H-1. The line between the two manholes will be filled with grout to eliminate infiltration into the sewer between the two plugs and to prevent migration across Hamilton Avenue through the laterals shown on **Figure 3**

4 Next Steps

RACER continues to move toward decreasing PFAS contributions leaving the site. Sewer bulkheads and plugs will be installed in December 2021. Subsequent sampling will be performed in the remaining active sewers to confirm the effectiveness of this implementation.

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Hamilton Avenue Sanitary Sewer Updates

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3.2 Sanitary Sewer Permanent Plug

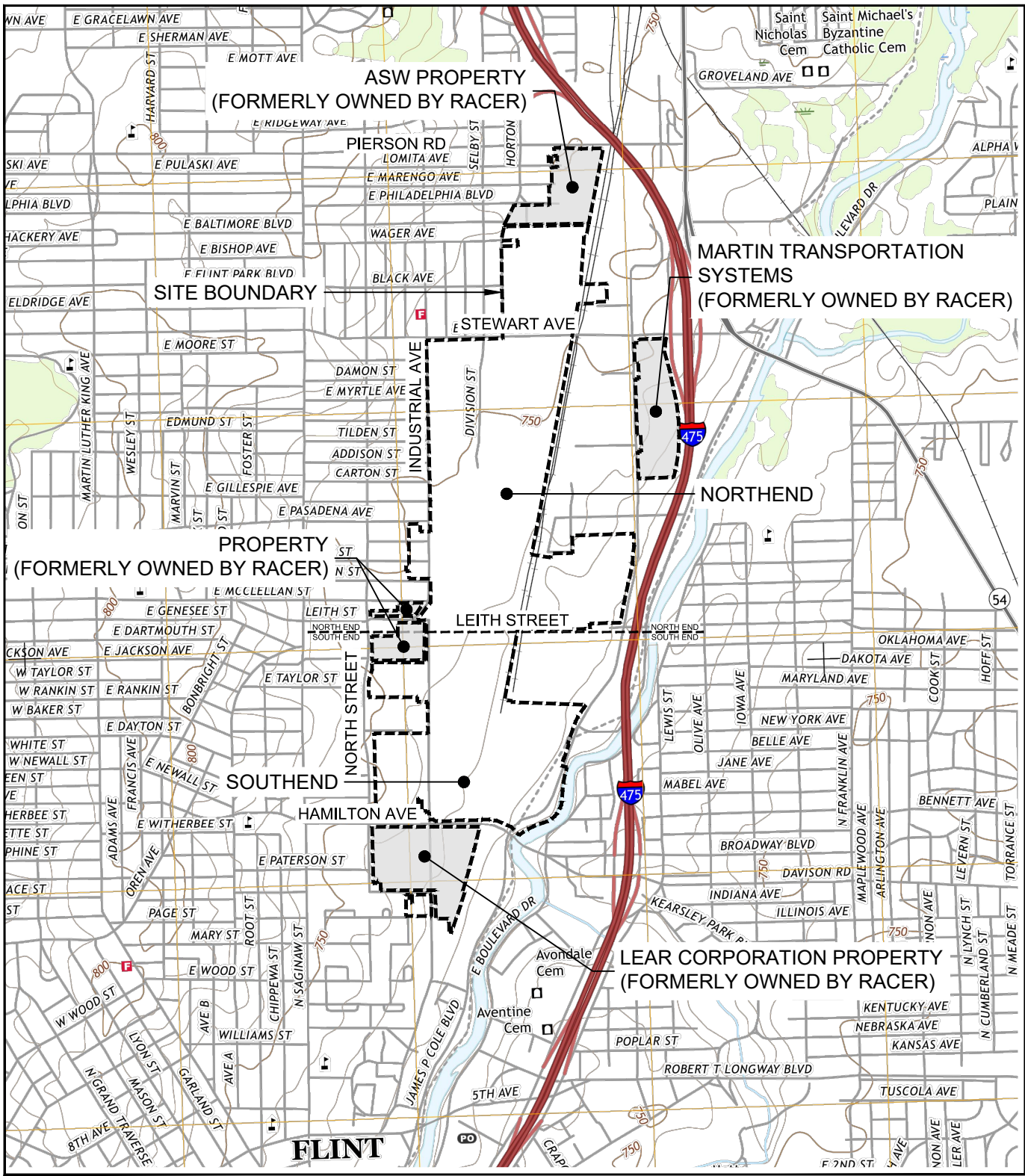
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Figures

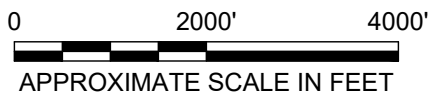
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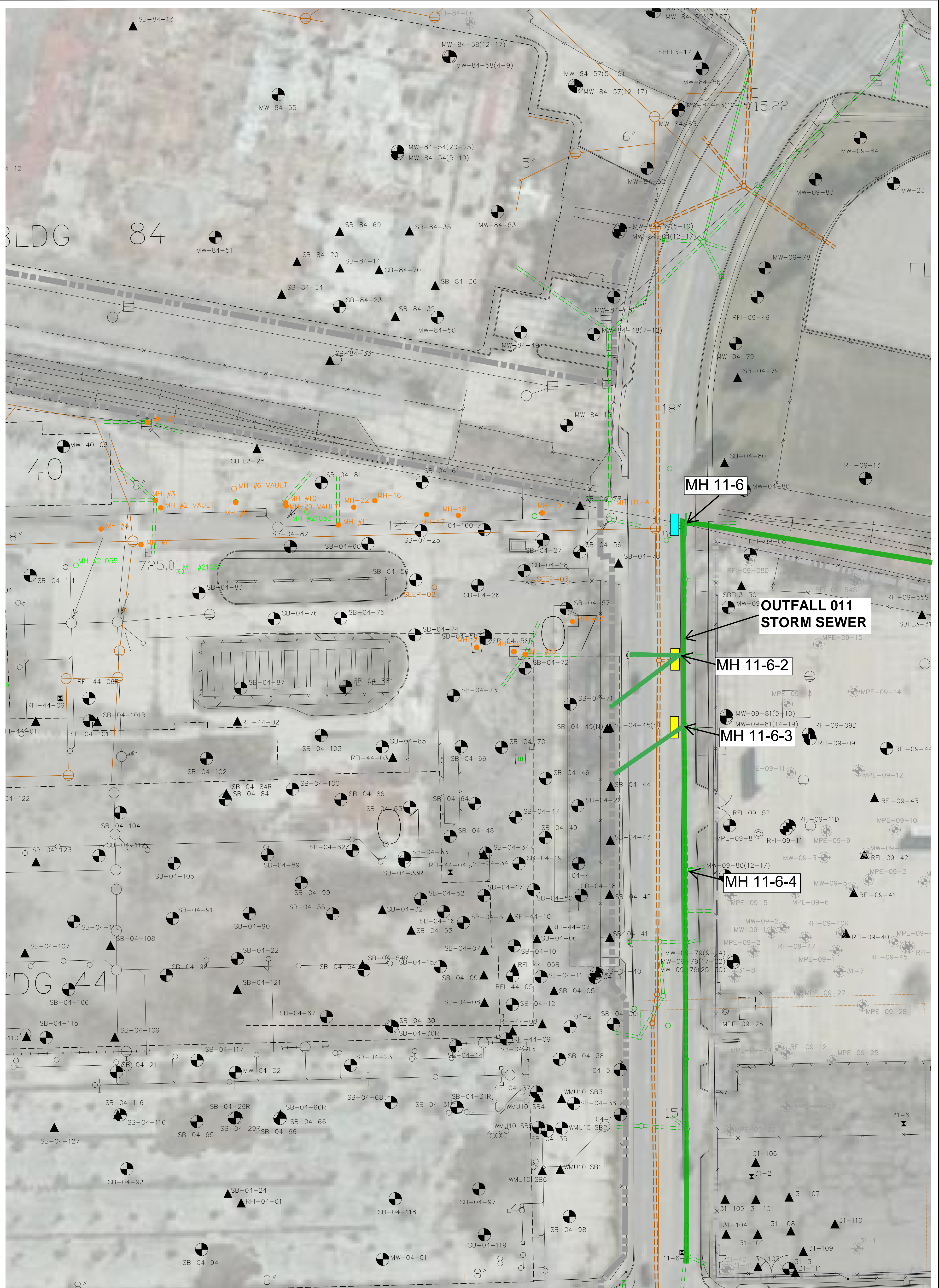
SOURCE: USGS 7.5 MIN., FLINT NORTH QUADRANGLE, FLINT NORTH 2017



AREA LOCATION
 MICHIGAN



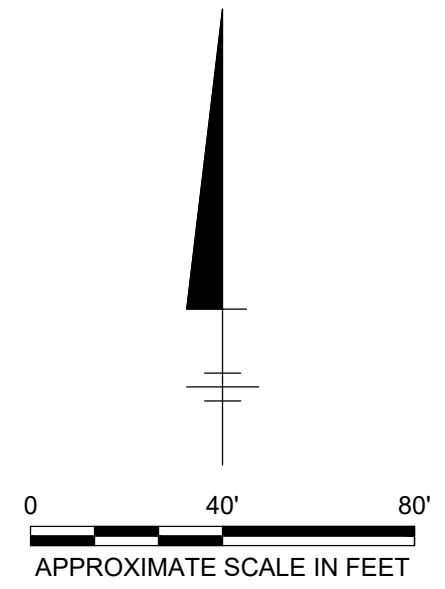
RACER TRUST BUICK CITY FLINT, MICHIGAN	
SITE LOCATION MAP	
	Design & Consultancy for national and built assets
FIGURE 1	



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LEGEND:

- | | |
|-----------------------------|---------------------------------|
| ▲ SOIL BORING | ⊗ RIVER GAUGE |
| ⊕ MONITORING WELL (ACTIVE) | ⊗ UNABLE TO LOCATE |
| ⊞ PIEZOMETER | — HISTORICAL STORM SEWER LINE |
| ⊙ RECOVERY WELL | — STORM SEWER LINE (2018) |
| ⊠ SOIL GAS POINT | — SANITARY SEWER LINE |
| ■ SUB-SLAB MONITORING POINT | --- RACER TRUST PROPERTY FORMER |
| ● TRANSECT POINT | --- RACER TRUST PROPERTY |
| ⊕ SURFACE WATER | ■ PROPOSED BULKHEAD LOCATION |
| | ■ PROPOSED PLUG LOCATIONS |



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BUICK CITY
FLINT, MICHIGAN

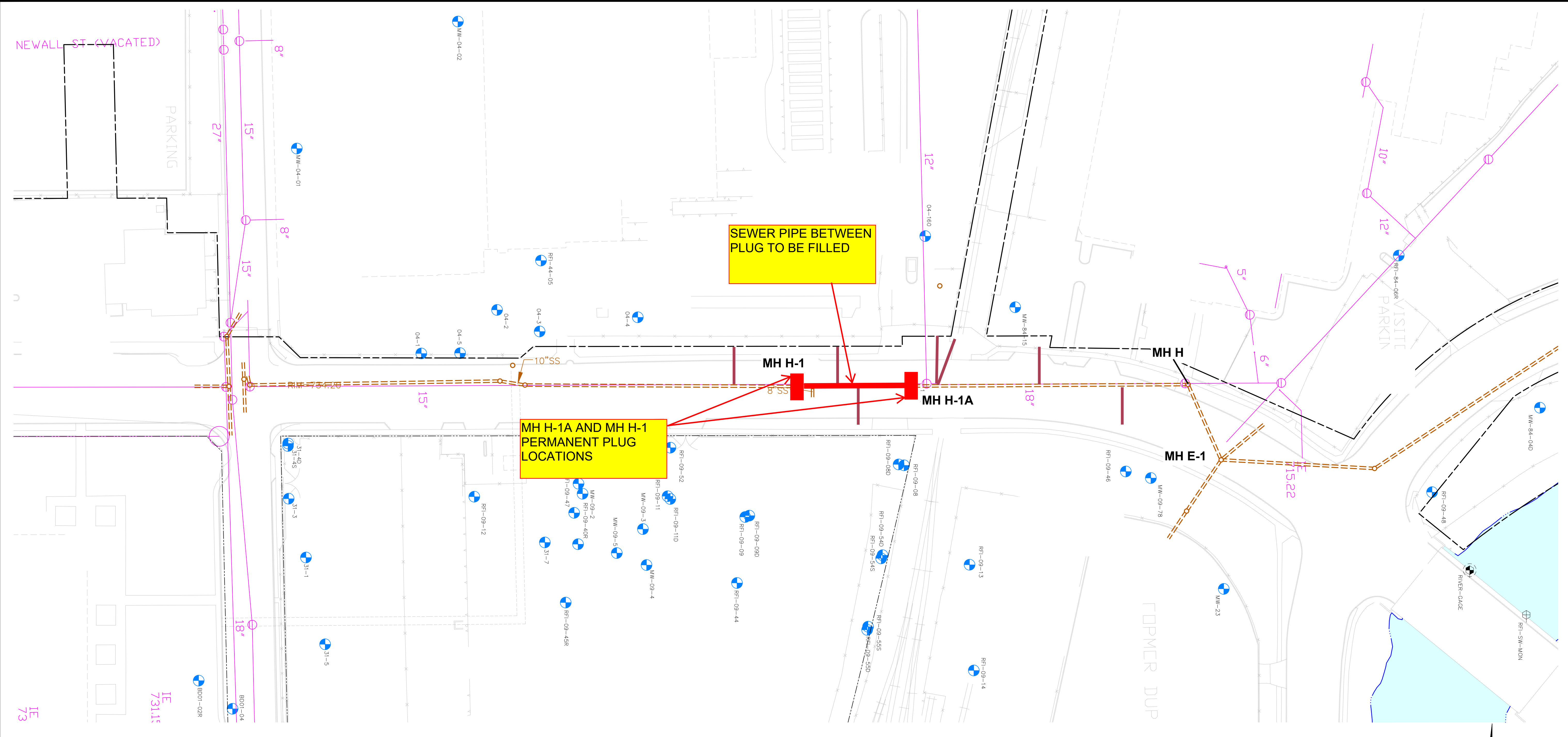
**OUTFALL 011 PROPOSED
BULKHEAD AND PLUG LOCATIONS**



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FIGURE
2

CITY: SYRACUSE DIV: GROUP: ENV DB: A SANCHEZ ID: ALSIGMS PIC: C.S. PETERS PM: C. KIKER TM: C. KIKER LVR: ON=OFF=REF
 C:\Users\alsanchez\OneDrive - ARCADIS\BIM 360 Docs\RACER TRUST\BUICK CITY RCRA\2019\10-DWG\RTBC-F-HAMILTON SANITARY SEWER.dwg LAYOUT: 3 SAVED: 17/2019 5:39 PM ACADVER: 21.05 (LMS TECH) PAGES: 1 PLOTSTYLETABLE: PLOTSTYLETABLE PAGESETUP: PLOTSTYLETABLE PLOTTED: 17/2019 6:09 PM BY: SANCHEZ, ADRIAN



- LEGEND:**
- MONITORING WELL (ACTIVE)
 - ⊗ PIEZOMETER
 - ⊙ RECOVERY WELL
 - SURVEYED SANITARY SEWER LINE
 - HISTORIC SANITARY SEWER LINE

0 50' 100'
 APPROXIMATE SCALE IN FEET

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 FLINT, MICHIGAN

**HAMILTON AVENUE SANITARY SEWER
 PLUGGING**



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FIGURE
3

Tables

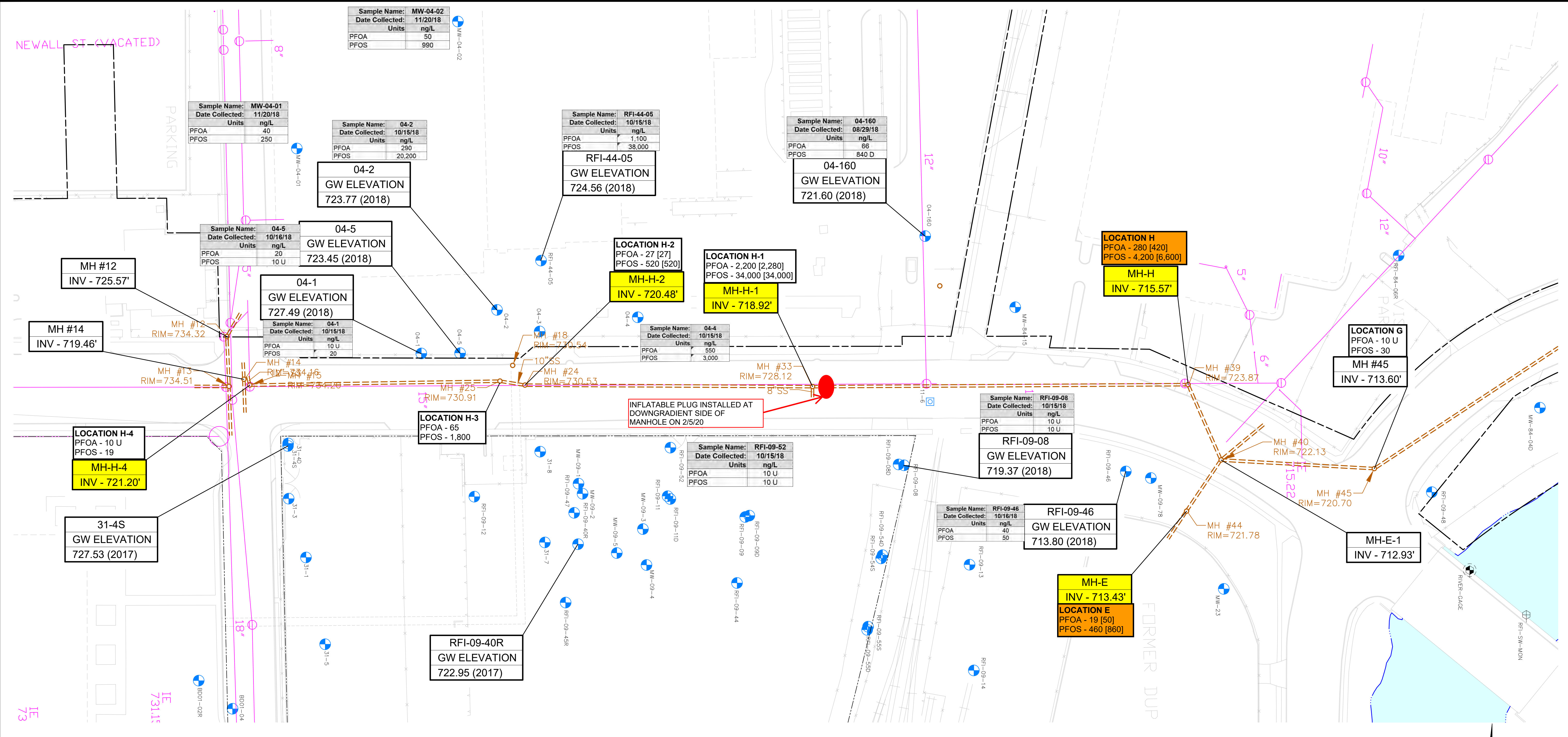
Table 1
Racer Buick City
Outfall 011 Storm Sewer PFAS Analytical

Location ID: Date Collected:	Units	MH11-6 08/09/21	MH11-6A-2NL 08/09/21	MH11-6A-2NWL 08/09/21	MH11-6A-3NWL 08/09/21	MH11-6A-4 08/09/21
PFAS						
11CI-PF3OUdS (F-53B Minor)	ng/L	4.1 UY	2 U	10 UY	10 UY	2 U
4:2 FTS	ng/L	4.1 UY	2 U	10 UY	10 UY	2 U
6:2FTS	ng/L	8.2 UY	3.9 U	21 UY	20 UY	3.9 U
8:2FTS	ng/L	8.2 UY	3.9 U	21 UY	20 UY	3.9 U
9CI-PF3ONS (F-53B Major)	ng/L	4.1 UY	2 U	10 UY	10 UY	2 U
ADONA	ng/L	4.1 UY	2 U	10 UY	10 UY	2 U
HFPO-DA (GenX)	ng/L	21 UY	9.9 U	52 UY	51 UY	9.8 U
N-ethyl perfluorooctane sulfonamidoacetic acid (NEtFOSAA)	ng/L	8.2 UY	3.9 U	21 UY	20 UY	3.9 U
N-methyl perfluorooctane sulfonamidoacetic acid (NMeFOSAA)	ng/L	4.1 UY	2 U	10 UY	10 UY	2 U
Perfluorobutanesulfonic acid (PFBS)	ng/L	340 Y	250	490 Y	500 Y	11
Perfluorobutanoic acid (PFBA)	ng/L	85 Y	73	120 Y	140 Y	9.8 U
Perfluorodecanesulfonic acid (PFDS)	ng/L	4.1 UY	2 U	10 UY	10 UY	2 U
Perfluorodecanoic acid (PFDA)	ng/L	11 Y	3.8	23 Y	27 Y	2 U
Perfluorododecanoic acid (PFDoA)	ng/L	4.1 UY	2 U	10 UY	10 UY	2 U
Perfluoroheptanesulfonic Acid (PFHpS)	ng/L	390 Y	340	610 Y	710 Y	2 U
Perfluoroheptanoic acid (PFHpA)	ng/L	160 Y	160	240 Y	290 Y	2 U
Perfluorohexanesulfonic acid (PFHxS)	ng/L	7,400 Y	6,700	11,000 Y	13,000 Y	6.7
Perfluorohexanoic acid (PFHxA)	ng/L	1,000 Y	810	1,600 Y	1,800 Y	4.6
Perfluorononanesulfonic acid (PFNS)	ng/L	4.1 UY	2 U	10 UY	10 UY	2 U
Perfluorononanoic acid (PFNA)	ng/L	16 Y	13	33 Y	38 Y	2 U
Perfluorooctane Sulfonamide (FOSA)	ng/L	4.1 UY	2 U	10 UY	10 UY	2 U
Perfluorooctane sulfonic acid	ng/L	21,000 Y	16,000	45,000 Y	50,000 Y	8.3
Perfluorooctanoic acid	ng/L	520 Y	440	800 Y	860 Y	5.6
Perfluoropentanesulfonic acid (PFPeS)	ng/L	500 Y	420	700 Y	830 Y	2 U
Perfluoropentanoic acid (PFPeA)	ng/L	160 Y	150	240 Y	280 Y	5.4
Perfluorotetradecanoic acid (PFTeA)	ng/L	8.2 UY	3.9 U	21 UY	20 UY	3.9 U
Perfluorotridecanoic Acid (PFTriA)	ng/L	4.1 UY	2 U	10 UY	10 UY	2 U
Perfluoroundecanoic acid (PFUnA)	ng/L	4.1 UY	2 U	10 UY	10 UY	2 U
PFHxS-BR	ng/L	1,200 Y	1,200	1,700 Y	2,100 Y	2 U
PFHxS-LN	ng/L	6,200 Y	5,600	9,000 Y	11,000 Y	5.2
PFOS-BR	ng/L	9,300 Y	7,600	18,000 Y	22,000 Y	4.1
PFOS-LN	ng/L	11,000 Y	7,700	26,000 Y	27,000 Y	4.3

Appendix A

Hamilton Avenue Sanitary Sewer Updates

CITY: SYRACUSE DIV/GROUP: ENV DB: A SANCHEZ ID: ALS/GMS PIC: C S PETERS PM: C KIKER TM: C KIKER LVR: ON=OFF=REF
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INFLATABLE PLUG INSTALLED AT DOWNGRADIENT SIDE OF MANHOLE ON 2/5/20

LEGEND:

- MONITORING WELL (ACTIVE)
- ⊗ PIEZOMETER
- ⊙ RECOVERY WELL
- SURVEYED SANITARY SEWER LINE
- HISTORIC SANITARY SEWER LINE
- BULKHEAD

MH #14
INV - 719.46'

← MANHOLE ID
← INVERT ELEVATION (FT AMSL)

31-4S
GW ELEVATION
727.53 (2017)

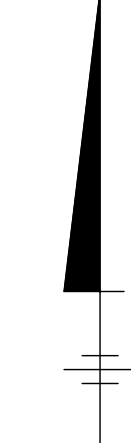
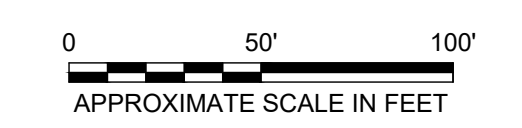
← WELL ID
← GROUNDWATER ELEVATION (FT AMSL)

MH-H-4
INV - 721.20'

← YELLOW INDICATES SUGGESTED SAMPLE LOCATION


LOCATION E
PFOA - 19 [50]
PFOS - 460 [860]

← ORANGE INDICATES SAMPLED AFTER THE PLUG INSTALLED



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HAMILTON AVENUE SANITARY SEWER



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FIGURE
3

SUBJECT
RACER Buick City Sanitary PFAS Update

TO
Grant Trigger, RACER Trust

DATE
June 28, 2021

PROJECT NUMBER
30075935

COPIES TO
Chris Peters, Arcadis
Micki Maki, Arcadis

NAME
Tony Maffeo

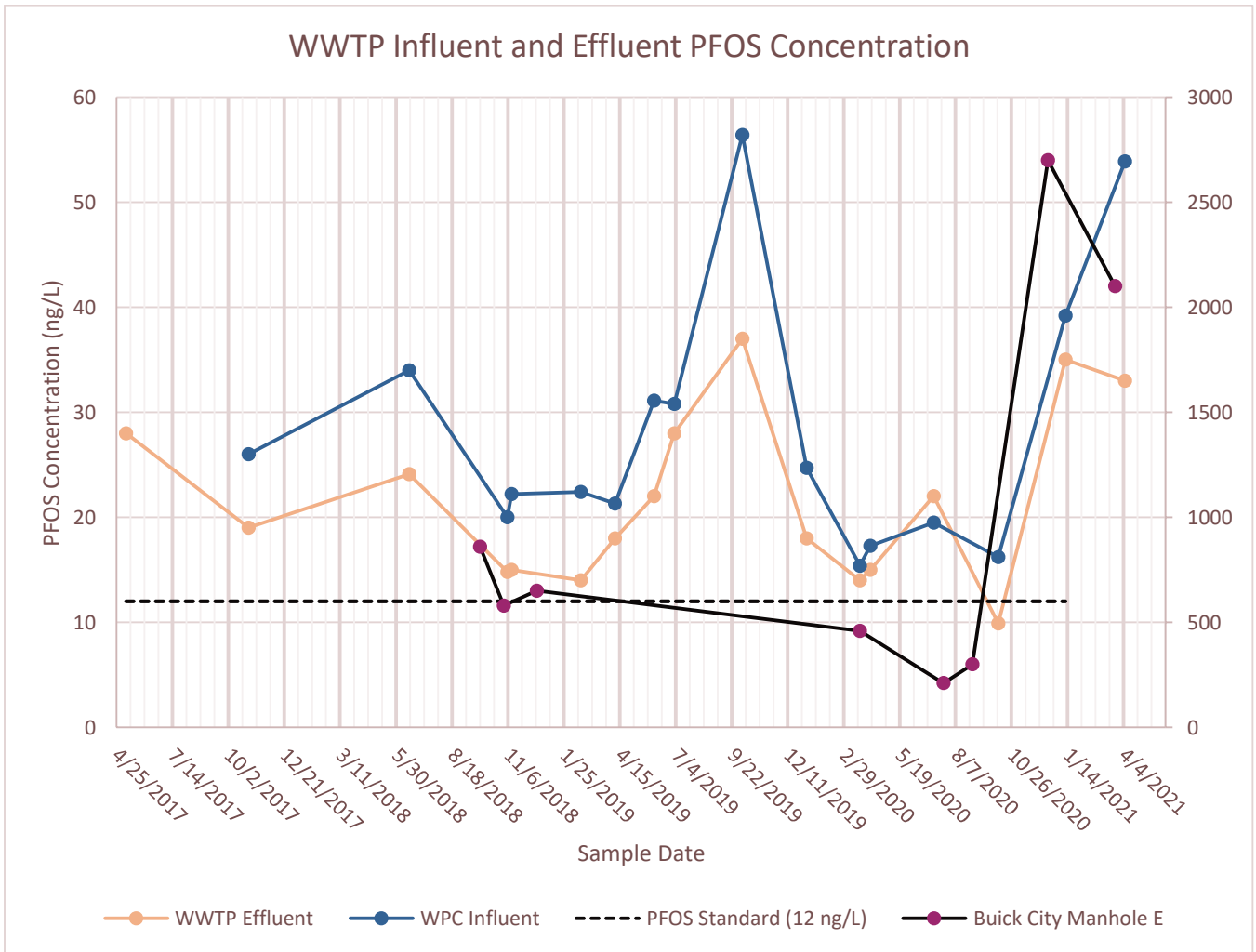
This memo summarizes the recent activities related to the Hamilton Avenue sanitary sewer at the RACER Buick City Site (Site) located in Flint, Michigan. In an attempt to assess the benefits of blocking portions of the abandoned sanitary sewers in the vicinity of Hamilton Avenue and the amount of PFOS entering the City of Flint sanitary sewer system a series of samples were collected to over the past 3 months. Thirteen samples collected from the sanitary sewer on March 23, April 6, April 21, and May 25 of 2021 are shown on Figure 1 and included in Table 1.

- Three samples were collected from Manholes MH E, MH E-1, and MH H-1A on March 23, 2021.
- Three samples were collected from Manholes MH E, MH E-1, and MH H-1A on April 6, 2021.
- Three samples were collected from Manholes MH E, MH E-1, and MH H-1A on April 21, 2021.
- Four samples were collected from Manholes MH E, MH E-1, MH H-1A, and MH H-1 on May 25, 2021, following installation of a temporary plugs.

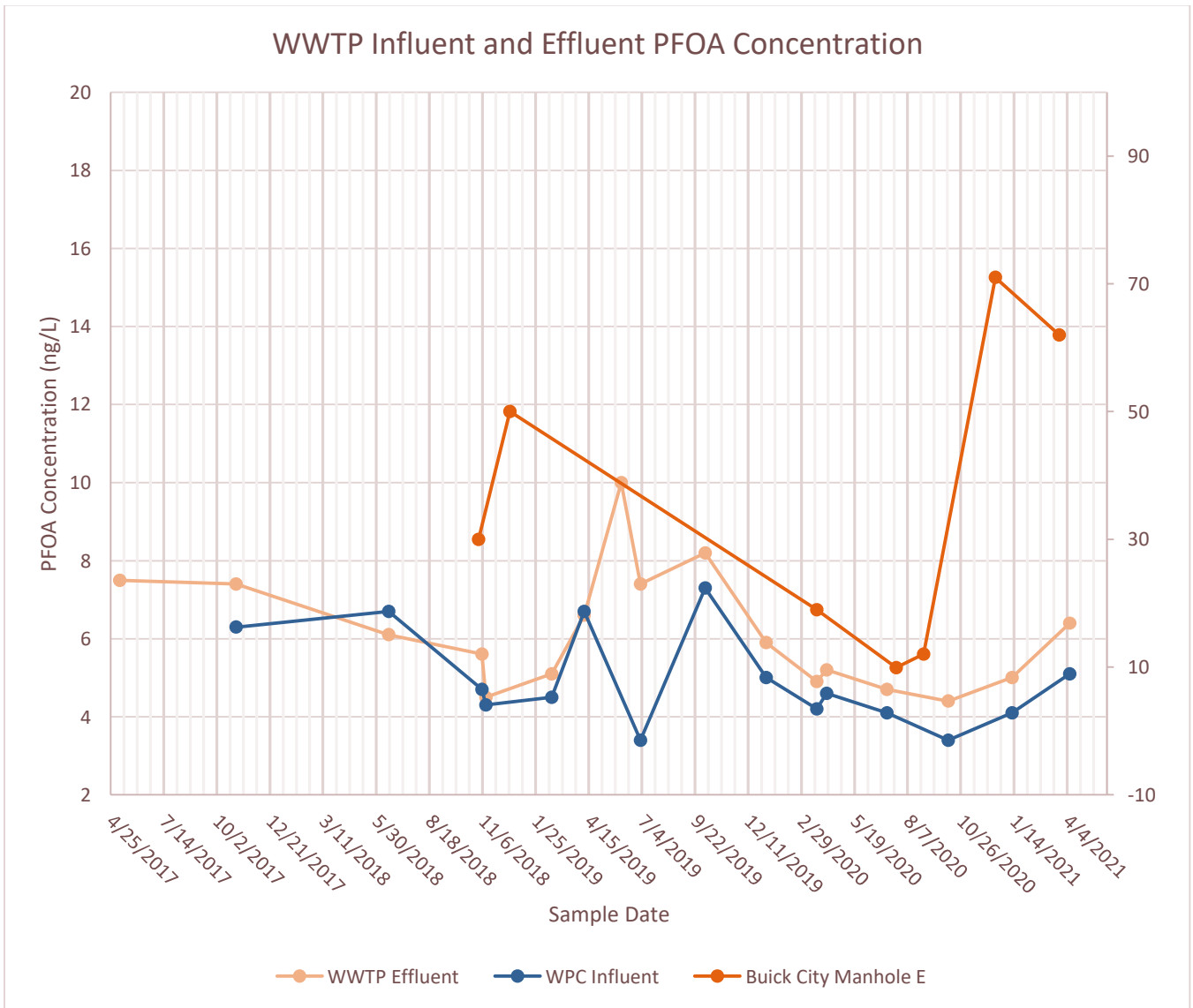
Trend curves (displayed below) were also prepared to evaluate the relationship between the PFOS and PFOA levels in the Hamilton Avenue sanitary sewer and levels of PFOS and PFOA received at the City of Flint WWTP. Based on limited data the results are inconclusive through the end of 2019. However, the peak PFOS concentration at Manhole E-1 in December 2020 coincides with the highest levels of PFOS detected at the WWTP in January 2021. On the other hand, a substantial increase in PFOA at Manhole E-1 in January 2021 did not appear to materially impact the levels of PFOA at the City of Flint WWTP. With respect to PFOS although other sources of PFOS cannot be discounted a reduction in PFOS levels in the Hamilton Avenue sanitary sewer is expected to improve the City WWTP performance.

RACER had previously installed a temporary plug to block the sanitary sewer at Manhole E-1 on July 14, 2020. This resulted in a drop in PFOS concentrations at Manhole E followed by an apparent reduction at the City of Flint WWTP. On December 14, 2020, groundwater began daylighting at the surface onsite north of Hamilton Avenue. In an attempt to respond to the daylighting issue, the plug in the sanitary sewer was removed resulting in a significant increase of PFOS released into the City sanitary sewer system as sampled on January 11, 2021. RACER implemented additional measures onsite to prevent the daylighting issue including filling 22 manholes including Manhole 10-5 (storm sewer) onsite manholes with concrete.

New temporary plugs were installed in manholes MH H-1 and MH H-1A on May 6, 2021 and will remain in place through November 2021 to better understand where the PFAS is coming from and to confirm the daylighting issue is resolved and that PFOS releases into the City sanitary sewer have been reduced. If this yields a positive result a permanent bulkhead will be installed.



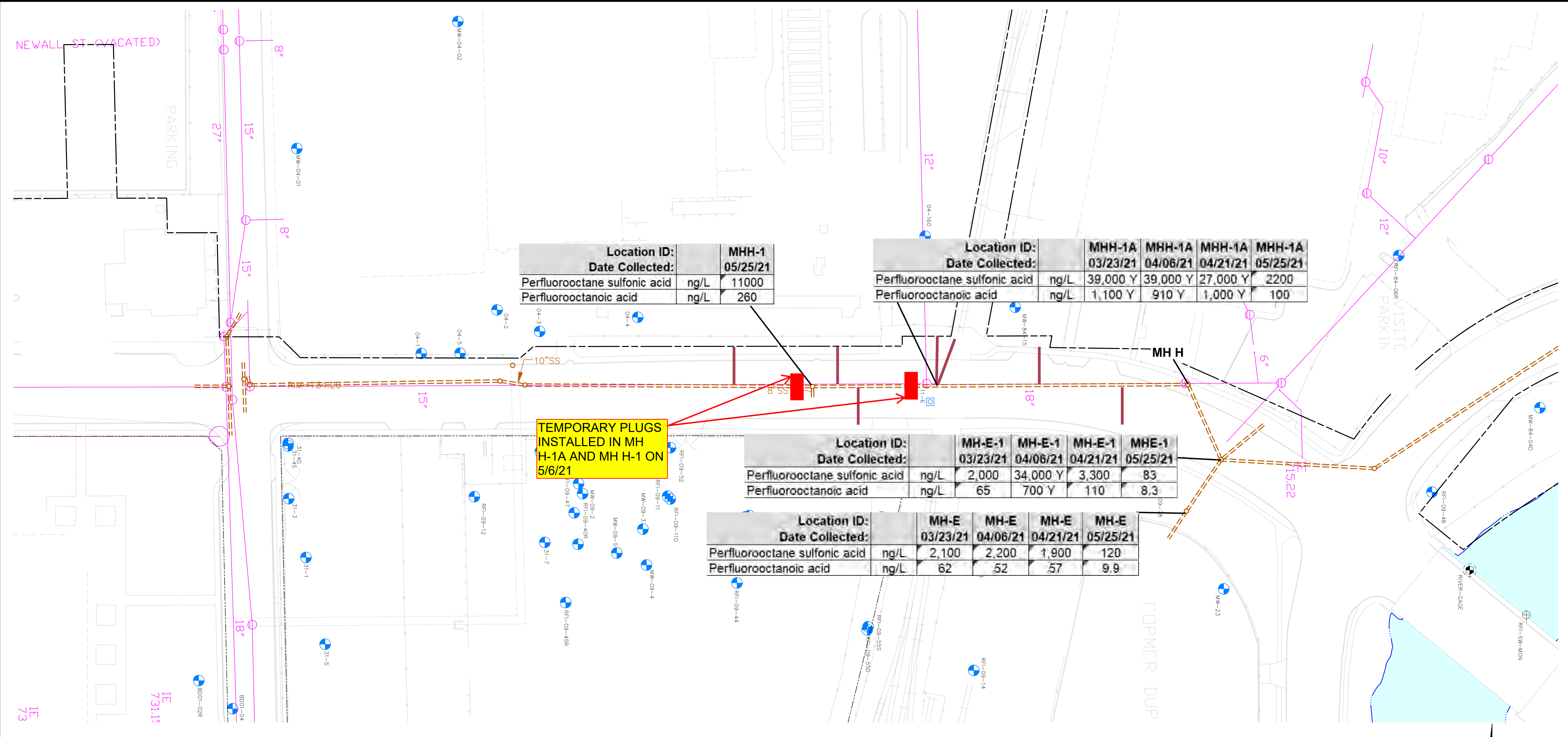
Note: Data from Buick City Manhole E is scaled on the right Y-axis



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Figures

CITY: SYRACUSE DIV: GROUP: ENV DB: A SANCHEZ ID: ALSIGMS PIC: C.S. PETERS PM: C. KIKER TM: C. KIKER LVR: ON=OFF=REF- C:\Users\alsanchez\OneDrive - ARCADIS\BIM 380 Docs\RACER TRUST\BUICK CITY RCRA\2019\10-DWG\RTBC-F-HAMILTON SANITARY SEWER.dwg LAYOUT: 3 SAVED: 17/2019 5:39 PM ACADVER: 21.05 (LMS TECH) PAGES: 10 PLOTSTYLETABLE: PLOTSTYLETABLE PAGESETUP: PLOTSTYLETABLE PLOTTED: 17/2019 6:09 PM BY: SANCHEZ, ADRIAN



Location ID:	MHH-1
Date Collected:	05/25/21
Perfluorooctane sulfonic acid	ng/L 11000
Perfluorooctanoic acid	ng/L 260

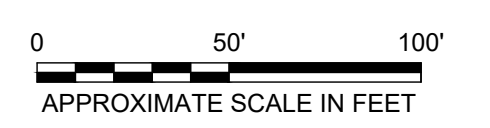
Location ID:	MHH-1A	MHH-1A	MHH-1A	MHH-1A
Date Collected:	03/23/21	04/06/21	04/21/21	05/25/21
Perfluorooctane sulfonic acid	ng/L 39,000 Y	39,000 Y	27,000 Y	2200
Perfluorooctanoic acid	ng/L 1,100 Y	910 Y	1,000 Y	100

Location ID:	MH-E-1	MH-E-1	MH-E-1	MH-E-1
Date Collected:	03/23/21	04/06/21	04/21/21	05/25/21
Perfluorooctane sulfonic acid	ng/L 2,000	34,000 Y	3,300	83
Perfluorooctanoic acid	ng/L 65	700 Y	110	8.3

Location ID:	MH-E	MH-E	MH-E	MH-E
Date Collected:	03/23/21	04/06/21	04/21/21	05/25/21
Perfluorooctane sulfonic acid	ng/L 2,100	2,200	1,900	120
Perfluorooctanoic acid	ng/L 62	52	57	9.9

TEMPORARY PLUGS INSTALLED IN MH H-1A AND MH H-1 ON 5/6/21

- LEGEND:**
- MONITORING WELL (ACTIVE)
 - PIEZOMETER
 - RECOVERY WELL
 - SURVEYED SANITARY SEWER LINE
 - HISTORIC SANITARY SEWER LINE



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BUICK CITY
FLINT, MICHIGAN

**HAMILTON AVENUE SANITARY SEWER
DATA FROM 3/23/21 THROUGH 5/25/21**

Table

Location ID: Date Collected:		MH-E 03/23/21	MH-E 04/06/21	MH-E 04/21/21	MH-E 05/25/21	MH-E-1 03/23/21
PFAS						
11CI-PF3OUdS (F-53B Minor)	ng/L	9.9 U	2 U	2 U	2 U	11 U
4:2 FTS	ng/L	9.9 U	2 U	2 U	2 U	11 U
6:2FTS	ng/L	9.9 U	2 U	2 U	4.1 U	11 U
8:2FTS	ng/L	9.9 U	2 U	2 U	2 U	11 U
9CI-PF3ONS (F-53B Major)	ng/L	9.9 U	2 U	2 U	2 U	11 U
ADONA	ng/L	9.9 U	2 U	2 U	2 U	11 U
HFPO-DA (GenX)	ng/L	9.9 U	2 U	2 U	10 U	11 U
N-ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	ng/L	9.9 U	4 U	4 U	4.1 U	11 U
N-methyl perfluorooctane sulfonamidoacetic acid (NMeFOSAA)	ng/L	9.9 U	2 U	2 U	2 U	11 U
Perfluorobutanesulfonic acid (PFBS)	ng/L	41	41	41	19	48
Perfluorobutanoic acid (PFBA)	ng/L	20 U	15	18	18	22 U
Perfluorodecanesulfonic acid (PFDS)	ng/L	9.9 U	2 U	2 U	2 U	11 U
Perfluorodecanoic acid (PFDA)	ng/L	9.9 U	2 U	2 U	2 U	11 U
Perfluorododecanoic acid (PFDoDA)	ng/L	9.9 U	2 U	2 U	2 U	11 U
Perfluoroheptanesulfonic Acid (PFHpS)	ng/L	39	38	43	2 U	40
Perfluoroheptanoic acid (PFHpA)	ng/L	18	15	17	5.1	23
Perfluorohexanesulfonic acid (PFHxS)	ng/L	690	660	700	61	790
Perfluorohexanoic acid (PFHxA)	ng/L	100	90	91	15	110
Perfluorononanesulfonic acid (PFNS)	ng/L	9.9 U	2 U	2 U	2 U	11 U
Perfluorononanoic acid (PFNA)	ng/L	9.9 U	3.4	4.5	4.1	11 U
Perfluorooctane Sulfonamide (FOSA)	ng/L	9.9 U	2 U	2 U	2 U	11 U
Perfluorooctane sulfonic acid (PFOS)	ng/L	2,100	2,200	1,900	120	2,000
Perfluorooctanoic acid (PFOA)	ng/L	62	52	57	9.9	65
Perfluoropentanesulfonic acid (PFPeS)	ng/L	63	56	56	14	68
Perfluoropentanoic acid (PFPeA)	ng/L	24	21	25	8.8	26
Perfluorotetradecanoic acid (PFTeDA)	ng/L	9.9 U	4 U	4 U	4.1 U	11 U
Perfluorotridecanoic Acid (PFTrDA)	ng/L	9.9 U	2 U	2 U	2 U	11 U
Perfluoroundecanoic acid (PFUnDA)	ng/L	9.9 U	2 U	2 U	2 U	11 U
PFHxS-BR	ng/L	110	100	110	11	120
PFHxS-LN	ng/L	580	560	600	50	670
PFOS-BR	ng/L	960	990	810	47	910
PFOS-LN	ng/L	1,100	1,200	1,100	74	1,100

Location ID: Date Collected:		MH-E-1 04/06/21	MH-E-1 04/21/21	MH-E-1 05/25/21	MHH-1A 03/23/21
PFAS					
11CI-PF3OUdS (F-53B Minor)	ng/L	10 UY	2.1 U	2 U	51 UY
4:2 FTS	ng/L	10 UY	2.1 U	2 U	51 UY
6:2FTS	ng/L	10 UY	2.1 U	3.9 U	51 UY
8:2FTS	ng/L	10 UY	2.1 U	2 U	51 UY
9CI-PF3ONS (F-53B Major)	ng/L	10 UY	2.1 U	2 U	51 UY
ADONA	ng/L	10 UY	2.1 U	2 U	51 UY
HFPO-DA (GenX)	ng/L	10 UY	2.1 U	9.8 U	51 UY
N-ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	ng/L	20 UY	4.3 U	3.9 U	51 UY
N-methyl perfluorooctane sulfonamidoacetic acid (NMeFOSAA)	ng/L	10 UY	2.1 U	2 U	51 UY
Perfluorobutanesulfonic acid (PFBS)	ng/L	380 Y	60	14	620 Y
Perfluorobutanoic acid (PFBA)	ng/L	100 Y	23	20 UY	170 Y
Perfluorodecanesulfonic acid (PFDS)	ng/L	10 UY	2.1 U	2 U	51 UY
Perfluorodecanoic acid (PFDA)	ng/L	16 Y	2.1 U	2 U	51 UY
Perfluorododecanoic acid (PFDoDA)	ng/L	10 UY	2.1 U	2 U	51 UY
Perfluoroheptanesulfonic Acid (PFHpS)	ng/L	480 Y	71	2.0	810 Y
Perfluoroheptanoic acid (PFHpA)	ng/L	200 Y	31	4.2	350 Y
Perfluorohexanesulfonic acid (PFHxS)	ng/L	8,600 Y	1,300	48	15,000 Y
Perfluorohexanoic acid (PFHxA)	ng/L	1,300 Y	170	11	1,900 Y
Perfluorononanesulfonic acid (PFNS)	ng/L	10 UY	2.1 U	2 U	51 UY
Perfluorononanoic acid (PFNA)	ng/L	19 Y	5.6	3.2	51 UY
Perfluorooctane Sulfonamide (FOSA)	ng/L	10 UY	2.1 U	2 U	51 UY
Perfluorooctane sulfonic acid (PFOS)	ng/L	34,000 Y	3,300	83	39,000 Y
Perfluorooctanoic acid (PFOA)	ng/L	700 Y	110	8.3	1,100 Y
Perfluoropentanesulfonic acid (PFPeS)	ng/L	680 Y	85	11	1,200 Y
Perfluoropentanoic acid (PFPeA)	ng/L	220 Y	35	6.7	340 Y
Perfluorotetradecanoic acid (PFTeDA)	ng/L	20 UY	4.3 U	3.9 U	51 UY
Perfluorotridecanoic Acid (PFTrDA)	ng/L	10 UY	2.1 U	2 U	51 UY
Perfluoroundecanoic acid (PFUnDA)	ng/L	10 UY	2.1 U	2 U	51 UY
PFHxS-BR	ng/L	1,300 Y	190	8.6	2,200 Y
PFHxS-LN	ng/L	7,300 Y	1,100	39	13,000 Y
PFOS-BR	ng/L	15,000 Y	1,400	47	18,000 Y
PFOS-LN	ng/L	19,000 Y	1,900	35	21,000 Y

Location ID: Date Collected:		MHH-1A 04/06/21	MHH-1A 04/21/21	MHH-1A 05/25/21	MHH-1 05/25/21
PFAS					
11CI-PF3OUdS (F-53B Minor)	ng/L	9.9 UY	9.9 UY	2 U	2.1 U
4:2 FTS	ng/L	9.9 UY	9.9 UY	2 U	2.1 U
6:2FTS	ng/L	9.9 UY	9.9 UY	4.1 U	4.1 U
8:2FTS	ng/L	9.9 UY	9.9 UY	2 U	2.1 U
9CI-PF3ONS (F-53B Major)	ng/L	9.9 UY	9.9 UY	2 U	2.1 U
ADONA	ng/L	9.9 UY	9.9 UY	2 U	2.1 U
HFPO-DA (GenX)	ng/L	9.9 UY	9.9 UY	10 U	10 U
N-ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	ng/L	20 UY	20 UY	4.1 U	4.1 U
N-methyl perfluorooctane sulfonamidoacetic acid (NMeFOSAA)	ng/L	9.9 UY	9.9 UY	2 U	2.1 U
Perfluorobutanesulfonic acid (PFBS)	ng/L	480 Y	450 Y	20	89
Perfluorobutanoic acid (PFBA)	ng/L	130 Y	130 Y	26	41
Perfluorodecanesulfonic acid (PFDS)	ng/L	9.9 UY	9.9 UY	2 U	2.1 U
Perfluorodecanoic acid (PFDA)	ng/L	16 Y	15 Y	3.1	8.8
Perfluorododecanoic acid (PFDoDA)	ng/L	9.9 UY	9.9 UY	2 U	2.1 U
Perfluoroheptanesulfonic Acid (PFHpS)	ng/L	620 Y	620 Y	50	220
Perfluoroheptanoic acid (PFHpA)	ng/L	260 Y	270 Y	55	94
Perfluorohexanesulfonic acid (PFHxS)	ng/L	11,000 Y	11,000 Y	800	3300
Perfluorohexanoic acid (PFHxA)	ng/L	1,600 Y	1,600 Y	130	440
Perfluorononanesulfonic acid (PFNS)	ng/L	9.9 UY	9.9 UY	2 U	2.1 U
Perfluorononanoic acid (PFNA)	ng/L	23 Y	28 Y	7.0	14
Perfluorooctane Sulfonamide (FOSA)	ng/L	9.9 UY	9.9 UY	2 U	2.1 U
Perfluorooctane sulfonic acid (PFOS)	ng/L	39,000 Y	27,000 Y	2200	11000
Perfluorooctanoic acid (PFOA)	ng/L	910 Y	1,000 Y	100	260
Perfluoropentanesulfonic acid (PFPeS)	ng/L	900 Y	790 Y	33	180
Perfluoropentanoic acid (PFPeA)	ng/L	270 Y	280 Y	57	90
Perfluorotetradecanoic acid (PFTeDA)	ng/L	20 UY	20 UY	4.1 U	4.1 U
Perfluorotridecanoic Acid (PFTrDA)	ng/L	9.9 UY	9.9 UY	2 U	2.1 U
Perfluoroundecanoic acid (PFUnDA)	ng/L	9.9 UY	9.9 UY	2 U	2.1 U
PFHxS-BR	ng/L	1,800 Y	1,600 Y	1100	530
PFHxS-LN	ng/L	9,600 Y	9,300 Y	1000	2800
PFOS-BR	ng/L	18,000 Y	13,000 Y	100	5200
PFOS-LN	ng/L	22,000 Y	15,000 Y	690	5300

Table
Summary of WSANITS Sample Analytical Results

DRAFT
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ATTORNEY WORK PRODUCT

Qualifier Type	Lab Qualifiers	Definition
Inorganic	U	Concentration below method detection limits
Inorganic	UY	Concentration below method detection limits and matrix interference
Inorganic	Y	Matrix interference
Organic	U	Concentration below method detection limits
Organic	UY	Concentration below method detection limits and matrix interference
Organic	Y	Matrix interference

Analytical Reports



Analytical Laboratory Report

Report ID: S24611.01(01)
Generated on 06/10/2021

Report to

Attention: Erin Kozak
Arcadis US, Inc.
28550 Cabot Drive
Suite 500
Novi, MI 48377

Phone: O: 810-225-1901 FAX:
Email: erin.kozak@arcadis.com

Additional Contacts: Megan Humphrey, Micki Maki, Joey Barker

Report produced by

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2680 East Lansing Drive
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Phone: (517) 332-0167 FAX: (517) 332-6333

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John Lavery (johnlavery@meritlabs.com)
Barbara Ball (bball@meritlabs.com)

Report Summary

Lab Sample ID(s): S24611.01-S24611.07
Project: 30075935.03200 / Buick City
Collected Date(s): 05/25/2021
Submitted Date/Time: 05/25/2021 16:30
Sampled by: Donald Richmond
P.O. #: 30075935.03200

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Maya Murshak
Technical Director



Analytical Laboratory Report

General Report Notes

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

Methods may be modified for improved performance.

Results reported on a dry weight basis where applicable.

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

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

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

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

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

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

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

PFAS requirement: Section 9.3.8 of U.S. EPA Method 537.1 states "If the method analyte(s) found in the Field Sample is present in the

FRB at a concentration greater than 1/3 the MRL, then all samples collected with that FRB are invalid and must be recollected and reanalyzed."

Samples submitted without an accompanying FRB may not be acceptable for compliance purposes.

Report Narrative

There is no additional narrative for this analytical report



Analytical Laboratory Report

Laboratory Certifications

Authority	Certification ID
Michigan DEQ	#9956
DOD ELAP/ISO 17025	#69699
WBENC	#2005110032
Ohio VAP	#CL0002
Indiana DOH	#C-MI-07
New York NELAC	#11814
North Carolina DENR	#680
North Carolina DOH	#26702
Alaska CSLAP	#17-001
Pennsylvania DEP	#68-05884

Qualifier Descriptions

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

Glossary of Abbreviations

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



Analytical Laboratory Report

Method Summary

Method	Version
ASTMD7979-19M	ASTM Method D7979 - 19 Modified (Isotopic Dilution)

Parameter Summary

Parameter	Synonym	Cas #
PFBA	Perfluorobutanoic Acid	375-22-4
PFPeA	Perfluoropentanoic Acid	2706-90-3
4:2 FTSA	4:2 Fluorotelomer Sulfonic Acid	757124-72-4
PFHxA	Perfluorohexanoic Acid	307-24-4
PFBS	Perfluorobutane sulfonic Acid	375-73-5
PFHpA	Perfluoroheptanoic Acid	375-85-9
PFPeS	Perfluoropentane Sulfonic Acid	2706-91-4
6:2 FTSA	6:2 Fluorotelomer Sulfonic Acid	27619-97-2
PFOA	Perfluorooctanoic Acid	335-67-1
PFHxS	Perfluorohexane Sulfonic Acid	355-46-4
PFHxS-LN	Perfluorohexane Sulfonic Acid - LN	355-46-4-LN
PFHxS-BR	Perfluorohexane Sulfonic Acid - BR	355-46-4-BR
PFNA	Perfluorononanoic Acid	375-95-1
8:2 FTSA	8:2 Fluorotelomer Sulfonic Acid	39108-34-4
PFHpS	Perfluoroheptane Sulfonic Acid	375-92-8
PFDA	Perfluorodecanoic Acid	335-76-2
N-MeFOSAA	N-methyl perfluorooctanesulfonamidoacetic acid	2355-31-9
EtFOSAA	N-Ethyl Perfluorooctane Sulfonamidoacetic Acid	2991-50-6
PFOS	Perfluorooctane Sulfonic Acid	1763-23-1
PFOS-LN	Perfluorooctane Sulfonic Acid - LN	1763-23-1-LN
PFOS-BR	Perfluorooctane Sulfonic Acid - BR	1763-23-1-BR
PFUnDA	Perfluoroundecanoic Acid	2058-94-8
PFNS	Perfluorononane Sulfonic Acid	68259-12-1
PFDoDA	Perfluorododecanoic Acid	307-55-1
PFDS	Perfluorodecane Sulfonic Acid	335-77-3
PFTTrDA	Perfluorotridecanoic Acid	72629-94-8
FOSA	Perfluorooctane Sulfonamide	754-91-6
PFTeDA	Perfluorotetradecanoic Acid	376-06-7
11Cl-PF3OUdS	11-chloroeicosafuoro-3-oxaundecane-1-sulfonic acid	763051-92-9
9Cl-PF3ONS	9-chlorohexadecafluoro-3-oxanone1-sulfonic acid	756426-58-1
ADONA	4,8-dioxa-3H-perfluorononanoic acid	919005-14-4
HFPO-DA	Hexafluoropropylene oxide dimer	13252-13-6



Analytical Laboratory Report

Sample Summary (7 samples)

Sample ID	Sample Tag	Matrix	Collected Date/Time
S24611.01	Outfall 010_052521	Groundwater	05/25/21 10:00
S24611.02	MHE_052521	Groundwater	05/25/21 10:25
S24611.03	MHE-1_052521	Groundwater	05/25/21 10:45
S24611.04	MHH-1A_052521	Groundwater	05/25/21 11:20
S24611.05	MHH-1_052521	Groundwater	05/25/21 11:45
S24611.06	MH10-2_052521	Groundwater	05/25/21 12:10
S24611.07	MH11-6_052521	Groundwater	05/25/21 12:45



Analytical Laboratory Report

Lab Sample ID: S24611.01

Sample Tag: Outfall 010_052521

Collected Date/Time: 05/25/2021 10:00

Matrix: Groundwater

COC Reference: 146061

Sample Containers

#	Type	Preservative(s)	Refrigerated?	Arrival Temp. (C)	Thermometer #
1	15ml Centrifuge Tube	None	Yes	4.4	IR

Extraction / Prep.

Parameter	Result	Method	Run Date	Analyst	Flags
Initial wt. (g) / Final wt. (g) / Volume (ml)*	12.03/6.83/10	ASTMD7979-19M	05/26/21 10:30	KCV	

Organics

28 PFAs, Method: ASTMD7979-19M, Run Date: 05/27/21 22:44, Analyst: KCV

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
PFBA*	26	9.6		ng/L	1.92	375-22-4	
PFPeA*	34	3.8		ng/L	1.92	2706-90-3	
4:2 FTSA*	Not detected	1.9		ng/L	1.92	757124-72-4	
PFHxA*	160	1.9		ng/L	1.92	307-24-4	
PFBS*	78	1.9		ng/L	1.92	375-73-5	
PFHpA*	29	1.9		ng/L	1.92	375-85-9	
PFPeS*	84	1.9		ng/L	1.92	2706-91-4	
6:2 FTSA*	Not detected	3.8		ng/L	1.92	27619-97-2	
PFOA*	91	1.9		ng/L	1.92	335-67-1	
PFHxS*	880	1.9		ng/L	1.92	355-46-4	
PFHxS-LN*	720	1.9		ng/L	1.92	355-46-4-LN	
PFHxS-BR*	160	1.9		ng/L	1.92	355-46-4-BR	
PFNA*	8.9	1.9		ng/L	1.92	375-95-1	
8:2 FTSA*	Not detected	1.9		ng/L	1.92	39108-34-4	
PFHpS*	50	1.9		ng/L	1.92	375-92-8	
PFDA*	2.6	1.9		ng/L	1.92	335-76-2	
N-MeFOSAA*	Not detected	1.9		ng/L	1.92	2355-31-9	
EtFOSAA*	Not detected	3.8		ng/L	1.92	2991-50-6	
PFOS*	2,700	1.9		ng/L	1.92	1763-23-1	
PFOS-LN*	1,200	1.9		ng/L	1.92	1763-23-1-LN	
PFOS-BR*	1,400	1.9		ng/L	1.92	1763-23-1-BR	
PFUnDA*	Not detected	1.9		ng/L	1.92	2058-94-8	
PFNS*	Not detected	1.9		ng/L	1.92	68259-12-1	
PFDODA*	Not detected	1.9		ng/L	1.92	307-55-1	
PFDS*	Not detected	1.9		ng/L	1.92	335-77-3	
PFTTrDA*	Not detected	1.9		ng/L	1.92	72629-94-8	
FOSA*	Not detected	1.9		ng/L	1.92	754-91-6	
PFTeDA*	Not detected	3.8		ng/L	1.92	376-06-7	
11Cl-PF3OUdS*	Not detected	1.9		ng/L	1.92	763051-92-9	
9Cl-PF3ONS*	Not detected	1.9		ng/L	1.92	756426-58-1	
ADONA*	Not detected	1.9		ng/L	1.92	919005-14-4	
HFPO-DA*	Not detected	9.6		ng/L	1.92	13252-13-6	



Analytical Laboratory Report

Lab Sample ID: S24611.02

Sample Tag: MHE_052521

Collected Date/Time: 05/25/2021 10:25

Matrix: Groundwater

COC Reference: 146061

Sample Containers

#	Type	Preservative(s)	Refrigerated?	Arrival Temp. (C)	Thermometer #
1	15ml Centrifuge Tube	None	Yes	4.4	IR

Extraction / Prep.

Parameter	Result	Method	Run Date	Analyst	Flags
Initial wt. (g) / Final wt. (g) / Volume (ml)*	12.27/6.86/11	ASTMD7979-19M	05/26/21 10:30	KCV	

Organics

28 PFAs, Method: ASTMD7979-19M, Run Date: 05/27/21 23:03, Analyst: KCV

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
PFBA*	18	10		ng/L	2.03	375-22-4	
PFPeA*	8.8	4.1		ng/L	2.03	2706-90-3	
4:2 FTSA*	Not detected	2.0		ng/L	2.03	757124-72-4	
PFHxA*	15	2.0		ng/L	2.03	307-24-4	
PFBS*	19	2.0		ng/L	2.03	375-73-5	
PFHpA*	5.1	2.0		ng/L	2.03	375-85-9	
PFPeS*	14	2.0		ng/L	2.03	2706-91-4	
6:2 FTSA*	Not detected	4.1		ng/L	2.03	27619-97-2	
PFOA*	9.9	2.0		ng/L	2.03	335-67-1	
PFHxS*	61	2.0		ng/L	2.03	355-46-4	
PFHxS-LN*	50	2.0		ng/L	2.03	355-46-4-LN	
PFHxS-BR*	11	2.0		ng/L	2.03	355-46-4-BR	
PFNA*	4.1	2.0		ng/L	2.03	375-95-1	
8:2 FTSA*	Not detected	2.0		ng/L	2.03	39108-34-4	
PFHpS*	Not detected	2.0		ng/L	2.03	375-92-8	
PFDA*	Not detected	2.0		ng/L	2.03	335-76-2	
N-MeFOSAA*	Not detected	2.0		ng/L	2.03	2355-31-9	
EtFOSAA*	Not detected	4.1		ng/L	2.03	2991-50-6	
PFOS*	120	2.0		ng/L	2.03	1763-23-1	
PFOS-LN*	74	2.0		ng/L	2.03	1763-23-1-LN	
PFOS-BR*	47	2.0		ng/L	2.03	1763-23-1-BR	
PFUnDA*	Not detected	2.0		ng/L	2.03	2058-94-8	
PFNS*	Not detected	2.0		ng/L	2.03	68259-12-1	
PFDODA*	Not detected	2.0		ng/L	2.03	307-55-1	
PFDS*	Not detected	2.0		ng/L	2.03	335-77-3	
PFTTrDA*	Not detected	2.0		ng/L	2.03	72629-94-8	
FOSA*	Not detected	2.0		ng/L	2.03	754-91-6	
PFTeDA*	Not detected	4.1		ng/L	2.03	376-06-7	
11Cl-PF3OUdS*	Not detected	2.0		ng/L	2.03	763051-92-9	
9Cl-PF3ONS*	Not detected	2.0		ng/L	2.03	756426-58-1	
ADONA*	Not detected	2.0		ng/L	2.03	919005-14-4	
HFPO-DA*	Not detected	10		ng/L	2.03	13252-13-6	



Analytical Laboratory Report

Lab Sample ID: S24611.03

Sample Tag: MHE-1_052521

Collected Date/Time: 05/25/2021 10:45

Matrix: Groundwater

COC Reference: 146061

Sample Containers

#	Type	Preservative(s)	Refrigerated?	Arrival Temp. (C)	Thermometer #
1	15ml Centrifuge Tube	None	Yes	4.4	IR

Extraction / Prep.

Parameter	Result	Method	Run Date	Analyst	Flags
Initial wt. (g) / Final wt. (g) / Volume (ml)*	11.92/6.81/10	ASTMD7979-19M	05/26/21 10:30	KCV	

Organics

28 PFAs, Method: ASTMD7979-19M, Run Date: 05/27/21 23:23, Analyst: KCV

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
PFBA*	Not detected	20		ng/L	1.96	375-22-4	X
PFPeA*	6.7	3.9		ng/L	1.96	2706-90-3	
4:2 FTSA*	Not detected	2.0		ng/L	1.96	757124-72-4	
PFHxA*	11	2.0		ng/L	1.96	307-24-4	
PFBS*	14	2.0		ng/L	1.96	375-73-5	
PFHpA*	4.2	2.0		ng/L	1.96	375-85-9	
PFPeS*	11	2.0		ng/L	1.96	2706-91-4	
6:2 FTSA*	Not detected	3.9		ng/L	1.96	27619-97-2	
PFOA*	8.3	2.0		ng/L	1.96	335-67-1	
PFHxS*	48	2.0		ng/L	1.96	355-46-4	
PFHxS-LN*	39	2.0		ng/L	1.96	355-46-4-LN	
PFHxS-BR*	8.6	2.0		ng/L	1.96	355-46-4-BR	
PFNA*	3.2	2.0		ng/L	1.96	375-95-1	
8:2 FTSA*	Not detected	2.0		ng/L	1.96	39108-34-4	
PFHpS*	2.0	2.0		ng/L	1.96	375-92-8	
PFDA*	Not detected	2.0		ng/L	1.96	335-76-2	
N-MeFOSAA*	Not detected	2.0		ng/L	1.96	2355-31-9	
EtFOSAA*	Not detected	3.9		ng/L	1.96	2991-50-6	
PFOS*	83	2.0		ng/L	1.96	1763-23-1	
PFOS-LN*	47	2.0		ng/L	1.96	1763-23-1-LN	
PFOS-BR*	35	2.0		ng/L	1.96	1763-23-1-BR	
PFUnDA*	Not detected	2.0		ng/L	1.96	2058-94-8	
PFNS*	Not detected	2.0		ng/L	1.96	68259-12-1	
PFDODA*	Not detected	2.0		ng/L	1.96	307-55-1	
PFDS*	Not detected	2.0		ng/L	1.96	335-77-3	
PFTTrDA*	Not detected	2.0		ng/L	1.96	72629-94-8	
FOSA*	Not detected	2.0		ng/L	1.96	754-91-6	
PFTeDA*	Not detected	3.9		ng/L	1.96	376-06-7	
11Cl-PF3OUdS*	Not detected	2.0		ng/L	1.96	763051-92-9	
9Cl-PF3ONS*	Not detected	2.0		ng/L	1.96	756426-58-1	
ADONA*	Not detected	2.0		ng/L	1.96	919005-14-4	
HFPO-DA*	Not detected	9.8		ng/L	1.96	13252-13-6	

X-Elevated reporting limit due to matrix interference



Analytical Laboratory Report

Lab Sample ID: S24611.04

Sample Tag: MHH-1A_052521

Collected Date/Time: 05/25/2021 11:20

Matrix: Groundwater

COC Reference: 146061

Sample Containers

#	Type	Preservative(s)	Refrigerated?	Arrival Temp. (C)	Thermometer #
1	15ml Centrifuge Tube	None	Yes	4.4	IR

Extraction / Prep.

Parameter	Result	Method	Run Date	Analyst	Flags
Initial wt. (g) / Final wt. (g) / Volume (ml)*	12.26/6.84/11	ASTMD7979-19M	05/26/21 10:30	KCV	

Organics

28 PFAs, Method: ASTMD7979-19M, Run Date: 05/27/21 23:42, Analyst: KCV

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
PFBA*	26	10		ng/L	2.03	375-22-4	
PFPeA*	57	4.1		ng/L	2.03	2706-90-3	
4:2 FTSA*	Not detected	2.0		ng/L	2.03	757124-72-4	
PFHxA*	130	2.0		ng/L	2.03	307-24-4	
PFBS*	20	2.0		ng/L	2.03	375-73-5	
PFHpA*	55	2.0		ng/L	2.03	375-85-9	
PFPeS*	33	2.0		ng/L	2.03	2706-91-4	
6:2 FTSA*	Not detected	4.1		ng/L	2.03	27619-97-2	
PFOA*	100	2.0		ng/L	2.03	335-67-1	
PFHxS*	800	2.0		ng/L	2.03	355-46-4	
PFHxS-LN*	690	2.0		ng/L	2.03	355-46-4-LN	
PFHxS-BR*	100	2.0		ng/L	2.03	355-46-4-BR	
PFNA*	7.0	2.0		ng/L	2.03	375-95-1	
8:2 FTSA*	Not detected	2.0		ng/L	2.03	39108-34-4	
PFHpS*	50	2.0		ng/L	2.03	375-92-8	
PFDA*	3.1	2.0		ng/L	2.03	335-76-2	
N-MeFOSAA*	Not detected	2.0		ng/L	2.03	2355-31-9	
EtFOSAA*	Not detected	4.1		ng/L	2.03	2991-50-6	
PFOS*	2,200	2.0		ng/L	2.03	1763-23-1	
PFOS-LN*	1,000	2.0		ng/L	2.03	1763-23-1-LN	
PFOS-BR*	1,100	2.0		ng/L	2.03	1763-23-1-BR	
PFUnDA*	Not detected	2.0		ng/L	2.03	2058-94-8	
PFNS*	Not detected	2.0		ng/L	2.03	68259-12-1	
PFDODA*	Not detected	2.0		ng/L	2.03	307-55-1	
PFDS*	Not detected	2.0		ng/L	2.03	335-77-3	
PFTTrDA*	Not detected	2.0		ng/L	2.03	72629-94-8	
FOSA*	Not detected	2.0		ng/L	2.03	754-91-6	
PFTeDA*	Not detected	4.1		ng/L	2.03	376-06-7	
11Cl-PF3OUdS*	Not detected	2.0		ng/L	2.03	763051-92-9	
9Cl-PF3ONS*	Not detected	2.0		ng/L	2.03	756426-58-1	
ADONA*	Not detected	2.0		ng/L	2.03	919005-14-4	
HFPO-DA*	Not detected	10		ng/L	2.03	13252-13-6	



Analytical Laboratory Report

Lab Sample ID: S24611.05

Sample Tag: MHH-1_052521

Collected Date/Time: 05/25/2021 11:45

Matrix: Groundwater

COC Reference: 146061

Sample Containers

#	Type	Preservative(s)	Refrigerated?	Arrival Temp. (C)	Thermometer #
1	15ml Centrifuge Tube	None	Yes	4.4	IR

Extraction / Prep.

Parameter	Result	Method	Run Date	Analyst	Flags
Initial wt. (g) / Final wt. (g) / Volume (ml)*	12.15/6.80/11	ASTMD7979-19M	05/26/21 10:30	KCV	

Organics

28 PFAs, Method: ASTMD7979-19M, Run Date: 05/28/21 00:02, Analyst: KCV

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
PFBA*	41	10		ng/L	2.06	375-22-4	
PFPeA*	90	4.1		ng/L	2.06	2706-90-3	
4:2 FTSA*	Not detected	2.1		ng/L	2.06	757124-72-4	
PFHxA*	440	2.1		ng/L	2.06	307-24-4	
PFBS*	89	2.1		ng/L	2.06	375-73-5	
PFHpA*	94	2.1		ng/L	2.06	375-85-9	
PFPeS*	180	2.1		ng/L	2.06	2706-91-4	
6:2 FTSA*	Not detected	4.1		ng/L	2.06	27619-97-2	
PFOA*	260	2.1		ng/L	2.06	335-67-1	
PFHxS*	3,300	2.1		ng/L	2.06	355-46-4	
PFHxS-LN*	2,800	2.1		ng/L	2.06	355-46-4-LN	
PFHxS-BR*	530	2.1		ng/L	2.06	355-46-4-BR	
PFNA*	14	2.1		ng/L	2.06	375-95-1	
8:2 FTSA*	Not detected	2.1		ng/L	2.06	39108-34-4	
PFHpS*	220	2.1		ng/L	2.06	375-92-8	
PFDA*	8.8	2.1		ng/L	2.06	335-76-2	
N-MeFOSAA*	Not detected	2.1		ng/L	2.06	2355-31-9	
EtFOSAA*	Not detected	4.1		ng/L	2.06	2991-50-6	
PFOS*	11,000	2.1		ng/L	2.06	1763-23-1	
PFOS-LN*	5,300	2.1		ng/L	2.06	1763-23-1-LN	
PFOS-BR*	5,200	2.1		ng/L	2.06	1763-23-1-BR	
PFUnDA*	Not detected	2.1		ng/L	2.06	2058-94-8	
PFNS*	Not detected	2.1		ng/L	2.06	68259-12-1	
PFDODA*	Not detected	2.1		ng/L	2.06	307-55-1	
PFDS*	Not detected	2.1		ng/L	2.06	335-77-3	
PFTTrDA*	Not detected	2.1		ng/L	2.06	72629-94-8	
FOSA*	Not detected	2.1		ng/L	2.06	754-91-6	
PFTeDA*	Not detected	4.1		ng/L	2.06	376-06-7	
11Cl-PF3OUdS*	Not detected	2.1		ng/L	2.06	763051-92-9	
9Cl-PF3ONS*	Not detected	2.1		ng/L	2.06	756426-58-1	
ADONA*	Not detected	2.1		ng/L	2.06	919005-14-4	
HFPO-DA*	Not detected	10		ng/L	2.06	13252-13-6	



Analytical Laboratory Report

Lab Sample ID: S24611.06

Sample Tag: MH10-2_052521

Collected Date/Time: 05/25/2021 12:10

Matrix: Groundwater

COC Reference: 146061

Sample Containers

#	Type	Preservative(s)	Refrigerated?	Arrival Temp. (C)	Thermometer #
1	15ml Centrifuge Tube	None	Yes	4.4	IR

Extraction / Prep.

Parameter	Result	Method	Run Date	Analyst	Flags
Initial wt. (g) / Final wt. (g) / Volume (ml)*	12.82/6.83/12	ASTMD7979-19M	05/26/21 10:30	KCV	

Organics

28 PFAs, Method: ASTMD7979-19M, Run Date: 05/28/21 09:30, Analyst: KCV

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
PFBA*	18	10		ng/L	2	375-22-4	
PFPeA*	26	4.0		ng/L	2	2706-90-3	
4:2 FTSA*	Not detected	2.0		ng/L	2	757124-72-4	
PFHxA*	62	2.0		ng/L	2	307-24-4	
PFBS*	26	2.0		ng/L	2	375-73-5	
PFHpA*	17	2.0		ng/L	2	375-85-9	
PFPeS*	33	2.0		ng/L	2	2706-91-4	
6:2 FTSA*	Not detected	4.0		ng/L	2	27619-97-2	
PFOA*	33	2.0		ng/L	2	335-67-1	
PFHxS*	290	2.0		ng/L	2	355-46-4	
PFHxS-LN*	240	2.0		ng/L	2	355-46-4-LN	
PFHxS-BR*	53	2.0		ng/L	2	355-46-4-BR	
PFNA*	2.8	2.0		ng/L	2	375-95-1	
8:2 FTSA*	Not detected	2.0		ng/L	2	39108-34-4	
PFHpS*	9.4	2.0		ng/L	2	375-92-8	
PFDA*	Not detected	2.0		ng/L	2	335-76-2	
N-MeFOSAA*	Not detected	2.0		ng/L	2	2355-31-9	
EtFOSAA*	Not detected	4.0		ng/L	2	2991-50-6	
PFOS*	98	2.0		ng/L	2	1763-23-1	
PFOS-LN*	28	2.0		ng/L	2	1763-23-1-LN	
PFOS-BR*	70	2.0		ng/L	2	1763-23-1-BR	
PFUnDA*	Not detected	2.0		ng/L	2	2058-94-8	
PFNS*	Not detected	2.0		ng/L	2	68259-12-1	
PFDODA*	Not detected	2.0		ng/L	2	307-55-1	
PFDS*	Not detected	2.0		ng/L	2	335-77-3	
PFTTrDA*	Not detected	2.0		ng/L	2	72629-94-8	
FOSA*	Not detected	2.0		ng/L	2	754-91-6	
PFTeDA*	Not detected	4.0		ng/L	2	376-06-7	
11Cl-PF3OUdS*	Not detected	2.0		ng/L	2	763051-92-9	
9Cl-PF3ONS*	Not detected	2.0		ng/L	2	756426-58-1	
ADONA*	Not detected	2.0		ng/L	2	919005-14-4	
HFPO-DA*	Not detected	10		ng/L	2	13252-13-6	



Analytical Laboratory Report

Lab Sample ID: S24611.07

Sample Tag: MH11-6_052521

Collected Date/Time: 05/25/2021 12:45

Matrix: Groundwater

COC Reference: 146061

Sample Containers

#	Type	Preservative(s)	Refrigerated?	Arrival Temp. (C)	Thermometer #
1	15ml Centrifuge Tube	None	Yes	4.4	IR

Extraction / Prep.

Parameter	Result	Method	Run Date	Analyst	Flags
Initial wt. (g) / Final wt. (g) / Volume (ml)*	12.14/6.89/10	ASTMD7979-19M	05/26/21 10:30	KCV	

Organics

28 PFAs, Method: ASTMD7979-19M, Run Date: 05/28/21 00:41, Analyst: KCV

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
PFBA*	36	9.5		ng/L	1.9	375-22-4	
PFPeA*	83	3.8		ng/L	1.9	2706-90-3	
4:2 FTSA*	Not detected	1.9		ng/L	1.9	757124-72-4	
PFHxA*	400	1.9		ng/L	1.9	307-24-4	
PFBS*	74	1.9		ng/L	1.9	375-73-5	
PFHpA*	71	1.9		ng/L	1.9	375-85-9	
PFPeS*	140	1.9		ng/L	1.9	2706-91-4	
6:2 FTSA*	Not detected	3.8		ng/L	1.9	27619-97-2	
PFOA*	210	1.9		ng/L	1.9	335-67-1	
PFHxS*	2,800	1.9		ng/L	1.9	355-46-4	
PFHxS-LN*	2,400	1.9		ng/L	1.9	355-46-4-LN	
PFHxS-BR*	390	1.9		ng/L	1.9	355-46-4-BR	
PFNA*	13	1.9		ng/L	1.9	375-95-1	
8:2 FTSA*	Not detected	1.9		ng/L	1.9	39108-34-4	
PFHpS*	150	1.9		ng/L	1.9	375-92-8	
PFDA*	7.0	1.9		ng/L	1.9	335-76-2	
N-MeFOSAA*	Not detected	1.9		ng/L	1.9	2355-31-9	
EtFOSAA*	Not detected	3.8		ng/L	1.9	2991-50-6	
PFOS*	9,700	1.9		ng/L	1.9	1763-23-1	
PFOS-LN*	5,100	1.9		ng/L	1.9	1763-23-1-LN	
PFOS-BR*	4,400	1.9		ng/L	1.9	1763-23-1-BR	
PFUnDA*	Not detected	1.9		ng/L	1.9	2058-94-8	
PFNS*	Not detected	1.9		ng/L	1.9	68259-12-1	
PFDODA*	Not detected	1.9		ng/L	1.9	307-55-1	
PFDS*	Not detected	1.9		ng/L	1.9	335-77-3	
PFTTrDA*	Not detected	1.9		ng/L	1.9	72629-94-8	
FOSA*	Not detected	1.9		ng/L	1.9	754-91-6	
PFTeDA*	Not detected	3.8		ng/L	1.9	376-06-7	
11Cl-PF3OUdS*	Not detected	1.9		ng/L	1.9	763051-92-9	
9Cl-PF3ONS*	Not detected	1.9		ng/L	1.9	756426-58-1	
ADONA*	Not detected	1.9		ng/L	1.9	919005-14-4	
HFPO-DA*	Not detected	9.5		ng/L	1.9	13252-13-6	

Merit Laboratories Login Checklist

Lab Set ID:S24611

Client:ARCADIS_NOVI (ARCADIS U.S., Inc.)

Project: 30075935.03200 / Buick City

Submitted:05/25/2021 16:30 Login User: SRS

Attention: Erin Kozak

Address: Arcadis US, Inc.
28550 Cabot Drive
Suite 500
Novi, MI 48377

Phone: O: 810-225-1901 FAX:

Email: erin.kozak@arcadis.com

Selection	Description	Note
-----------	-------------	------

Sample Receiving

- | | | |
|-----|--|--|
| 01. | <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A | Samples are received at 4C +/- 2C Thermometer # IR 4.4 |
| 02. | <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A | Received on ice/ cooling process begun |
| 03. | <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> N/A | Samples shipped |
| 04. | <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> N/A | Samples left in 24 hr. drop box |
| 05. | <input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A | Are there custody seals/tape or is the drop box locked |

Chain of Custody

- | | | |
|-----|--|--|
| 06. | <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A | COC adequately filled out |
| 07. | <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A | COC signed and relinquished to the lab |
| 08. | <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A | Sample tag on bottles match COC |
| 09. | <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> N/A | Subcontracting needed? Subcontracted to: |

Preservation

- | | | |
|-----|--|---|
| 10. | <input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A | Do sample have correct chemical preservation |
| 11. | <input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A | Completed pH checks on preserved samples? (no VOAs) |
| 12. | <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> N/A | Did any samples need to be preserved in the lab? |

Bottle Conditions

- | | | |
|-----|--|---|
| 13. | <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A | All bottles intact |
| 14. | <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A | Appropriate analytical bottles are used |
| 15. | <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A | Merit bottles used |
| 16. | <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A | Sufficient sample volume received |
| 17. | <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> N/A | Samples require laboratory filtration |
| 18. | <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A | Samples submitted within holding time |
| 19. | <input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A | Do water VOC or TOX bottles contain headspace |

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

Client Review By: _____ Date: _____



2680 East Lansing Dr., East Lansing, MI 48823
 Phone (517) 332-0167 Fax (517) 332-4034
 www.meritlabs.com

C.O.C. PAGE # 1 OF 1 146061

REPORT TO

CHAIN OF CUSTODY RECORD

INVOICE TO

CONTACT NAME: Joey Barner
 COMPANY: Arcadis
 ADDRESS: 28550 Cabot Dr Suite 500
 CITY: Novi STATE: MI ZIP CODE: 48337
 PHONE NO.: 248 790 5218 FAX NO.: _____ P.O. NO.: _____
 E-MAIL ADDRESS: Joey.Barner@arcadis.com QUOTE NO.: _____

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

ANALYSIS (ATTACH LIST IF MORE SPACE IS REQUIRED)

PROJECT NO./NAME: 30075935.03200 / Buick City SAMPLER(S) - PLEASE PRINT/SIGN NAME: Donatit Picemant / Don Barner
 TURNAROUND TIME REQUIRED: 1 DAY 2 DAYS 3 DAYS STANDARD OTHER _____
 DELIVERABLES REQUIRED: STD LEVEL II LEVEL III LEVEL IV EDD OTHER _____

- Certifications
 OHIO VAP Drinking Water
 DoD NPDES
 Project Locations
 Detroit New York
 Other _____
 Special Instructions

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

Containers & Preservatives

MERIT LAB NO. <small>FOR LAB USE ONLY</small>	YEAR		SAMPLE TAG IDENTIFICATION-DESCRIPTION	MATRIX	# OF BOTTLES	NONE	HCl	HNO ₃	H ₂ SO ₄	NaOH	MeOH	OTHER	PFAS
	DATE	TIME											
24611.01	5/25/21	1000	OF 010-052521	GW	3	X							X
.02	5/25/21	1025	MHE-052521	GW	3	X							X
.03	5/25/21	1045	MHE-1-052521	GW	3	X							X
.04	5/25/21	1120	MH H-1A-052521	GW	3	X							X
.05	5/25/21	1145	MH H-1-052521	GW	3	X							X
.06	5/25/21	1210	MH 10-2-052521	GW	3	X							X
.07	5/25/21	1245	MH 11-6-052521	GW	3	X							X

RELINQUISHED BY: Don Barner/Arcadis Sampler DATE: 5/25/21 TIME: 1530
 RECEIVED BY: [Signature] DATE: 5/25/21 TIME: 1534
 RELINQUISHED BY: [Signature] DATE: 5/25/21 TIME: 16:30
 RECEIVED BY: [Signature] DATE: 5/25/21 TIME: 1630

RELINQUISHED BY: _____ DATE: _____ TIME: _____
 RECEIVED BY: _____ DATE: _____ TIME: _____
 SEAL NO. SEAL INTACT YES NO INITIALS _____
 SEAL NO. SEAL INTACT YES NO INITIALS _____
 NOTES: TEMP. ON ARRIVAL 4.4

(PLEASE NOTE: SIGNING ACKNOWLEDGES ADHERENCE TO MERIT'S SAMPLE ACCEPTANCE POLICY ON REVERSE SIDE)



Analytical Laboratory Report

Report ID: S23413.01(01)
Generated on 04/30/2021

Report to

Attention: Erin Kozak
Arcadis US, Inc.
28550 Cabot Drive
Suite 500
Novi, MI 48377

Phone: O: 810-225-1901 FAX:
Email: erin.kozak@arcadis.com

Additional Contacts: Megan Humphrey, Micki Maki, Joey Barker

Report produced by

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

Phone: (517) 332-0167 FAX: (517) 332-6333

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

Report Summary

Lab Sample ID(s): S23413.01-S23413.10
Project: 30075935.03200 / Arcadis
Collected Date(s): 04/21/2021
Submitted Date/Time: 04/21/2021 16:15
Sampled by: Donald Richmond
P.O. #: 30075935.03200

Table of Contents

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- General Report Notes (Page 2)
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- Sample Summary (Page 5)

Maya Murshak
Technical Director



Analytical Laboratory Report

General Report Notes

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

Methods may be modified for improved performance.

Results reported on a dry weight basis where applicable.

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

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

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

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

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

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

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

PFAS requirement: Section 9.3.8 of U.S. EPA Method 537.1 states "If the method analyte(s) found in the Field Sample is present in the

FRB at a concentration greater than 1/3 the MRL, then all samples collected with that FRB are invalid and must be recollected and reanalyzed."

Samples submitted without an accompanying FRB may not be acceptable for compliance purposes.

Report Narrative

There is no additional narrative for this analytical report



Analytical Laboratory Report

Laboratory Certifications

Authority	Certification ID
Michigan DEQ	#9956
DOD ELAP/ISO 17025	#69699
WBENC	#2005110032
Ohio VAP	#CL0002
Indiana DOH	#C-MI-07
New York NELAC	#11814
North Carolina DENR	#680
North Carolina DOH	#26702
Alaska CSLAP	#17-001
Pennsylvania DEP	#68-05884

Qualifier Descriptions

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

Glossary of Abbreviations

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



Analytical Laboratory Report

Method Summary

Method	Version
ASTMD7979-19M	ASTM Method D7979 - 19 Modified (Isotopic Dilution)

Parameter Summary

Parameter	Synonym	Cas #
PFBA	Perfluorobutanoic Acid	375-22-4
PFPeA	Perfluoropentanoic Acid	2706-90-3
4:2 FTSA	4:2 Fluorotelomer Sulfonic Acid	757124-72-4
PFHxA	Perfluorohexanoic Acid	307-24-4
PFBS	Perfluorobutane sulfonic Acid	375-73-5
PFHpA	Perfluoroheptanoic Acid	375-85-9
PFPeS	Perfluoropentane Sulfonic Acid	2706-91-4
6:2 FTSA	6:2 Fluorotelomer Sulfonic Acid	27619-97-2
PFOA	Perfluorooctanoic Acid	335-67-1
PFHxS	Perfluorohexane Sulfonic Acid	355-46-4
PFHxS-LN	Perfluorohexane Sulfonic Acid - LN	355-46-4-LN
PFHxS-BR	Perfluorohexane Sulfonic Acid - BR	355-46-4-BR
PFNA	Perfluorononanoic Acid	375-95-1
8:2 FTSA	8:2 Fluorotelomer Sulfonic Acid	39108-34-4
PFHpS	Perfluoroheptane Sulfonic Acid	375-92-8
PFDA	Perfluorodecanoic Acid	335-76-2
N-MeFOSAA	N-methyl perfluorooctanesulfonamidoacetic acid	2355-31-9
EtFOSAA	N-Ethyl Perfluorooctane Sulfonamidoacetic Acid	2991-50-6
PFOS	Perfluorooctane Sulfonic Acid	1763-23-1
PFOS-LN	Perfluorooctane Sulfonic Acid - LN	1763-23-1-LN
PFOS-BR	Perfluorooctane Sulfonic Acid - BR	1763-23-1-BR
PFUnDA	Perfluoroundecanoic Acid	2058-94-8
PFNS	Perfluorononane Sulfonic Acid	68259-12-1
PFDoDA	Perfluorododecanoic Acid	307-55-1
PFDS	Perfluorodecane Sulfonic Acid	335-77-3
PFTTrDA	Perfluorotridecanoic Acid	72629-94-8
FOSA	Perfluorooctane Sulfonamide	754-91-6
PFTeDA	Perfluorotetradecanoic Acid	376-06-7
11Cl-PF3OUdS	11-chloroeicosafuoro-3-oxaundecane-1-sulfonic acid	763051-92-9
9Cl-PF3ONS	9-chlorohexadecafluoro-3-oxanone1-sulfonic acid	756426-58-1
ADONA	4,8-dioxa-3H-perfluorononanoic acid	919005-14-4
HFPO-DA	Hexafluoropropylene oxide dimer	13252-13-6



Analytical Laboratory Report

Sample Summary (10 samples)

Sample ID	Sample Tag	Matrix	Collected Date/Time
S23413.01	Outfall010_042121	Groundwater	04/21/21 09:15
S23413.02	MHE_042121	Groundwater	04/21/21 09:45
S23413.03	MHE-1_042121	Groundwater	04/21/21 11:00
S23413.04	MHH-1A_042121	Groundwater	04/21/21 11:30
S23413.05	MH10-5_042121	Groundwater	04/21/21 12:15
S23413.06	MH11-6_042121	Groundwater	04/21/21 12:50
S23413.07	Outfall003_042121	Groundwater	04/21/21 13:30
S23413.08	MH3-6_042121	Groundwater	04/21/21 14:00
S23413.09	MH3-38_042121	Groundwater	04/21/21 14:40
S23413.10	MH3-52_042121	Groundwater	04/21/21 15:15



Analytical Laboratory Report

Lab Sample ID: S23413.01

Sample Tag: Outfall010_042121

Collected Date/Time: 04/21/2021 09:15

Matrix: Groundwater

COC Reference: 135617

Sample Containers

#	Type	Preservative(s)	Refrigerated?	Arrival Temp. (C)	Thermometer #
1	15ml Centrifuge Tube	None	Yes	4.4	IR

Extraction / Prep.

Parameter	Result	Method	Run Date	Analyst	Flags
Initial wt. (g) / Final wt. (g) / Volume (ml)*	12.32/6.87/11	ASTMD7979-19M	04/23/21 11:00	KCV	

Organics

28 PFAs, Method: ASTMD7979-19M, Run Date: 04/23/21 19:16, Analyst: KCV

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
PFBA*	22	10		ng/L	2.02	375-22-4	
PFPeA*	44	4.0		ng/L	2.02	2706-90-3	
4:2 FTSA*	Not detected	2.0		ng/L	2.02	757124-72-4	
PFHxA*	150	2.0		ng/L	2.02	307-24-4	
PFBS*	60	2.0		ng/L	2.02	375-73-5	
PFHpA*	38	2.0		ng/L	2.02	375-85-9	
PFPeS*	87	2.0		ng/L	2.02	2706-91-4	
6:2 FTSA*	Not detected	2.0		ng/L	2.02	27619-97-2	
PFOA*	120	2.0		ng/L	2.02	335-67-1	
PFHxS*	1,100	2.0		ng/L	2.02	355-46-4	
PFHxS-LN*	950	2.0		ng/L	2.02	355-46-4-LN	
PFHxS-BR*	190	2.0		ng/L	2.02	355-46-4-BR	
PFNA*	7.1	2.0		ng/L	2.02	375-95-1	
8:2 FTSA*	Not detected	2.0		ng/L	2.02	39108-34-4	
PFHpS*	57	2.0		ng/L	2.02	375-92-8	
PFDA*	Not detected	2.0		ng/L	2.02	335-76-2	
N-MeFOSAA*	Not detected	2.0		ng/L	2.02	2355-31-9	
EtFOSAA*	Not detected	4.0		ng/L	2.02	2991-50-6	
PFOS*	1,900	2.0		ng/L	2.02	1763-23-1	
PFOS-LN*	830	2.0		ng/L	2.02	1763-23-1-LN	
PFOS-BR*	1,000	2.0		ng/L	2.02	1763-23-1-BR	
PFUnDA*	Not detected	2.0		ng/L	2.02	2058-94-8	
PFNS*	Not detected	2.0		ng/L	2.02	68259-12-1	
PFDODA*	Not detected	2.0		ng/L	2.02	307-55-1	
PFDS*	Not detected	2.0		ng/L	2.02	335-77-3	
PFTTrDA*	Not detected	2.0		ng/L	2.02	72629-94-8	
FOSA*	Not detected	2.0		ng/L	2.02	754-91-6	
PFTeDA*	Not detected	4.0		ng/L	2.02	376-06-7	
11Cl-PF3OUdS*	Not detected	2.0		ng/L	2.02	763051-92-9	
9Cl-PF3ONS*	Not detected	2.0		ng/L	2.02	756426-58-1	
ADONA*	Not detected	2.0		ng/L	2.02	919005-14-4	
HFPO-DA*	Not detected	2.0		ng/L	2.02	13252-13-6	



Analytical Laboratory Report

Lab Sample ID: S23413.02

Sample Tag: MHE_042121

Collected Date/Time: 04/21/2021 09:45

Matrix: Groundwater

COC Reference: 135617

Sample Containers

#	Type	Preservative(s)	Refrigerated?	Arrival Temp. (C)	Thermometer #
1	15ml Centrifuge Tube	None	Yes	4.4	IR

Extraction / Prep.

Parameter	Result	Method	Run Date	Analyst	Flags
Initial wt. (g) / Final wt. (g) / Volume (ml)*	12.31/6.86/11	ASTMD7979-19M	04/23/21 11:00	KCV	

Organics

28 PFAs, Method: ASTMD7979-19M, Run Date: 04/23/21 21:27, Analyst: KCV

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
PFBA*	18	10		ng/L	2.02	375-22-4	
PFPeA*	25	4.0		ng/L	2.02	2706-90-3	
4:2 FTSA*	Not detected	2.0		ng/L	2.02	757124-72-4	
PFHxA*	91	2.0		ng/L	2.02	307-24-4	
PFBS*	41	2.0		ng/L	2.02	375-73-5	
PFHpA*	17	2.0		ng/L	2.02	375-85-9	
PFPeS*	56	2.0		ng/L	2.02	2706-91-4	
6:2 FTSA*	Not detected	2.0		ng/L	2.02	27619-97-2	
PFOA*	57	2.0		ng/L	2.02	335-67-1	
PFHxS*	700	2.0		ng/L	2.02	355-46-4	
PFHxS-LN*	600	2.0		ng/L	2.02	355-46-4-LN	
PFHxS-BR*	110	2.0		ng/L	2.02	355-46-4-BR	
PFNA*	4.5	2.0		ng/L	2.02	375-95-1	
8:2 FTSA*	Not detected	2.0		ng/L	2.02	39108-34-4	
PFHpS*	43	2.0		ng/L	2.02	375-92-8	
PFDA*	Not detected	2.0		ng/L	2.02	335-76-2	
N-MeFOSAA*	Not detected	2.0		ng/L	2.02	2355-31-9	
EtFOSAA*	Not detected	4.0		ng/L	2.02	2991-50-6	
PFOS*	1,900	2.0		ng/L	2.02	1763-23-1	
PFOS-LN*	1,100	2.0		ng/L	2.02	1763-23-1-LN	
PFOS-BR*	810	2.0		ng/L	2.02	1763-23-1-BR	
PFUnDA*	Not detected	2.0		ng/L	2.02	2058-94-8	
PFNS*	Not detected	2.0		ng/L	2.02	68259-12-1	
PFDODA*	Not detected	2.0		ng/L	2.02	307-55-1	
PFDS*	Not detected	2.0		ng/L	2.02	335-77-3	
PFTTrDA*	Not detected	2.0		ng/L	2.02	72629-94-8	
FOSA*	Not detected	2.0		ng/L	2.02	754-91-6	
PFTeDA*	Not detected	4.0		ng/L	2.02	376-06-7	
11Cl-PF3OUdS*	Not detected	2.0		ng/L	2.02	763051-92-9	
9Cl-PF3ONS*	Not detected	2.0		ng/L	2.02	756426-58-1	
ADONA*	Not detected	2.0		ng/L	2.02	919005-14-4	
HFPO-DA*	Not detected	2.0		ng/L	2.02	13252-13-6	



Analytical Laboratory Report

Lab Sample ID: S23413.03

Sample Tag: MHE-1_042121

Collected Date/Time: 04/21/2021 11:00

Matrix: Groundwater

COC Reference: 135617

Sample Containers

#	Type	Preservative(s)	Refrigerated?	Arrival Temp. (C)	Thermometer #
1	15ml Centrifuge Tube	None	Yes	4.4	IR

Extraction / Prep.

Parameter	Result	Method	Run Date	Analyst	Flags
Initial wt. (g) / Final wt. (g) / Volume (ml)*	11.59/6.89/10	ASTMD7979-19M	04/23/21 11:00	KCV	

Organics

28 PFAs, Method: ASTMD7979-19M, Run Date: 04/23/21 21:47, Analyst: KCV

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
PFBA*	23	11		ng/L	2.13	375-22-4	
PFPeA*	35	4.3		ng/L	2.13	2706-90-3	
4:2 FTSA*	Not detected	2.1		ng/L	2.13	757124-72-4	
PFHxA*	170	2.1		ng/L	2.13	307-24-4	
PFBS*	60	2.1		ng/L	2.13	375-73-5	
PFHpA*	31	2.1		ng/L	2.13	375-85-9	
PFPeS*	85	2.1		ng/L	2.13	2706-91-4	
6:2 FTSA*	Not detected	2.1		ng/L	2.13	27619-97-2	
PFOA*	110	2.1		ng/L	2.13	335-67-1	
PFHxS*	1,300	2.1		ng/L	2.13	355-46-4	
PFHxS-LN*	1,100	2.1		ng/L	2.13	355-46-4-LN	
PFHxS-BR*	190	2.1		ng/L	2.13	355-46-4-BR	
PFNA*	5.6	2.1		ng/L	2.13	375-95-1	
8:2 FTSA*	Not detected	2.1		ng/L	2.13	39108-34-4	
PFHpS*	71	2.1		ng/L	2.13	375-92-8	
PFDA*	Not detected	2.1		ng/L	2.13	335-76-2	
N-MeFOSAA*	Not detected	2.1		ng/L	2.13	2355-31-9	
EtFOSAA*	Not detected	4.3		ng/L	2.13	2991-50-6	
PFOS*	3,300	2.1		ng/L	2.13	1763-23-1	
PFOS-LN*	1,900	2.1		ng/L	2.13	1763-23-1-LN	
PFOS-BR*	1,400	2.1		ng/L	2.13	1763-23-1-BR	
PFUnDA*	Not detected	2.1		ng/L	2.13	2058-94-8	
PFNS*	Not detected	2.1		ng/L	2.13	68259-12-1	
PFDODA*	Not detected	2.1		ng/L	2.13	307-55-1	
PFDS*	Not detected	2.1		ng/L	2.13	335-77-3	
PFTTrDA*	Not detected	2.1		ng/L	2.13	72629-94-8	
FOSA*	Not detected	2.1		ng/L	2.13	754-91-6	
PFTeDA*	Not detected	4.3		ng/L	2.13	376-06-7	
11Cl-PF3OUdS*	Not detected	2.1		ng/L	2.13	763051-92-9	
9Cl-PF3ONS*	Not detected	2.1		ng/L	2.13	756426-58-1	
ADONA*	Not detected	2.1		ng/L	2.13	919005-14-4	
HFPO-DA*	Not detected	2.1		ng/L	2.13	13252-13-6	



Analytical Laboratory Report

Lab Sample ID: S23413.04

Sample Tag: MHH-1A_042121

Collected Date/Time: 04/21/2021 11:30

Matrix: Groundwater

COC Reference: 135617

Sample Containers

#	Type	Preservative(s)	Refrigerated?	Arrival Temp. (C)	Thermometer #
1	15ml Centrifuge Tube	None	Yes	4.4	IR

Extraction / Prep.

Parameter	Result	Method	Run Date	Analyst	Flags
Initial wt. (g) / Final wt. (g) / Volume (ml)*	12.49/6.95/11	ASTMD7979-19M	04/23/21 11:00	KCV	

Organics

28 PFAs, Method: ASTMD7979-19M, Run Date: 04/26/21 20:29, Analyst: KCV

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
PFBA*	130	50		ng/L	9.93	375-22-4	Y
PFPeA*	280	20		ng/L	9.93	2706-90-3	Y
4:2 FTSA*	Not detected	9.9		ng/L	9.93	757124-72-4	Y
PFHxA*	1,600	9.9		ng/L	9.93	307-24-4	Y
PFBS*	450	9.9		ng/L	9.93	375-73-5	Y
PFHpA*	270	9.9		ng/L	9.93	375-85-9	Y
PFPeS*	790	9.9		ng/L	9.93	2706-91-4	Y
6:2 FTSA*	Not detected	9.9		ng/L	9.93	27619-97-2	Y
PFOA*	1,000	9.9		ng/L	9.93	335-67-1	Y
PFHxS*	11,000	9.9		ng/L	9.93	355-46-4	Y
PFHxS-LN*	9,300	9.9		ng/L	9.93	355-46-4-LN	Y
PFHxS-BR*	1,600	9.9		ng/L	9.93	355-46-4-BR	Y
PFNA*	28	9.9		ng/L	9.93	375-95-1	Y
8:2 FTSA*	Not detected	9.9		ng/L	9.93	39108-34-4	Y
PFHpS*	620	9.9		ng/L	9.93	375-92-8	Y
PFDA*	15	9.9		ng/L	9.93	335-76-2	Y
N-MeFOSAA*	Not detected	9.9		ng/L	9.93	2355-31-9	Y
EtFOSAA*	Not detected	20		ng/L	9.93	2991-50-6	Y
PFOS*	27,000	9.9		ng/L	9.93	1763-23-1	Y
PFOS-LN*	15,000	9.9		ng/L	9.93	1763-23-1-LN	Y
PFOS-BR*	13,000	9.9		ng/L	9.93	1763-23-1-BR	Y
PFUnDA*	Not detected	9.9		ng/L	9.93	2058-94-8	Y
PFNS*	Not detected	9.9		ng/L	9.93	68259-12-1	Y
PFDODA*	Not detected	9.9		ng/L	9.93	307-55-1	Y
PFDS*	Not detected	9.9		ng/L	9.93	335-77-3	Y
PFTTrDA*	Not detected	9.9		ng/L	9.93	72629-94-8	Y
FOSA*	Not detected	9.9		ng/L	9.93	754-91-6	Y
PFTeDA*	Not detected	20		ng/L	9.93	376-06-7	Y
11Cl-PF3OUdS*	Not detected	9.9		ng/L	9.93	763051-92-9	Y
9Cl-PF3ONS*	Not detected	9.9		ng/L	9.93	756426-58-1	Y
ADONA*	Not detected	9.9		ng/L	9.93	919005-14-4	Y
HFPO-DA*	Not detected	9.9		ng/L	9.93	13252-13-6	Y

Y-Elevated reporting limit due to high target concentration



Analytical Laboratory Report

Lab Sample ID: S23413.05

Sample Tag: MH10-5_042121

Collected Date/Time: 04/21/2021 12:15

Matrix: Groundwater

COC Reference: 135617

Sample Containers

#	Type	Preservative(s)	Refrigerated?	Arrival Temp. (C)	Thermometer #
1	15ml Centrifuge Tube	None	Yes	4.4	IR

Extraction / Prep.

Parameter	Result	Method	Run Date	Analyst	Flags
Initial wt. (g) / Final wt. (g) / Volume (ml)*	12.08/6.93/11	ASTMD7979-19M	04/23/21 11:00	KCV	

Organics

28 PFAs, Method: ASTMD7979-19M, Run Date: 04/23/21 22:26, Analyst: KCV

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
PFBA*	36	11		ng/L	2.14	375-22-4	
PFPeA*	82	4.3		ng/L	2.14	2706-90-3	
4:2 FTSA*	Not detected	2.1		ng/L	2.14	757124-72-4	
PFHxA*	300	2.1		ng/L	2.14	307-24-4	
PFBS*	79	2.1		ng/L	2.14	375-73-5	
PFHpA*	66	2.1		ng/L	2.14	375-85-9	
PFPeS*	170	2.1		ng/L	2.14	2706-91-4	
6:2 FTSA*	Not detected	2.1		ng/L	2.14	27619-97-2	
PFOA*	340	2.1		ng/L	2.14	335-67-1	
PFHxS*	3,300	2.1		ng/L	2.14	355-46-4	
PFHxS-LN*	2,800	2.1		ng/L	2.14	355-46-4-LN	
PFHxS-BR*	480	2.1		ng/L	2.14	355-46-4-BR	
PFNA*	8.4	2.1		ng/L	2.14	375-95-1	
8:2 FTSA*	Not detected	2.1		ng/L	2.14	39108-34-4	
PFHpS*	230	2.1		ng/L	2.14	375-92-8	
PFDA*	Not detected	2.1		ng/L	2.14	335-76-2	
N-MeFOSAA*	Not detected	2.1		ng/L	2.14	2355-31-9	
EtFOSAA*	Not detected	4.3		ng/L	2.14	2991-50-6	
PFOS*	5,500	2.1		ng/L	2.14	1763-23-1	
PFOS-LN*	2,400	2.1		ng/L	2.14	1763-23-1-LN	
PFOS-BR*	3,100	2.1		ng/L	2.14	1763-23-1-BR	
PFUnDA*	Not detected	2.1		ng/L	2.14	2058-94-8	
PFNS*	Not detected	2.1		ng/L	2.14	68259-12-1	
PFDODA*	Not detected	2.1		ng/L	2.14	307-55-1	
PFDS*	Not detected	2.1		ng/L	2.14	335-77-3	
PFTTrDA*	Not detected	2.1		ng/L	2.14	72629-94-8	
FOSA*	Not detected	2.1		ng/L	2.14	754-91-6	
PFTeDA*	Not detected	4.3		ng/L	2.14	376-06-7	
11Cl-PF3OUdS*	Not detected	2.1		ng/L	2.14	763051-92-9	
9Cl-PF3ONS*	Not detected	2.1		ng/L	2.14	756426-58-1	
ADONA*	Not detected	2.1		ng/L	2.14	919005-14-4	
HFPO-DA*	Not detected	2.1		ng/L	2.14	13252-13-6	



Analytical Laboratory Report

Lab Sample ID: S23413.06

Sample Tag: MH11-6_042121

Collected Date/Time: 04/21/2021 12:50

Matrix: Groundwater

COC Reference: 135617

Sample Containers

#	Type	Preservative(s)	Refrigerated?	Arrival Temp. (C)	Thermometer #
1	15ml Centrifuge Tube	None	Yes	4.4	IR

Extraction / Prep.

Parameter	Result	Method	Run Date	Analyst	Flags
Initial wt. (g) / Final wt. (g) / Volume (ml)*	12.11/6.84/11	ASTMD7979-19M	04/23/21 11:00	KCV	

Organics

28 PFAs, Method: ASTMD7979-19M, Run Date: 04/23/21 22:45, Analyst: KCV

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
PFBA*	18	10		ng/L	2.09	375-22-4	
PFPeA*	30	4.2		ng/L	2.09	2706-90-3	
4:2 FTSA*	Not detected	2.1		ng/L	2.09	757124-72-4	
PFHxA*	35	2.1		ng/L	2.09	307-24-4	
PFBS*	7.4	2.1		ng/L	2.09	375-73-5	
PFHpA*	17	2.1		ng/L	2.09	375-85-9	
PFPeS*	4.9	2.1		ng/L	2.09	2706-91-4	
6:2 FTSA*	Not detected	2.1		ng/L	2.09	27619-97-2	
PFOA*	27	2.1		ng/L	2.09	335-67-1	
PFHxS*	87	2.1		ng/L	2.09	355-46-4	
PFHxS-LN*	73	2.1		ng/L	2.09	355-46-4-LN	
PFHxS-BR*	13	2.1		ng/L	2.09	355-46-4-BR	
PFNA*	7.1	2.1		ng/L	2.09	375-95-1	
8:2 FTSA*	Not detected	2.1		ng/L	2.09	39108-34-4	
PFHpS*	2.7	2.1		ng/L	2.09	375-92-8	
PFDA*	Not detected	2.1		ng/L	2.09	335-76-2	
N-MeFOSAA*	Not detected	2.1		ng/L	2.09	2355-31-9	
EtFOSAA*	Not detected	4.2		ng/L	2.09	2991-50-6	
PFOS*	90	2.1		ng/L	2.09	1763-23-1	
PFOS-LN*	51	2.1		ng/L	2.09	1763-23-1-LN	
PFOS-BR*	38	2.1		ng/L	2.09	1763-23-1-BR	
PFUnDA*	Not detected	2.1		ng/L	2.09	2058-94-8	
PFNS*	Not detected	2.1		ng/L	2.09	68259-12-1	
PFDODA*	Not detected	2.1		ng/L	2.09	307-55-1	
PFDS*	Not detected	2.1		ng/L	2.09	335-77-3	
PFTTrDA*	Not detected	2.1		ng/L	2.09	72629-94-8	
FOSA*	Not detected	2.1		ng/L	2.09	754-91-6	
PFTeDA*	Not detected	4.2		ng/L	2.09	376-06-7	
11Cl-PF3OUdS*	Not detected	2.1		ng/L	2.09	763051-92-9	
9Cl-PF3ONS*	Not detected	2.1		ng/L	2.09	756426-58-1	
ADONA*	Not detected	2.1		ng/L	2.09	919005-14-4	
HFPO-DA*	Not detected	2.1		ng/L	2.09	13252-13-6	



Analytical Laboratory Report

Lab Sample ID: S23413.07

Sample Tag: Outfall003_042121

Collected Date/Time: 04/21/2021 13:30

Matrix: Groundwater

COC Reference: 135617

Sample Containers

#	Type	Preservative(s)	Refrigerated?	Arrival Temp. (C)	Thermometer #
1	15ml Centrifuge Tube	None	Yes	4.4	IR

Extraction / Prep.

Parameter	Result	Method	Run Date	Analyst	Flags
Initial wt. (g) / Final wt. (g) / Volume (ml)*	11.99/6.97/10	ASTMD7979-19M	04/23/21 11:00	KCV	

Organics

28 PFAs, Method: ASTMD7979-19M, Run Date: 04/23/21 23:05, Analyst: KCV

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
PFBA*	Not detected	18		ng/L	1.99	375-22-4	X
PFPeA*	Not detected	4.0		ng/L	1.99	2706-90-3	
4:2 FTSA*	Not detected	2.0		ng/L	1.99	757124-72-4	
PFHxA*	5.6	2.0		ng/L	1.99	307-24-4	
PFBS*	3.0	2.0		ng/L	1.99	375-73-5	
PFHpA*	2.4	2.0		ng/L	1.99	375-85-9	
PFPeS*	2.5	2.0		ng/L	1.99	2706-91-4	
6:2 FTSA*	Not detected	2.0		ng/L	1.99	27619-97-2	
PFOA*	8.6	2.0		ng/L	1.99	335-67-1	
PFHxS*	26	2.0		ng/L	1.99	355-46-4	
PFHxS-LN*	21	2.0		ng/L	1.99	355-46-4-LN	
PFHxS-BR*	4.3	2.0		ng/L	1.99	355-46-4-BR	
PFNA*	2.6	2.0		ng/L	1.99	375-95-1	
8:2 FTSA*	Not detected	2.0		ng/L	1.99	39108-34-4	
PFHpS*	Not detected	2.0		ng/L	1.99	375-92-8	
PFDA*	Not detected	2.0		ng/L	1.99	335-76-2	
N-MeFOSAA*	Not detected	2.0		ng/L	1.99	2355-31-9	
EtFOSAA*	Not detected	4.0		ng/L	1.99	2991-50-6	
PFOS*	110	2.0		ng/L	1.99	1763-23-1	
PFOS-LN*	69	2.0		ng/L	1.99	1763-23-1-LN	
PFOS-BR*	45	2.0		ng/L	1.99	1763-23-1-BR	
PFUnDA*	Not detected	2.0		ng/L	1.99	2058-94-8	
PFNS*	Not detected	2.0		ng/L	1.99	68259-12-1	
PFDODA*	Not detected	2.0		ng/L	1.99	307-55-1	
PFDS*	Not detected	2.0		ng/L	1.99	335-77-3	
PFTTrDA*	Not detected	2.0		ng/L	1.99	72629-94-8	
FOSA*	Not detected	2.0		ng/L	1.99	754-91-6	
PFTeDA*	Not detected	4.0		ng/L	1.99	376-06-7	
11Cl-PF3OUdS*	Not detected	2.0		ng/L	1.99	763051-92-9	
9Cl-PF3ONS*	Not detected	2.0		ng/L	1.99	756426-58-1	
ADONA*	Not detected	2.0		ng/L	1.99	919005-14-4	
HFPO-DA*	Not detected	2.0		ng/L	1.99	13252-13-6	

X-Elevated reporting limit due to matrix interference



Analytical Laboratory Report

Lab Sample ID: S23413.08

Sample Tag: MH3-6_042121

Collected Date/Time: 04/21/2021 14:00

Matrix: Groundwater

COC Reference: 135617

Sample Containers

#	Type	Preservative(s)	Refrigerated?	Arrival Temp. (C)	Thermometer #
1	15ml Centrifuge Tube	None	Yes	4.4	IR

Extraction / Prep.

Parameter	Result	Method	Run Date	Analyst	Flags
Initial wt. (g) / Final wt. (g) / Volume (ml)*	12.25/6.82/11	ASTMD7979-19M	04/23/21 11:00	KCV	

Organics

28 PFAs, Method: ASTMD7979-19M, Run Date: 04/23/21 23:24, Analyst: KCV

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
PFBA*	Not detected	12		ng/L	2.03	375-22-4	X
PFPeA*	Not detected	4.1		ng/L	2.03	2706-90-3	
4:2 FTSA*	Not detected	2.0		ng/L	2.03	757124-72-4	
PFHxA*	4.9	2.0		ng/L	2.03	307-24-4	
PFBS*	3.8	2.0		ng/L	2.03	375-73-5	
PFHpA*	Not detected	2.0		ng/L	2.03	375-85-9	
PFPeS*	2.2	2.0		ng/L	2.03	2706-91-4	
6:2 FTSA*	Not detected	2.0		ng/L	2.03	27619-97-2	
PFOA*	5.6	2.0		ng/L	2.03	335-67-1	
PFHxS*	25	2.0		ng/L	2.03	355-46-4	
PFHxS-LN*	20	2.0		ng/L	2.03	355-46-4-LN	
PFHxS-BR*	3.4	2.0		ng/L	2.03	355-46-4-BR	
PFNA*	Not detected	2.0		ng/L	2.03	375-95-1	
8:2 FTSA*	Not detected	2.0		ng/L	2.03	39108-34-4	
PFHpS*	Not detected	2.0		ng/L	2.03	375-92-8	
PFDA*	Not detected	2.0		ng/L	2.03	335-76-2	
N-MeFOSAA*	Not detected	2.0		ng/L	2.03	2355-31-9	
EtFOSAA*	Not detected	4.1		ng/L	2.03	2991-50-6	
PFOS*	25	2.0		ng/L	2.03	1763-23-1	
PFOS-LN*	14	2.0		ng/L	2.03	1763-23-1-LN	
PFOS-BR*	11	2.0		ng/L	2.03	1763-23-1-BR	
PFUnDA*	Not detected	2.0		ng/L	2.03	2058-94-8	
PFNS*	Not detected	2.0		ng/L	2.03	68259-12-1	
PFDODA*	Not detected	2.0		ng/L	2.03	307-55-1	
PFDS*	Not detected	2.0		ng/L	2.03	335-77-3	
PFTTrDA*	Not detected	2.0		ng/L	2.03	72629-94-8	
FOSA*	Not detected	2.0		ng/L	2.03	754-91-6	
PFTeDA*	Not detected	4.1		ng/L	2.03	376-06-7	
11Cl-PF3OUdS*	Not detected	2.0		ng/L	2.03	763051-92-9	
9Cl-PF3ONS*	Not detected	2.0		ng/L	2.03	756426-58-1	
ADONA*	Not detected	2.0		ng/L	2.03	919005-14-4	
HFPO-DA*	Not detected	2.0		ng/L	2.03	13252-13-6	

X-Elevated reporting limit due to matrix interference



Analytical Laboratory Report

Lab Sample ID: S23413.09

Sample Tag: MH3-38_042121

Collected Date/Time: 04/21/2021 14:40

Matrix: Groundwater

COC Reference: 135617

Sample Containers

#	Type	Preservative(s)	Refrigerated?	Arrival Temp. (C)	Thermometer #
1	15ml Centrifuge Tube	None	Yes	4.4	IR

Extraction / Prep.

Parameter	Result	Method	Run Date	Analyst	Flags
Initial wt. (g) / Final wt. (g) / Volume (ml)*	12.04/6.91/11	ASTMD7979-19M	04/23/21 11:00	KCV	

Organics

28 PFAs, Method: ASTMD7979-19M, Run Date: 04/23/21 23:44, Analyst: KCV

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
PFBA*	Not detected	11		ng/L	2.14	375-22-4	
PFPeA*	Not detected	4.3		ng/L	2.14	2706-90-3	
4:2 FTSA*	Not detected	2.1		ng/L	2.14	757124-72-4	
PFHxA*	Not detected	2.1		ng/L	2.14	307-24-4	
PFBS*	2.5	2.1		ng/L	2.14	375-73-5	
PFHpA*	Not detected	2.1		ng/L	2.14	375-85-9	
PFPeS*	Not detected	2.1		ng/L	2.14	2706-91-4	
6:2 FTSA*	Not detected	2.1		ng/L	2.14	27619-97-2	
PFOA*	Not detected	2.1		ng/L	2.14	335-67-1	
PFHxS*	5.2	2.1		ng/L	2.14	355-46-4	
PFHxS-LN*	3.9	2.1		ng/L	2.14	355-46-4-LN	
PFHxS-BR*	Not detected	2.1		ng/L	2.14	355-46-4-BR	
PFNA*	Not detected	2.1		ng/L	2.14	375-95-1	
8:2 FTSA*	Not detected	2.1		ng/L	2.14	39108-34-4	
PFHpS*	Not detected	2.1		ng/L	2.14	375-92-8	
PFDA*	Not detected	2.1		ng/L	2.14	335-76-2	
N-MeFOSAA*	Not detected	2.1		ng/L	2.14	2355-31-9	
EtFOSAA*	Not detected	4.3		ng/L	2.14	2991-50-6	
PFOS*	2.7	2.1		ng/L	2.14	1763-23-1	
PFOS-LN*	Not detected	2.1		ng/L	2.14	1763-23-1-LN	
PFOS-BR*	Not detected	2.1		ng/L	2.14	1763-23-1-BR	
PFUnDA*	Not detected	2.1		ng/L	2.14	2058-94-8	
PFNS*	Not detected	2.1		ng/L	2.14	68259-12-1	
PFDODA*	Not detected	2.1		ng/L	2.14	307-55-1	
PFDS*	Not detected	2.1		ng/L	2.14	335-77-3	
PFTTrDA*	Not detected	2.1		ng/L	2.14	72629-94-8	
FOSA*	Not detected	2.1		ng/L	2.14	754-91-6	
PFTeDA*	Not detected	4.3		ng/L	2.14	376-06-7	
11Cl-PF3OUdS*	Not detected	2.1		ng/L	2.14	763051-92-9	
9Cl-PF3ONS*	Not detected	2.1		ng/L	2.14	756426-58-1	
ADONA*	Not detected	2.1		ng/L	2.14	919005-14-4	
HFPO-DA*	Not detected	2.1		ng/L	2.14	13252-13-6	



Analytical Laboratory Report

Lab Sample ID: S23413.10

Sample Tag: MH3-52_042121

Collected Date/Time: 04/21/2021 15:15

Matrix: Groundwater

COC Reference: 135617

Sample Containers

#	Type	Preservative(s)	Refrigerated?	Arrival Temp. (C)	Thermometer #
1	15ml Centrifuge Tube	None	Yes	4.4	IR

Extraction / Prep.

Parameter	Result	Method	Run Date	Analyst	Flags
Initial wt. (g) / Final wt. (g) / Volume (ml)*	12.04/6.94/11	ASTMD7979-19M	04/23/21 11:00	KCV	

Organics

28 PFAs, Method: ASTMD7979-19M, Run Date: 04/24/21 00:03, Analyst: KCV

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
PFBA*	Not detected	11		ng/L	2.16	375-22-4	
PFPeA*	Not detected	4.3		ng/L	2.16	2706-90-3	
4:2 FTSA*	Not detected	2.2		ng/L	2.16	757124-72-4	
PFHxA*	Not detected	2.2		ng/L	2.16	307-24-4	
PFBS*	3.4	2.2		ng/L	2.16	375-73-5	
PFHpA*	Not detected	2.2		ng/L	2.16	375-85-9	
PFPeS*	Not detected	2.2		ng/L	2.16	2706-91-4	
6:2 FTSA*	Not detected	2.2		ng/L	2.16	27619-97-2	
PFOA*	Not detected	2.2		ng/L	2.16	335-67-1	
PFHxS*	Not detected	2.2		ng/L	2.16	355-46-4	
PFHxS-LN*	Not detected	2.2		ng/L	2.16	355-46-4-LN	
PFHxS-BR*	Not detected	2.2		ng/L	2.16	355-46-4-BR	
PFNA*	Not detected	2.2		ng/L	2.16	375-95-1	
8:2 FTSA*	Not detected	2.2		ng/L	2.16	39108-34-4	
PFHpS*	Not detected	2.2		ng/L	2.16	375-92-8	
PFDA*	Not detected	2.2		ng/L	2.16	335-76-2	
N-MeFOSAA*	Not detected	2.2		ng/L	2.16	2355-31-9	
EtFOSAA*	Not detected	4.3		ng/L	2.16	2991-50-6	
PFOS*	2.4	2.2		ng/L	2.16	1763-23-1	
PFOS-LN*	Not detected	2.2		ng/L	2.16	1763-23-1-LN	
PFOS-BR*	Not detected	2.2		ng/L	2.16	1763-23-1-BR	
PFUnDA*	Not detected	2.2		ng/L	2.16	2058-94-8	
PFNS*	Not detected	2.2		ng/L	2.16	68259-12-1	
PFDODA*	Not detected	2.2		ng/L	2.16	307-55-1	
PFDS*	Not detected	2.2		ng/L	2.16	335-77-3	
PFTTrDA*	Not detected	2.2		ng/L	2.16	72629-94-8	
FOSA*	Not detected	2.2		ng/L	2.16	754-91-6	
PFTeDA*	Not detected	4.3		ng/L	2.16	376-06-7	
11Cl-PF3OUdS*	Not detected	2.2		ng/L	2.16	763051-92-9	
9Cl-PF3ONS*	Not detected	2.2		ng/L	2.16	756426-58-1	
ADONA*	Not detected	2.2		ng/L	2.16	919005-14-4	
HFPO-DA*	Not detected	2.2		ng/L	2.16	13252-13-6	

Merit Laboratories Login Checklist

Lab Set ID:S23413

Client:ARCADIS_NOVI (ARCADIS U.S., Inc.)

Project: 30075935.03200 / Arcadis

Submitted:04/21/2021 16:15 Login User: SRS

Attention: Erin Kozak

Address: Arcadis US, Inc.
28550 Cabot Drive
Suite 500
Novi, MI 48377

Phone: O: 810-225-1901 FAX:

Email: erin.kozak@arcadis.com

Selection	Description	Note
Sample Receiving		
01.	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	Samples are received at 4C +/- 2C Thermometer # IR 4.4
02.	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	Received on ice/ cooling process begun
03.	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> N/A	Samples shipped
04.	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> N/A	Samples left in 24 hr. drop box
05.	<input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A	Are there custody seals/tape or is the drop box locked
Chain of Custody		
06.	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	COC adequately filled out
07.	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	COC signed and relinquished to the lab
08.	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	Sample tag on bottles match COC
09.	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> N/A	Subcontracting needed? Subcontracted to:
Preservation		
10.	<input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A	Do sample have correct chemical preservation
11.	<input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A	Completed pH checks on preserved samples? (no VOAs)
12.	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> N/A	Did any samples need to be preserved in the lab?
Bottle Conditions		
13.	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	All bottles intact
14.	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	Appropriate analytical bottles are used
15.	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	Merit bottles used
16.	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	Sufficient sample volume received
17.	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> N/A	Samples require laboratory filtration
18.	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	Samples submitted within holding time
19.	<input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A	Do water VOC or TOX bottles contain headspace

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

Client Review By: _____ Date: _____



2680 East Lansing Dr., East Lansing, MI 48823
 Phone (517) 332-0167 Fax (517) 332-4034
 www.meritlabs.com

C.O.C. PAGE # 1 OF 1

135617

REPORT TO

CHAIN OF CUSTODY RECORD

INVOICE TO

CONTACT NAME: Joey Barker
 COMPANY: Arcadis
 ADDRESS: 28550 Cabot Dr Suite 500
 CITY: Novi STATE: MI ZIP CODE: 48377
 PHONE NO.: 248 790 5218 FAX NO.: _____ P.O. NO.: _____
 E-MAIL ADDRESS: Joey.Barker@arcadis.com QUOTE NO.: _____

CONTACT NAME: _____ NAME: _____
 COMPANY: _____
 ADDRESS: _____
 CITY: _____ STATE: _____ ZIP CODE: _____
 PHONE NO.: _____ E-MAIL ADDRESS: _____

PROJECT NO./NAME: 300.75935.03200/Arcadis SAMPLER(S) - PLEASE PRINT/SIGN NAME: Donald Richard / Danni Richard
 TURNAROUND TIME REQUIRED: 1 DAY 2 DAYS 3 DAYS STANDARD OTHER _____
 DELIVERABLES REQUIRED: STD LEVEL II LEVEL III LEVEL IV EDD OTHER _____

ANALYSIS (ATTACH LIST IF MORE SPACE IS REQUIRED)

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

Containers & Preservatives

- Certifications
 OHIO VAP Drinking Water
 DoD NPDES
 Project Locations
 Detroit New York
 Other _____
 Special Instructions

MERIT LAB NO. <small>FOR LAB USE ONLY</small>	YEAR		SAMPLE TAG IDENTIFICATION-DESCRIPTION	MATRIX	# OF BOTTLES	NONE	HCl	HNO ₃	H ₂ SO ₄	NaOH	MeOH	OTHER	PFAS
	DATE	TIME											
23413.01	4/21/21	0915	Outfall 010_042121	GW	3	X							X
.02	4/21/21	0945	MHE_042121	GW	3	X							X
.03	4/21/21	1100	MHE-1_042121	GW	3	X							X
.04	4/21/21	1130	MHE-1A_042121	GW	3	X							X
.05	4/21/21	1215	MH 10-5_042121	GW	3	X							X
.06	4/21/21	1250	MH 11-6_042121	GW	3	X							X
.07	4/21/21	1330	Outfall 003_042121	GW	3	X							X
.08	4/21/21	1400	MH 3-6_042121	GW	3	X							X
.09	4/21/21	1440	MH 3-38_042121	GW	3	X							X
.10	4/21/21	1515	MH 3-52_042121	GW	3	X							X

RELINQUISHED BY: [Signature] / Arcadis DATE: 4/21/21 TIME: 15:30
 RECEIVED BY: [Signature] DATE: 4/21/21 TIME: 15:30
 RELINQUISHED BY: [Signature] DATE: 4/21/21 TIME: 16:05
 RECEIVED BY: [Signature] DATE: 4/21/21 TIME: 16:05

RELINQUISHED BY: _____ DATE: _____ TIME: _____
 RECEIVED BY: _____ DATE: _____ TIME: _____
 SEAL NO. SEAL INTACT YES NO INITIALS _____
 SEAL NO. SEAL INTACT YES NO INITIALS _____
 NOTES: TEMP. ON ARRIVAL 4.4

PLEASE NOTE: SIGNING ACKNOWLEDGES ADHERENCE TO MERIT'S SAMPLE ACCEPTANCE POLICY ON REVERSE SIDE



Analytical Laboratory Report

Report ID: S22480.01(01)
Generated on 03/30/2021

Report to

Attention: Erin Kozak
Arcadis US, Inc.
28550 Cabot Drive
Suite 500
Novi, MI 48377

Phone: O: 810-225-1901 FAX:
Email: erin.kozak@arcadis.com

Additional Contacts: Megan Humphrey, Micki Maki, Joey Barker

Report produced by

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

Phone: (517) 332-0167 FAX: (517) 332-6333

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

Report Summary

Lab Sample ID(s): S22480.01-S22480.06
Project: 30075935.03200 / Buick City
Collected Date(s): 03/23/2021
Submitted Date/Time: 03/23/2021 15:10
Sampled by: Donald Richmond
P.O. #: 30075935.03200

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Maya Murshak
Technical Director



Analytical Laboratory Report

General Report Notes

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

Methods may be modified for improved performance.

Results reported on a dry weight basis where applicable.

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

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

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

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

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

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

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

PFAS requirement: Section 9.3.8 of U.S. EPA Method 537.1 states "If the method analyte(s) found in the Field Sample is present in the

FRB at a concentration greater than 1/3 the MRL, then all samples collected with that FRB are invalid and must be recollected and reanalyzed."

Samples submitted without an accompanying FRB may not be acceptable for compliance purposes.

Report Narrative

There is no additional narrative for this analytical report



Analytical Laboratory Report

Laboratory Certifications

Authority	Certification ID
Michigan DEQ	#9956
DOD ELAP/ISO 17025	#69699
WBENC	#2005110032
Ohio VAP	#CL0002
Indiana DOH	#C-MI-07
New York NELAC	#11814
North Carolina DENR	#680
North Carolina DOH	#26702
Alaska CSLAP	#17-001
Pennsylvania DEP	#68-05884

Qualifier Descriptions

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

Glossary of Abbreviations

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



Analytical Laboratory Report

Method Summary

Method	Version
ASTMD7979-19M	ASTM Method D7979 - 19 Modified (Isotopic Dilution)

Parameter Summary

Parameter	Synonym	Cas #
PFBA	Perfluorobutanoic Acid	375-22-4
PFPeA	Perfluoropentanoic Acid	2706-90-3
4:2 FTSA	4:2 Fluorotelomer Sulfonic Acid	757124-72-4
PFHxA	Perfluorohexanoic Acid	307-24-4
PFBS	Perfluorobutane sulfonic Acid	375-73-5
PFHpA	Perfluoroheptanoic Acid	375-85-9
PFPeS	Perfluoropentane Sulfonic Acid	2706-91-4
6:2 FTSA	6:2 Fluorotelomer Sulfonic Acid	27619-97-2
PFOA	Perfluorooctanoic Acid	335-67-1
PFHxS	Perfluorohexane Sulfonic Acid	355-46-4
PFHxS-LN	Perfluorohexane Sulfonic Acid - LN	355-46-4-LN
PFHxS-BR	Perfluorohexane Sulfonic Acid - BR	355-46-4-BR
PFNA	Perfluorononanoic Acid	375-95-1
8:2 FTSA	8:2 Fluorotelomer Sulfonic Acid	39108-34-4
PFHpS	Perfluoroheptane Sulfonic Acid	375-92-8
PFDA	Perfluorodecanoic Acid	335-76-2
N-MeFOSAA	N-methyl perfluorooctanesulfonamidoacetic acid	2355-31-9
EtFOSAA	N-Ethyl Perfluorooctane Sulfonamidoacetic Acid	2991-50-6
PFOS	Perfluorooctane Sulfonic Acid	1763-23-1
PFOS-LN	Perfluorooctane Sulfonic Acid - LN	1763-23-1-LN
PFOS-BR	Perfluorooctane Sulfonic Acid - BR	1763-23-1-BR
PFUnDA	Perfluoroundecanoic Acid	2058-94-8
PFNS	Perfluorononane Sulfonic Acid	68259-12-1
PFDoDA	Perfluorododecanoic Acid	307-55-1
PFDS	Perfluorodecane Sulfonic Acid	335-77-3
PFTTrDA	Perfluorotridecanoic Acid	72629-94-8
FOSA	Perfluorooctane Sulfonamide	754-91-6
PFTeDA	Perfluorotetradecanoic Acid	376-06-7
11Cl-PF3OUdS	11-chloroeicosafuoro-3-oxaundecane-1-sulfonic acid	763051-92-9
9Cl-PF3ONS	9-chlorohexadecafluoro-3-oxanone1-sulfonic acid	756426-58-1
ADONA	4,8-dioxa-3H-perfluorononanoic acid	919005-14-4
HFPO-DA	Hexafluoropropylene oxide dimer	13252-13-6



Analytical Laboratory Report

Sample Summary (6 samples)

Sample ID	Sample Tag	Matrix	Collected Date/Time
S22480.01	MHE_032321	Groundwater	03/23/21 10:00
S22480.02	Outfall 010_032321	Groundwater	03/23/21 09:30
S22480.03	MHE-1_032321	Groundwater	03/23/21 10:30
S22480.04	MHH-1A_032321	Groundwater	03/23/21 11:15
S22480.05	MH11-6_032321	Groundwater	03/23/21 12:00
S22480.06	MH10-5_032321	Groundwater	03/23/21 12:55



Analytical Laboratory Report

Lab Sample ID: S22480.01

Sample Tag: MHE_032321

Collected Date/Time: 03/23/2021 10:00

Matrix: Groundwater

COC Reference: 142081

Sample Containers

#	Type	Preservative(s)	Refrigerated?	Arrival Temp. (C)	Thermometer #
1	15ml Centrifuge Tube	None	Yes	2.6	IR

Extraction / Prep.

Parameter	Result	Method	Run Date	Analyst	Flags
Initial wt. (g) / Final wt. (g) / Volume (ml)*	12.11/7.06/10	ASTMD7979-19M	03/25/21 12:00	KCV	

Organics

28 PFAs, Method: ASTMD7979-19M, Run Date: 03/25/21 21:51, Analyst: KCV

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
PFBA*	Not detected	20		ng/L	1.98	375-22-4	
PFPeA*	24	9.9		ng/L	1.98	2706-90-3	
4:2 FTSA*	Not detected	9.9		ng/L	1.98	757124-72-4	
PFHxA*	100	9.9		ng/L	1.98	307-24-4	
PFBS*	41	9.9		ng/L	1.98	375-73-5	
PFHpA*	18	9.9		ng/L	1.98	375-85-9	
PFPeS*	63	9.9		ng/L	1.98	2706-91-4	
6:2 FTSA*	Not detected	9.9		ng/L	1.98	27619-97-2	
PFOA*	62	9.9		ng/L	1.98	335-67-1	
PFHxS*	690	9.9		ng/L	1.98	355-46-4	
PFHxS-LN*	580	9.9		ng/L	1.98	355-46-4-LN	
PFHxS-BR*	110	9.9		ng/L	1.98	355-46-4-BR	
PFNA*	Not detected	9.9		ng/L	1.98	375-95-1	
8:2 FTSA*	Not detected	9.9		ng/L	1.98	39108-34-4	
PFHpS*	39	9.9		ng/L	1.98	375-92-8	
PFDA*	Not detected	9.9		ng/L	1.98	335-76-2	
N-MeFOSAA*	Not detected	9.9		ng/L	1.98	2355-31-9	
EtFOSAA*	Not detected	9.9		ng/L	1.98	2991-50-6	
PFOS*	2,100	9.9		ng/L	1.98	1763-23-1	
PFOS-LN*	1,100	9.9		ng/L	1.98	1763-23-1-LN	
PFOS-BR*	960	9.9		ng/L	1.98	1763-23-1-BR	
PFUnDA*	Not detected	9.9		ng/L	1.98	2058-94-8	
PFNS*	Not detected	9.9		ng/L	1.98	68259-12-1	
PFDODA*	Not detected	9.9		ng/L	1.98	307-55-1	
PFDS*	Not detected	9.9		ng/L	1.98	335-77-3	
PFTTrDA*	Not detected	9.9		ng/L	1.98	72629-94-8	
FOSA*	Not detected	9.9		ng/L	1.98	754-91-6	
PFTeDA*	Not detected	9.9		ng/L	1.98	376-06-7	
11Cl-PF3OUdS*	Not detected	9.9		ng/L	1.98	763051-92-9	
9Cl-PF3ONS*	Not detected	9.9		ng/L	1.98	756426-58-1	
ADONA*	Not detected	9.9		ng/L	1.98	919005-14-4	
HFPO-DA*	Not detected	9.9		ng/L	1.98	13252-13-6	



Analytical Laboratory Report

Lab Sample ID: S22480.02

Sample Tag: Outfall 010_032321

Collected Date/Time: 03/23/2021 09:30

Matrix: Groundwater

COC Reference: 142081

Sample Containers

#	Type	Preservative(s)	Refrigerated?	Arrival Temp. (C)	Thermometer #
1	15ml Centrifuge Tube	None	Yes	2.6	IR

Extraction / Prep.

Parameter	Result	Method	Run Date	Analyst	Flags
Initial wt. (g) / Final wt. (g) / Volume (ml)*	12.85/7.08/12	ASTMD7979-19M	03/25/21 12:00	KCV	

Organics

28 PFAs, Method: ASTMD7979-19M, Run Date: 03/25/21 22:10, Analyst: KCV

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
PFBA*	30	21		ng/L	2.08	375-22-4	
PFPeA*	51	10		ng/L	2.08	2706-90-3	
4:2 FTSA*	Not detected	10		ng/L	2.08	757124-72-4	
PFHxA*	220	10		ng/L	2.08	307-24-4	
PFBS*	80	10		ng/L	2.08	375-73-5	
PFHpA*	43	10		ng/L	2.08	375-85-9	
PFPeS*	120	10		ng/L	2.08	2706-91-4	
6:2 FTSA*	Not detected	10		ng/L	2.08	27619-97-2	
PFOA*	150	10		ng/L	2.08	335-67-1	
PFHxS*	1,600	10		ng/L	2.08	355-46-4	
PFHxS-LN*	1,400	10		ng/L	2.08	355-46-4-LN	
PFHxS-BR*	240	10		ng/L	2.08	355-46-4-BR	
PFNA*	12	10		ng/L	2.08	375-95-1	
8:2 FTSA*	Not detected	10		ng/L	2.08	39108-34-4	
PFHpS*	110	10		ng/L	2.08	375-92-8	
PFDA*	Not detected	10		ng/L	2.08	335-76-2	
N-MeFOSAA*	Not detected	10		ng/L	2.08	2355-31-9	
EtFOSAA*	Not detected	10		ng/L	2.08	2991-50-6	
PFOS*	7,600	10		ng/L	2.08	1763-23-1	
PFOS-LN*	3,800	10		ng/L	2.08	1763-23-1-LN	
PFOS-BR*	3,900	10		ng/L	2.08	1763-23-1-BR	
PFUnDA*	Not detected	10		ng/L	2.08	2058-94-8	
PFNS*	Not detected	10		ng/L	2.08	68259-12-1	
PFDODA*	Not detected	10		ng/L	2.08	307-55-1	
PFDS*	Not detected	10		ng/L	2.08	335-77-3	
PFTTrDA*	Not detected	10		ng/L	2.08	72629-94-8	
FOSA*	Not detected	10		ng/L	2.08	754-91-6	
PFTeDA*	Not detected	10		ng/L	2.08	376-06-7	
11Cl-PF3OUdS*	Not detected	10		ng/L	2.08	763051-92-9	
9Cl-PF3ONS*	Not detected	10		ng/L	2.08	756426-58-1	
ADONA*	Not detected	10		ng/L	2.08	919005-14-4	
HFPO-DA*	Not detected	10		ng/L	2.08	13252-13-6	



Analytical Laboratory Report

Lab Sample ID: S22480.03

Sample Tag: MHE-1_032321

Collected Date/Time: 03/23/2021 10:30

Matrix: Groundwater

COC Reference: 142081

Sample Containers

#	Type	Preservative(s)	Refrigerated?	Arrival Temp. (C)	Thermometer #
1	15ml Centrifuge Tube	None	Yes	2.6	IR

Extraction / Prep.

Parameter	Result	Method	Run Date	Analyst	Flags
Initial wt. (g) / Final wt. (g) / Volume (ml)*	12.17/7.07/11	ASTMD7979-19M	03/25/21 12:00	KCV	

Organics

28 PFAs, Method: ASTMD7979-19M, Run Date: 03/25/21 22:30, Analyst: KCV

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
PFBA*	Not detected	22		ng/L	2.16	375-22-4	
PFPeA*	26	11		ng/L	2.16	2706-90-3	
4:2 FTSA*	Not detected	11		ng/L	2.16	757124-72-4	
PFHxA*	110	11		ng/L	2.16	307-24-4	
PFBS*	48	11		ng/L	2.16	375-73-5	
PFHpA*	23	11		ng/L	2.16	375-85-9	
PFPeS*	68	11		ng/L	2.16	2706-91-4	
6:2 FTSA*	Not detected	11		ng/L	2.16	27619-97-2	
PFOA*	65	11		ng/L	2.16	335-67-1	
PFHxS*	790	11		ng/L	2.16	355-46-4	
PFHxS-LN*	670	11		ng/L	2.16	355-46-4-LN	
PFHxS-BR*	120	11		ng/L	2.16	355-46-4-BR	
PFNA*	Not detected	11		ng/L	2.16	375-95-1	
8:2 FTSA*	Not detected	11		ng/L	2.16	39108-34-4	
PFHpS*	40	11		ng/L	2.16	375-92-8	
PFDA*	Not detected	11		ng/L	2.16	335-76-2	
N-MeFOSAA*	Not detected	11		ng/L	2.16	2355-31-9	
EtFOSAA*	Not detected	11		ng/L	2.16	2991-50-6	
PFOS*	2,000	11		ng/L	2.16	1763-23-1	
PFOS-LN*	1,100	11		ng/L	2.16	1763-23-1-LN	
PFOS-BR*	910	11		ng/L	2.16	1763-23-1-BR	
PFUnDA*	Not detected	11		ng/L	2.16	2058-94-8	
PFNS*	Not detected	11		ng/L	2.16	68259-12-1	
PFDODA*	Not detected	11		ng/L	2.16	307-55-1	
PFDS*	Not detected	11		ng/L	2.16	335-77-3	
PFTTrDA*	Not detected	11		ng/L	2.16	72629-94-8	
FOSA*	Not detected	11		ng/L	2.16	754-91-6	
PFTeDA*	Not detected	11		ng/L	2.16	376-06-7	
11Cl-PF3OUdS*	Not detected	11		ng/L	2.16	763051-92-9	
9Cl-PF3ONS*	Not detected	11		ng/L	2.16	756426-58-1	
ADONA*	Not detected	11		ng/L	2.16	919005-14-4	
HFPO-DA*	Not detected	11		ng/L	2.16	13252-13-6	



Analytical Laboratory Report

Lab Sample ID: S22480.04

Sample Tag: MHH-1A_032321

Collected Date/Time: 03/23/2021 11:15

Matrix: Groundwater

COC Reference: 142081

Sample Containers

#	Type	Preservative(s)	Refrigerated?	Arrival Temp. (C)	Thermometer #
1	15ml Centrifuge Tube	None	Yes	2.6	IR

Extraction / Prep.

Parameter	Result	Method	Run Date	Analyst	Flags
Initial wt. (g) / Final wt. (g) / Volume (ml)*	12.50/7.10/11	ASTMD7979-19M	03/25/21 12:00	KCV	

Organics

28 PFAs, Method: ASTMD7979-19M, Run Date: 03/26/21 14:46, Analyst: KCV

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
PFBA*	170	100		ng/L	10.2	375-22-4	Y
PFPeA*	340	51		ng/L	10.2	2706-90-3	Y
4:2 FTSA*	Not detected	51		ng/L	10.2	757124-72-4	Y
PFHxA*	1,900	51		ng/L	10.2	307-24-4	Y
PFBS*	620	51		ng/L	10.2	375-73-5	Y
PFHpA*	350	51		ng/L	10.2	375-85-9	Y
PFPeS*	1,200	51		ng/L	10.2	2706-91-4	Y
6:2 FTSA*	Not detected	51		ng/L	10.2	27619-97-2	Y
PFOA*	1,100	51		ng/L	10.2	335-67-1	Y
PFHxS*	15,000	51		ng/L	10.2	355-46-4	Y
PFHxS-LN*	13,000	51		ng/L	10.2	355-46-4-LN	Y
PFHxS-BR*	2,200	51		ng/L	10.2	355-46-4-BR	Y
PFNA*	Not detected	51		ng/L	10.2	375-95-1	Y
8:2 FTSA*	Not detected	51		ng/L	10.2	39108-34-4	Y
PFHpS*	810	51		ng/L	10.2	375-92-8	Y
PFDA*	Not detected	51		ng/L	10.2	335-76-2	Y
N-MeFOSAA*	Not detected	51		ng/L	10.2	2355-31-9	Y
EtFOSAA*	Not detected	51		ng/L	10.2	2991-50-6	Y
PFOS*	39,000	51		ng/L	10.2	1763-23-1	Y
PFOS-LN*	21,000	51		ng/L	10.2	1763-23-1-LN	Y
PFOS-BR*	18,000	51		ng/L	10.2	1763-23-1-BR	Y
PFUnDA*	Not detected	51		ng/L	10.2	2058-94-8	Y
PFNS*	Not detected	51		ng/L	10.2	68259-12-1	Y
PFDODA*	Not detected	51		ng/L	10.2	307-55-1	Y
PFDS*	Not detected	51		ng/L	10.2	335-77-3	Y
PFTTrDA*	Not detected	51		ng/L	10.2	72629-94-8	Y
FOSA*	Not detected	51		ng/L	10.2	754-91-6	Y
PFTeDA*	Not detected	51		ng/L	10.2	376-06-7	Y
11Cl-PF3OUdS*	Not detected	51		ng/L	10.2	763051-92-9	Y
9Cl-PF3ONS*	Not detected	51		ng/L	10.2	756426-58-1	Y
ADONA*	Not detected	51		ng/L	10.2	919005-14-4	Y
HFPO-DA*	Not detected	51		ng/L	10.2	13252-13-6	Y

Y-Elevated reporting limit due to high target concentration



Analytical Laboratory Report

Lab Sample ID: S22480.05

Sample Tag: MH11-6_032321

Collected Date/Time: 03/23/2021 12:00

Matrix: Groundwater

COC Reference: 142081

Sample Containers

#	Type	Preservative(s)	Refrigerated?	Arrival Temp. (C)	Thermometer #
1	15ml Centrifuge Tube	None	Yes	2.6	IR

Extraction / Prep.

Parameter	Result	Method	Run Date	Analyst	Flags
Initial wt. (g) / Final wt. (g) / Volume (ml)*	12.47/7.09/11	ASTMD7979-19M	03/25/21 12:00	KCV	

Organics

28 PFAs, Method: ASTMD7979-19M, Run Date: 03/25/21 23:09, Analyst: KCV

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
PFBA*	Not detected	20		ng/L	2.04	375-22-4	
PFPeA*	22	10		ng/L	2.04	2706-90-3	
4:2 FTSA*	Not detected	10		ng/L	2.04	757124-72-4	
PFHxA*	25	10		ng/L	2.04	307-24-4	
PFBS*	Not detected	10		ng/L	2.04	375-73-5	
PFHpA*	13	10		ng/L	2.04	375-85-9	
PFPeS*	Not detected	10		ng/L	2.04	2706-91-4	
6:2 FTSA*	Not detected	10		ng/L	2.04	27619-97-2	
PFOA*	18	10		ng/L	2.04	335-67-1	
PFHxS*	52	10		ng/L	2.04	355-46-4	
PFHxS-LN*	43	10		ng/L	2.04	355-46-4-LN	
PFHxS-BR*	Not detected	10		ng/L	2.04	355-46-4-BR	
PFNA*	Not detected	10		ng/L	2.04	375-95-1	
8:2 FTSA*	Not detected	10		ng/L	2.04	39108-34-4	
PFHpS*	Not detected	10		ng/L	2.04	375-92-8	
PFDA*	Not detected	10		ng/L	2.04	335-76-2	
N-MeFOSAA*	Not detected	10		ng/L	2.04	2355-31-9	
EtFOSAA*	Not detected	10		ng/L	2.04	2991-50-6	
PFOS*	65	10		ng/L	2.04	1763-23-1	
PFOS-LN*	38	10		ng/L	2.04	1763-23-1-LN	
PFOS-BR*	26	10		ng/L	2.04	1763-23-1-BR	
PFUnDA*	Not detected	10		ng/L	2.04	2058-94-8	
PFNS*	Not detected	10		ng/L	2.04	68259-12-1	
PFDODA*	Not detected	10		ng/L	2.04	307-55-1	
PFDS*	Not detected	10		ng/L	2.04	335-77-3	
PFTTrDA*	Not detected	10		ng/L	2.04	72629-94-8	
FOSA*	Not detected	10		ng/L	2.04	754-91-6	
PFTeDA*	Not detected	10		ng/L	2.04	376-06-7	
11Cl-PF3OUdS*	Not detected	10		ng/L	2.04	763051-92-9	
9Cl-PF3ONS*	Not detected	10		ng/L	2.04	756426-58-1	
ADONA*	Not detected	10		ng/L	2.04	919005-14-4	
HFPO-DA*	Not detected	10		ng/L	2.04	13252-13-6	



Analytical Laboratory Report

Lab Sample ID: S22480.06

Sample Tag: MH10-5_032321

Collected Date/Time: 03/23/2021 12:55

Matrix: Groundwater

COC Reference: 142081

Sample Containers

#	Type	Preservative(s)	Refrigerated?	Arrival Temp. (C)	Thermometer #
1	15ml Centrifuge Tube	None	Yes	2.6	IR

Extraction / Prep.

Parameter	Result	Method	Run Date	Analyst	Flags
Initial wt. (g) / Final wt. (g) / Volume (ml)*	12.11/7.06/10	ASTMD7979-19M	03/25/21 12:00	KCV	

Organics

28 PFAs, Method: ASTMD7979-19M, Run Date: 03/25/21 23:28, Analyst: KCV

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
PFBA*	37	20		ng/L	1.98	375-22-4	
PFPeA*	81	9.9		ng/L	1.98	2706-90-3	
4:2 FTSA*	Not detected	9.9		ng/L	1.98	757124-72-4	
PFHxA*	330	9.9		ng/L	1.98	307-24-4	
PFBS*	85	9.9		ng/L	1.98	375-73-5	
PFHpA*	86	9.9		ng/L	1.98	375-85-9	
PFPeS*	190	9.9		ng/L	1.98	2706-91-4	
6:2 FTSA*	Not detected	9.9		ng/L	1.98	27619-97-2	
PFOA*	340	9.9		ng/L	1.98	335-67-1	
PFHxS*	3,600	9.9		ng/L	1.98	355-46-4	
PFHxS-LN*	3,100	9.9		ng/L	1.98	355-46-4-LN	
PFHxS-BR*	500	9.9		ng/L	1.98	355-46-4-BR	
PFNA*	Not detected	9.9		ng/L	1.98	375-95-1	
8:2 FTSA*	Not detected	9.9		ng/L	1.98	39108-34-4	
PFHpS*	200	9.9		ng/L	1.98	375-92-8	
PFDA*	Not detected	9.9		ng/L	1.98	335-76-2	
N-MeFOSAA*	Not detected	9.9		ng/L	1.98	2355-31-9	
EtFOSAA*	Not detected	9.9		ng/L	1.98	2991-50-6	
PFOS*	6,000	9.9		ng/L	1.98	1763-23-1	
PFOS-LN*	2,800	9.9		ng/L	1.98	1763-23-1-LN	
PFOS-BR*	3,200	9.9		ng/L	1.98	1763-23-1-BR	
PFUnDA*	Not detected	9.9		ng/L	1.98	2058-94-8	
PFNS*	Not detected	9.9		ng/L	1.98	68259-12-1	
PFDODA*	Not detected	9.9		ng/L	1.98	307-55-1	
PFDS*	Not detected	9.9		ng/L	1.98	335-77-3	
PFTTrDA*	Not detected	9.9		ng/L	1.98	72629-94-8	
FOSA*	Not detected	9.9		ng/L	1.98	754-91-6	
PFTeDA*	Not detected	9.9		ng/L	1.98	376-06-7	
11Cl-PF3OUdS*	Not detected	9.9		ng/L	1.98	763051-92-9	
9Cl-PF3ONS*	Not detected	9.9		ng/L	1.98	756426-58-1	
ADONA*	Not detected	9.9		ng/L	1.98	919005-14-4	
HFPO-DA*	Not detected	9.9		ng/L	1.98	13252-13-6	

Merit Laboratories Login Checklist

Lab Set ID:S22480

Client:ARCADIS_NOVI (ARCADIS U.S., Inc.)

Project: 30075935.03200 / Buick City

Submitted:03/23/2021 15:10 Login User: SRS

Attention: Erin Kozak

Address: Arcadis US, Inc.
28550 Cabot Drive
Suite 500
Novi, MI 48377

Phone: O: 810-225-1901 FAX:

Email: erin.kozak@arcadis.com

Selection	Description	Note
-----------	-------------	------

Sample Receiving

- | | | | |
|-----|--|--|--------|
| 01. | <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A | Samples are received at 4C +/- 2C Thermometer # | IR 2.6 |
| 02. | <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A | Received on ice/ cooling process begun | |
| 03. | <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> N/A | Samples shipped | |
| 04. | <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> N/A | Samples left in 24 hr. drop box | |
| 05. | <input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A | Are there custody seals/tape or is the drop box locked | |

Chain of Custody

- | | | | |
|-----|--|--|--|
| 06. | <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A | COC adequately filled out | |
| 07. | <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A | COC signed and relinquished to the lab | |
| 08. | <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A | Sample tag on bottles match COC | |
| 09. | <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> N/A | Subcontracting needed? Subcontracted to: | |

Preservation

- | | | | |
|-----|--|---|--|
| 10. | <input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A | Do sample have correct chemical preservation | |
| 11. | <input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A | Completed pH checks on preserved samples? (no VOAs) | |
| 12. | <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> N/A | Did any samples need to be preserved in the lab? | |

Bottle Conditions

- | | | | |
|-----|--|---|--|
| 13. | <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A | All bottles intact | |
| 14. | <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A | Appropriate analytical bottles are used | |
| 15. | <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A | Merit bottles used | |
| 16. | <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A | Sufficient sample volume received | |
| 17. | <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> N/A | Samples require laboratory filtration | |
| 18. | <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A | Samples submitted within holding time | |
| 19. | <input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A | Do water VOC or TOX bottles contain headspace | |

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

Client Review By: _____ Date: _____



2680 East Lansing Dr., East Lansing, MI 48823
 Phone (517) 332-0167 Fax (517) 332-4034
 www.meritlabs.com

C.O.C. PAGE # 1 OF 1 142081

REPORT TO

CHAIN OF CUSTODY RECORD

INVOICE TO

CONTACT NAME: Joey Barker
 COMPANY: Arccadis
 ADDRESS: 28550 Cabot Dr Suite 500
 CITY: Novi STATE: MI ZIP CODE: 48377
 PHONE NO.: 248 790 5218 FAX NO.: _____ P.O. NO.: _____
 E-MAIL ADDRESS: Joey.Barker@arccadis.com QUOTE NO.: _____

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

PROJECT NO./NAME: 30075935.03200/Buick city SAMPLER(S) - PLEASE PRINT/SIGN NAME: Donald Richmond / D. Richmond
 TURNAROUND TIME REQUIRED: 1 DAY 2 DAYS 3 DAYS STANDARD OTHER _____
 DELIVERABLES REQUIRED: STD LEVEL II LEVEL III LEVEL IV EDD OTHER _____

ANALYSIS (ATTACH LIST IF MORE SPACE IS REQUIRED)

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

Containers & Preservatives: _____
 Certifications: OHIO VAP Drinking Water DoD NPDES
 Project Locations: Detroit New York Other _____
 Special Instructions: _____

MERIT LAB NO. <small>FOR LAB USE ONLY</small>	YEAR		SAMPLE TAG IDENTIFICATION-DESCRIPTION	MATRIX	# OF BOTTLES	NONE	HCl	HNO ₃	H ₂ SO ₄	NaOH	MeOH	OTHER	PFAS
	DATE	TIME											
22480.01	3/23/21	1000	MHE_032321	GW	3	X							X
.02	3/23/21	0930	OF10_032321	GW	3	X							X
.03	3/23/21	1030	MHE-1_032321	GW	3	X							X
.04	3/23/21	1115	MH11-1A_032321	GW	3	X							X
.05	3/23/21	1200	MH11-C_032321	GW	3	X							X
.06	3/23/21	1255	MH10-5_032321	GW	3	X							X

RELINQUISHED BY: D. Richmond / Arccadis Sampler DATE: 3/23/21 TIME: 1335
 RECEIVED BY: J.A. Miller DATE: 3/23/21 TIME: 1335
 RELINQUISHED BY: J.A. Miller DATE: 3/23/21 TIME: 115:0
 RECEIVED BY: Sam Smith DATE: 3/23/21 TIME: 1510

RELINQUISHED BY: _____ DATE: _____ TIME: _____
 RECEIVED BY: _____ DATE: _____ TIME: _____
 SEAL NO. SEAL INTACT YES NO INITIALS _____
 SEAL NO. SEAL INTACT YES NO INITIALS _____
 NOTES: TEMP. ON ARRIVAL: 2.6

PLEASE NOTE: SIGNING ACKNOWLEDGES ADHERENCE TO MERIT'S SAMPLE ACCEPTANCE POLICY ON REVERSE SIDE

Memo



SUBJECT
RACER Buick City Sanitary PFAS Update

TO
Grant Trigger, RACER Trust

DATE
September 21, 2021

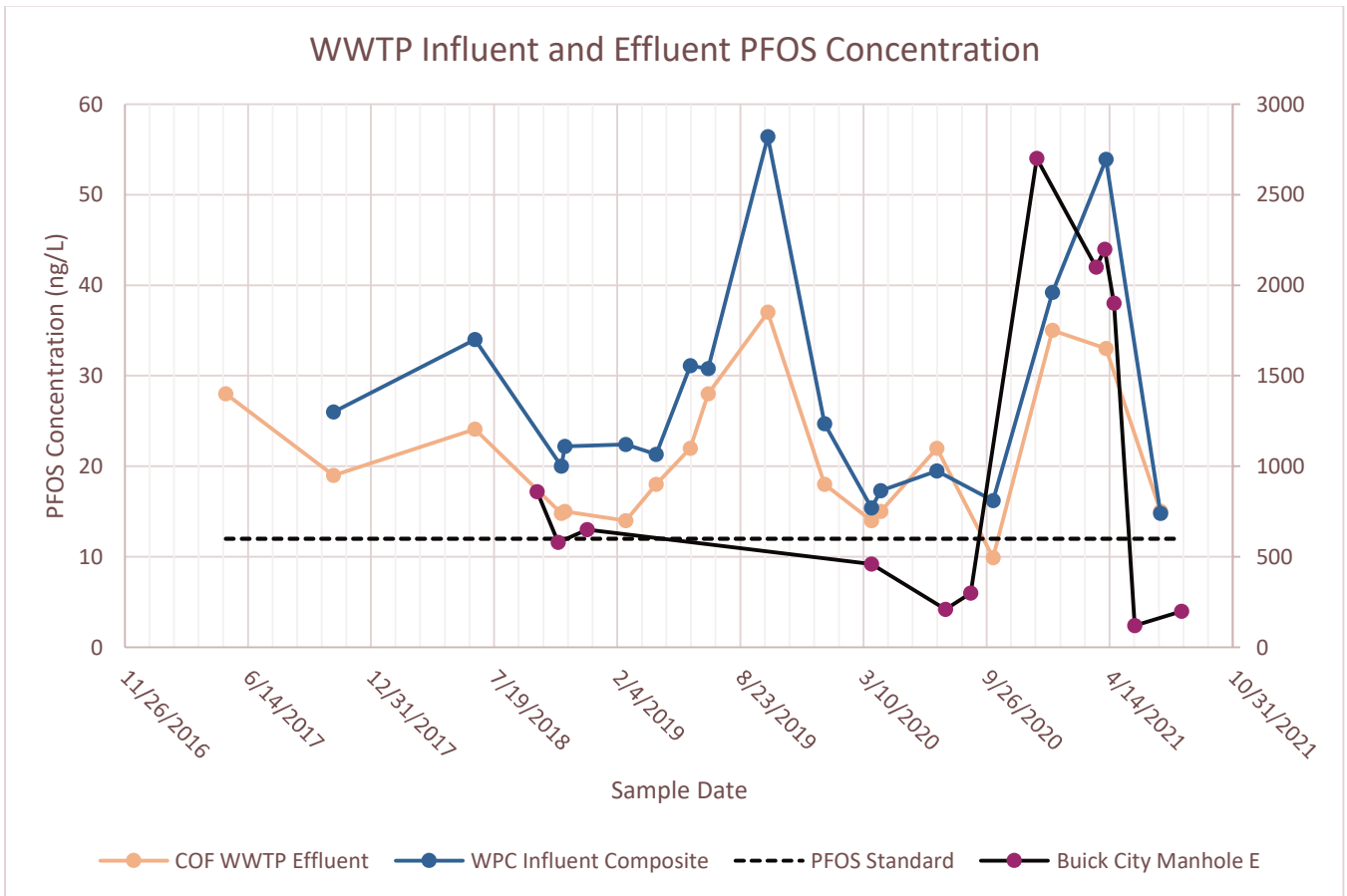
PROJECT NUMBER
30075935

COPIES TO
Chris Peters, Arcadis
Micki Maki, Arcadis

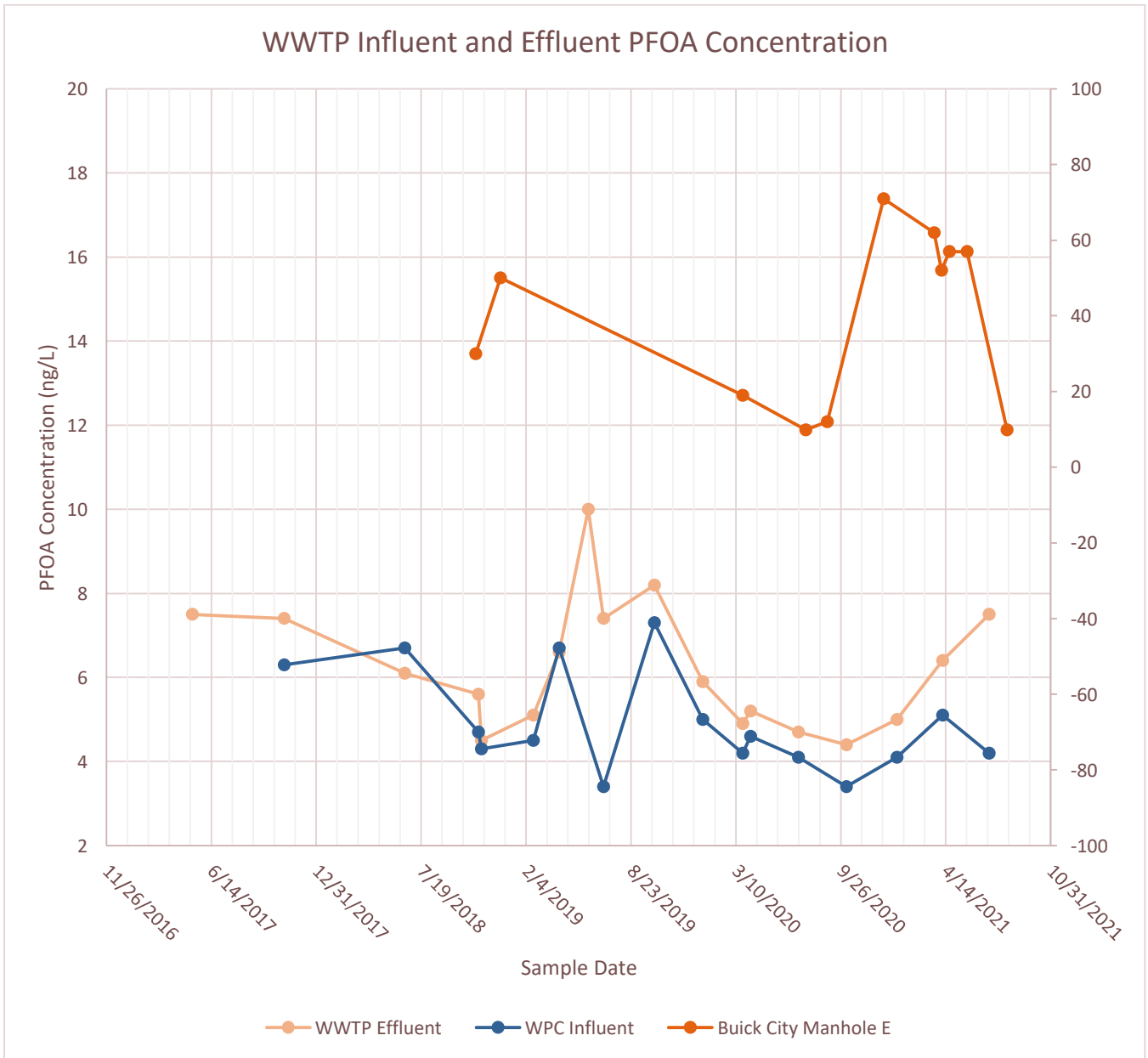
NAME
Tony Maffeo

This memo summarizes the recent activities related to the Hamilton Avenue sanitary sewer at the RACER Buick City Site (Site) located in Flint, Michigan. In an attempt to assess the benefits of blocking portions of the abandoned sanitary sewers in the vicinity of Hamilton Avenue and the amount of PFOS entering the City of Flint sanitary sewer system a series of samples were collected to over the past 3 months. One sample was collected from the sanitary sewer (Manhole MH E) on August 9th of 2021 are shown on **Figure 1** and included in **Table 1**.

Trend curves (displayed below) were also prepared to evaluate the relationship between the PFOS and PFOA levels in the Hamilton Avenue sanitary sewer and levels of PFOS and PFOA received at the City of Flint WWTP. Based on limited data the results are inconclusive through the end of 2019. However, the peak PFOS concentration at Manhole E-1 in December 2020 coincides with the highest levels of PFOS detected at the WWTP in January 2021. On the other hand, a substantial increase in PFOA at Manhole E-1 in January 2021 did not appear to materially impact the levels of PFOA at the City of Flint WWTP. With respect to PFOS although other sources of PFOS cannot be discounted a reduction in PFOS levels in the Hamilton Avenue sanitary sewer is expected to improve the City WWTP performance.



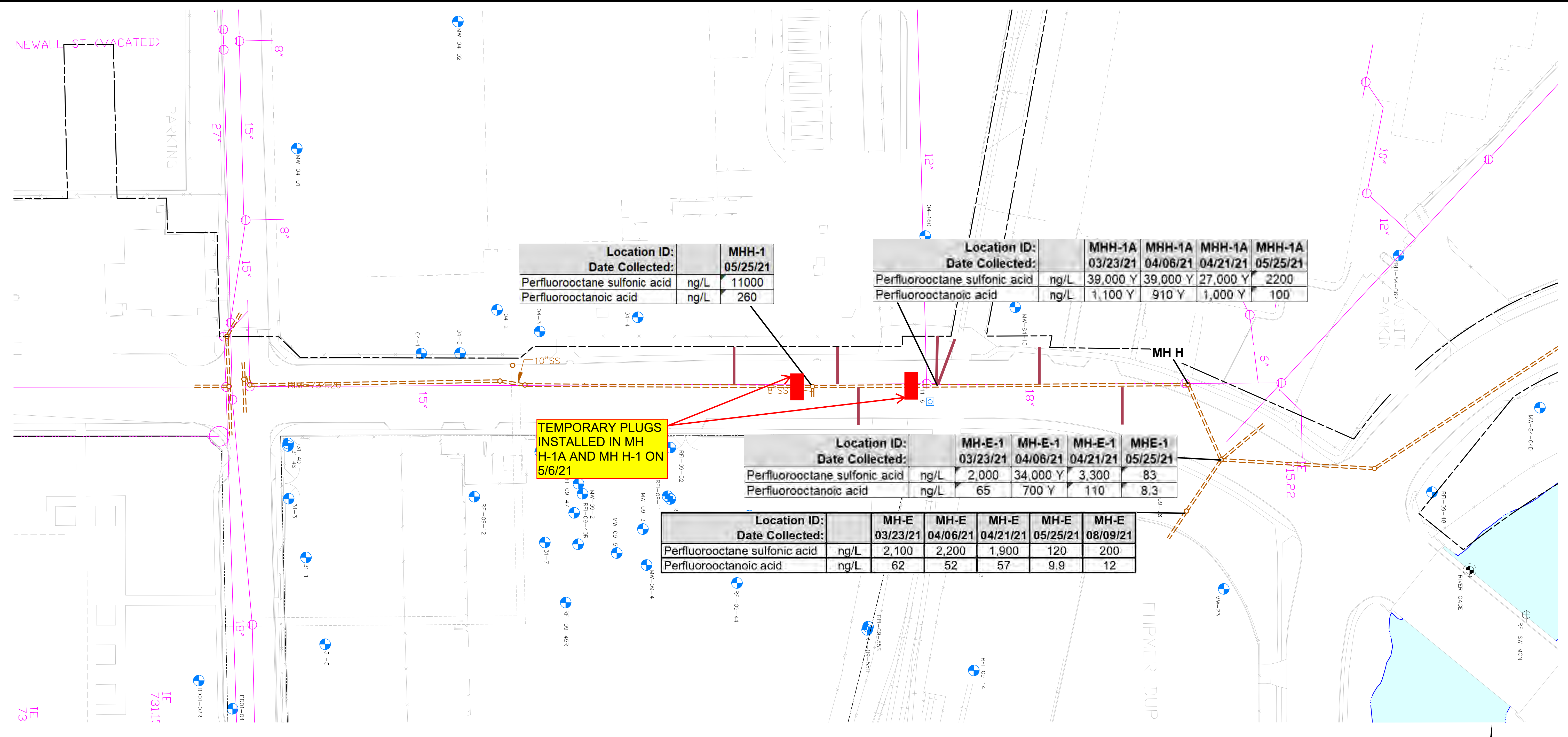
Note: Data from Buick City Manhole E is scaled on the right Y-axis



Note: Data from Buick City Manhole E is scaled on the right Y-axis

Figures

CITY: SYRACUSE DIV/GROUP: ENV DB: A SANCHEZ ID: ALSIGMS PIC: C.S. PETERS PM: C. KIKER TM: C. KIKER LVR: ON=OFF=REF-
 C:\Users\alsanchez\OneDrive - ARCADIS\BIM 380 Docs\RACER TRUST\BUICK CITY RCRA\2019\10-DWG\RTBC-F-HAMILTON SANITARY SEWER.dwg LAYOUT: 3 SAVED: 17/2019 5:39 PM ACADVER: 21.05 (LMS TECH) PAGES: 17 PLOTSTYLETABLE: PLOTSTYLETABLE PAGESETUP: PAGES: 17 PLOTTED: 17/2019 6:09 PM BY: SANCHEZ, ADRIAN



Location ID:	MHH-1
Date Collected:	05/25/21
Perfluorooctane sulfonic acid	ng/L 11000
Perfluorooctanoic acid	ng/L 260

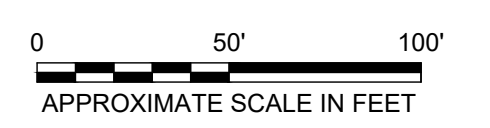
Location ID:	MHH-1A	MHH-1A	MHH-1A	MHH-1A
Date Collected:	03/23/21	04/06/21	04/21/21	05/25/21
Perfluorooctane sulfonic acid	ng/L 39,000 Y	39,000 Y	27,000 Y	2200
Perfluorooctanoic acid	ng/L 1,100 Y	910 Y	1,000 Y	100

Location ID:	MH-E-1	MH-E-1	MH-E-1	MH-E-1
Date Collected:	03/23/21	04/06/21	04/21/21	05/25/21
Perfluorooctane sulfonic acid	ng/L 2,000	34,000 Y	3,300	83
Perfluorooctanoic acid	ng/L 65	700 Y	110	8.3

Location ID:	MH-E	MH-E	MH-E	MH-E	MH-E
Date Collected:	03/23/21	04/06/21	04/21/21	05/25/21	08/09/21
Perfluorooctane sulfonic acid	ng/L 2,100	2,200	1,900	120	200
Perfluorooctanoic acid	ng/L 62	52	57	9.9	12

TEMPORARY PLUGS
 INSTALLED IN MH
 H-1A AND MH H-1 ON
 5/6/21

- LEGEND:**
- MONITORING WELL (ACTIVE)
 - PIEZOMETER
 - RECOVERY WELL
 - SURVEYED SANITARY SEWER LINE
 - HISTORIC SANITARY SEWER LINE



RACER TRUST
 BUICK CITY
 FLINT, MICHIGAN

**HAMILTON AVENUE SANITARY SEWER
 DATA FROM 3/23/21 THROUGH 8/9/21**

Analytical Reports



Analytical Laboratory Report

Report ID: S27041.01(01)
Generated on 08/30/2021

Report to

Attention: Erin Kozak
Arcadis US, Inc.
28550 Cabot Drive
Suite 500
Novi, MI 48377

Phone: O: 810-225-1901 FAX:
Email: erin.kozak@arcadis.com

Additional Contacts: Megan Humphrey, Micki Maki, Joey Barker, Stacey Hannula

Report produced by

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

Phone: (517) 332-0167 FAX: (517) 332-6333

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

Report Summary

Lab Sample ID(s): S27041.01-S27041.08
Project: RACER Buick City
Collected Date(s): 08/09/2021
Submitted Date/Time: 08/09/2021 16:10
Sampled by: Donald Richmond
P.O. #: 30075935.03100

Table of Contents

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

Maya Murshak
Technical Director



Analytical Laboratory Report

General Report Notes

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

Methods may be modified for improved performance.

Results reported on a dry weight basis where applicable.

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

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

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

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

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

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

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

PFAS requirement: Section 9.3.8 of U.S. EPA Method 537.1 states "If the method analyte(s) found in the Field Sample is present in the

FRB at a concentration greater than 1/3 the MRL, then all samples collected with that FRB are invalid and must be recollected and reanalyzed."

Samples submitted without an accompanying FRB may not be acceptable for compliance purposes.

Report Narrative

There is no additional narrative for this analytical report



Analytical Laboratory Report

Laboratory Certifications

Authority	Certification ID
Michigan DEQ	#9956
DOD ELAP/ISO 17025	#69699
WBENC	#2005110032
Ohio VAP	#CL0002
Indiana DOH	#C-MI-07
New York NELAC	#11814
North Carolina DENR	#680
North Carolina DOH	#26702
Alaska CSLAP	#17-001
Pennsylvania DEP	#68-05884

Qualifier Descriptions

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

Glossary of Abbreviations

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



Analytical Laboratory Report

Method Summary

Method	Version
ASTMD7979-19M	ASTM Method D7979 - 19 Modified (Isotopic Dilution)

Parameter Summary

Parameter	Synonym	Cas #
PFBA	Perfluorobutanoic Acid	375-22-4
PFPeA	Perfluoropentanoic Acid	2706-90-3
4:2 FTSA	4:2 Fluorotelomer Sulfonic Acid	757124-72-4
PFHxA	Perfluorohexanoic Acid	307-24-4
PFBS	Perfluorobutane sulfonic Acid	375-73-5
PFHpA	Perfluoroheptanoic Acid	375-85-9
PFPeS	Perfluoropentane Sulfonic Acid	2706-91-4
6:2 FTSA	6:2 Fluorotelomer Sulfonic Acid	27619-97-2
PFOA	Perfluorooctanoic Acid	335-67-1
PFHxS	Perfluorohexane Sulfonic Acid	355-46-4
PFHxS-LN	Perfluorohexane Sulfonic Acid - LN	355-46-4-LN
PFHxS-BR	Perfluorohexane Sulfonic Acid - BR	355-46-4-BR
PFNA	Perfluorononanoic Acid	375-95-1
8:2 FTSA	8:2 Fluorotelomer Sulfonic Acid	39108-34-4
PFHpS	Perfluoroheptane Sulfonic Acid	375-92-8
PFDA	Perfluorodecanoic Acid	335-76-2
N-MeFOSAA	N-methyl perfluorooctanesulfonamidoacetic acid	2355-31-9
EtFOSAA	N-Ethyl Perfluorooctane Sulfonamidoacetic Acid	2991-50-6
PFOS	Perfluorooctane Sulfonic Acid	1763-23-1
PFOS-LN	Perfluorooctane Sulfonic Acid - LN	1763-23-1-LN
PFOS-BR	Perfluorooctane Sulfonic Acid - BR	1763-23-1-BR
PFUnDA	Perfluoroundecanoic Acid	2058-94-8
PFNS	Perfluorononane Sulfonic Acid	68259-12-1
PFDoDA	Perfluorododecanoic Acid	307-55-1
PFDS	Perfluorodecane Sulfonic Acid	335-77-3
PFTTrDA	Perfluorotridecanoic Acid	72629-94-8
FOSA	Perfluorooctane Sulfonamide	754-91-6
PFTeDA	Perfluorotetradecanoic Acid	376-06-7
11Cl-PF3OUdS	11-chloroeicosafuoro-3-oxaundecane-1-sulfonic acid	763051-92-9
9Cl-PF3ONS	9-chlorohexadecafluoro-3-oxanone1-sulfonic acid	756426-58-1
ADONA	4,8-dioxa-3H-perfluorononanoic acid	919005-14-4
HFPO-DA	Hexafluoropropylene oxide dimer	13252-13-6



Analytical Laboratory Report

Sample Summary (8 samples)

Sample ID	Sample Tag	Matrix	Collected Date/Time
S27041.01	MH11-6_080921	Groundwater	08/09/21 10:25
S27041.02	MH11-6A-2NL_080921	Groundwater	08/09/21 10:45
S27041.03	MH11-6A-2NWL_080921	Groundwater	08/09/21 10:50
S27041.04	MH11-6A-3NWL_080921	Groundwater	08/09/21 11:00
S27041.05	MH11-6A-4_080921	Groundwater	08/09/21 11:15
S27041.06	Outfall 010_080921	Groundwater	08/09/21 12:50
S27041.07	MHE_080921	Groundwater	08/09/21 13:15
S27041.08	MH10-2_080921	Groundwater	08/09/21 14:00



Analytical Laboratory Report

Lab Sample ID: S27041.01

Sample Tag: MH11-6_080921

Collected Date/Time: 08/09/2021 10:25

Matrix: Groundwater

COC Reference: 132724

Sample Containers

#	Type	Preservative(s)	Refrigerated?	Arrival Temp. (C)	Thermometer #
1	15ml Centrifuge Tube	None	No	29.2	IR

Extraction / Prep.

Parameter	Result	Method	Run Date	Analyst	Flags
Initial wt. (g) / Final wt. (g) / Volume (ml)*	12.36/6.99/11	ASTMD7979-19M	08/26/21 15:15	KCV	

Organics

28 PFAs, Method: ASTMD7979-19M, Run Date: 08/27/21 20:27, Analyst: KCV

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
PFBA*	85	21		ng/L	4.1	375-22-4	Y
PFPeA*	160	8.2		ng/L	4.1	2706-90-3	Y
4:2 FTSA*	Not detected	4.1		ng/L	4.1	757124-72-4	Y
PFHxA*	1,000	4.1		ng/L	4.1	307-24-4	Y
PFBS*	340	4.1		ng/L	4.1	375-73-5	Y
PFHpA*	160	4.1		ng/L	4.1	375-85-9	Y
PFPeS*	500	4.1		ng/L	4.1	2706-91-4	Y
6:2 FTSA*	Not detected	8.2		ng/L	4.1	27619-97-2	Y
PFOA*	520	4.1		ng/L	4.1	335-67-1	Y
PFHxS*	7,400	4.1		ng/L	4.1	355-46-4	Y
PFHxS-LN*	6,200	4.1		ng/L	4.1	355-46-4-LN	Y
PFHxS-BR*	1,200	4.1		ng/L	4.1	355-46-4-BR	Y
PFNA*	16	4.1		ng/L	4.1	375-95-1	Y
8:2 FTSA*	Not detected	8.2		ng/L	4.1	39108-34-4	Y
PFHpS*	390	4.1		ng/L	4.1	375-92-8	Y
PFDA*	11	4.1		ng/L	4.1	335-76-2	Y
N-MeFOSAA*	Not detected	4.1		ng/L	4.1	2355-31-9	Y
EtFOSAA*	Not detected	8.2		ng/L	4.1	2991-50-6	Y
PFOS*	21,000	4.1		ng/L	4.1	1763-23-1	Y
PFOS-LN*	11,000	4.1		ng/L	4.1	1763-23-1-LN	Y
PFOS-BR*	9,300	4.1		ng/L	4.1	1763-23-1-BR	Y
PFUnDA*	Not detected	4.1		ng/L	4.1	2058-94-8	Y
PFNS*	Not detected	4.1		ng/L	4.1	68259-12-1	Y
PFDODA*	Not detected	4.1		ng/L	4.1	307-55-1	Y
PFDS*	Not detected	4.1		ng/L	4.1	335-77-3	Y
PFTTrDA*	Not detected	4.1		ng/L	4.1	72629-94-8	Y
FOSA*	Not detected	4.1		ng/L	4.1	754-91-6	Y
PFTeDA*	Not detected	8.2		ng/L	4.1	376-06-7	Y
11Cl-PF3OUdS*	Not detected	4.1		ng/L	4.1	763051-92-9	Y
9Cl-PF3ONS*	Not detected	4.1		ng/L	4.1	756426-58-1	Y
ADONA*	Not detected	4.1		ng/L	4.1	919005-14-4	Y
HFPO-DA*	Not detected	21		ng/L	4.1	13252-13-6	Y

Y-Elevated reporting limit due to high target concentration



Analytical Laboratory Report

Lab Sample ID: S27041.02

Sample Tag: MH11-6A-2NL_080921

Collected Date/Time: 08/09/2021 10:45

Matrix: Groundwater

COC Reference: 132724

Sample Containers

#	Type	Preservative(s)	Refrigerated?	Arrival Temp. (C)	Thermometer #
1	15ml Centrifuge Tube	None	No	29.2	IR

Extraction / Prep.

Parameter	Result	Method	Run Date	Analyst	Flags
Initial wt. (g) / Final wt. (g) / Volume (ml)*	12.64/7.07/11	ASTMD7979-19M	08/26/21 15:15	KCV	

Organics

28 PFAs, Method: ASTMD7979-19M, Run Date: 08/27/21 08:31, Analyst: KCV

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
PFBA*	73	9.9		ng/L	1.97	375-22-4	
PFPeA*	150	3.9		ng/L	1.97	2706-90-3	
4:2 FTSA*	Not detected	2.0		ng/L	1.97	757124-72-4	
PFHxA*	810	2.0		ng/L	1.97	307-24-4	
PFBS*	250	2.0		ng/L	1.97	375-73-5	
PFHpA*	160	2.0		ng/L	1.97	375-85-9	
PFPeS*	420	2.0		ng/L	1.97	2706-91-4	
6:2 FTSA*	Not detected	3.9		ng/L	1.97	27619-97-2	
PFOA*	440	2.0		ng/L	1.97	335-67-1	
PFHxS*	6,700	2.0		ng/L	1.97	355-46-4	
PFHxS-LN*	5,600	2.0		ng/L	1.97	355-46-4-LN	
PFHxS-BR*	1,200	2.0		ng/L	1.97	355-46-4-BR	
PFNA*	13	2.0		ng/L	1.97	375-95-1	
8:2 FTSA*	Not detected	3.9		ng/L	1.97	39108-34-4	
PFHpS*	340	2.0		ng/L	1.97	375-92-8	
PFDA*	3.8	2.0		ng/L	1.97	335-76-2	
N-MeFOSAA*	Not detected	2.0		ng/L	1.97	2355-31-9	
EtFOSAA*	Not detected	3.9		ng/L	1.97	2991-50-6	
PFOS*	16,000	2.0		ng/L	1.97	1763-23-1	
PFOS-LN*	7,700	2.0		ng/L	1.97	1763-23-1-LN	
PFOS-BR*	7,600	2.0		ng/L	1.97	1763-23-1-BR	
PFUnDA*	Not detected	2.0		ng/L	1.97	2058-94-8	
PFNS*	Not detected	2.0		ng/L	1.97	68259-12-1	
PFDODA*	Not detected	2.0		ng/L	1.97	307-55-1	
PFDS*	Not detected	2.0		ng/L	1.97	335-77-3	
PFTTrDA*	Not detected	2.0		ng/L	1.97	72629-94-8	
FOSA*	Not detected	2.0		ng/L	1.97	754-91-6	
PFTeDA*	Not detected	3.9		ng/L	1.97	376-06-7	
11Cl-PF3OUdS*	Not detected	2.0		ng/L	1.97	763051-92-9	
9Cl-PF3ONS*	Not detected	2.0		ng/L	1.97	756426-58-1	
ADONA*	Not detected	2.0		ng/L	1.97	919005-14-4	
HFPO-DA*	Not detected	9.9		ng/L	1.97	13252-13-6	



Analytical Laboratory Report

Lab Sample ID: S27041.03

Sample Tag: MH11-6A-2NWL_080921

Collected Date/Time: 08/09/2021 10:50

Matrix: Groundwater

COC Reference: 132724

Sample Containers

#	Type	Preservative(s)	Refrigerated?	Arrival Temp. (C)	Thermometer #
1	15ml Centrifuge Tube	None	No	29.2	IR

Extraction / Prep.

Parameter	Result	Method	Run Date	Analyst	Flags
Initial wt. (g) / Final wt. (g) / Volume (ml)*	12.35/7.03/11	ASTMD7979-19M	08/26/21 15:15	KCV	

Organics

28 PFAs, Method: ASTMD7979-19M, Run Date: 08/27/21 20:46, Analyst: KCV

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
PFBA*	120	52		ng/L	10.3	375-22-4	Y
PFPeA*	240	21		ng/L	10.3	2706-90-3	Y
4:2 FTSA*	Not detected	10		ng/L	10.3	757124-72-4	Y
PFHxA*	1,600	10		ng/L	10.3	307-24-4	Y
PFBS*	490	10		ng/L	10.3	375-73-5	Y
PFHpA*	240	10		ng/L	10.3	375-85-9	Y
PFPeS*	700	10		ng/L	10.3	2706-91-4	Y
6:2 FTSA*	Not detected	21		ng/L	10.3	27619-97-2	Y
PFOA*	800	10		ng/L	10.3	335-67-1	Y
PFHxS*	11,000	10		ng/L	10.3	355-46-4	Y
PFHxS-LN*	9,000	10		ng/L	10.3	355-46-4-LN	Y
PFHxS-BR*	1,700	10		ng/L	10.3	355-46-4-BR	Y
PFNA*	33	10		ng/L	10.3	375-95-1	Y
8:2 FTSA*	Not detected	21		ng/L	10.3	39108-34-4	Y
PFHpS*	610	10		ng/L	10.3	375-92-8	Y
PFDA*	23	10		ng/L	10.3	335-76-2	Y
N-MeFOSAA*	Not detected	10		ng/L	10.3	2355-31-9	Y
EtFOSAA*	Not detected	21		ng/L	10.3	2991-50-6	Y
PFOS*	45,000	10		ng/L	10.3	1763-23-1	Y
PFOS-LN*	26,000	10		ng/L	10.3	1763-23-1-LN	Y
PFOS-BR*	18,000	10		ng/L	10.3	1763-23-1-BR	Y
PFUnDA*	Not detected	10		ng/L	10.3	2058-94-8	Y
PFNS*	Not detected	10		ng/L	10.3	68259-12-1	Y
PFDODA*	Not detected	10		ng/L	10.3	307-55-1	Y
PFDS*	Not detected	10		ng/L	10.3	335-77-3	Y
PFTTrDA*	Not detected	10		ng/L	10.3	72629-94-8	Y
FOSA*	Not detected	10		ng/L	10.3	754-91-6	Y
PFTeDA*	Not detected	21		ng/L	10.3	376-06-7	Y
11Cl-PF3OUdS*	Not detected	10		ng/L	10.3	763051-92-9	Y
9Cl-PF3ONS*	Not detected	10		ng/L	10.3	756426-58-1	Y
ADONA*	Not detected	10		ng/L	10.3	919005-14-4	Y
HFPO-DA*	Not detected	52		ng/L	10.3	13252-13-6	Y

Y-Elevated reporting limit due to high target concentration



Analytical Laboratory Report

Lab Sample ID: S27041.04

Sample Tag: MH11-6A-3NWL_080921

Collected Date/Time: 08/09/2021 11:00

Matrix: Groundwater

COC Reference: 132724

Sample Containers

#	Type	Preservative(s)	Refrigerated?	Arrival Temp. (C)	Thermometer #
1	15ml Centrifuge Tube	None	No	29.2	IR

Extraction / Prep.

Parameter	Result	Method	Run Date	Analyst	Flags
Initial wt. (g) / Final wt. (g) / Volume (ml)*	12.48/7.04/11	ASTMD7979-19M	08/26/21 15:15	KCV	

Organics

28 PFAs, Method: ASTMD7979-19M, Run Date: 08/27/21 21:06, Analyst: KCV

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
PFBA*	140	51		ng/L	10.1	375-22-4	Y
PFPeA*	280	20		ng/L	10.1	2706-90-3	Y
4:2 FTSA*	Not detected	10		ng/L	10.1	757124-72-4	Y
PFHxA*	1,800	10		ng/L	10.1	307-24-4	Y
PFBS*	500	10		ng/L	10.1	375-73-5	Y
PFHpA*	290	10		ng/L	10.1	375-85-9	Y
PFPeS*	830	10		ng/L	10.1	2706-91-4	Y
6:2 FTSA*	Not detected	20		ng/L	10.1	27619-97-2	Y
PFOA*	860	10		ng/L	10.1	335-67-1	Y
PFHxS*	13,000	10		ng/L	10.1	355-46-4	Y
PFHxS-LN*	11,000	10		ng/L	10.1	355-46-4-LN	Y
PFHxS-BR*	2,100	10		ng/L	10.1	355-46-4-BR	Y
PFNA*	38	10		ng/L	10.1	375-95-1	Y
8:2 FTSA*	Not detected	20		ng/L	10.1	39108-34-4	Y
PFHpS*	710	10		ng/L	10.1	375-92-8	Y
PFDA*	27	10		ng/L	10.1	335-76-2	Y
N-MeFOSAA*	Not detected	10		ng/L	10.1	2355-31-9	Y
EtFOSAA*	Not detected	20		ng/L	10.1	2991-50-6	Y
PFOS*	50,000	10		ng/L	10.1	1763-23-1	Y
PFOS-LN*	27,000	10		ng/L	10.1	1763-23-1-LN	Y
PFOS-BR*	22,000	10		ng/L	10.1	1763-23-1-BR	Y
PFUnDA*	Not detected	10		ng/L	10.1	2058-94-8	Y
PFNS*	Not detected	10		ng/L	10.1	68259-12-1	Y
PFDODA*	Not detected	10		ng/L	10.1	307-55-1	Y
PFDS*	Not detected	10		ng/L	10.1	335-77-3	Y
PFTTrDA*	Not detected	10		ng/L	10.1	72629-94-8	Y
FOSA*	Not detected	10		ng/L	10.1	754-91-6	Y
PFTeDA*	Not detected	20		ng/L	10.1	376-06-7	Y
11Cl-PF3OUdS*	Not detected	10		ng/L	10.1	763051-92-9	Y
9Cl-PF3ONS*	Not detected	10		ng/L	10.1	756426-58-1	Y
ADONA*	Not detected	10		ng/L	10.1	919005-14-4	Y
HFPO-DA*	Not detected	51		ng/L	10.1	13252-13-6	Y

Y-Elevated reporting limit due to high target concentration



Analytical Laboratory Report

Lab Sample ID: S27041.05

Sample Tag: MH11-6A-4_080921

Collected Date/Time: 08/09/2021 11:15

Matrix: Groundwater

COC Reference: 132724

Sample Containers

#	Type	Preservative(s)	Refrigerated?	Arrival Temp. (C)	Thermometer #
1	15ml Centrifuge Tube	None	No	29.2	IR

Extraction / Prep.

Parameter	Result	Method	Run Date	Analyst	Flags
Initial wt. (g) / Final wt. (g) / Volume (ml)*	12.61/7.00/11	ASTMD7979-19M	08/26/21 15:15	KCV	

Organics

28 PFAs, Method: ASTMD7979-19M, Run Date: 08/27/21 09:29, Analyst: KCV

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
PFBA*	Not detected	9.8		ng/L	1.96	375-22-4	
PFPeA*	5.4	3.9		ng/L	1.96	2706-90-3	
4:2 FTSA*	Not detected	2.0		ng/L	1.96	757124-72-4	
PFHxA*	4.6	2.0		ng/L	1.96	307-24-4	
PFBS*	11	2.0		ng/L	1.96	375-73-5	
PFHpA*	Not detected	2.0		ng/L	1.96	375-85-9	
PFPeS*	Not detected	2.0		ng/L	1.96	2706-91-4	
6:2 FTSA*	Not detected	3.9		ng/L	1.96	27619-97-2	
PFOA*	5.6	2.0		ng/L	1.96	335-67-1	
PFHxS*	6.7	2.0		ng/L	1.96	355-46-4	
PFHxS-LN*	5.2	2.0		ng/L	1.96	355-46-4-LN	
PFHxS-BR*	Not detected	2.0		ng/L	1.96	355-46-4-BR	
PFNA*	Not detected	2.0		ng/L	1.96	375-95-1	
8:2 FTSA*	Not detected	3.9		ng/L	1.96	39108-34-4	
PFHpS*	Not detected	2.0		ng/L	1.96	375-92-8	
PFDA*	Not detected	2.0		ng/L	1.96	335-76-2	
N-MeFOSAA*	Not detected	2.0		ng/L	1.96	2355-31-9	
EtFOSAA*	Not detected	3.9		ng/L	1.96	2991-50-6	
PFOS*	8.3	2.0		ng/L	1.96	1763-23-1	
PFOS-LN*	4.3	2.0		ng/L	1.96	1763-23-1-LN	
PFOS-BR*	4.1	2.0		ng/L	1.96	1763-23-1-BR	
PFUnDA*	Not detected	2.0		ng/L	1.96	2058-94-8	
PFNS*	Not detected	2.0		ng/L	1.96	68259-12-1	
PFDODA*	Not detected	2.0		ng/L	1.96	307-55-1	
PFDS*	Not detected	2.0		ng/L	1.96	335-77-3	
PFTTrDA*	Not detected	2.0		ng/L	1.96	72629-94-8	
FOSA*	Not detected	2.0		ng/L	1.96	754-91-6	
PFTeDA*	Not detected	3.9		ng/L	1.96	376-06-7	
11Cl-PF3OUdS*	Not detected	2.0		ng/L	1.96	763051-92-9	
9Cl-PF3ONS*	Not detected	2.0		ng/L	1.96	756426-58-1	
ADONA*	Not detected	2.0		ng/L	1.96	919005-14-4	
HFPO-DA*	Not detected	9.8		ng/L	1.96	13252-13-6	



Analytical Laboratory Report

Lab Sample ID: S27041.06

Sample Tag: Outfall 010_080921

Collected Date/Time: 08/09/2021 12:50

Matrix: Groundwater

COC Reference: 132724

Sample Containers

#	Type	Preservative(s)	Refrigerated?	Arrival Temp. (C)	Thermometer #
1	15ml Centrifuge Tube	None	No	29.2	IR

Extraction / Prep.

Parameter	Result	Method	Run Date	Analyst	Flags
Initial wt. (g) / Final wt. (g) / Volume (ml)*	12.54/7.06/11	ASTMD7979-19M	08/26/21 15:15	KCV	

Organics

28 PFAs, Method: ASTMD7979-19M, Run Date: 08/27/21 09:49, Analyst: KCV

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
PFBA*	29	10		ng/L	2.01	375-22-4	
PFPeA*	40	4.0		ng/L	2.01	2706-90-3	
4:2 FTSA*	Not detected	2.0		ng/L	2.01	757124-72-4	
PFHxA*	150	2.0		ng/L	2.01	307-24-4	
PFBS*	66	2.0		ng/L	2.01	375-73-5	
PFHpA*	33	2.0		ng/L	2.01	375-85-9	
PFPeS*	73	2.0		ng/L	2.01	2706-91-4	
6:2 FTSA*	Not detected	4.0		ng/L	2.01	27619-97-2	
PFOA*	78	2.0		ng/L	2.01	335-67-1	
PFHxS*	800	2.0		ng/L	2.01	355-46-4	
PFHxS-LN*	670	2.0		ng/L	2.01	355-46-4-LN	
PFHxS-BR*	130	2.0		ng/L	2.01	355-46-4-BR	
PFNA*	9.0	2.0		ng/L	2.01	375-95-1	
8:2 FTSA*	Not detected	4.0		ng/L	2.01	39108-34-4	
PFHpS*	42	2.0		ng/L	2.01	375-92-8	
PFDA*	3.4	2.0		ng/L	2.01	335-76-2	
N-MeFOSAA*	Not detected	2.0		ng/L	2.01	2355-31-9	
EtFOSAA*	Not detected	4.0		ng/L	2.01	2991-50-6	
PFOS*	2,600	2.0		ng/L	2.01	1763-23-1	
PFOS-LN*	1,300	2.0		ng/L	2.01	1763-23-1-LN	
PFOS-BR*	1,100	2.0		ng/L	2.01	1763-23-1-BR	
PFUnDA*	Not detected	2.0		ng/L	2.01	2058-94-8	
PFNS*	Not detected	2.0		ng/L	2.01	68259-12-1	
PFDODA*	Not detected	2.0		ng/L	2.01	307-55-1	
PFDS*	Not detected	2.0		ng/L	2.01	335-77-3	
PFTTrDA*	Not detected	2.0		ng/L	2.01	72629-94-8	
FOSA*	Not detected	2.0		ng/L	2.01	754-91-6	
PFTeDA*	Not detected	4.0		ng/L	2.01	376-06-7	
11Cl-PF3OUdS*	Not detected	2.0		ng/L	2.01	763051-92-9	
9Cl-PF3ONS*	Not detected	2.0		ng/L	2.01	756426-58-1	
ADONA*	Not detected	2.0		ng/L	2.01	919005-14-4	
HFPO-DA*	Not detected	10		ng/L	2.01	13252-13-6	



Analytical Laboratory Report

Lab Sample ID: S27041.07

Sample Tag: MHE_080921

Collected Date/Time: 08/09/2021 13:15

Matrix: Groundwater

COC Reference: 132724

Sample Containers

#	Type	Preservative(s)	Refrigerated?	Arrival Temp. (C)	Thermometer #
1	15ml Centrifuge Tube	None	No	29.2	IR

Extraction / Prep.

Parameter	Result	Method	Run Date	Analyst	Flags
Initial wt. (g) / Final wt. (g) / Volume (ml)*	12.25/7.01/11	ASTMD7979-19M	08/26/21 15:15	KCV	

Organics

28 PFAs, Method: ASTMD7979-19M, Run Date: 08/27/21 10:08, Analyst: KCV

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
PFBA*	Not detected	13		ng/L	2.1	375-22-4	X
PFPeA*	10	4.2		ng/L	2.1	2706-90-3	
4:2 FTSA*	Not detected	2.1		ng/L	2.1	757124-72-4	
PFHxA*	17	2.1		ng/L	2.1	307-24-4	
PFBS*	27	2.1		ng/L	2.1	375-73-5	
PFHpA*	5.6	2.1		ng/L	2.1	375-85-9	
PFPeS*	20	2.1		ng/L	2.1	2706-91-4	
6:2 FTSA*	Not detected	4.2		ng/L	2.1	27619-97-2	
PFOA*	12	2.1		ng/L	2.1	335-67-1	
PFHxS*	100	2.1		ng/L	2.1	355-46-4	
PFHxS-LN*	83	2.1		ng/L	2.1	355-46-4-LN	
PFHxS-BR*	18	2.1		ng/L	2.1	355-46-4-BR	
PFNA*	4.4	2.1		ng/L	2.1	375-95-1	
8:2 FTSA*	Not detected	4.2		ng/L	2.1	39108-34-4	
PFHpS*	3.5	2.1		ng/L	2.1	375-92-8	
PFDA*	Not detected	2.1		ng/L	2.1	335-76-2	
N-MeFOSAA*	Not detected	2.1		ng/L	2.1	2355-31-9	
EtFOSAA*	Not detected	4.2		ng/L	2.1	2991-50-6	
PFOS*	200	2.1		ng/L	2.1	1763-23-1	
PFOS-LN*	110	2.1		ng/L	2.1	1763-23-1-LN	
PFOS-BR*	74	2.1		ng/L	2.1	1763-23-1-BR	
PFUnDA*	Not detected	2.1		ng/L	2.1	2058-94-8	
PFNS*	Not detected	2.1		ng/L	2.1	68259-12-1	
PFDODA*	Not detected	2.1		ng/L	2.1	307-55-1	
PFDS*	Not detected	2.1		ng/L	2.1	335-77-3	
PFTTrDA*	Not detected	2.1		ng/L	2.1	72629-94-8	
FOSA*	Not detected	2.1		ng/L	2.1	754-91-6	
PFTeDA*	Not detected	4.2		ng/L	2.1	376-06-7	
11Cl-PF3OUdS*	Not detected	2.1		ng/L	2.1	763051-92-9	
9Cl-PF3ONS*	Not detected	2.1		ng/L	2.1	756426-58-1	
ADONA*	Not detected	2.1		ng/L	2.1	919005-14-4	
HFPO-DA*	Not detected	11		ng/L	2.1	13252-13-6	

X-Elevated reporting limit due to matrix interference



Analytical Laboratory Report

Lab Sample ID: S27041.08

Sample Tag: MH10-2_080921

Collected Date/Time: 08/09/2021 14:00

Matrix: Groundwater

COC Reference: 132724

Sample Containers

#	Type	Preservative(s)	Refrigerated?	Arrival Temp. (C)	Thermometer #
1	15ml Centrifuge Tube	None	No	29.2	IR

Extraction / Prep.

Parameter	Result	Method	Run Date	Analyst	Flags
Initial wt. (g) / Final wt. (g) / Volume (ml)*	12.30/7.01/11	ASTMD7979-19M	08/26/21 15:15	KCV	

Organics

28 PFAs, Method: ASTMD7979-19M, Run Date: 08/27/21 10:28, Analyst: KCV

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
PFBA*	27	10		ng/L	2.08	375-22-4	
PFPeA*	35	4.2		ng/L	2.08	2706-90-3	
4:2 FTSA*	Not detected	2.1		ng/L	2.08	757124-72-4	
PFHxA*	77	2.1		ng/L	2.08	307-24-4	
PFBS*	20	2.1		ng/L	2.08	375-73-5	
PFHpA*	25	2.1		ng/L	2.08	375-85-9	
PFPeS*	25	2.1		ng/L	2.08	2706-91-4	
6:2 FTSA*	Not detected	4.2		ng/L	2.08	27619-97-2	
PFOA*	43	2.1		ng/L	2.08	335-67-1	
PFHxS*	330	2.1		ng/L	2.08	355-46-4	
PFHxS-LN*	280	2.1		ng/L	2.08	355-46-4-LN	
PFHxS-BR*	47	2.1		ng/L	2.08	355-46-4-BR	
PFNA*	4.4	2.1		ng/L	2.08	375-95-1	
8:2 FTSA*	Not detected	4.2		ng/L	2.08	39108-34-4	
PFHpS*	7.4	2.1		ng/L	2.08	375-92-8	
PFDA*	Not detected	2.1		ng/L	2.08	335-76-2	
N-MeFOSAA*	Not detected	2.1		ng/L	2.08	2355-31-9	
EtFOSAA*	Not detected	4.2		ng/L	2.08	2991-50-6	
PFOS*	150	2.1		ng/L	2.08	1763-23-1	
PFOS-LN*	49	2.1		ng/L	2.08	1763-23-1-LN	
PFOS-BR*	90	2.1		ng/L	2.08	1763-23-1-BR	
PFUnDA*	Not detected	2.1		ng/L	2.08	2058-94-8	
PFNS*	Not detected	2.1		ng/L	2.08	68259-12-1	
PFDODA*	Not detected	2.1		ng/L	2.08	307-55-1	
PFDS*	Not detected	2.1		ng/L	2.08	335-77-3	
PFTTrDA*	Not detected	2.1		ng/L	2.08	72629-94-8	
FOSA*	Not detected	2.1		ng/L	2.08	754-91-6	
PFTeDA*	Not detected	4.2		ng/L	2.08	376-06-7	
11Cl-PF3OUdS*	Not detected	2.1		ng/L	2.08	763051-92-9	
9Cl-PF3ONS*	Not detected	2.1		ng/L	2.08	756426-58-1	
ADONA*	Not detected	2.1		ng/L	2.08	919005-14-4	
HFPO-DA*	Not detected	10		ng/L	2.08	13252-13-6	

Merit Laboratories Login Checklist

Lab Set ID:S27041

Client:ARCADIS_NOVI (ARCADIS U.S., Inc.)

Project: RACER Buick City

Submitted:08/09/2021 16:10 Login User: SRS

Attention: Erin Kozak

Address: Arcadis US, Inc.
28550 Cabot Drive
Suite 500
Novi, MI 48377

Phone: O: 810-225-1901 FAX:

Email: erin.kozak@arcadis.com

Selection	Description	Note
Sample Receiving		
01.	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> N/A	Samples are received at 4C +/- 2C Thermometer # IR 29.2
02.	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> N/A	Received on ice/ cooling process begun
03.	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> N/A	Samples shipped
04.	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> N/A	Samples left in 24 hr. drop box
05.	<input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A	Are there custody seals/tape or is the drop box locked
Chain of Custody		
06.	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	COC adequately filled out
07.	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	COC signed and relinquished to the lab
08.	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	Sample tag on bottles match COC
09.	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> N/A	Subcontracting needed? Subcontracted to:
Preservation		
10.	<input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A	Do sample have correct chemical preservation
11.	<input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A	Completed pH checks on preserved samples? (no VOAs)
12.	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> N/A	Did any samples need to be preserved in the lab?
Bottle Conditions		
13.	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	All bottles intact
14.	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	Appropriate analytical bottles are used
15.	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	Merit bottles used
16.	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	Sufficient sample volume received
17.	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> N/A	Samples require laboratory filtration
18.	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	Samples submitted within holding time
19.	<input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A	Do water VOC or TOX bottles contain headspace

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

Client Review By: _____ Date: _____

SUBJECT
RACER Buick City Sanitary Sewer PFAS Update
and Bulkhead Notification

TO
Grant Trigger, RACER Trust

DATE
November 12, 2021,

PROJECT NUMBER
30075935

COPIES TO
Chris Peters, Arcadis
Micki Maki, Arcadis

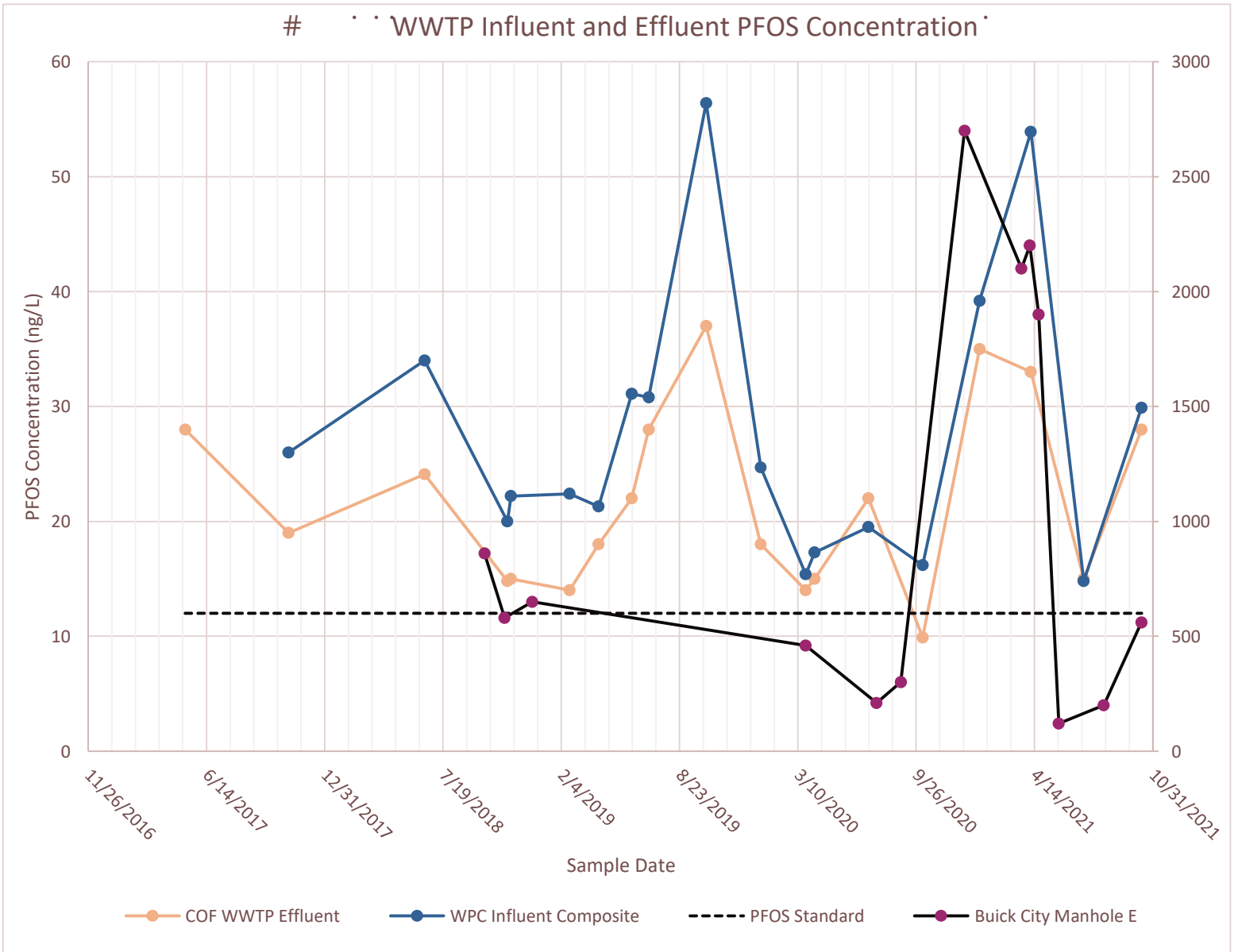
NAME
Tony Maffeo

This memo summarizes the recent activities related to the Hamilton Avenue sanitary sewer at the RACER Buick City Site (Site) located in Flint, Michigan. In an attempt to assess the benefits of blocking portions of the sanitary sewer along Hamilton Avenue adjacent to the Site to prevent the discharge of PFAS into the City of Flint sanitary sewer system a series of samples were collected to over the past 5 months. Two water samples were collected from the sanitary sewer (Manhole MH E and MH E-1, **Figure 1**) on October 12, 2021.

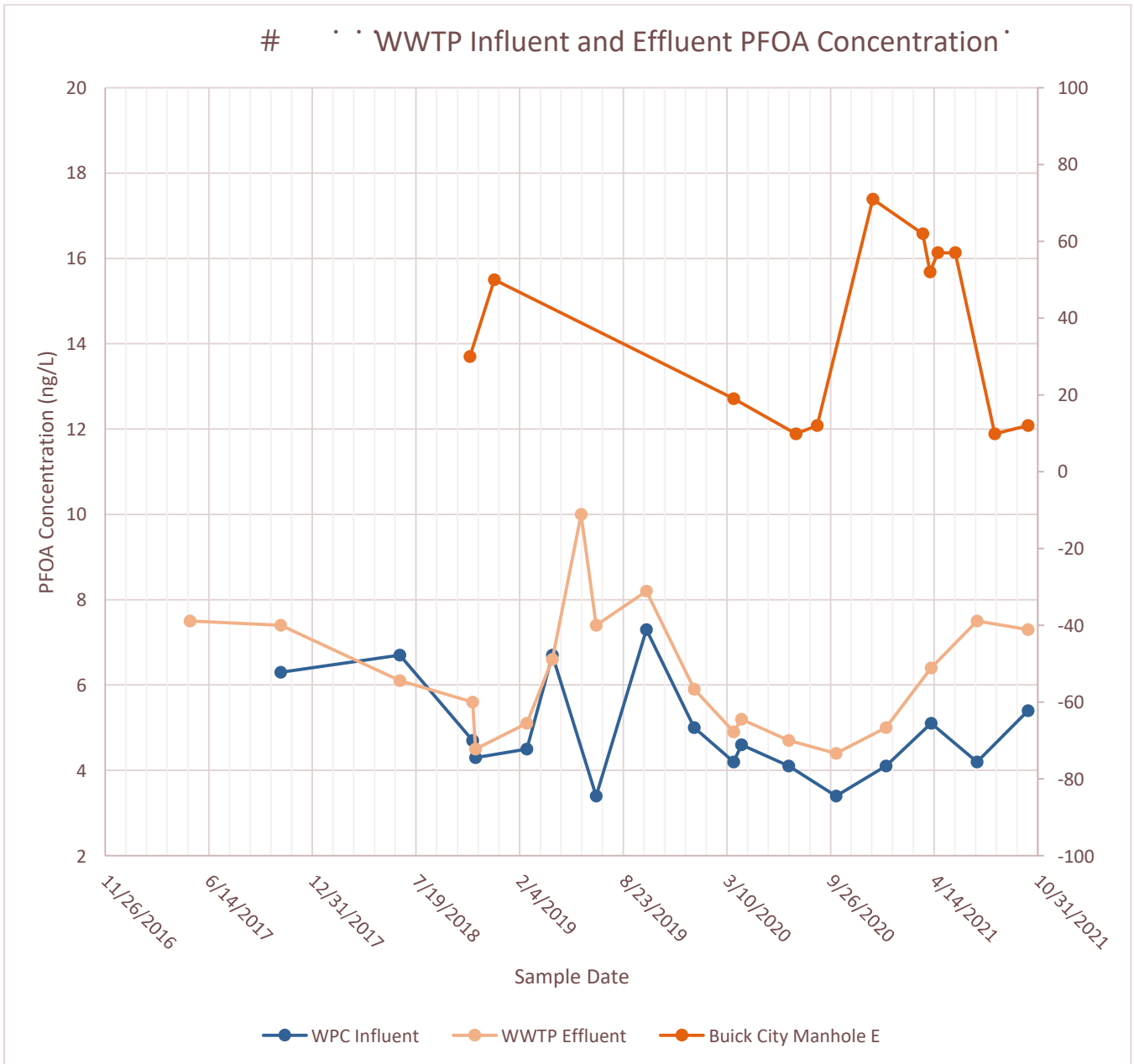
The analytical results from those samples are shown in the attached laboratory report (**Attachment A**). Concentration trend graphs (**Chart 1 and 2** displayed below) were also prepared to evaluate the relationship between the PFOS and PFOA levels in the Hamilton Avenue sanitary sewer and levels of PFOS and PFOA received at the City of Flint wastewater treatment plant (WWTP). Based on limited data the results are inconclusive through the end of 2019. However, the Increase in PFOS concentration at Manhole E-1 in October 2021 coincides with the higher levels of PFOS detected at the WWTP also in October 2021. On the other hand, a slight increase in PFOA at Manhole E-1 in October 2021 did not appear to affect the levels of PFOA at the City of Flint WWTP. With respect to PFOS, although other sources of PFOS cannot be discounted, a reduction in PFOS levels in the Hamilton Avenue sanitary sewer has shown a reduction at the City WWTP.

RACER had previously installed a temporary plug to block the sanitary sewer at Manhole E-1 on July 14, 2020. This resulted in a decrease in PFOS concentrations at Manhole E followed by a reduction at the City of Flint WWTP. On December 14, 2020, groundwater began daylighting at the surface on Site north of Hamilton Avenue. In an attempt to respond to the daylighting issue, the plug in the sanitary sewer was removed resulting in a significant increase of PFOS released into the City sanitary sewer system as sampled on January 11, 2021. RACER implemented additional measures onsite to prevent the daylighting issue including filling 22 on Site manholes with concrete, including storm sewer Manhole 10-5 (storm sewer).

New temporary plugs were installed in sanitary sewer manholes MH H-1 and MH H-1A on May 6, 2021 and have shown a reduction at the City of Flint WWTP as shown on **Chart 1 and 2**. Because the temporary plugs are having a positive effect on PFAS concentrations at the WWTP, RACER plans to move forward with the permanent bulkhead installation this month. Arcadis will coordinate the next sampling event with the City of Flint's quarterly sampling schedule.



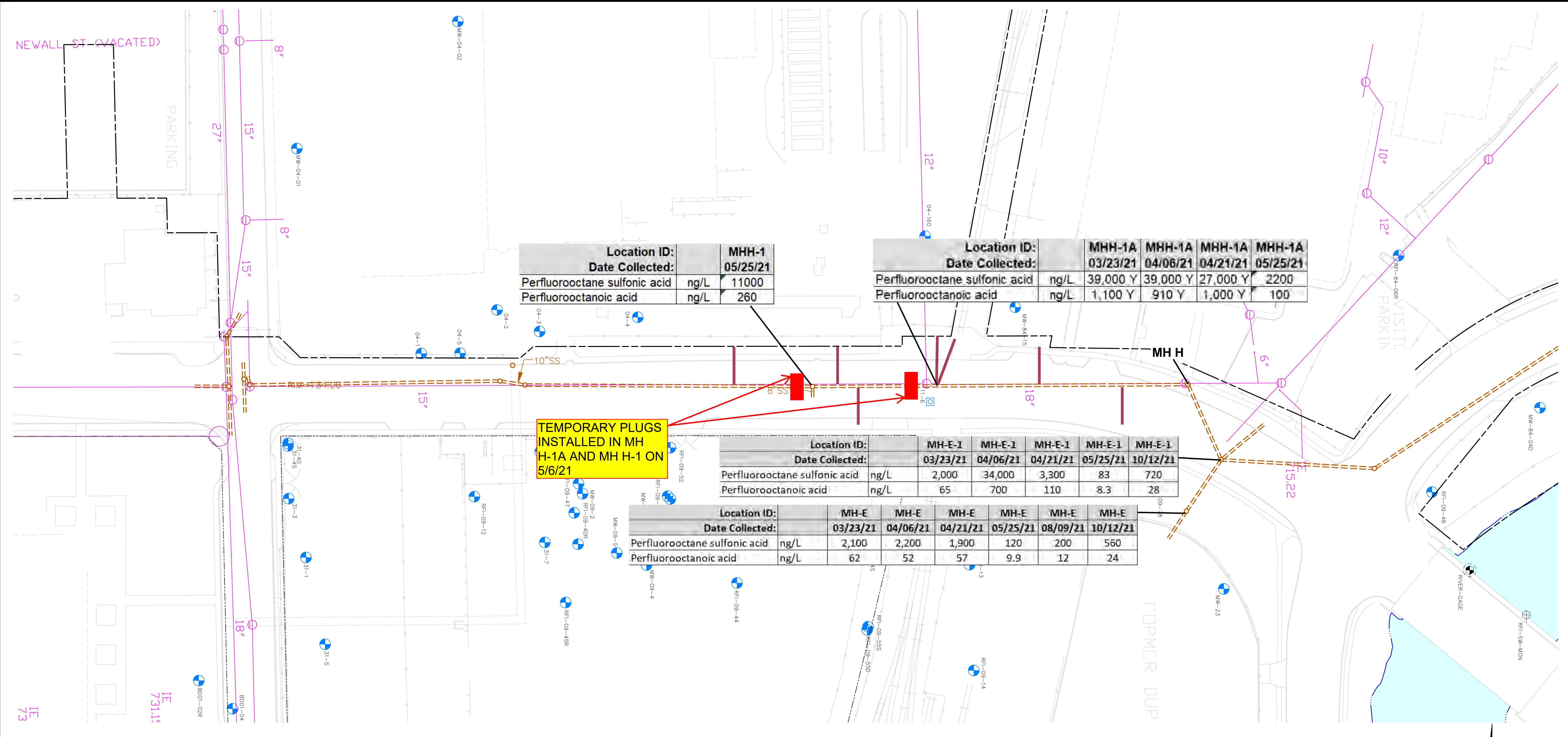
Note: Data from Buick City Manhole E is scaled on the right Y-axis



Note: Data from Buick City Manhole E is scaled on the right Y-axis

Figures

CITY: SYRACUSE DIV/GROUP: ENV DB: A SANCHEZ ID: ALS/GMS PIC: C.S. PETERS PM: C. KIKER TM: C. KIKER LVR: ON=OFF=REF
 C:\Users\alsanchez\OneDrive - ARCADIS\BIM 380 Docs\RACER TRUST\BUICK CITY RCRA\2019\10-DWG\RTBC-F-HAMILTON SANITARY SEWER.dwg LAYOUT: 3 SAVED: 17/2019 5:39 PM ACADVER: 21.05 (LMS TECH) PAGESETUP: PLOTSTYLETABLE: PLOTTED: 17/2019 6:09 PM BY: SANCHEZ, ADRIAN



Location ID:	MHH-1
Date Collected:	05/25/21
Perfluorooctane sulfonic acid	ng/L 11000
Perfluorooctanoic acid	ng/L 260

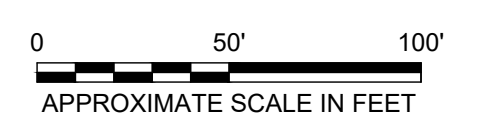
Location ID:	MHH-1A	MHH-1A	MHH-1A	MHH-1A
Date Collected:	03/23/21	04/06/21	04/21/21	05/25/21
Perfluorooctane sulfonic acid	ng/L 39,000 Y	39,000 Y	27,000 Y	2200
Perfluorooctanoic acid	ng/L 1,100 Y	910 Y	1,000 Y	100

TEMPORARY PLUGS
 INSTALLED IN MH
 H-1A AND MH H-1 ON
 5/6/21

Location ID:	MH-E-1	MH-E-1	MH-E-1	MH-E-1	MH-E-1
Date Collected:	03/23/21	04/06/21	04/21/21	05/25/21	10/12/21
Perfluorooctane sulfonic acid	ng/L 2,000	34,000	3,300	83	720
Perfluorooctanoic acid	ng/L 65	700	110	8.3	28

Location ID:	MH-E	MH-E	MH-E	MH-E	MH-E	MH-E
Date Collected:	03/23/21	04/06/21	04/21/21	05/25/21	08/09/21	10/12/21
Perfluorooctane sulfonic acid	ng/L 2,100	2,200	1,900	120	200	560
Perfluorooctanoic acid	ng/L 62	52	57	9.9	12	24

- LEGEND:**
- MONITORING WELL (ACTIVE)
 - ⊗ PIEZOMETER
 - ⊕ RECOVERY WELL
 - SURVEYED SANITARY SEWER LINE
 - HISTORIC SANITARY SEWER LINE



RACER TRUST
 BUICK CITY
 FLINT, MICHIGAN

**HAMILTON AVENUE SANITARY SEWER
 DATA FROM 3/23/21 THROUGH 10/12/21**

Attachment A
Analytical Reports



Analytical Laboratory Report

Report ID: S29237.01(01)
Generated on 10/29/2021

Report to

Attention: Erin Kozak
Arcadis US, Inc.
28550 Cabot Drive
Suite 500
Novi, MI 48377

Phone: O: 810-225-1901 FAX:
Email: erin.kozak@arcadis.com

Additional Contacts: Megan Humphrey, Micki Maki, Joey Barker, Alexis Crisp

Report produced by

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

Phone: (517) 332-0167 FAX: (517) 332-6333

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

Report Summary

Lab Sample ID(s): S29237.01-S29237.02
Project: 30075935.03200 / Buick City
Collected Date(s): 10/12/2021
Submitted Date/Time: 10/12/2021 15:30
Sampled by: Donald Richmond
P.O. #: 30075935.03200

Table of Contents

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Glossary of Abbreviations (Page 3)
Method Summary (Page 4)
Sample Summary (Page 5)

Maya Murshak
Technical Director



Analytical Laboratory Report

General Report Notes

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

Methods may be modified for improved performance.

Results reported on a dry weight basis where applicable.

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

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

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

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

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

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

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

PFAS requirement: Section 9.3.8 of U.S. EPA Method 537.1 states "If the method analyte(s) found in the Field Sample is present in the

FRB at a concentration greater than 1/3 the MRL, then all samples collected with that FRB are invalid and must be recollected and reanalyzed."

Samples submitted without an accompanying FRB may not be acceptable for compliance purposes.

Wisconsin PFAs analysis: MDL = LOD; RL = LOQ. LOD and LOQ are adjusted for dilution.

Report Narrative

There is no additional narrative for this analytical report



Analytical Laboratory Report

Laboratory Certifications

Authority	Certification ID
Michigan DEQ	#9956
DOD ELAP/ISO 17025	#69699
WBENC	#2005110032
Ohio VAP	#CL0002
Indiana DOH	#C-MI-07
New York NELAC	#11814
North Carolina DENR	#680
North Carolina DOH	#26702
Alaska CSLAP	#17-001
Pennsylvania DEP	#68-05884
Wisconsin DNR	FID# 399147320

Qualifier Descriptions

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

Glossary of Abbreviations

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



Analytical Laboratory Report

Method Summary

Method	Version
ASTMD7979-19M	ASTM Method D7979 - 19 Modified (Isotopic Dilution)

Parameter Summary

Parameter	Synonym	Cas #
PFBA	Perfluorobutanoic Acid	375-22-4
PFPeA	Perfluoropentanoic Acid	2706-90-3
4:2 FTSA	4:2 Fluorotelomer Sulfonic Acid	757124-72-4
PFHxA	Perfluorohexanoic Acid	307-24-4
PFBS	Perfluorobutane sulfonic Acid	375-73-5
PFHpA	Perfluoroheptanoic Acid	375-85-9
PFPeS	Perfluoropentane Sulfonic Acid	2706-91-4
6:2 FTSA	6:2 Fluorotelomer Sulfonic Acid	27619-97-2
PFOA	Perfluorooctanoic Acid	335-67-1
PFHxS	Perfluorohexane Sulfonic Acid	355-46-4
PFHxS-LN	Perfluorohexane Sulfonic Acid - LN	355-46-4-LN
PFHxS-BR	Perfluorohexane Sulfonic Acid - BR	355-46-4-BR
PFNA	Perfluorononanoic Acid	375-95-1
8:2 FTSA	8:2 Fluorotelomer Sulfonic Acid	39108-34-4
PFHpS	Perfluoroheptane Sulfonic Acid	375-92-8
PFDA	Perfluorodecanoic Acid	335-76-2
N-MeFOSAA	N-methyl perfluorooctanesulfonamidoacetic acid	2355-31-9
EtFOSAA	N-Ethyl Perfluorooctane Sulfonamidoacetic Acid	2991-50-6
PFOS	Perfluorooctane Sulfonic Acid	1763-23-1
PFOS-LN	Perfluorooctane Sulfonic Acid - LN	1763-23-1-LN
PFOS-BR	Perfluorooctane Sulfonic Acid - BR	1763-23-1-BR
PFUnDA	Perfluoroundecanoic Acid	2058-94-8
PFNS	Perfluorononane Sulfonic Acid	68259-12-1
PFDoDA	Perfluorododecanoic Acid	307-55-1
PFDS	Perfluorodecane Sulfonic Acid	335-77-3
PFTTrDA	Perfluorotridecanoic Acid	72629-94-8
FOSA	Perfluorooctane Sulfonamide	754-91-6
PFTeDA	Perfluorotetradecanoic Acid	376-06-7
11Cl-PF3OUdS	11-chloroeicosafuoro-3-oxaundecane-1-sulfonic acid	763051-92-9
9Cl-PF3ONS	9-chlorohexadecafluoro-3-oxanone1-sulfonic acid	756426-58-1
ADONA	4,8-dioxa-3H-perfluorononanoic acid	919005-14-4
HFPO-DA	Hexafluoropropylene oxide dimer	13252-13-6



Analytical Laboratory Report

Sample Summary (2 samples)

Sample ID	Sample Tag	Matrix	Collected Date/Time
S29237.01	MHE_101221	Groundwater	10/12/21 11:10
S29237.02	MHE-1_101221	Groundwater	10/12/21 11:25



Analytical Laboratory Report

Lab Sample ID: S29237.01

Sample Tag: MHE_101221

Collected Date/Time: 10/12/2021 11:10

Matrix: Groundwater

COC Reference: 140967

Sample Containers

#	Type	Preservative(s)	Refrigerated?	Arrival Temp. (C)	Thermometer #
1	15ml Centrifuge Tube	None	Yes	24.1	IR

Extraction / Prep.

Parameter	Result	Method	Run Date	Analyst	Flags
Initial wt. (g) / Final wt. (g) / Volume (ml)*	12.30/7.01/11	ASTMD7979-19M	10/21/21 08:00	KCV	

Organics

28 PFAs, Method: ASTMD7979-19M, Run Date: 10/25/21 19:50, Analyst: KCV

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
PFBA*	Not detected	21		ng/L	2.08	375-22-4	X
PFPeA*	14	4.2		ng/L	2.08	2706-90-3	
4:2 FTSA*	Not detected	2.1		ng/L	2.08	757124-72-4	
PFHxA*	48	2.1		ng/L	2.08	307-24-4	
PFBS*	36	2.1		ng/L	2.08	375-73-5	
PFHpA*	9.9	2.1		ng/L	2.08	375-85-9	
PFPeS*	32	2.1		ng/L	2.08	2706-91-4	
6:2 FTSA*	Not detected	4.2		ng/L	2.08	27619-97-2	
PFOA*	24	2.1		ng/L	2.08	335-67-1	
PFHxS*	340	2.1		ng/L	2.08	355-46-4	
PFHxS-LN*	280	2.1		ng/L	2.08	355-46-4-LN	
PFHxS-BR*	53	2.1		ng/L	2.08	355-46-4-BR	
PFNA*	4.9	2.1		ng/L	2.08	375-95-1	
8:2 FTSA*	Not detected	4.2		ng/L	2.08	39108-34-4	
PFHpS*	14	2.1		ng/L	2.08	375-92-8	
PFDA*	Not detected	2.1		ng/L	2.08	335-76-2	
N-MeFOSAA*	Not detected	2.1		ng/L	2.08	2355-31-9	
EtFOSAA*	Not detected	4.2		ng/L	2.08	2991-50-6	
PFOS*	560	2.1		ng/L	2.08	1763-23-1	
PFOS-LN*	330	2.1		ng/L	2.08	1763-23-1-LN	
PFOS-BR*	230	2.1		ng/L	2.08	1763-23-1-BR	
PFUnDA*	Not detected	2.1		ng/L	2.08	2058-94-8	
PFNS*	Not detected	2.1		ng/L	2.08	68259-12-1	
PFDODA*	Not detected	2.1		ng/L	2.08	307-55-1	
PFDS*	Not detected	2.1		ng/L	2.08	335-77-3	
PFTTrDA*	Not detected	2.1		ng/L	2.08	72629-94-8	
FOSA*	Not detected	2.1		ng/L	2.08	754-91-6	
PFTeDA*	Not detected	4.2		ng/L	2.08	376-06-7	
11Cl-PF3OUdS*	Not detected	2.1		ng/L	2.08	763051-92-9	
9Cl-PF3ONS*	Not detected	2.1		ng/L	2.08	756426-58-1	
ADONA*	Not detected	2.1		ng/L	2.08	919005-14-4	
HFPO-DA*	Not detected	10		ng/L	2.08	13252-13-6	

X-Elevated reporting limit due to matrix interference



Analytical Laboratory Report

Lab Sample ID: S29237.02

Sample Tag: MHE-1_101221

Collected Date/Time: 10/12/2021 11:25

Matrix: Groundwater

COC Reference: 140967

Sample Containers

#	Type	Preservative(s)	Refrigerated?	Arrival Temp. (C)	Thermometer #
1	15ml Centrifuge Tube	None	Yes	24.1	IR

Extraction / Prep.

Parameter	Result	Method	Run Date	Analyst	Flags
Initial wt. (g) / Final wt. (g) / Volume (ml)*	12.51/7.05/11	ASTMD7979-19M	10/21/21 08:00	KCV	

Organics

28 PFAs, Method: ASTMD7979-19M, Run Date: 10/25/21 20:09, Analyst: KCV

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
PFBA*	Not detected	20		ng/L	2.01	375-22-4	X
PFPeA*	17	4.0		ng/L	2.01	2706-90-3	
4:2 FTSA*	Not detected	2.0		ng/L	2.01	757124-72-4	
PFHxA*	60	2.0		ng/L	2.01	307-24-4	
PFBS*	41	2.0		ng/L	2.01	375-73-5	
PFHpA*	11	2.0		ng/L	2.01	375-85-9	
PFPeS*	42	2.0		ng/L	2.01	2706-91-4	
6:2 FTSA*	Not detected	4.0		ng/L	2.01	27619-97-2	
PFOA*	28	2.0		ng/L	2.01	335-67-1	
PFHxS*	360	2.0		ng/L	2.01	355-46-4	
PFHxS-LN*	310	2.0		ng/L	2.01	355-46-4-LN	
PFHxS-BR*	57	2.0		ng/L	2.01	355-46-4-BR	
PFNA*	4.0	2.0		ng/L	2.01	375-95-1	
8:2 FTSA*	Not detected	4.0		ng/L	2.01	39108-34-4	
PFHpS*	15	2.0		ng/L	2.01	375-92-8	
PFDA*	Not detected	2.0		ng/L	2.01	335-76-2	
N-MeFOSAA*	Not detected	2.0		ng/L	2.01	2355-31-9	
EtFOSAA*	Not detected	4.0		ng/L	2.01	2991-50-6	
PFOS*	720	2.0		ng/L	2.01	1763-23-1	
PFOS-LN*	430	2.0		ng/L	2.01	1763-23-1-LN	
PFOS-BR*	280	2.0		ng/L	2.01	1763-23-1-BR	
PFUnDA*	Not detected	2.0		ng/L	2.01	2058-94-8	
PFNS*	Not detected	2.0		ng/L	2.01	68259-12-1	
PFDODA*	Not detected	2.0		ng/L	2.01	307-55-1	
PFDS*	Not detected	2.0		ng/L	2.01	335-77-3	
PFTTrDA*	Not detected	2.0		ng/L	2.01	72629-94-8	
FOSA*	Not detected	2.0		ng/L	2.01	754-91-6	
PFTeDA*	Not detected	4.0		ng/L	2.01	376-06-7	
11Cl-PF3OUdS*	Not detected	2.0		ng/L	2.01	763051-92-9	
9Cl-PF3ONS*	Not detected	2.0		ng/L	2.01	756426-58-1	
ADONA*	Not detected	2.0		ng/L	2.01	919005-14-4	
HFPO-DA*	Not detected	10		ng/L	2.01	13252-13-6	

X-Elevated reporting limit due to matrix interference

Merit Laboratories Login Checklist

Lab Set ID:S29237

Client:ARCADIS_NOVI (ARCADIS U.S., Inc.)

Project: 30075935.03200 / Buick City

Submitted: 10/12/2021 15:30 Login User: JRM

Attention: Erin Kozak

Address: Arcadis US, Inc.
28550 Cabot Drive
Suite 500
Novi, MI 48377

Phone: O: 810-225-1901 FAX:

Email: erin.kozak@arcadis.com

Selection	Description	Note
Sample Receiving		
01.	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> N/A	Samples are received at 4C +/- 2C Thermometer # IR 24.1
02.	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> N/A	Received on ice/ cooling process begun
03.	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> N/A	Samples shipped
04.	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> N/A	Samples left in 24 hr. drop box
05.	<input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A	Are there custody seals/tape or is the drop box locked
Chain of Custody		
06.	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	COC adequately filled out
07.	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	COC signed and relinquished to the lab
08.	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	Sample tag on bottles match COC
09.	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> N/A	Subcontracting needed? Subcontracted to:
Preservation		
10.	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	Do sample have correct chemical preservation
11.	<input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A	Completed pH checks on preserved samples? (no VOAs)
12.	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> N/A	Did any samples need to be preserved in the lab?
Bottle Conditions		
13.	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	All bottles intact
14.	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	Appropriate analytical bottles are used
15.	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	Merit bottles used
16.	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	Sufficient sample volume received
17.	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> N/A	Samples require laboratory filtration
18.	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	Samples submitted within holding time
19.	<input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A	Do water VOC or TOX bottles contain headspace

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

Client Review By: _____ Date: _____

Appendix B

Bulkhead Details

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