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Sent Via Email Only

June 23, 2025
File No. 16.0062961.91

Ms. Karen Vorce, District Supervisor
Grand Rapids District Office
Remediation and Redevelopment Division
Michigan Department of Environment, Great Lakes, and Energy
350 Ottawa Avenue NW, Unit 10
Grand Rapids, Michigan 49503
vorcek@michigan.gov

Re: Wolverine World Wide, Inc. Consent Decree Court Case No. 1:18-cv-00039
Residential Well Sampling Completion Report

Dear Ms. Vorce:

On behalf of Wolverine World Wide, Inc. (Wolverine), Rose & Westra, a Division of GZA GeoEnvironmental, Inc. (R&W/GZA), is submitting this cover letter and enclosure in response to the referenced Consent Decree, effective February 19, 2020.

This submittal includes the Perimeter Monitoring Response Activity Plan, North Kent Study Area Completion Report identified in Section 7.12(a)(v) of the Consent Decree.

If you have any questions, please contact us.

Very truly yours,

Rose & Westra, a Division of GZA GeoEnvironmental, Inc.

Loretta J. Powers, CHMM
Associate Principal

Mark A. Westra
Principal

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Enclosure: Perimeter Completion Report

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Perimeter Monitoring Response Activity Plan North Kent Study Area Completion Report

Kent County, Michigan

Disclaimer: This document is a DRAFT document that has not received approval from the Michigan Department of Environment, Great Lakes, and Energy (EGLE). This document was prepared pursuant to a court Consent Decree. The opinions, findings, and conclusions expressed are those of the authors and not those of EGLE.

DRAFT – FOR REVIEW ONLY

Submittal Date: June 23, 2025
File No. 16.0062961.91

PREPARED FOR:
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ACRONYMS

CD	Consent Decree
CSM	Conceptual Site Model
DoD	United States Department of Defense
DWC	Drinking Water Cleanup
EDD	Electronic Data Deliverable
EGLE	Michigan Department of Environment, Great Lakes and Energy
FAM	Financial Assurance Mechanism
EPA	U.S. Environmental Protection Agency
GSI	Groundwater-Surface Water Interface
HSDS	House Street Disposal Site
HSP	House Street Property
MS/MSD	Matrix Spike/Matrix Spike Duplicate
ng/L	Nanogram per Liter
NIST	National Institute of Standards and Technology
NKSA	North Kent Study Area
Perimeter CR	North Kent Study Area Perimeter RAP Completion Report
PFAS	Per- and Polyfluoroalkyl Substances
PFBS	Perfluorobutane Sulfonic Acid
PFHxS	Perfluorohexane Sulfonic Acid
PFOA	Perfluorooctanoic Acid
PFOS	Perfluorooctane Sulfonate
PVC	Polyvinyl Chloride
Pace	Pace Analytical Services (West Columbia, South Carolina)
ppb	Parts per billion
QAPP	Quality Assurance Project Plan [*Former Wolverine Tannery, House Street Disposal Area, and Wolven/Jewell Area, Per- and Polyfluoroalkyl Substances Investigation Program*]
QA/QC	Quality Assurance/Quality Control
QSM	Quality Systems Manual
R&W/GZA	Rose & Westra, a Division of GZA GeoEnvironmental, Inc.
RAP	Response Activity Plan
ROW	Right of Way
SOP	Standard Operating Procedures
SOW	Scope of Work
Stearns	Stearns Drilling Company (Dutton, Michigan)
USGS	United States Geological Survey
microgram per liter	µg/L
VAP	Vertical Aquifer Profiling
WJSA	Wolven/Jewell Study Area
Wolverine	Wolverine World Wide, Inc.

1.0 INTRODUCTION

On behalf of Wolverine World Wide, Inc. ("Wolverine"), R&W/GZA prepared this Perimeter CR summarizing the activities completed associated with the *Perimeter Monitoring Response Activity Plan* dated August 17, 2020, and revised on December 31, 2020 (Perimeter RAP, **Appendix A**), the *Perimeter Wells Statement of Work* dated January 31, 2020 (SOW, **Appendix B**), and associated supplemental documentation. The SOW and subsequent RAP were implemented as set forth in CD No. 1:18-cv-00039, effective February 19, 2020.

Section 7.12(a)(v) of the CD indicates this Perimeter CR shall be submitted within two years of the installation of the required perimeter wells (June 23, 2025).

The CD requires that the Perimeter CR:

- *Demonstrates that Defendant has completed the installation of perimeter wells as required by Paragraph 7.9(a);*
- *Provides for the long-term maintenance and monitoring of perimeter wells installed as required by Paragraph 7.9(a);*
- *Provides a proposed Financial Assurance Mechanism as set forth in Section VIII (Financial Assurance) for the long-term Perimeter Well Response Activities*.

2.0 CONDITIONS OF CD PARAGRAPH 7.9

Section 7.9 (a) of the CD:

(a) Perimeter Wells.

In the Municipal Water Areas, Defendant shall install a perimeter well network in accordance with Appendix N— Statement of Work for Perimeter Well and the Response Activity Plan in Paragraph 7.4(a) to monitor the potential migration and threat posed by PFAS Compounds in groundwater to drinking water wells outside the Municipal Water Areas. If any two or more Municipal Water areas are contiguous, the perimeter well network may be installed on the boundaries of such contiguous area.

The Perimeter RAP outlines the implementation of the requirements identified in CD Section 7.9(a).

3.0 BACKGROUND

Based on interpretation of regional geology and hydrogeology, residential water well sampling data collected in the NKSA, and groundwater investigations performed associated with the House Street Study Area and Wolven/Jewell Study Area (WJSA), a CSM was provided in the Perimeter RAP (R&W/GZA, 2020). Data collected during the implementation of Perimeter RAP activities supports the CSM with only minor revisions based on the data gathered associated with groundwater flow interpretation.

Groundwater potentiometric surface elevation contours were interpolated from the static water levels collected during the quarterly monitoring well network gauging. **Figures 1A** through **1D,** and **2A** through **2D** indicate the quarterly groundwater potentiometric surface elevation contours in the shallow and deep zones, respectively.

4.0 PERIMETER RAP AND WORKPLAN OBJECTIVES

The Perimeter RAP identified the following data gaps:

- Potential for PFAS impacted groundwater in the shallow and deep zones to migrate from the municipal water areas; and
- Additional data needed to further characterize the plume:
  - West, northwest, and south of the HSDS primary plume (west of US 131)
  - North and south of the northwest portion of the WJSA plume, near the Rogue River
  - North of the WJSA plume north of Wellington Ridge, along US 131
  - Southeast of the WJSA plume, north of 10 Mile Road
  - West of the North Childsdale municipal water area

All of the identified areas and well locations proposed as part of the Perimeter SOW/RAP can be referenced relative to the plume interpretations in **Figure 3**.

The following table provides a summary of the investigation tasks and objectives proposed in the Perimeter RAP, based on the identified data gaps:

Table 4.0.1 VAP and Monitoring Well Installation

VAP Location	Well(s)	RAP	Purpose
HS-PMW-16	HS-PMW-16A, HS-PMW-16B, HS-PMW-16C	Perimeter	Monitor potential migration of HS plume downgradient to the east and into Area 6
HS-PMW-22	HS-PMW-22	Perimeter	
HS-PMW-RI-108	HS-PMW-RI-108A, HS-PMW-RI-108B, HS-PMW-RI-108C, HS-PMW-RI-108D	Area 6 Dual Purpose	
HS-PMW-RI-109	HS-PMW-RI-109A, HS-PMW-RI-109B, HS-PMW-RI-109C	Area 6 Dual Purpose	
HS-MW-13	HS-MW-13A, HS-MW-13B, and HS-MW-13C	Perimeter (Existing)	
HS-PMW-RI-101	HS-PMW-RI-101A and HS-PMW-RI-101B	Perimeter	Evaluate potential PFAS migration at the edge of the Freska Lake area toward the edge of the NKSA
HS-PMW-RI-105	HS-PMW-RI-105A and HS-PMW-RI-105B	Perimeter	
HS-PMW-RI-106	HS-PMW-RI-106A and HS-PMW-RI-106B	Perimeter	
HS-MW-32	HS-MW-32A, HS-MW-32B, HS-MW-32C, and HS-MW-32D	Perimeter (Existing)	
HS-PMW-RI-102	HS-PMW-RI-102	Perimeter	Monitor for PFAS migration from the municipal water areas toward the southeast and into Area 5
Area5-RI-3	Area5-RI-3A and Area5-RI-3B	Area 5 Dual Purpose	
HS-PMW-RI-103	HS-PMW-RI-103A and HS-PMW-RI-103B	Area 5 Dual Purpose	
HS-PMW-RI-104	HS-PMW-RI-104A, HS-PMW-RI-104B, HS-PMW-RI-104C and HS-PMW-RI-104D	Area 5 Dual Purpose	
HS-PMW-RI-107	HS-PMW-RI-107A, HS-PMW-R-107B, HS-PMW-RI-107C and HS-PMW-RI-107D	Area 5 Dual Purpose	
Area5-RI-8	Area5-RI-8A, Area5-RI-8B and Area5-RI-8C	Area 5 Dual Purpose	

VAP Location	Well(s)	RAP	Purpose
Area5-RI-9	Area5-RI-9A, Area5-RI-9B and Area5-RI-9C	Area 5 Dual Purpose	
Area5-RI-11	Area5-RI-11A, Area5-RI-11B, Area5-RI-11C and Area5-RI-11D	Area 5 Dual Purpose	
HS-PMW-RI-111	HS-PMW-RI-111A and HS-PMW-RI-111B	Areas 11/12 Dual Purpose	Monitor for PFAS migration from the municipal water areas toward Area 11
HS-PMW-RI-112	HS-PMW-RI-112A and HS-PMW-RI-112B	Areas 11/12 Dual Purpose	
WV-PMW-RI-101	WV-PMW-RI-101A and WV-PMW-RI-101B	Perimeter	Evaluate potential migration of PFAS from Wellington Ridge municipal water area and delineate the southwest and northeast boundary of the PFAS plume
WV-PMW-RI-102	WV-PMW-RI-102	Perimeter	
WV-PMW-RI-104	WV-PMW-RI-104A, WV-PMW-RI-104B, WV-PMW-RI-104C, and WV-PMW-RI-104D	Perimeter	
WV-PMW-RI-105	WV-PMW-RI-105A and WV-PMW-RI-105B	Perimeter	
WV-MW-4	WV-MW-4	Perimeter (Existing)	
WV-MW-5	WV-MW-5D and WV-MW-5D	Perimeter (Existing)	
WV-MW-11	WV-MW-11S and WV-MW-11D	Perimeter (Existing)	
WV-MW-15	WV-MW-15A, WV-MW-15B, WV-MW-15C, and WV-MW-15D	Perimeter (Existing)	
WV-PMW-RI-106	WV-PMW-RI-106A, WV-PMW-RI-106B, WV-PMW-RI-106C, WV-PMW-RI-106D, WV-PMW-RI-106E	Perimeter	Evaluate the potential migration of the PFAS plume from the WJSA municipal water area toward the south
WV-PMW-RI-107	WV-PMW-RI-107	Perimeter	
WV-PMW-RI-108	WV-PMW-RI-108	Perimeter	
Area19-MW-8	Area19-MW-8A, Area19-MW-8B, and Area19-MW-8C	Areas 19 Dual Purpose	Monitor the potential downgradient migration of the Wellington Ridge PFAS plume along the western edge of Area 19
Area19-MW-9	Area19-MW-9A, Area19-MW-9B, and Area19-MW-9C	Areas 19 Dual Purpose	
Area19-MW-14	Area19-MW-14A and Area19-MW-14B	Areas 19 Dual Purpose	
Area19-MW-15	Area19-MW-15A, Area19-MW-15B, Area19-MW-15C and Area19-MW-15D	Areas 19 Dual Purpose	

The following sections provide a detailed investigation summary of activities completed to satisfy the project objectives required by Paragraph 7.9(a) and Appendix N of the CD as well as the Perimeter RAP.

5.0 INVESTIGATION METHODOLOGY

The previously listed objectives were met through investigative activities conducted from May 2021 through March 2024 under EGLE-approved submissions. Those activities included:

- VAP at the proposed monitoring well locations to collect geologic and analytical data to determine permanent monitoring well screen depths;
- Installation of 25 Perimeter RAP specific overburden groundwater monitoring wells at varying depths to monitor the lateral and vertical extent of PFAS-compound concentrations in the groundwater;
- Annual groundwater sampling until substantial completion of the perimeter well network (this includes the Perimeter specific and dual-purpose wells);

- Quarterly water level measurements to provide data to interpret the groundwater elevation; and
- Quarterly groundwater sampling to monitor PFAS concentrations in the groundwater for one year (refer to **Section 5.3.1** for the quarterly water level and sampling timeline).

Monitoring well locations are depicted on **Figure 3.**

5.1 VERTICAL AQUIFER PROFILING AND MONITORING WELL INSTALLATION

R&W/GZA observed borings drilled by Wolverine's drilling contractor, Stearns Drilling (Dutton, Michigan). Hollow-stem auger drilling methods were utilized, and drilling activities for Perimeter only wells (no dual purpose) occurred between May 12, 2021 and May 31, 2023. When possible, the boring was to be drilled to the top of bedrock or upon refusal. The borehole terminal depth was also evaluated based on the depths of adjacent water wells and the presence of confining strata. VAP sampling, in accordance with SOP A25 (included in the QAPP), was then performed by setting a temporary 2-inch diameter PVC well screen and collecting groundwater samples at 10-foot intervals within the saturated zone. If fine-grained soil was present or groundwater columns discontinuous, the VAP intervals were adjusted based on field observations. Investigation derived waste was handled and disposed of in accordance with the SOW. After receiving VAP data, proposed monitoring well screen locations were communicated to EGLE and mutually agreed upon before the monitoring well screens were installed based on the combination of profiling data, encountered geology, and nearby drinking water well elevations.

Table 4.0.1 in **Section 4** provides a summary of each VAP location and the subsequent wells installed. **Appendix C** includes the soil boring logs and monitoring well construction diagrams and **Table 1** (attached) summarizes monitoring well screen intervals. **Figure 3** provides final well installation locations for Perimeter and dual-purpose wells.

5.2 GROUNDWATER AND SURFACE WATER GAUGING

R&W/GZA installed staff gauges which were used with USGS gauging station USGS04118500 to measure Rogue River elevations during the groundwater gauging events (Q1 2023 through Q1 2024). Groundwater elevation readings were collected from monitoring wells throughout the NKSA. Groundwater and surface water gauging data and associated elevations for the quarterly gauging events are provided on **Table 2**.

Figures 1A through **1D** and **2A** through **2D** depict the water level elevations for shallow and deep potentiometric surface in the NKSA. Monitoring well locations specific to Perimeter RAP are provided on **Figure 3.** R&W/GZA grouped the wells into the shallow and deep zones based on borehole lithologies, screen intervals, and static water elevation, as mentioned in the Perimeter RAP.

5.3 GROUNDWATER SAMPLING

The Perimeter wells were sampled quarterly using adjustable rate, submersible, peristaltic, or bladder pumps and disposable tubing (refer to SOP A16 included in the QAPP). Low-flow groundwater sampling logs are included in **Appendix D**.

Once VAP sampling was completed and a monitoring well location was installed, an initial groundwater sample was taken per the RAP. Following substantial completion (as agreed upon by EGLE) of Perimeter wells, groundwater was sampled quarterly per the Perimeter RAP. Sampling events occurred:

- Initial Sampling: January 2022 and May 2022.
- Q4 2022: dual purpose wells sampled as part of other Area RAP events
- Q1 2023: dual purpose wells sampled as part of other Area RAP events

- Q2 2023: April 11 through June 21, 2023.
- Q3 2023: July 11 through September 15, 2023
- Q4 2023: October 4 through December 19, 2023.
- Q1 2024: January 9 through March 1, 2024

There were no deviations or exclusions from the SOW or RAP during the quarterly groundwater sampling schedule. Investigation derived waste was handled and disposed of in accordance with the SOW.

6.0 PERIMETER RAP AND SOW SAMPLING ADJUSTMENTS

6.1 VAP SAMPLING ADJUSTMENTS

R&W/GZA had several rounds of communication with EGLE regarding possible changes in well locations based on inaccessibility, etc. Changes to the proposed locations identified in the SOW/RAP were made with EGLE concurrence. The following well was relocated:

- WV-PMW-RI-108: moved 1,300 ft northwest from the original proposed location due to real estate access.

Please see the other RAP Completion Reports for details regarding dual purpose well adjustments. R&W/GZA does not believe these changes materially affected the findings from the Perimeter SOW or RAP.

7.0 ANALYTICAL METHOD AND ANALYTES

Pace analyzed the groundwater samples for PFAS using DoD QSM 5.3 Guidelines (isotope dilution). The analyte list with the 28 PFAS compounds specified in the CD, and reporting limits are provided in Table A.7.7 of the QAPP.

8.0 APPLICABLE PART 201 CLEANUP CRITERIA AND PROJECT ACTION LEVELS

Since the submittal of the Perimeter RAP on December 4, 2020, EGLE set DWC for five additional PFAS compounds under Rule 44. The CD established a requirement concentration for PFOS + PFOA of 10 ηg/L. However, in the CD (Paragraph 7.5e(i/ii)), it states this value would be superseded by applicable Part 201 DWC when established. Groundwater wells in the NKSA used for drinking water are potential receptors of PFAS exposure via groundwater ingestion. To effectively monitor the potential migration and threat posed by PFAS Compounds in groundwater to drinking water wells outside the municipal water areas, analytical results for the Perimeter groundwater data are applicable Part 201 Generic Groundwater Cleanup Criteria Protective of DWC for Residential Land Uses. These values are currently:

Table 8.0.1 Project Criteria

Compound	Part 201 DWC (µg/L)
HFPO-DA	0.370
PFBS	0.420
PFHxS	0.051
PFHxA	400
PFNA	0.006
PFOA	0.008
PFOS	0.016

9.0 GROUNDWATER SAMPLING RESULTS

The following section provides a summary of the analytical results from groundwater samples collected during the investigation activities.

9.1 VAP GROUNDWATER SAMPLING

A total of 104 VAP samples were collected from 28 locations including dual-purpose locations and locations that are part of the Perimeter RAP only. VAP samples taken from locations that were drilled prior to the CD are not included in this VAP summary. PFOS was measured in 11 samples, 3 of which exceeded its DWC. PFOA was measured in 18 samples, 6 of which exceeded its DWC. No other VAP samples exceeded criteria. These results were used for the sole purpose of identifying appropriate permanent monitoring well screen intervals in conjunction with EGLE. A summary of the VAP data is presented in **Table 3**.

A geological cross-section plan view is presented in **Figure 5**. Geologic cross-sections through Perimeter and are shown on **Figures 6A** through **6D**.

9.2 GROUNDWATER MONITORING WELL SAMPLING

Groundwater samples were collected from a total of 88 monitoring wells, initially after installation and once per quarter for four consecutive quarters starting in Q2 of 2023. During the quarters where an Area RAP sampling event coincided with a Perimeter event, the dual-purpose wells were only sampled one time to satisfy both RAPs. The dual-purpose wells were sampled additional times prior to Q2 2023 per the requirements of the Area RAP to which they belong. These results are not included in this discussion.

In total, there were 359 samples for Perimeter quarterly groundwater sampling. Of the 28 PFAS compounds analyzed, only PFOA, PFOS, and PFHxS concentrations exceeded DWC. Other PFAS were either well under the DWC or DWC are not established.

Table 9.1.1 Summary of PFAS Exceeding Criteria

Compound	Total Samples	Number of Detections	Number of DWC Exceedances	Maximum Conc. (µg/L)
PFOA	359	84	39	0.17
PFOS	359	43	18	0.042
PFHxS	359	65	1	0.058

In summary, PFOA concentrations in the shallow aquifer that exceed DWC are more prevalent than in the deep aquifer. PFOS exceedances were all limited to the shallow aquifer. PFOS exceedances in the shallow aquifer are limited to wells where PFOA also exceeded. Not all wells that have PFOA exceedances also have PFOS exceedances, but all PFOS exceedances are all found in a well that has a PFOA DWC exceedance. Exceedances of PFHxS DWC are limited to well HS-PMW-RI-104C in the shallow aquifer.

Figures 4A and **4B** depict PFHxS, PFOA, and PFOS concentrations in the shallow and deep aquifer, respectively, as they were the only PFAS with DWC exceedances. The quarterly results on the figure are compared to Part 201 DWC to spatially illustrate the information summarized in this section and the results in the attached data tables. Note: VAP and initial sampling results are not included on **Figures 4A** and **4B** (i.e., only permanent well data). Groundwater sample results for the quarters that were specific to Perimeter groundwater are summarized in **Table 4A**. Results for dual-purpose wells sampled prior to the Perimeter quarters are summarized in **Table 4B.**

A geological cross-section plan view is presented in **Figure 5**. This plan view map depicts the plume interpretation from data collected between 2017 to 2019. This data set, which includes data from R&W/GZA monitoring wells, NKLF and residential wells, is the most complete for the NKSA and is therefore the most accurate to date. Geologic cross-sections through the NKSA and are shown on **Figures 6A** through **6E**.

9.3 FINDINGS

Based on the results summarized above (**Sections 9.1** and **9.2**), the following summarizes the Perimeter investigation:

Wolven Jewell Study Area

Wells Area19-MW-14A in the deep aquifer and WV-MW-5S, WV-PMW-RI-106A, B and C in the shallow all had DWC exceedances of PFOA (**Figure 4A and B)**. These wells were sampled to monitor the potential migration of the Wellington Ridge PFAS plume outside of municipal drinking water areas. According to the other groundwater results from monitoring wells in this area (**Figure 4A and B)**, the shallow potentiometric surface (**Figure 1A-E**), and the cross section through the area (**Figure 6D**), the Wellington Ridge plume appears to be migrating northwesterly with the WV-PMW-RI-106 cluster sitting at a peak in surface and groundwater elevation. The drinking water wells that are downgradient, immediately west of WV-MW-5S, have been identified as part of proposed continued sampling efforts in the Residential Well Resampling Plan CR. Along with the proposed drinking water well activities, monitoring wells along the groundwater flow path in the area will continue to be sampled on an annual basis for the next 3 years. Following the completion of the third annual event, the results will be evaluated along with residential well results to better understand the Wellington Ridge plume. The well clusters WV-PMW-RI-105, WV-PMW-RI-106, WV-PMW-RI-102, WV-MW-5, WV-PMW-101 and Area19-MW-14 are applicable to this criterion.

House Street Study Area

The other wells that identified PFOA in excess of DWC were put in place to monitor and delineate the House Street plume. The wells that exceeded DWC to the northwest of the plume were installed to evaluate potential PFAS migration at the edge of the Freska Lake area toward the edge of the NKSA. The wells to the southeast were to monitor for PFAS migration from the plume in the municipal water areas into filter Areas 5, 6, and 11. Outside of HS-PMW-RI-102B, all the detections and exceedances were confined to the shallow aquifer.

Shallow groundwater is flowing towards the Rogue River on the western/northwestern edge of the NKSA near HS-PMW-RI-105A. The shallow potentiometric surface (**Figures 1A-D**) identifies an area of low relief and flow in that area. It is difficult to ascertain the source of the detection as the only upgradient well, HS-PMW-RI-105A was non-detect for all compounds. Additionally, to the east, HS-MW-32A sits at the same groundwater elevation and between 105A and the House Street plume with no PFAS detections. To address the exceedance of PFOA at HS-PMW-RI-105A and to better understand and monitor the potential PFAS migration, additional bi-annual static water level collection at HS-PMW-RI-105A, HS-MW-32A, HS-PMW-RI-101A, and HS-PMW-RI-105A is recommended.

Southeast of the HSDS between Areas 5 and 6, there are consistent detections and exceedances at the HS-PMW-RI-104 cluster and HS-PMW-RI-103A. Based on these results, the shallow potentiometric surface (**Figures 1A-D**) and the cross section (**Figure 6B**) through this area, the House Street plume is flowing southeast and is well defined to the southwest around Area 5 by consistent non detects. Detections in HS-PMW-16A and B, the general trend of the shallow groundwater flow, and residential drinking well samples collected as part of the Res Well CR suggest that the plume is not as well defined to the east. However, filter Area 6 is directly adjacent to the North Kent Landfill study area (NKLF) and the NKSA is thoroughly monitored up to that point. To better understand and monitor the long-term conditions of the migration of PFAS in groundwater in this area, monitoring wells

HS-MW16A and B, HS-MW-13A, HS-PMW-RI-103A and B, and the HS-PMW-RI-104 cluster should continue to be monitored and sampled on an annual basis for the next 3 years. Also, residential well samples in Area 6 will continue to be collected as part of the Res Well CR resample plan and will add to the long-term evaluation.

The southern end of the NKSA had two shallow wells with consistent exceedances of PFOA and PFOS just north of filter Area 11. It is well understood that shallow groundwater is flowing towards the Grand River and that Area 11 is primarily covered by municipal water or is vacant. Any drinking water wells not connected to municipal water in the area are being monitored or filtered as part of the Filter CR or ResWell CR. Because groundwater flow is well understood and there is little threat to drinking water receptors, no further sampling is suggested in this area.

The discussion above demonstrates the groundwater flow and PFAS concentrations for the Perimeter RAP within the NKSA are well understood, but certain areas require continued monitoring to better understand and monitor the long-term conditions of the migration of PFAS in groundwater. The samples taken at residential drinking water wells, as well as the annual groundwater samples collected at the identified well clusters will meet the CD obligation to provide for monitoring the potential migration and threat posed by PFAS compounds in groundwater to drinking water wells outside the Municipal Water Areas. The continued monitoring discussed above is presented in **Figure 7.**

10.0 DATA QUALITY ASSURANCE AND CONTROL

QC samples (i.e., field blanks, field duplicates, and MS/MSDs) were collected at a rate of one per 20 samples in accordance with the QAPP and approved SOW. QA/QC samples were collected using the methods described in the SOPs and analyzed using the same analytical methods as the investigative samples.

Selected Perimeter data have been validated according to performance requirements and the QA/QC limits in Table D.1.1 of Revision 2 of the QAPP. In addition, R&W/GZA consulted the general guidance in the EPA Contract Laboratory Program National Functional Guidance for Organic and Inorganic Superfund Data Review and relevant analytical method(s) to assess data usability. Approximately 5 percent of all PFAS samples collected are included for data validation. Sample delivery group YI01015 was included within the 5-percent PFAS samples selected for data validation per the QAPP and approved SOW. Adjustments to data qualifiers identified during data validation have been incorporated into the dataset and are included on the attached tables.

There were no deviations noted in the data validation reports provided by the analytical laboratory for the sampling events completed. The data collected are usable for this investigation.

Analytical data has been provided to EGLE via EDD. The Stage 4 Data Validation Report which included Perimeter groundwater samples is included in **Appendix E**.

10.1 FIELD PARAMETER QUALIFIERS

During validation of quarterly groundwater sampling data, field parameters were qualified for one or more of the following reasons:

- Temperature readings collected prior to July 27, 2023, were qualified because the meters were not checked with a NIST-certified thermometer.
- Certain temperature probes were outside manufacturer's accuracy range versus the NIST thermometer.
- Specific conductivity readings were qualified either when the end of day calibration verifications were not made or was calibrated with standards that differed from those values specified in the SOP.

- The meter failed the end of day calibration check for a specific parameter.
- The field parameter was not stable at the time of sampling and the two-hour time limit was not reached.

Other data qualifications, if encountered, are noted on the sample logs. Qualified readings may be used to determine stabilization (intended use) but may not be used for other purposes.

11.0 FINANCIAL ASSURANCE MECHANISM

As described in **Section 1.0**, Section 7.12(a)(v) of the CD requires a proposed FAM as part of this Perimeter CR.

The following is proposed to better understand and monitor the long-term conditions of the migration of PFAS in groundwater:

Continued investigation for the Wolven Jewell Study Area:

- Annual static water levels and groundwater sampling at clusters WV-PMW-RI-106, WV-PMW-RI-105, WV-PMW-RI-102, WV-MW-5, WV-PMW-101 and Area19-MW-14 for three years.

Continued investigation for the House Street Study Area:

- Northwest edge of NKSA/Freska Lake Area; bi-annual static water levels at HS-PMW-RI-105A, HS-MW-32A, HS-PMW-RI-101A, and HS-PMW-RI-105A.
- Southeast of the HSDS between Areas 5 and 6; annual static water levels and groundwater sampling at HS-MW16A and B, HS-MW-13A, HS-PMW-RI-103A and B, and the HS-PMW-RI-104 cluster for 3 years.

Implementation of the above-described scope of work is estimated to be One Hundred Eighty-Five Thousand Dollars ($185,000.00). Subject to EGLE approval, Wolverine will fund one of the approved FAMs (e.g., a performance bond, escrow, cash, certificate of deposit, irrevocable letter of credit, corporate guarantee, or financial test), in that amount and in a formal form acceptable to EGLE.

Upon completion of the above scope of work (i.e. approximately 3 years from EGLE approval of this Completion Report), the findings will be evaluated in conjunction with EGLE to determine what, if any, steps are applicable for monitoring associated with the Perimeter wells going forward.

12.0 REFERENCES

R&W/GZA. 2018. *Conceptual Site Model Update and Status Report, Former House Street Disposal Area, Wolverine World Wide, Inc., Rockford, Michigan*.

R&W/GZA. 2018. *Quality Assurance Project Plan, Former Wolverine Tannery and House Street Disposal Area, Revision 2.* Submitted to EPA August 29, 2018 with errata pages submitted October 31, 2018 and April 15, 2019.

R&W/GZA. 2020. *Perimeter Monitoring Response Activity Plan, North Kent Study Area*. Submitted to Michigan Department of Environment, Great Lakes, and Energy. August 17, 2020, revised December 31, 2020.

R&W/GZA. 2020. *Perimeter Wells Statement of Work, North Kent Study Area*. Submitted to Michigan Department of Environment, Great Lakes, and Energy. January 31, 2020.

U.S. District Court, Western District of Michigan, Southern Division. 2020. *Consent Decree No. 1:18-cv-00039-JTN-ESC, Michigan Department of Environment, Great Lakes, and Energy and Plainfield Charter Township and Algoma Township.*

TABLES

TABLE 1
MONITORING WELL SUMMARY
Perimeter
Plainfield Township, Kent County, Michigan

Name	Completion Date	Northing (international feet)	Easting (international feet)	Ground Surface Elevation (feet amsl)	Top of Casing Elevation (feet amsl)	Screen Interval (feet bgs)	Screen Elevation (feet amsl)
HS-MW-13A*	1/14/2020	583,050.494	12,792,154.774	723.77	726.23	79.2 - 84.0	644.6 - 639.8
HS-MW-13B*	1/14/2020	583,056.466	12,792,155.908	723.87	726.30	148.8 - 153.6	575.1 - 570.3
HS-MW-13C*	12/17/2019	583,061.629	12,792,155.908	723.80	726.09	199.4 - 204.2	524.4 - 519.6
HS-PMW-16A*	2/20/2023	585,199.169	12,790,557.580	766.40	766.09	89.3 - 94.3	677.1 - 672.1
HS-PMW-16B*	2/20/2023	585,193.199	12,790,557.823	766.67	766.09	118.7 - 123.7	648.0 - 643.0
HS-PMW-16C*	1/9/2023	585,187.512	12,790,557.802	766.82	766.54	161.6 - 166.6	605.2 - 600.2
HS-PMW-22	5/31/2023	590,339.709	12,789,779.065	836.97	839.25	169.3 - 174.3	667.7 - 662.7
HS-MW-32A	5/9/2019	591,684.339	12,784,010.168	724.80	727.36	60.9 - 65.5	663.9 - 659.3
HS-MW-32B	5/8/2019	591,691.256	12,784,009.175	725.10	727.85	79.1 - 83.7	646.0 - 641.4
HS-MW-32C	5/8/2019	591,698.520	12,784,006.116	725.10	727.72	108.8 - 113.4	616.3 - 611.7
HS-MW-32D	5/6/2019	591,703.493	12,784,004.299	725.00	727.55	142.3 - 146.9	582.7 - 578.1
AREA5-RI-3A*	10/26/2021	579,174.158	12,790,181.417	689.89	692.25	59.4 - 64.4	630.5 - 625.5
AREA5-RI-3B*	8/2/2021	579,173.708	12,790,175.492	690.19	692.50	106.7 - 111.7	583.5 - 578.5
AREA5-RI-8A*	8/20/2021	582,290.479	12,787,551.138	786.62	786.17	85.6 - 90.6	701.0 - 696.0
AREA5-RI-8B*	8/19/2021	582,284.982	12,787,551.285	785.96	785.75	156.7 - 161.7	629.3 - 624.3
AREA5-RI-8C*	5/10/2021	582,279.122	12,787,550.870	785.96	785.70	174.7 - 179.7	611.3 - 606.3
AREA5-RI-9A*	4/28/2022	581,686.773	12,786,032.998	811.39	813.54	96.4 - 101.4	715.0 - 710.0
AREA5-RI-9B*	4/27/2022	581,682.101	12,786,030.026	811.27	813.91	149.0 - 154.0	662.3 - 657.3
AREA5-RI-9C*	9/22/2021	581,677.548	12,786,025.717	811.56	814.55	218.9 - 223.9	592.7 - 587.7
AREA5-RI-11A*	11/5/2021	582,218.650	12,788,795.708	790.22	793.38	106.8 - 111.8	683.4 - 678.4
AREA5-RI-11B*	11/4/2021	582,213.511	12,788,800.232	790.38	793.39	137.0 - 142.0	653.4 - 648.4
AREA5-RI-11C*	11/2/2021	582,208.161	12,788,794.835	790.94	793.98	229.5 - 234.5	561.4 - 556.4
AREA5-RI-11D*	8/10/2021	582,200.783	12,788,794.553	791.55	794.56	259.0 - 264.0	532.6 - 527.6
HS-PMW-RI-101A	5/17/2023	592,242.212	12,785,937.426	728.54	728.35	10.3 - 15.3	718.2 - 713.2
HS-PMW-RI-101B	5/17/2023	592,238.140	12,785,937.523	728.22	728.14	79.9 - 84.9	648.3 - 643.3
HS-PMW-RI-102A	8/4/2022	584,569.915	12,786,594.601	759.33	761.74	45.1 - 50.1	714.2 - 709.2
HS-PMW-RI-102B	8/4/2022	584,564.882	12,786,591.575	759.38	761.48	99.4 - 104.4	660.0 - 655.0
HS-PMW-RI-102C	8/3/2022	584,561.047	12,786,588.820	759.27	761.51	134.3 - 139.3	625.0 - 620.0
HS-PMW-RI-102D	8/3/2022	584,556.601	12,786,585.679	759.16	761.55	174.1 - 179.1	585.1 - 580.1
HS-PMW-RI-103A*	4/14/2022	582,330.630	12,790,582.190	764.00	766.42	87.2 - 92.2	676.8 - 671.8
HS-PMW-RI-103B*	8/17/2021	582,325.637	12,790,577.931	764.37	767.11	106.0 - 111.0	658.4 - 653.4
HS-PMW-RI-104A*	4/13/2022	580,466.290	12,792,378.611	662.51	662.03	15.1 - 20.1	647.4 - 642.4
HS-PMW-RI-104B*	4/12/2022	580,471.096	12,792,379.343	662.67	662.14	45.9 - 50.9	616.8 - 611.8
HS-PMW-RI-104C*	4/12/2022	580,475.006	12,792,382.655	662.72	662.23	74.8 - 79.8	587.9 - 582.9
HS-PMW-RI-104D*	10/4/2021	580,480.945	12,792,383.735	663.18	662.44	112.1 - 117.1	551.1 - 546.1
HS-PMW-RI-105A	5/23/2023	591,935.275	12,780,567.082	744.02	743.51	25.0 - 30.0	719.0 - 714.0
HS-PMW-RI-105B	8/1/2022	591,939.940	12,780,567.250	743.62	743.03	153.4 - 158.4	590.2 - 585.2
HS-PMW-RI-106A	5/23/2023	588,417.325	12,782,126.964	761.39	760.83	45.3 - 50.3	716.1 - 711.1
HS-PMW-RI-106B	7/21/2022	588,421.766	12,782,121.241	760.99	760.38	205.3 - 210.3	555.7 - 550.7
HS-PMW-RI-107A*	4/15/2022	582,193.707	12,789,501.499	740.10	742.80	76.5 - 81.5	663.6 - 658.6
HS-PMW-RI-107B*	4/26/2022	582,196.367	12,789,496.227	740.30	742.77	172.7 - 177.7	567.6 - 562.6
HS-PMW-RI-107C*	4/25/2022	582,190.769	12,789,493.787	740.97	742.86	182.8 - 187.8	558.2 - 553.2
HS-PMW-RI-107D*	10/21/2021	582,188.539	12,789,498.168	740.70	741.58	197.8 - 202.8	542.9 - 537.9
HS-PMW-RI-108A*	3/22/2021	588,318.254	12,791,007.613	816.50	815.86	65.8 - 70.8	750.7 - 745.7
HS-PMW-RI-108B*	6/21/2021	588,323.056	12,791,000.910	816.06	815.52	132.1 - 137.1	684.0 - 679.0
HS-PMW-RI-108C*	6/23/2021	588,320.812	12,791,005.573	816.18	815.84	170.0 - 175.0	646.2 - 641.2
HS-PMW-RI-108D*	4/2/2021	588,314.821	12,791,010.252	816.19	815.86	223.3 - 228.3	592.9 - 587.9
HS-PMW-RI-109A*	8/17/2022	586,838.688	12,790,114.190	786.25	785.82	14.0 - 19.0	772.3 - 767.3
HS-PMW-RI-109B*	8/16/2022	586,838.410	12,790,118.873	786.27	785.85	125.0 - 130.0	661.3 - 656.3
HS-PMW-RI-109C*	8/17/2022	586,838.610	12,790,125.081	786.40	785.97	144.1 - 149.1	642.3 - 637.3
HS-PMW-RI-111A*	8/22/2022	573,474.319	12,796,352.706	618.91	621.60	10.2 - 15.2	608.7 - 603.7
HS-PMW-RI-111B*	8/22/2022	573,470.259	12,796,356.837	619.23	622.15	45.0 - 50.0	574.2 - 569.2
HS-PMW-RI-112A*	5/2/2022	572,436.246	12,796,783.493	619.27	618.86	24.7 - 29.7	594.6 - 589.6
HS-PMW-RI-112B*	5/2/2022	572,436.411	12,796,777.886	619.07	618.67	69.8 - 74.8	549.3 - 544.3
WV-MW-4	3/12/2018	595,780.290	12,793,867.196	852.50	854.99	130.2 - 135.2	722.3 - 717.3
WV-MW-5S	3/14/2018	597,052.598	12,795,332.001	862.10	865.01	61.5 - 66.5	800.6 - 795.6
WV-MW-5D	3/14/2018	597,048.784	12,795,329.745	862.00	865.07	68.7 - 73.7	793.3 - 788.3
WV-MW-11S	1/3/2019	597,095.569	12,791,205.030	732.80	735.89	29.4 - 34.4	703.4 - 698.4
WV-MW-11D	1/9/2019	597,100.586	12,791,204.897	733.00	735.96	158.9 - 163.9	574.1 - 569.1
WV-MW-15A	8/30/2019	595,519.838	12,787,749.709	721.50	721.25	9.0 - 14.0	712.5 - 707.5
WV-MW-15B	8/30/2019	595,523.746	12,787,750.284	721.40	721.07	33.1 - 38.1	688.3 - 683.3
WV-MW-15C	8/21/2019	595,533.155	12,787,750.383	721.30	720.84	43.7 - 48.5	677.6 - 672.8
WV-MW-15D	8/19/2019	595,528.089	12,787,750.795	721.30	721.09	135.1 - 137.8	586.2 - 583.5
AREA19-MW-8A*	4/21/2023	597,632.850	12,798,795.170	829.67	831.75	27.4 - 32.4	802.3 - 797.3
AREA19-MW-8B*	4/24/2023	597,633.039	12,798,790.053	829.64	831.76	178.7 - 183.7	650.9 - 645.9
AREA19-MW-8C*	6/6/2022	597,627.644	12,798,790.548	829.71	832.09	244.6 - 249.6	585.1 - 580.1
AREA19-MW-9A*	5/2/2023	599,116.248	12,798,320.308	796.04	795.61	19.2 - 24.2	776.8 - 771.8
AREA19-MW-9B*	5/1/2023	599,111.565	12,798,316.793	795.83	795.60	93.2 - 98.2	702.6 - 697.6
AREA19-MW-9C*	12/27/2022	599,107.959	12,798,312.617	795.81	795.32	157.5 - 162.5	638.3 - 633.3
AREA19-MW-14A*	6/23/2023	596,464.738	12,798,540.135	868.18	870.73	149.6 - 154.6	718.6 - 713.6
AREA19-MW-14B*	6/21/2023	596,465.848	12,798,548.271	868.13	870.92	163.8 - 168.8	704.3 - 699.3
AREA19-MW-15A*	5/9/2023	600,108.098	12,797,923.144	836.22	835.73	45.0 - 50.0	791.2 - 786.2
AREA19-MW-15B*	5/8/2023	600,112.932	12,797,922.684	836.30	835.79	129.1 - 134.1	707.2 - 702.2
AREA19-MW-15C*	6/17/2022	600,119.189	12,797,922.455	836.19	835.71	164.7 - 169.7	671.5 - 666.5
WV-PMW-RI-101A	8/5/2022	597,901.358	12,795,786.745	837.54	840.39	39.7 - 44.7	797.8 - 792.8
WV-PMW-RI-101B	12/5/2021	597,896.954	12,795,783.850	837.48	840.39	278.6 - 283.6	558.9 - 553.9
WV-PMW-RI-102	8/8/2022	596,518.719	12,794,482.165	841.71	844.05	44.9 - 49.9	796.8 - 791.8
WV-PMW-RI-104A	4/14/2023	597,064.304	12,789,617.868	737.05	736.68	26.0 - 31.0	711.1 - 706.1
WV-PMW-RI-104B	10/11/2022	597,065.370	12,789,613.950	736.96	736.68	130.3 - 135.3	606.7 - 601.7
WV-PMW-RI-105A	4/13/2023	595,033.049	12,788,585.342	738.89	738.39	35.0 - 40.0	703.9 - 698.9
WV-PMW-RI-105B	9/7/2022	595,036.860	12,788,585.770	739.05	738.52	79.6 - 84.6	659.5 - 654.5
WV-PMW-RI-106A	12/10/2021	592,656.313	12,798,281.349	887.97	887.37	19.1 - 24.1	868.9 - 863.9
WV-PMW-RI-106B	12/10/2021	592,653.479	12,798,277.048	887.94	887.59	34.4 - 39.4	853.5 - 848.5
WV-PMW-RI-106C	12/10/2021	592,654.380	12,798,285.292	888.26	887.79	54.4 - 59.4	833.9 - 828.9
WV-PMW-RI-106D	6/2/2021	592,651.646	12,798,282.376	888.44	888.18	70.5 - 75.5	817.9 - 812.9
WV-PMW-RI-106E	6/11/2021	592,649.865	12,798,287.003	888.45	887.94	176.5 - 181.5	712.0 - 707.0
WV-PMW-RI-107	5/25/2021	591,107.454	12,797,804.113	840.31	842.77	187 - 192	653.3 - 648.3
WV-PMW-RI-108	5/10/2023	590,028.821	12,798,918.944	797.00	800.27	9.6 - 14.6	787.4 - 782.4

NOTES:
1) Northing and easting values are in North American Datum of 1983, Michigan State Plane South Zone, International Feet.
2) Abbreviations Include:
"feet amsl" indicates feet above mean sea level (North American Vertical Datum of 1988).
"feet bgs" indicates approximate feet below ground surface.
3) Northing, easting, ground surface elevation, and top of casing elevation were surveyed by Exxel Engineering, Inc. of Grand Rapids, Michigan.
4) Screen intervals presented are based on field measurements of the completed monitoring well to the nearest tenth of a foot; therefore, readings may differ from the approximate depth interval recorded on the soil boring log.
5) "*" indicates dual purpose well.

TABLE 2
QUARTERLY GROUNDWATER AND SURFACE WATER GAUGING ELEVATIONS
Perimeter
Algoma and Plainfield Townships, Kent County, Michigan

Well	Q2 2023 4/10/2023	Q3 2023 7/10/2023	Q4 2023 10/2/2023	Q1 2024 1/8/2024
AREA11-RI-1A	624.02	[1]	623.52	622.82
AREA11-RI-1B	624.04	625.20	624.28	623.71
AREA11-RI-1C	624.09	625.17	624.26	623.70
AREA12-RI-1	626.41	625.20	624.92	625.03
AREA12-RI-3	629.68	629.00	628.58	628.35
AREA19-GSI-1	[2]	697.60	697.32	697.56
AREA19-GSI-2	[2]	691.19	690.77	691.04
AREA19-GSI-3	[2]	690.87	690.51	690.65
AREA19-MW-11C	[4]	714.93	714.25	714.23
AREA19-MW-12C	[4]	710.13	709.55	709.71
AREA19-MW-13A	759.82	761.05	761.29	760.48
AREA19-MW-13B	732.53	733.01	732.54	731.72
AREA19-MW-13C	732.43	732.91	732.45	731.62
AREA19-MW-14A	[3]	735.55	736.43	737.02
AREA19-MW-14B	[3]	758.95	736.49	737.20
AREA19-MW-15A	[3]	793.75	793.14	792.60
AREA19-MW-15B	[3]	738.36	742.19	744.64
AREA19-MW-15C	751.18	738.21	742.03	744.63
AREA19-MW-16A	[3]	783.54	781.99	781.92
AREA19-MW-16B	[3]	779.25	777.78	777.77
AREA19-MW-16C	[3]	728.76	727.84	727.86
AREA19-MW-2	874.39	869.61	869.63	870.95
AREA19-MW-221A	697.49	695.17	694.81	695.23
AREA19-MW-221B	697.64	695.97	695.76	695.98
AREA19-MW-222	693.43	691.62	691.41	692.00
AREA19-MW-223	693.46	691.02	690.63	690.93
AREA19-MW-224	695.15	693.19	692.65	694.00
AREA19-MW-225A	700.06	698.17	697.93	698.27
AREA19-MW-225B	700.84	699.01	698.74	699.13
AREA19-MW-226A	[3]	702.37	702.14	702.59
AREA19-MW-226B	704.24	702.46	702.27	702.67
AREA19-MW-3	[3]	726.24	725.86	725.43
AREA19-MW-4A	[3]	[3]	725.17	724.66
AREA19-MW-4B	[3]	[3]	725.20	724.70
AREA19-MW-5C	[4]	727.48	726.92	726.32
AREA19-MW-6A	[3]	714.91	713.97	713.13
AREA19-MW-6B	[3]	714.08	713.19	712.76
AREA19-MW-6C	[3]	713.93	713.06	712.72
AREA19-MW-7A	700.07	698.29	697.92	698.19
AREA19-MW-7B	706.67	Artesian	Artesian	Artesian
AREA19-MW-8A	[3]	800.96	799.73	799.08
AREA19-MW-8B	[3]	738.57	740.08	741.65
AREA19-MW-8C	725.71	717.98	719.93	722.55
AREA19-MW-9A	[3]	790.78	790.06	790.77
AREA19-MW-9B	[3]	738.66	742.46	744.90
AREA19-MW-9C	748.02	739.48	743.04	745.18
AREA5-RI-10A	701.46	702.27	702.25	701.79
AREA5-RI-10B	703.04	703.83	703.76	703.29
AREA5-RI-10C	693.78	694.40	694.18	693.78
AREA5-RI-10D	693.71	694.37	694.13	693.71
AREA5-RI-11A	696.56	697.37	697.29	697.24
AREA5-RI-11B	696.93	697.74	697.65	696.89
AREA5-RI-11C	687.75	688.28	688.00	687.65
AREA5-RI-11D	686.88	687.37	687.10	686.76
AREA5-RI-1A	649.51	649.10	648.16	648.26
AREA5-RI-1B	653.80	653.36	652.68	652.69
AREA5-RI-1C	659.09	658.62	658.18	657.94
AREA5-RI-2A	691.26	689.39	688.81	689.36
AREA5-RI-2B	691.48	689.60	689.02	689.57
AREA5-RI-3A	660.77	658.47	659.71	659.47
AREA5-RI-3B	659.40	658.96	658.44	658.25
AREA5-RI-4A	693.45	689.72	688.67	689.71
AREA5-RI-4B	692.28	689.39	688.68	689.44
AREA5-RI-5A	652.21	649.38	647.60	646.91

TABLE 2
QUARTERLY GROUNDWATER AND SURFACE WATER GAUGING ELEVATIONS
Perimeter
Algoma and Plainfield Townships, Kent County, Michigan

Well	Q2 2023 4/10/2023	Q3 2023 7/10/2023	Q4 2023 10/2/2023	Q1 2024 1/8/2024
AREA5-RI-5B	648.64	644.81	642.52	641.59
AREA5-RI-6	629.20	628.64	627.53	627.46
AREA5-RI-7A	636.18	635.03	633.43	632.69
AREA5-RI-7B	638.56	636.69	635.25	634.81
AREA5-RI-8A	704.72	705.56	705.49	704.99
AREA5-RI-8B	704.60	705.43	705.34	704.84
AREA5-RI-8C	700.62	701.35	701.20	700.71
AREA5-RI-9A	717.84	718.66	718.51	717.69
AREA5-RI-9B	703.63	704.41	704.29	703.73
AREA5-RI-9C	703.79	704.55	704.43	703.88
AREA6-RI-1A	681.02	681.46	681.18	680.56
AREA6-RI-1B	680.45	680.89	680.57	679.94
AREA6-RI-3A	708.88	709.06	708.67	708.27
AREA6-RI-3B	666.62	666.62	666.76	666.23
AREA6-RI-3C	666.64	667.06	666.79	666.26
AREA6-RI-3D	667.06	667.48	667.19	666.68
AREA6-RI-4A	757.95	757.27	757.35	756.47
AREA6-RI-4B	739.81	736.34	738.98	739.59
AREA6-RI-4C	735.18	736.19	738.82	739.43
AREA6-RI-4D	740.73	736.12	738.67	739.45
HS-GSI-1	631.40	630.57	630.40	630.58
HS-GSI-2	[2]	625.09	624.92	625.04
HS-GSI-3	618.60	617.79	617.65	617.84
HS-GSI-4	[2]	608.84	608.68	608.86
HS-GSI-5	[2]	608.95	608.77	609.05
HS-GSI-6	[2]	606.01	605.82	607.01
HS-GSI-7	[2]	605.74	605.52	606.80
HS-GSI-8	[2]	606.11	605.56	606.98
HS-GSI-9	[2]	716.25	715.83	716.78
HS-MW-10D	731.05	729.56	730.37	730.64
HS-MW-10M	722.47	723.09	722.66	722.19
HS-MW-10S	722.46	723.11	722.66	722.18
HS-MW-11D	716.03	716.65	716.33	715.83
HS-MW-11M	716.00	716.65	716.31	715.86
HS-MW-11S	716.89	717.36	717.02	716.57
HS-MW-12A	705.97	705.75	705.02	704.44
HS-MW-12B	702.38	702.16	701.63	701.12
HS-MW-12C	683.10	683.69	683.35	682.86
HS-MW-12D	683.45	684.04	683.69	683.20
HS-MW-12E	683.37	683.29	683.72	683.38
HS-MW-13A	667.80	668.24	667.88	667.43
HS-MW-13B	667.85	668.29	667.95	667.46
HS-MW-13C	668.36	668.78	668.44	667.97
HS-MW-14D	659.57	659.30	658.97	658.79
HS-MW-14M	655.73	660.43	660.06	660.01
HS-MW-14S	656.63	656.04	655.80	655.81
HS-MW-15D	635.57	634.74	634.34	634.38
HS-MW-15M	634.38	633.60	633.16	632.51
HS-MW-15S	630.89	629.61	629.21	629.38
HS-MW-17D	686.50	687.09	686.75	686.33
HS-MW-17M	686.57	687.14	686.83	686.39
HS-MW-17S	700.28	701.05	700.93	700.50
HS-MW-18D	662.26	662.37	661.92	656.61
HS-MW-18S	667.28	666.68	665.87	665.52
HS-MW-19D	652.51	649.95	649.11	649.25
HS-MW-19S	653.83	651.89	651.01	651.27
HS-MW-20D	648.62	648.73	648.24	647.81
HS-MW-20M	648.72	648.82	648.35	647.90
HS-MW-20S	648.74	648.86	648.38	647.94
HS-MW-21D	638.67	638.09	637.60	637.17
HS-MW-21M	637.56	637.31	636.83	636.46
HS-MW-21S	637.81	637.56	637.16	636.77
HS-MW-23A	720.62	721.10	720.74	720.32
HS-MW-23B	720.58	721.06	720.72	720.29

TABLE 2
QUARTERLY GROUNDWATER AND SURFACE WATER GAUGING ELEVATIONS
Perimeter
Algoma and Plainfield Townships, Kent County, Michigan

Well	Q2 2023 4/10/2023	Q3 2023 7/10/2023	Q4 2023 10/2/2023	Q1 2024 1/8/2024
HS-MW-23C	720.65	721.10	720.76	720.34
HS-MW-23D	720.57	721.02	720.68	720.26
HS-MW-24A	722.85	721.61	721.37	721.36
HS-MW-24B	721.81	721.57	721.32	721.33
HS-MW-25D	628.73	627.18	626.59	626.48
HS-MW-25S	628.83	627.28	626.67	626.57
HS-MW-260	628.37	627.46	627.28	627.45
HS-MW-261	627.67	626.91	626.73	626.87
HS-MW-262	626.74	626.21	625.03	626.14
HS-MW-263A	622.81	622.17	622.11	622.18
HS-MW-263B	623.78	622.62	622.39	622.54
HS-MW-264	617.98	616.18	615.94	616.04
HS-MW-265	[2]	605.77	605.58	606.81
HS-MW-266A	632.63	632.68	632.40	632.33
HS-MW-266B	632.70	632.76	632.45	632.40
HS-MW-26D	640.30	638.15	636.07	635.39
HS-MW-26M	640.18	637.97	635.90	635.20
HS-MW-26S	635.88	635.61	633.61	633.18
HS-MW-27A	Dry	Dry	Dry	Dry
HS-MW-27B	644.25	643.11	642.68	641.96
HS-MW-27C	645.28	643.94	643.59	642.87
HS-MW-27D	645.67	644.16	643.82	643.43
HS-MW-27E	645.63	644.17	643.77	643.07
HS-MW-28A	629.45	629.09	628.66	628.44
HS-MW-28B	629.48	629.12	[6]	628.47
HS-MW-28C	629.41	629.05	628.62	628.42
HS-MW-28D	630.37	629.94	629.43	629.18
HS-MW-28E	630.46	630.07	629.55	629.27
HS-MW-29A	627.70	626.88	626.69	626.83
HS-MW-29B	627.93	627.10	626.92	[4]
HS-MW-29C	627.79	626.97	626.78	626.91
HS-MW-29D	627.72	626.90	626.73	[4]
HS-MW-30A	630.85	630.53	630.04	629.78
HS-MW-30B	630.87	630.53	630.05	629.75
HS-MW-30C	631.14	631.02	630.55	630.18
HS-MW-30D	631.26	631.20	630.72	630.35
HS-MW-30E	631.24	631.22	630.74	630.34
HS-MW-31A	623.01	623.54	623.06	622.30
HS-MW-31B	623.22	623.77	622.85	622.30
HS-MW-31C	623.01	623.54	623.07	622.54
HS-MW-31D	622.87	623.40	622.52	622.18
HS-MW-31E	622.90	623.46	622.77	622.21
HS-MW-32A	[2]	719.35	719.05	719.47
HS-MW-32B	[2]	719.35	719.07	719.46
HS-MW-32C	[2]	719.49	719.22	719.64
HS-MW-32D	[2]	719.27	719.00	719.41
HS-MW-8	721.02	721.56	721.17	720.75
HS-MW-9D	741.47	737.52	740.28	740.88
HS-MW-9M	741.31	737.35	740.11	740.72
HS-MW-9S	793.28	792.74	792.84	792.50
HS-PMW-16A	691.94	693.01	692.61	691.97
HS-PMW-16B	692.13	693.20	692.79	692.14
HS-PMW-16C	689.29	690.19	689.96	689.22
HS-PMW-22	[3]	739.47	741.21	741.48
HS-PMW-RI-101A	[3]	720.14	719.65	720.21
HS-PMW-RI-101B	[3]	719.16	718.87	719.33
HS-PMW-RI-102A	718.29	718.58	718.22	717.79
HS-PMW-RI-102B	718.03	718.56	718.21	717.75
HS-PMW-RI-102C	718.01	718.55	718.20	717.74
HS-PMW-RI-102D	718.02	718.55	718.22	717.75
HS-PMW-RI-103A	691.16	691.58	691.35	691.11
HS-PMW-RI-103B	690.31	690.77	690.56	690.29
HS-PMW-RI-104A	648.81	648.67	648.23	647.86
HS-PMW-RI-104B	646.82	648.68	648.25	647.86

TABLE 2
QUARTERLY GROUNDWATER AND SURFACE WATER GAUGING ELEVATIONS
Perimeter
Algoma and Plainfield Townships, Kent County, Michigan

Well	Q2 2023 4/10/2023	Q3 2023 7/10/2023	Q4 2023 10/2/2023	Q1 2024 1/8/2024
HS-PMW-RI-104C	648.85	648.73	648.28	647.93
HS-PMW-RI-104D	655.16	654.99	654.59	654.33
HS-PMW-RI-105A	[3]	720.93	720.62	720.98
HS-PMW-RI-105B	732.13	730.68	729.50	731.61
HS-PMW-RI-106A	[3]	723.73	723.54	723.53
HS-PMW-RI-106B	723.17	722.97	722.77	722.80
HS-PMW-RI-107A	694.02	694.70	694.53	694.15
HS-PMW-RI-107B	680.12	680.48	680.18	679.84
HS-PMW-RI-107C	680.09	680.47	680.13	679.81
HS-PMW-RI-107D	678.44	678.81	678.50	678.17
HS-PMW-RI-108A	799.77	799.85	799.45	798.62
HS-PMW-RI-108B	740.50	737.36	[6]	740.55
HS-PMW-RI-108C	[5]	[5]	[5]	[5]
HS-PMW-RI-108D	741.43	737.51	740.16	740.81
HS-PMW-RI-109A	777.32	776.69	776.26	776.81
HS-PMW-RI-109B	720.82	721.85	721.38	720.86
HS-PMW-RI-109C	721.08	722.06	721.62	719.10
HS-PMW-RI-110A	630.21	631.00	630.45	629.82
HS-PMW-RI-110B	630.08	630.88	630.32	629.67
HS-PMW-RI-111A	616.04	613.44	612.99	613.14
HS-PMW-RI-111B	616.25	613.65	613.20	613.38
HS-PMW-RI-112A	616.30	609.52	609.20	609.74
HS-PMW-RI-112B	616.19	609.50	609.20	609.74
WV/CH-GSI-1	675.47	675.00	674.85	674.97
WV/CH-GSI-2	672.16	671.36	671.15	671.16
WV/CH-MW-240	684.56	683.27	682.92	682.73
WV/CH-MW-241A	685.05	682.31	681.39	679.63
WV/CH-MW-241B	684.54	682.13	681.29	679.83
WV/CH-MW-242A	678.89	678.23	677.76	677.77
WV/CH-MW-242B	697.74	695.95	696.71	696.79
WV-MW-1	757.30	754.20	755.89	755.76
WV-MW-10D	747.91	743.89	745.92	746.85
WV-MW-10M	746.75	743.00	744.99	745.60
WV-MW-10S	741.04	738.64	738.22	737.37
WV-MW-11D	743.96	Artesian	Artesian	Artesian
WV-MW-11S	724.46	724.54	723.16	722.60
WV-MW-12D	716.77	714.81	714.32	714.59
WV-MW-12M	716.71	714.74	714.29	714.52
WV-MW-12S	721.49	720.84	719.76	719.16
WV-MW-13D	800.15	801.14	800.63	800.03
WV-MW-13M	820.93	819.36	818.42	818.52
WV-MW-13S	820.73	819.32	818.44	818.66
WV-MW-14D	730.55	730.69	730.53	730.57
WV-MW-14S	861.84	859.80	859.45	859.95
WV-MW-15A	718.67	716.34	715.87	716.27
WV-MW-15B	718.50	716.18	715.74	716.11
WV-MW-15C	718.42	716.12	715.66	716.03
WV-MW-15D	729.09	Artesian	Artesian	Artesian
WV-MW-16D	759.83	756.81	758.35	759.14
WV-MW-16S	815.33	814.77	814.57	814.59
WV-MW-2D	784.65	783.73	783.90	783.98
WV-MW-2S	790.03	789.95	789.92	789.92
WV-MW-3D	799.00	799.89	799.41	798.87
WV-MW-3S	819.03	817.62	817.01	817.42
WV-MW-4	752.90	747.06	749.93	751.66
WV-MW-5D	799.24	800.35	799.82	799.22
WV-MW-5S	799.38	800.50	799.97	799.37
WV-MW-6D	764.06	759.83	760.38	760.88
WV-MW-6S	780.63	778.55	778.09	778.18
WV-MW-7D	715.07	713.03	712.49	713.06
WV-MW-7M	715.07	712.99	712.49	713.07
WV-MW-7S	715.07	712.98	712.46	713.02
WV-MW-8D	753.43	750.99	752.24	752.94
WV-MW-8M	819.81	820.58	820.12	819.31

TABLE 2
QUARTERLY GROUNDWATER AND SURFACE WATER GAUGING ELEVATIONS
Perimeter
Algoma and Plainfield Townships, Kent County, Michigan

Well	Q2 2023 4/10/2023	Q3 2023 7/10/2023	Q4 2023 10/2/2023	Q1 2024 1/8/2024
WV-MW-8S	819.77	820.56	820.08	819.27
WV-MW-9	822.51	822.48	822.27	821.28
WVNW-GSI-1	711.90	710.64	710.49	710.94
WVNW-GSI-2	[2]	712.09	711.67	712.42
WVNW-MW-200A	717.75	715.59	715.10	715.38 [7]
WVNW-MW-200B	717.69	715.56	715.04	715.25
WVNW-MW-201A	714.79	712.64	712.19	712.84
WVNW-MW-201B	714.79	712.61	712.15	712.81
WVNW-MW-201C	714.76	712.61	712.15	712.80
WVNW-MW-202A	714.32	712.37	711.89	712.46
WVNW-MW-202B	714.29	712.42	711.93	712.49
WVNW-MW-203	714.89	712.84	712.31	712.89
WV-PMW-RI-101A	801.26	802.41	801.73	801.04
WV-PMW-RI-101B	729.71	720.10	723.73	728.02
WV-PMW-RI-102	797.76	798.85	798.27	[4]
WV-PMW-RI-104A	[3]	715.65	714.98	715.13
WV-PMW-RI-104B	721.63	719.85	719.70	719.97
WV-PMW-RI-105A	[3]	716.81	716.25	716.52
WV-PMW-RI-105B	721.68	720.08	719.63	719.80
WV-PMW-RI-106A	880.89	878.53	877.72	878.85
WV-PMW-RI-106B	881.51	879.16	878.40	879.48
WV-PMW-RI-106C	881.48	879.14	878.34	879.41
WV-PMW-RI-106D	877.58	871.50	869.50	870.42
WV-PMW-RI-106E	747.15	746.05	746.47	747.07
WV-PMW-RI-107	743.87	740.37	742.12	743.39
WV-PMW-RI-108	[3]	789.39	788.19	787.88

Staff Gauge	Q2 2023 4/10/2023	Q3 2023 7/10/2023	Q4 2023 10/2/2023	Q1 2024 1/8/2024
11 Mile Road Bridge	714.85	712.97	712.72	713.13
12 Mile Road Bridge	707.44	705.84	705.62	706.02
Algoma Avenue Bridge	710.99	709.44	709.15	709.56
Jericho Avenue Bridge	671.11	670.23	670.03	670.23
Rogue River Road Bridge	617.95	617.50	617.34	617.45
Dam Seawall	680.16	679.04	678.80	679.06
East Bridge Street Bridge	679.72	678.86	678.64	678.83
TA-SG-RC	[4]	691.97	691.48	691.49
USGS04118500	629.75 [8]	628.49 [8]	628.21 [8]	629.18 [8]

Notes:

[1] indicates could not locate.
[2] indicates inaccessable due to snow/icy conditions, high river level, or road closure.
[3] indicates not installed at time of measurement event.
[4] indicates not measured.
[5] indicates not measured because the well was damaged when grout blew into the screen.
[6] indicates recorded water depth was anomalous and was not used for contouring.
[7] indicates reading from 1/9/2024 because the reading entered during 1/8/2024 measurement event was anomalous.
[8] indicates readings were provided by the United States Geological Survey:
https://waterdata.usgs.gov/monitoring-location/04118500/#parameterCode=00065&period=P7D&showMedian=false

TABLE 3
SUMMARY OF VAP GROUNDWATER SAMPLE ANALYSIS - PFAS
Perimeter
Algoma & Plainfield Townships, Kent County, Michigan

Sample Event	Part 201 Generic Residential Groundwater Cleanup Criteria - Drinking Water[2]	Area 6 (Dual Purpose)	Area 6 (Dual Purpose)	Area 6 (Dual Purpose)	Area 6 (Dual Purpose)	Area 6 (Dual Purpose)	Area 6 (Dual Purpose)	Area 6 (Dual Purpose)	Area 6 (Dual Purpose)	Area 6 (Dual Purpose)	Area 6 (Dual Purpose)	Perimeter	Perimeter	Area 5 (Dual Purpose)	Area 5 (Dual Purpose)	Area 5 (Dual Purpose)	Area 5 (Dual Purpose)
Vertical Aquifer Profiling (VAP) Location		HS-PMW-16	HS-PMW-16	HS-PMW-16	HS-PMW-16	HS-PMW-16	HS-PMW-16	HS-PMW-16	HS-PMW-16	HS-PMW-16	HS-PMW-16	HS-PMW-22	HS-PMW-22	AREA5-RI-3	AREA5-RI-3	AREA5-RI-3	AREA5-RI-3
Sample Name		HS-PMW-16 (79-84)	HS-PMW-16 (89-94)	HS-PMW-16 (89-94) DUP	HS-PMW-16 (99-104)	HS-PMW-16 (109-114)	HS-PMW-16 (119-124)	HS-PMW-16 (129-134)	HS-PMW-16 (139-144)	HS-PMW-16 (149-154)	HS-PMW-16-(159-164)	HS-PMW-22 (169-174)	HS-PMW-22 (179-184)	AREA 5-RI-3 (40-45)	AREA 5-RI-3 (50-55)	AREA 5-RI-3 (50-55) DUP	AREA 5-RI-3 (60-65)
Screen Interval (feet below ground surface)		79-84	89-94	89-94	99-104	109-114	119-124	129-134	139-144	149-154	159-164	169-174	179-184	40-45	50-55	50-55	60-65
Laboratory Sample ID		YA05006-001	YA05006-002	YA05006-003	YA05006-004	YA05006-005	YA05006-006	YA05006-007	YA05006-008	YA05006-009	YA06006-001	YC14007-001	YC14007-002	WG29022-001	WG29022-002	WG29022-003	WG29022-004
Sample Date		12/30/2022	12/30/2022	12/30/2022	01/03/2023	01/03/2023	01/03/2023	01/04/2023	01/04/2023	01/04/2023	01/05/2023	03/02/2023	03/02/2023	07/27/2021	07/27/2021	07/27/2021	07/27/2021
Parameter (µg/L)																	
9-chlorohexadecafluoro-3-oxanone-1-sulfonic acid (9Cl-PF3ONS)	NCL	<0.0067	<0.0068	<0.0068	<0.007	<0.0072	<0.007	<0.0069	<0.007	<0.0069	<0.0069	<0.0067	<0.0067	<0.007	<0.0067	<0.0068	<0.0071
11-chloroeicosafluoro-3-oxaundecane-1-sulfonic acid (11CL-PF3OUdS)	NCL	<0.0067	<0.0068	<0.0068	<0.007	<0.0072	<0.007	<0.0069	<0.007	<0.0069	<0.0069	<0.0067	<0.0067	<0.007	<0.0067	<0.0068	<0.0071
4,8-dioxa-3H-perfluorononanoic acid (ADONA)	NCL	<0.0067	<0.0068	<0.0068	<0.007	<0.0072	<0.007	<0.0069	<0.007	<0.0069	<0.0069	<0.0067	<0.0067	<0.007	<0.0067	<0.0068	<0.0071
1H,1H,2H,2H-perfluorohexane sulfonate (4:2FTS)	NCL	<0.0067	<0.0068	<0.0068	<0.007	<0.0072	<0.007	<0.0069	<0.007	<0.0069	<0.0069	<0.0067	<0.0067	<0.007	<0.0067	<0.0068	<0.0071
6:2 Fluorotelomer sulfonic acid (6:2 FTS)	NCL	0.025	<0.0068	0.0068	<0.007	<0.0072	<0.007	<0.0069	<0.007	<0.0069	<0.0069	<0.0067	<0.0067	<0.007	<0.0067	<0.0068	<0.0071
8:2 Fluorotelomer sulfonic acid (8:2 FTS)	NCL	<0.0067	<0.0068	<0.0068	<0.007	<0.0072	<0.007	<0.0069	<0.007	<0.0069	<0.0069	<0.0067	<0.0067	<0.007	<0.0067	<0.0068	<0.0071
N-ethylperfluoro-1-octanesulfonamidoacetic acid (EtFOSAA)	NCL	<0.0067	<0.0068	<0.0068	<0.007	<0.0072	<0.007	<0.0069	<0.007	<0.0069	<0.0069	<0.0067	<0.0067	<0.007	<0.0067	<0.0068	<0.0071
N-methylperfluoro-1-octanesulfonamidoacetic acid (MeFOSAA)	NCL	<0.0067	<0.0068	<0.0068	<0.007	<0.0072	<0.007	<0.0069	<0.007	<0.0069	<0.0069	<0.0067	<0.0067	<0.007	<0.0067	<0.0068	<0.0071
Perfluorobutane sulfonic acid (PFBS)	0.42 (A)	0.0072	0.0061	0.0061	0.0066	0.0072	0.0058	0.0067	0.0045	0.0039	<0.0035	0.0068	0.0061	0.0045	0.0036	<0.0034	0.004
Perfluorodecane sulfonic acid (PFDS)	NCL	<0.0034	<0.0034	<0.0034	<0.0035	<0.0036	<0.0035	<0.0034	<0.0035	<0.0035	<0.0035	<0.0034	<0.0033	<0.0035	<0.0033	<0.0034	<0.0035
Perfluoroheptane sulfonic acid (PFHpS)	NCL	<0.0034	<0.0034	<0.0034	<0.0035	<0.0036	<0.0035	<0.0034	<0.0035	<0.0035	<0.0035	<0.0034	<0.0033	<0.0035	<0.0033	<0.0034	<0.0035
Perfluorononane sulfonic acid (PFNS)	NCL	<0.0034	<0.0034	<0.0034	<0.0035	<0.0036	<0.0035	<0.0034	<0.0035	<0.0035	<0.0035	<0.0034	<0.0033	<0.0035	<0.0033	<0.0034	<0.0035
Perfluorooctane sulfonamide (FOSA)	NCL	<0.0034	<0.0034	<0.0034	<0.0035	<0.0036	<0.0035	<0.0034	<0.0035	<0.0035	<0.0035	<0.0034	<0.0033	<0.0035	<0.0033	<0.0034	<0.0035
Perfluoropentane sulfonic acid (PFPeS)	NCL	<0.0034	<0.0034	<0.0034	<0.0035	<0.0036	<0.0035	<0.0034	<0.0035	<0.0035	<0.0035	<0.0034	<0.0033	<0.0035	<0.0033	<0.0034	<0.0035
Perfluorohexane sulfonic acid (PFHxS)	0.051 (A)	<0.0034	<0.0034	<0.0034	<0.0035	<0.0036	<0.0035	<0.0034	<0.0035	<0.0035	<0.0035	<0.0034	<0.0033	<0.0035	<0.0033	<0.0034	<0.0035
Perfluorobutanoic acid (PFBA)	NCL	<0.0034	0.0037	0.0038	<0.0035	<0.0036	<0.0035	<0.0034	<0.0035	0.004	<0.0035	<0.0034	<0.0033	<0.0035	<0.0033	<0.0034	<0.0035
Perfluorodecanoic acid (PFDA)	NCL	<0.0034	<0.0034	<0.0034	<0.0035	<0.0036	<0.0035	<0.0034	<0.0035	<0.0035	<0.0035	<0.0034	<0.0033	<0.0035	<0.0033	<0.0034	<0.0035
Perfluorododecanoic acid (PFDoDA)	NCL	<0.0034	<0.0034	<0.0034	<0.0035	<0.0036	<0.0035	<0.0034	<0.0035	<0.0035	<0.0035	<0.0034	<0.0033	<0.0035	<0.0033	<0.0034	<0.0035
Perfluoroheptanoic acid (PFHpA)	NCL	<0.0034	<0.0034	<0.0034	<0.0035	<0.0036	<0.0035	<0.0034	<0.0035	<0.0035	<0.0035	<0.0034	<0.0033	<0.0035	<0.0033	<0.0034	<0.0035
Perfluorohexanoic acid (PFHxA)	400 (A)	<0.0034	0.0055	0.0054	0.004	0.0061	0.0037	<0.0034	<0.0035	0.0066	0.0039	<0.0034	<0.0033	<0.0035	<0.0033	<0.0034	<0.0035
Perfluorononanoic acid (PFNA)	0.006 (A)	<0.0034	<0.0034	<0.0034	<0.0035	<0.0036	<0.0035	<0.0034	<0.0035	<0.0035	<0.0035	<0.0034	<0.0033	<0.0035	<0.0033	<0.0034	<0.0035
Perfluorooctanoic acid (PFOA)	0.008 (A)	<0.0034	0.0038	0.0041	0.0068	0.0058	0.0053	0.0041	<0.0035	<0.0035	<0.0035	0.0051	<0.0033	<0.0035	<0.0033	<0.0034	<0.0035
Perfluorooctane sulfonic acid (PFOS)	0.016 (A)	<0.0034	<0.0034	<0.0034	<0.0035	<0.0036	<0.0035	<0.0034	<0.0035	<0.0035	<0.0035	<0.0034	<0.0033	<0.0035	<0.0033	<0.0034	<0.0035
Perfluoropentanoic acid (PFPeA)	NCL	<0.0034	0.0042	0.0043	0.0038	0.0064	<0.0035	<0.0034	0.0046	0.0099	0.0057	<0.0034	<0.0033	<0.0035	<0.0033	<0.0034	<0.0035
Perfluorotetradecanoic acid (PFTeDA)	NCL	<0.0034	<0.0034	<0.0034	<0.0035	<0.0036	<0.0035	<0.0034	<0.0035	<0.0035	<0.0035	<0.0034	<0.0033	<0.0035	<0.0033	<0.0034	<0.0035
Perfluorotridecanoic acid (PFTrDA)	NCL	<0.0034	<0.0034	<0.0034	<0.0035	<0.0036	<0.0035	<0.0034	<0.0035	<0.0035	<0.0035	<0.0034	<0.0033	<0.0035	<0.0033	<0.0034	<0.0035
Perfluoroundecanoic acid (PFUnDA)	NCL	<0.0034	<0.0034	<0.0034	<0.0035	<0.0036	<0.0035	<0.0034	<0.0035	<0.0035	<0.0035	<0.0034	<0.0033	<0.0035	<0.0033	<0.0034	<0.0035
Tetrafluoro-2-(heptafluoropropoxy)propanoic acid (GenX)	0.37 (A)	<0.0067	<0.0068	<0.0068	<0.007	<0.0072	<0.007	<0.0069	<0.007	<0.0069	<0.0069	<0.0067	<0.0067	<0.007	<0.0067	<0.0068	<0.0071

TABLE 3
SUMMARY OF VAP GROUNDWATER SAMPLE ANALYSIS - PFAS
Perimeter
Algoma & Plainfield Townships, Kent County, Michigan

Sample Event	Part 201 Generic Residential Groundwater Cleanup Criteria - Drinking Water[2]	Area 5 (Dual Purpose)	Area 5 (Dual Purpose)	Area 5 (Dual Purpose)	Area 5 (Dual Purpose)	Area 5 (Dual Purpose)	Area 5 (Dual Purpose)	Area 5 (Dual Purpose)	Area 5 (Dual Purpose)	Area 5 (Dual Purpose)	Area 5 (Dual Purpose)	Area 5 (Dual Purpose)	Area 5 (Dual Purpose)	Area 5 (Dual Purpose)	Area 5 (Dual Purpose)	Area 5 (Dual Purpose)	Area 5 (Dual Purpose)
Vertical Aquifer Profiling (VAP) Location		AREA5-RI-3	AREA5-RI-3	AREA5-RI-3	AREA5-RI-8	AREA5-RI-8	AREA5-RI-8	AREA5-RI-8	AREA5-RI-8	AREA5-RI-8	AREA5-RI-8	AREA5-RI-8	AREA5-RI-8	AREA5-RI-8	AREA5-RI-8	AREA5-RI-9	AREA5-RI-9	AREA5-RI-9
Sample Name		AREA 5-RI-3 (70-75)	Area5-RI-3 (95-100)	Area5-RI-3 (105-110)	Area 5-RI-8 (84-89)	Area 5-RI-8 (94-99)	Area 5-RI-8 (104-109)	Area 5-RI-8 (114-119)	Area 5-RI-8 (124-129)	Area 5-RI-8 (134-139)	Area 5-RI-8 (144-149)	Area 5-RI-8 (154-159)	Area 5-RI-8 (164-169)	Area 5-RI-8 (172-177)	Area 5-RI-9 (95-100)	Area 5-RI-9 (130-135)	Area 5-RI-9 (140-145)
Screen Interval (feet below ground surface)		70-75	95-100	105-110	84-89	94-99	104-109	114-119	124-129	134-139	144-149	154-159	164-169	172-177	95-100	130-135	140-145
Laboratory Sample ID		WG29022-005	WG31009-001	WG31009-002	WE07121-001	WE07121-002	WE07121-003	WE07121-004	WE07121-005	WE07121-006	WE07121-007	WE07121-008	WE12031-001	WE12031-002	WI21007-001	WI21007-002	WI21007-003
Sample Date		07/27/2021	07/29/2021	07/29/2021	05/04/2021	05/05/2021	05/05/2021	05/05/2021	05/06/2021	05/06/2021	05/06/2021	05/06/2021	05/07/2021	05/10/2021	09/15/2021	09/15/2021	09/16/2021
Parameter (µg/L)																	
9-chlorohexadecafluoro-3-oxanone-1-sulfonic acid (9Cl-PF3ONS)	NCL	<0.0067	<0.0071	<0.0069	<0.0068	<0.0069	<0.0071	<0.0069	<0.0072	<0.0072	<0.007	<0.0068	<0.0071	<0.007	<0.0067	<0.0069	<0.0069
11-chloroeicosafluoro-3-oxaundecane-1-sulfonic acid (11CL-PF3OUdS)	NCL	<0.0067	<0.0071	<0.0069	<0.0068	<0.0069	<0.0071	<0.0069	<0.0072	<0.0072	<0.007	<0.0068	<0.0071	<0.007	<0.0067	<0.0069	<0.0069
4,8-dioxa-3H-perfluorononanoic acid (ADONA)	NCL	<0.0067	<0.0071	<0.0069	<0.0068	<0.0069	<0.0071	<0.0069	<0.0072	<0.0072	<0.007	<0.0068	<0.0071	<0.007	<0.0067	<0.0069	<0.0069
1H,1H,2H,2H-perfluorohexane sulfonate (4:2FTS)	NCL	<0.0067	<0.0071	<0.0069	<0.0068	<0.0069	<0.0071	<0.0069	<0.0072	<0.0072	<0.007	<0.0068	<0.0071	<0.007	<0.0067	<0.0069	<0.0069
6:2 Fluorotelomer sulfonic acid (6:2 FTS)	NCL	<0.0067	<0.0071	<0.0069	<0.0068	<0.0069	<0.0071	<0.0069	<0.0072	<0.0072	<0.007	<0.0068	<0.0071	<0.007	<0.0067	<0.0069	<0.0069
8:2 Fluorotelomer sulfonic acid (8:2 FTS)	NCL	<0.0067	<0.0071	<0.0069	<0.0068	<0.0069	<0.0071	<0.0069	<0.0072	<0.0072	<0.007	<0.0068	<0.0071	<0.007	<0.0067	<0.0069	<0.0069
N-ethylperfluoro-1-octanesulfonamidoacetic acid (EtFOSAA)	NCL	<0.0067	<0.0071	<0.0069	<0.0068	<0.0069	<0.0071	<0.0069	<0.0072	<0.0072	<0.007	<0.0068	<0.0071	<0.007	<0.0067	<0.0069	<0.0069
N-methylperfluoro-1-octanesulfonamidoacetic acid (MeFOSAA)	NCL	<0.0067	<0.0071	<0.0069	<0.0068	<0.0069	<0.0071	<0.0069	<0.0072	<0.0072	<0.007	<0.0068	<0.0071	<0.007	<0.0067	<0.0069	<0.0069
Perfluorobutane sulfonic acid (PFBS)	0.42 (A)	<0.0034	<0.0035	<0.0034	0.0067	0.0045	<0.0035	<0.0035	<0.0036	<0.0036	0.0038	<0.0034	0.0074	0.0055	0.0051	<0.0035	<0.0034
Perfluorodecane sulfonic acid (PFDS)	NCL	<0.0034	<0.0035	<0.0034	<0.0034	<0.0034	<0.0035	<0.0035	<0.0036	<0.0036	<0.0035	<0.0034	<0.0035	<0.0035	<0.0034	<0.0035	<0.0034
Perfluoroheptane sulfonic acid (PFHpS)	NCL	<0.0034	<0.0035	<0.0034	<0.0034	<0.0034	<0.0035	<0.0035	<0.0036	<0.0036	<0.0035	<0.0034	<0.0035	<0.0035	0.0039	<0.0035	<0.0034
Perfluorononane sulfonic acid (PFNS)	NCL	<0.0034	<0.0035	<0.0034	<0.0034	<0.0034	<0.0035	<0.0035	<0.0036	<0.0036	<0.0035	<0.0034	<0.0035	<0.0035	<0.0034	<0.0035	<0.0034
Perfluorooctane sulfonamide (FOSA)	NCL	<0.0034	<0.0035	<0.0034	<0.0034	<0.0034	<0.0035	<0.0035	<0.0036	<0.0036	<0.0035	<0.0034	<0.0035	<0.0035	<0.0034	<0.0035	<0.0034
Perfluoropentane sulfonic acid (PFPeS)	NCL	<0.0034	<0.0035	<0.0034	<0.0034	<0.0034	<0.0035	<0.0035	<0.0036	<0.0036	<0.0035	<0.0034	<0.0035	<0.0035	0.0058	<0.0035	<0.0034
Perfluorohexane sulfonic acid (PFHxS)	0.051 (A)	<0.0034	<0.0035	<0.0034	<0.0034	<0.0034	<0.0035	<0.0035	<0.0036	<0.0036	<0.0035	<0.0034	0.0044	0.004	***0.091***	<0.0035	<0.0034
Perfluorobutanoic acid (PFBA)	NCL	<0.0034	<0.0035	<0.0034	<0.0034	<0.0034	<0.0035	<0.0035	<0.0036	<0.0036	<0.0035	<0.0034	0.0041	0.0038	0.01	<0.0035	<0.0034
Perfluorodecanoic acid (PFDA)	NCL	<0.0034	<0.0035	<0.0034	<0.0034	<0.0034	<0.0035	<0.0035	<0.0036	<0.0036	<0.0035	<0.0034	<0.0035	<0.0035	<0.0034	<0.0035	<0.0034
Perfluorododecanoic acid (PFDoDA)	NCL	<0.0034	<0.0035	<0.0034	<0.0034	<0.0034	<0.0035	<0.0035	<0.0036	<0.0036	<0.0035	<0.0034	<0.0035	<0.0035	<0.0034	<0.0035	<0.0034
Perfluoroheptanoic acid (PFHpA)	NCL	<0.0034	<0.0035	<0.0034	<0.0034	<0.0034	<0.0035	<0.0035	<0.0036	<0.0036	<0.0035	<0.0034	<0.0035	<0.0035	0.0097	<0.0035	<0.0034
Perfluorohexanoic acid (PFHxA)	400 (A)	<0.0034	<0.0035	<0.0034	<0.0034	<0.0034	<0.0035	<0.0035	<0.0036	<0.0036	<0.0035	<0.0034	<0.0035	<0.0035	0.015	<0.0035	<0.0034
Perfluorononanoic acid (PFNA)	0.006 (A)	<0.0034	<0.0035	<0.0034	<0.0034	<0.0034	<0.0035	<0.0035	<0.0036	<0.0036	<0.0035	<0.0034	<0.0035	<0.0035	<0.0034	<0.0035	<0.0034
Perfluorooctanoic acid (PFOA)	0.008 (A)	<0.0034	<0.0035	<0.0034	<0.0034	<0.0034	<0.0035	<0.0035	<0.0036	<0.0036	<0.0035	<0.0034	0.0035	<0.0035	***0.015***	<0.0035	<0.0034
Perfluorooctane sulfonic acid (PFOS)	0.016 (A)	<0.0034	<0.0035	<0.0034	<0.0034	<0.0034	<0.0035	<0.0035	<0.0036	<0.0036	<0.0035	<0.0034	<0.0035	<0.0035	***0.12***	<0.0035	<0.0034
Perfluoropentanoic acid (PFPeA)	NCL	<0.0034	<0.0035	<0.0034	<0.0034	<0.0034	<0.0035	<0.0035	<0.0036	<0.0036	<0.0035	<0.0034	<0.0035	<0.0035	0.014	<0.0035	<0.0034
Perfluorotetradecanoic acid (PFTeDA)	NCL	<0.0034	<0.0035	<0.0034	<0.0034	<0.0034	<0.0035	<0.0035	<0.0036	<0.0036	<0.0035	<0.0034	<0.0035	<0.0035	<0.0034	<0.0035	<0.0034
Perfluorotridecanoic acid (PFTrDA)	NCL	<0.0034	<0.0035	<0.0034	<0.0034	<0.0034	<0.0035	<0.0035	<0.0036	<0.0036	<0.0035	<0.0034	<0.0035	<0.0035	<0.0034	<0.0035	<0.0034
Perfluoroundecanoic acid (PFUnDA)	NCL	<0.0034	<0.0035	<0.0034	<0.0034	<0.0034	<0.0035	<0.0035	<0.0036	<0.0036	<0.0035	<0.0034	<0.0035	<0.0035	<0.0034	<0.0035	<0.0034
Tetrafluoro-2-(heptafluoropropoxy)propanoic acid (GenX)	0.37 (A)	<0.0067	<0.0071	<0.0069	<0.0068	<0.0069	<0.0071	<0.0069	<0.0072	<0.0072	<0.007	<0.0068	<0.0071	<0.007	<0.0067	<0.0069	<0.0069

TABLE 3
SUMMARY OF VAP GROUNDWATER SAMPLE ANALYSIS - PFAS
Perimeter
Algoma & Plainfield Townships, Kent County, Michigan

Sample Event	Part 201 Generic Residential Groundwater Cleanup Criteria - Drinking Water[2]	Area 5 (Dual Purpose)	Area 5 (Dual Purpose)	Area 5 (Dual Purpose)	Area 5 (Dual Purpose)	Area 5 (Dual Purpose)	Area 5 (Dual Purpose)	Area 5 (Dual Purpose)	Area 5 (Dual Purpose)	Area 5 (Dual Purpose)	Area 5 (Dual Purpose)	Area 5 (Dual Purpose)	Area 5 (Dual Purpose)	Area 5 (Dual Purpose)	Area 5 (Dual Purpose)	Area 5 (Dual Purpose)
Vertical Aquifer Profiling (VAP) Location		AREA5-RI-9	AREA5-RI-9	AREA5-RI-9	AREA5-RI-9	AREA5-RI-9	AREA5-RI-9	AREA5-RI-9	AREA5-RI-9	AREA5-RI-11	AREA5-RI-11	AREA5-RI-11	AREA5-RI-11	AREA5-RI-11	AREA5-RI-11	AREA5-RI-11
Sample Name		Area 5-RI-9 (150-155)	Area 5-RI-9 (160-165)	Area 5-RI-9 (170-175)	Area 5-RI-9 (180-185)	Area 5-RI-9 (190-195)	Area 5-RI-9 (200-205)	Area 5-RI-9 (210-215)	Area 5-RI-9 (220-225)	AREA5-RI-11 (95-100)	AREA5-RI-11 (105-110)	AREA5-RI-11 (115-120)	AREA5-RI-11 (125-130)	AREA5-RI-11 (135-140)	AREA5-RI-11 (145-150)	AREA5-RI-11 (155-160)	AREA5-RI-11 (165-170)
Screen Interval (feet below ground surface)		150-155	160-165	170-175	180-185	190-195	200-205	210-215	220-225	95-100	105-110	115-120	125-130	135-140	145-150	155-160	165-170
Laboratory Sample ID		WI21007-004	WI21007-005	WI21007-006	WI21007-007	WI21007-008	WI21007-009	WI22028-001	WI22028-002	wh07012-001	wh07012-002	wh07012-003	wh07012-004	wh07012-005	wh07012-006	wh07012-007	wh07012-008
Sample Date		09/16/2021	09/17/2021	09/17/2021	09/17/2021	09/20/2021	09/20/2021	09/21/2021	09/21/2021	08/03/2021	08/03/2021	08/03/2021	08/03/2021	08/04/2021	08/04/2021	08/04/2021	08/04/2021
Parameter (µg/L)																	
9-chlorohexadecafluoro-3-oxanone-1-sulfonic acid (9Cl-PF3ONS)	NCL	<0.0068	<0.0068	<0.0067	<0.0066	<0.0074	<0.0076	<0.0067	<0.0069	<0.0074	<0.0072	<0.0071	<0.0071	<0.0072	<0.0074	<0.0074	<0.0073
11-chloroeicosafluoro-3-oxaundecane-1-sulfonic acid (11CL-PF3OUdS)	NCL	<0.0068	<0.0068	<0.0067	<0.0066	<0.0074	<0.0076	<0.0067	<0.0069	<0.0074	<0.0072	<0.0071	<0.0071	<0.0072	<0.0074	<0.0074	<0.0073
4,8-dioxa-3H-perfluorononanoic acid (ADONA)	NCL	<0.0068	<0.0068	<0.0067	<0.0066	<0.0074	<0.0076	<0.0067	<0.0069	<0.0074	<0.0072	<0.0071	<0.0071	<0.0072	<0.0074	<0.0074	<0.0073
1H,1H,2H,2H-perfluorohexane sulfonate (4:2FTS)	NCL	<0.0068	<0.0068	<0.0067	<0.0066	<0.0074	<0.0076	<0.0067	<0.0069	<0.0074	<0.0072	<0.0071	<0.0071	<0.0072	<0.0074	<0.0074	<0.0073
6:2 Fluorotelomer sulfonic acid (6:2 FTS)	NCL	<0.0068	<0.0068	<0.0067	0.012	<0.0074	<0.0076	<0.0067	<0.0069	<0.0074	<0.0072	<0.0071	<0.0071	<0.0072	<0.0074	<0.0074	<0.0073
8:2 Fluorotelomer sulfonic acid (8:2 FTS)	NCL	<0.0068	<0.0068	<0.0067	<0.0066	<0.0074	<0.0076	<0.0067	<0.0069	<0.0074	<0.0072	<0.0071	<0.0071	<0.0072	<0.0074	<0.0074	<0.0073
N-ethylperfluoro-1-octanesulfonamidoacetic acid (EtFOSAA)	NCL	<0.0068	<0.0068	<0.0067	<0.0066	<0.0074	<0.0076	<0.0067	<0.0069	<0.0074	<0.0072	<0.0071	<0.0071	<0.0072	<0.0074	<0.0074	<0.0073
N-methylperfluoro-1-octanesulfonamidoacetic acid (MeFOSAA)	NCL	<0.0068	<0.0068	<0.0067	<0.0066	<0.0074	<0.0076	<0.0067	<0.0069	<0.0074	<0.0072	<0.0071	<0.0071	<0.0072	<0.0074	<0.0074	<0.0073
Perfluorobutane sulfonic acid (PFBS)	0.42 (A)	<0.0034	<0.0034	<0.0033	<0.0033	<0.0037	<0.0038	<0.0034	<0.0034	<0.0037	<0.0036	<0.0036	<0.0036	<0.0036	<0.0037	<0.0037	<0.0036
Perfluorodecane sulfonic acid (PFDS)	NCL	<0.0034	<0.0034	<0.0033	<0.0033	<0.0037	<0.0038	<0.0034	<0.0034	<0.0037	<0.0036	<0.0036	<0.0036	<0.0036	<0.0037	<0.0037	<0.0036
Perfluoroheptane sulfonic acid (PFHpS)	NCL	<0.0034	<0.0034	<0.0033	<0.0033	<0.0037	<0.0038	<0.0034	<0.0034	<0.0037	<0.0036	<0.0036	<0.0036	<0.0036	<0.0037	<0.0037	<0.0036
Perfluorononane sulfonic acid (PFNS)	NCL	<0.0034	<0.0034	<0.0033	<0.0033	<0.0037	<0.0038	<0.0034	<0.0034	<0.0037	<0.0036	<0.0036	<0.0036	<0.0036	<0.0037	<0.0037	<0.0036
Perfluorooctane sulfonamide (FOSA)	NCL	<0.0034	<0.0034	<0.0033	<0.0033	<0.0037	<0.0038	<0.0034	<0.0034	<0.0037	<0.0036	<0.0036	<0.0036	<0.0036	<0.0037	<0.0037	<0.0036
Perfluoropentane sulfonic acid (PFPeS)	NCL	<0.0034	<0.0034	<0.0033	<0.0033	<0.0037	<0.0038	<0.0034	<0.0034	<0.0037	<0.0036	<0.0036	<0.0036	<0.0036	<0.0037	<0.0037	<0.0036
Perfluorohexane sulfonic acid (PFHxS)	0.051 (A)	<0.0034	<0.0034	<0.0033	<0.0033	<0.0037	<0.0038	<0.0034	<0.0034	<0.0037	<0.0036	<0.0036	<0.0036	<0.0036	<0.0037	<0.0037	<0.0036
Perfluorobutanoic acid (PFBA)	NCL	<0.0034	<0.0034	<0.0033	<0.0033	<0.0037	<0.0038	<0.0034	<0.0034	<0.0037	<0.0036	<0.0036	<0.0036	<0.0036	<0.0037	<0.0037	<0.0036
Perfluorodecanoic acid (PFDA)	NCL	<0.0034	<0.0034	<0.0033	<0.0033	<0.0037	<0.0038	<0.0034	<0.0034	<0.0037	<0.0036	<0.0036	<0.0036	<0.0036	<0.0037	<0.0037	<0.0036
Perfluorododecanoic acid (PFDoDA)	NCL	<0.0034	<0.0034	<0.0033	<0.0033	<0.0037	<0.0038	<0.0034	<0.0034	<0.0037	<0.0036	<0.0036	<0.0036	<0.0036	<0.0037	<0.0037	<0.0036
Perfluoroheptanoic acid (PFHpA)	NCL	<0.0034	<0.0034	<0.0033	<0.0033	<0.0037	<0.0038	<0.0034	<0.0034	<0.0037	<0.0036	<0.0036	<0.0036	<0.0036	<0.0037	<0.0037	<0.0036
Perfluorohexanoic acid (PFHxA)	400 (A)	<0.0034	<0.0034	<0.0033	<0.0033	<0.0037	<0.0038	<0.0034	<0.0034	<0.0037	<0.0036	<0.0036	<0.0036	<0.0036	<0.0037	<0.0037	<0.0036
Perfluorononanoic acid (PFNA)	0.006 (A)	<0.0034	<0.0034	<0.0033	<0.0033	<0.0037	<0.0038	<0.0034	<0.0034	<0.0037	<0.0036	<0.0036	<0.0036	<0.0036	<0.0037	<0.0037	<0.0036
Perfluorooctanoic acid (PFOA)	0.008 (A)	<0.0034	<0.0034	<0.0033	<0.0033	<0.0037	<0.0038	<0.0034	<0.0034	<0.0037	<0.0036	<0.0036	<0.0036	<0.0036	<0.0037	<0.0037	<0.0036
Perfluorooctane sulfonic acid (PFOS)	0.016 (A)	<0.0034	<0.0034	<0.0033	<0.0033	<0.0037	<0.0038	<0.0034	<0.0034	<0.0037	<0.0036	<0.0036	<0.0036	0.0036	<0.0037	<0.0037	<0.0036
Perfluoropentanoic acid (PFPeA)	NCL	<0.0034	<0.0034	<0.0033	<0.0033	<0.0037	<0.0038	<0.0034	<0.0034	<0.0037	<0.0036	<0.0036	<0.0036	<0.0036	<0.0037	<0.0037	<0.0036
Perfluorotetradecanoic acid (PFTeDA)	NCL	<0.0034	<0.0034	<0.0033	<0.0033	<0.0037	<0.0038	<0.0034	<0.0034	<0.0037	<0.0036	<0.0036	<0.0036	<0.0036	<0.0037	<0.0037	<0.0036
Perfluorotridecanoic acid (PFTrDA)	NCL	<0.0034	<0.0034	<0.0033	<0.0033	<0.0037	<0.0038	<0.0034	<0.0034	<0.0037	<0.0036	<0.0036	<0.0036	<0.0036	<0.0037	<0.0037	<0.0036
Perfluoroundecanoic acid (PFUnDA)	NCL	<0.0034	<0.0034	<0.0033	<0.0033	<0.0037	<0.0038	<0.0034	<0.0034	<0.0037	<0.0036	<0.0036	<0.0036	<0.0036	<0.0037	<0.0037	<0.0036
Tetrafluoro-2-(heptafluoropropoxy)propanoic acid (GenX)	0.37 (A)	<0.0068	<0.0068	<0.0067	<0.0066	<0.0074	<0.0076	<0.0067	<0.0069	<0.0074	<0.0072	<0.0071	<0.0071	<0.0072	<0.0074	<0.0074	<0.0073

TABLE 3
SUMMARY OF VAP GROUNDWATER SAMPLE ANALYSIS - PFAS
Perimeter
Algoma & Plainfield Townships, Kent County, Michigan

Sample Event	Part 201 Generic Residential Groundwater Cleanup Criteria - Drinking Water[2]	Area 5 (Dual Purpose)	Area 5 (Dual Purpose)	Area 5 (Dual Purpose)	Area 5 (Dual Purpose)	Area 5 (Dual Purpose)	Area 5 (Dual Purpose)	Area 5 (Dual Purpose)	Perimeter	Perimeter	Perimeter	Perimeter	Perimeter	Perimeter	Perimeter	Perimeter	Perimeter
Vertical Aquifer Profiling (VAP) Location		AREA5-RI-11	AREA5-RI-11	AREA5-RI-11	AREA5-RI-11	AREA5-RI-11	AREA5-RI-11	AREA5-RI-11	HS-PMW-RI-101	HS-PMW-RI-101	HS-PMW-RI-101	HS-PMW-RI-101	HS-PMW-RI-101	HS-PMW-RI-102	HS-PMW-RI-102	HS-PMW-RI-102	HS-PMW-RI-102
Sample Name		AREA5-RI-11 (175-180)	AREA5-RI-11 (185-190)	AREA5-RI-11 (195-200)	Area5-RI-11 (205-210)	Area5-RI-11 (215-220)	Area5-RI-11 (225-230)	Area5-RI-11 (255-260)	HS-PMW-RI-101 (10-15)	HS-PMW-RI-101 (19-24)	HS-PMW-RI-101 (29-34)	HS-PMW-RI-101 (39-44)	HS-PMW-RI-101 (73-78)	HS-PMW-RI-102 (49-54)	HS-PMW-RI-102 (59-64)	HS-PMW-RI-102 (69-74)	HS-PMW-RI-102 (79-84)
Screen Interval (feet below ground surface)		175-180	185-190	195-200	205-210	215-220	225-230	255-260	10-15	19-24	29-34	39-44	73-78	49-54	59-64	69-74	79-84
Laboratory Sample ID		wh07012-009	wh07012-010	wh07012-011	WH14014-001	WH14014-002	WH14014-003	WH14014-004	XK18020-001	XK18020-002	XK18020-003	XK18020-005	XK18020-004	WL18010-001	WL18010-002	WL18010-003	WL18010-004
Sample Date		08/05/2021	08/05/2021	08/05/2021	08/09/2021	08/09/2021	08/09/2021	08/11/2021	11/08/2022	11/08/2022	11/08/2022	11/09/2022	11/11/2022	12/14/2021	12/14/2021	12/14/2021	12/14/2021
Parameter (µg/L)																	
9-chlorohexadecafluoro-3-oxanone-1-sulfonic acid (9Cl-PF3ONS)	NCL	<0.0079	<0.0077	<0.0072	<0.0071	<0.0069	<0.0076	<0.0073	<0.0068	<0.0068	<0.007	<0.0068	<0.0069	<0.007	<0.0069	<0.0068	<0.0087
11-chloroeicosafluoro-3-oxaundecane-1-sulfonic acid (11CL-PF3OUdS)	NCL	<0.0079	<0.0077	<0.0072	<0.0071	<0.0069	<0.0076	<0.0073	<0.0068	<0.0068	<0.007	<0.0068	<0.0069	<0.007	<0.0069	<0.0068	<0.0087
4,8-dioxa-3H-perfluorononanoic acid (ADONA)	NCL	<0.0079	<0.0077	<0.0072	<0.0071	<0.0069	<0.0076	<0.0073	<0.0068	<0.0068	<0.007	<0.0068	<0.0069	<0.007	<0.0069	<0.0068	<0.0087
1H,1H,2H,2H-perfluorohexane sulfonate (4:2FTS)	NCL	<0.0079	<0.0077	<0.0072	<0.0071	<0.0069	<0.0076	<0.0073	<0.0068	<0.0068	<0.007	<0.0068	<0.0069	<0.007	<0.0069	<0.0068	<0.0087
6:2 Fluorotelomer sulfonic acid (6:2 FTS)	NCL	<0.0073 [H]	<0.0074 [H]	<0.0076 [H]	<0.0071	<0.0069	<0.0076	<0.0073	<0.0068	<0.0068	<0.007	<0.0068	<0.0069	<0.0069	<0.0069	<0.0068	<0.0087
8:2 Fluorotelomer sulfonic acid (8:2 FTS)	NCL	<0.0079	<0.0077	<0.0072	<0.0071	<0.0069	<0.0076	<0.0073	<0.0068	<0.0068	<0.007	<0.0068	<0.0069	<0.007	<0.0069	<0.0068	<0.0087
N-ethylperfluoro-1-octanesulfonamidoacetic acid (EtFOSAA)	NCL	<0.0079	<0.0077	<0.0072	<0.0071	<0.0069	<0.0076	<0.0073	<0.0068	<0.0068	<0.007	<0.0068	<0.0069	<0.007	<0.0069	<0.0068	<0.0087
N-methylperfluoro-1-octanesulfonamidoacetic acid (MeFOSAA)	NCL	<0.0079	<0.0077	<0.0072	<0.0071	<0.0069	<0.0076	<0.0073	<0.0068	<0.0068	<0.007	<0.0068	<0.0069	<0.007	<0.0069	<0.0068	<0.0087
Perfluorobutane sulfonic acid (PFBS)	0.42 (A)	<0.004	<0.0039	<0.0036	<0.0036	<0.0035	0.0045	<0.0036	<0.0034	0.0042	<0.0035	<0.0034	<0.0035	<0.0035	<0.0034	<0.0034	<0.0043
Perfluorodecane sulfonic acid (PFDS)	NCL	<0.004	<0.0039	<0.0036	<0.0036	<0.0035	<0.0038	<0.0036	<0.0034	<0.0034	<0.0035	<0.0034	<0.0035	<0.0035	<0.0034	<0.0034	<0.0043
Perfluoroheptane sulfonic acid (PFHpS)	NCL	<0.004	<0.0039	<0.0036	<0.0036	<0.0035	<0.0038	<0.0036	<0.0034	<0.0034	<0.0035	<0.0034	<0.0035	<0.0035	<0.0034	<0.0034	<0.0043
Perfluorononane sulfonic acid (PFNS)	NCL	<0.004	<0.0039	<0.0036	<0.0036	<0.0035	<0.0038	<0.0036	<0.0034	<0.0034	<0.0035	<0.0034	<0.0035	<0.0035	<0.0034	<0.0034	<0.0043
Perfluorooctane sulfonamide (FOSA)	NCL	<0.004	<0.0039	<0.0036	<0.0036	<0.0035	<0.0038	<0.0036	<0.0034	<0.0034	<0.0035	<0.0034	<0.0035	<0.0035	<0.0034	<0.0034	<0.0043
Perfluoropentane sulfonic acid (PFPeS)	NCL	<0.004	<0.0039	<0.0036	<0.0036	<0.0035	<0.0038	<0.0036	<0.0034	<0.0034	<0.0035	<0.0034	<0.0035	<0.0035	<0.0034	<0.0034	<0.0043
Perfluorohexane sulfonic acid (PFHxS)	0.051 (A)	<0.004	<0.0039	<0.0036	<0.0036	<0.0035	<0.0038	<0.0036	<0.0034	<0.0034	<0.0035	<0.0034	<0.0035	<0.0035	<0.0034	<0.0034	<0.0043
Perfluorobutanoic acid (PFBA)	NCL	<0.004	<0.0039	<0.0036	<0.0036	<0.0035	<0.0038	<0.0036	<0.0034	<0.0034	<0.0035	<0.0034	<0.0035	<0.0035	<0.0034	<0.0034	<0.0043
Perfluorodecanoic acid (PFDA)	NCL	<0.004	<0.0039	<0.0036	<0.0036	<0.0035	<0.0038	<0.0036	<0.0034	<0.0034	<0.0035	<0.0034	<0.0035	<0.0035	<0.0034	<0.0034	<0.0043
Perfluorododecanoic acid (PFDoDA)	NCL	<0.004	<0.0039	<0.0036	<0.0036	<0.0035	<0.0038	<0.0036	<0.0034	<0.0034	<0.0035	<0.0034	<0.0035	<0.0035	<0.0034	<0.0034	<0.0043
Perfluoroheptanoic acid (PFHpA)	NCL	<0.004	<0.0039	<0.0036	<0.0036	<0.0035	<0.0038	<0.0036	<0.0034	<0.0034	<0.0035	<0.0034	<0.0035	<0.0035	<0.0034	<0.0034	<0.0043
Perfluorohexanoic acid (PFHxA)	400 (A)	<0.004	<0.0039	<0.0036	<0.0036	<0.0035	<0.0038	<0.0036	<0.0034	<0.0034	<0.0035	<0.0034	<0.0035	<0.0035	<0.0034	<0.0034	<0.0043
Perfluorononanoic acid (PFNA)	0.006 (A)	<0.004	<0.0039	<0.0036	<0.0036	<0.0035	<0.0038	<0.0036	<0.0034	<0.0034	<0.0035	<0.0034	<0.0035	<0.0035	<0.0034	<0.0034	<0.0043
Perfluorooctanoic acid (PFOA)	0.008 (A)	<0.004	<0.0039	<0.0036	<0.0036	<0.0035	<0.0038	<0.0036	0.0035	<0.0034	<0.0035	<0.0034	<0.0035	<0.0035	<0.0034	<0.0034	<0.0043
Perfluorooctane sulfonic acid (PFOS)	0.016 (A)	<0.004	<0.0039	<0.0036	<0.0036	<0.0035	<0.0038	<0.0036	0.0039	<0.0034	<0.0035	<0.0034	<0.0035	<0.0035	0.0034	<0.0034	<0.0043
Perfluoropentanoic acid (PFPeA)	NCL	<0.004	<0.0039	<0.0036	<0.0036	<0.0035	<0.0038	<0.0036	<0.0034	<0.0034	<0.0035	<0.0034	<0.0035	<0.0035	<0.0034	<0.0034	<0.0043
Perfluorotetradecanoic acid (PFTeDA)	NCL	<0.0037 [H]	<0.0037 [H]	<0.0038 [H]	<0.0036	<0.0035	<0.0038	<0.0036	<0.0034	<0.0034	<0.0035	<0.0034	<0.0035	<0.0035	<0.0034	<0.0034	<0.0043
Perfluorotridecanoic acid (PFTrDA)	NCL	<0.004	<0.0039	<0.0036	<0.0036	<0.0035	<0.0038	<0.0036	<0.0034	<0.0034	<0.0035	<0.0034	<0.0035	<0.0035	<0.0034	<0.0034	<0.0043
Perfluoroundecanoic acid (PFUnDA)	NCL	<0.004	<0.0039	<0.0036	<0.0036	<0.0035	<0.0038	<0.0036	<0.0034	<0.0034	<0.0035	<0.0034	<0.0035	<0.0035	<0.0034	<0.0034	<0.0043
Tetrafluoro-2-(heptafluoropropoxy)propanoic acid (GenX)	0.37 (A)	<0.0079	<0.0077	<0.0072	<0.0071	<0.0069	<0.0076	<0.0073	<0.0068	<0.0068	<0.007	<0.0068	<0.0069	<0.007	<0.0069	<0.0068	<0.0087

TABLE 3
SUMMARY OF VAP GROUNDWATER SAMPLE ANALYSIS - PFAS
Perimeter
Algoma & Plainfield Townships, Kent County, Michigan

Sample Event	Part 201 Generic Residential Groundwater Cleanup Criteria - Drinking Water[2]	Perimeter	Perimeter	Perimeter	Perimeter	Perimeter	Perimeter	Perimeter	Perimeter	Perimeter	Perimeter	Perimeter	Perimeter	Perimeter	Perimeter	Area 5 (Dual Purpose)	Area 5 (Dual Purpose)	Area 5 (Dual Purpose)
Vertical Aquifer Profiling (VAP) Location		HS-PMW-RI-102	HS-PMW-RI-102	HS-PMW-RI-102	HS-PMW-RI-102	HS-PMW-RI-102	HS-PMW-RI-102	HS-PMW-RI-102	HS-PMW-RI-102	HS-PMW-RI-102	HS-PMW-RI-102	HS-PMW-RI-102	HS-PMW-RI-102	HS-PMW-RI-102	HS-PMW-RI-102	HS-PMW-RI-103	HS-PMW-RI-103	HS-PMW-RI-103
Sample Name		HS-PMW-RI-102 (89-94)	HS-PMW-RI-102 (99-104)	HS-PMW-RI-102 (109-114)	HS-PMW-RI-102 (119-124)	HS-PMW-RI-102 (119-124) DUP	HS-PMW-RI-102 (129-134)	HS-PMW-RI-102 (139-144)	HS-PMW-RI-102 (149-154)	HS-PMW-RI-102 (159-164)	HS-PMW-RI-102 (169-174)	HS-PMW-RI-102 (179-184)	HS-PMW-RI-102 (189-194)	HS-PMW-RI-102 (199-204)	HS-PMW-RI-103 (75-80)	HS-PMW-RI-103 (85-90)	HS-PMW-RI-103 (85-90) DUP
Screen Interval (feet below ground surface)		89-94	99-104	109-114	119-124	119-124	129-134	139-144	149-154	159-164	169-174	179-184	189-194	199-204	75-80	85-90	85-90
Laboratory Sample ID		WL18010-005	WL18010-006	WL18010-007	WL18010-008	WL18010-009	WL18010-010	WL18010-011	WL18010-012	WL18010-013	WL18010-014	WL22034-001	WL22034-002	WL22034-003	WH14013-001	WH14013-002	WH14013-005
Sample Date		12/15/2021	12/15/2021	12/15/2021	12/16/2021	12/16/2021	12/16/2021	12/16/2021	12/17/2021	12/17/2021	12/17/2021	12/20/2021	12/21/2021	12/21/2021	08/12/2021	08/13/2021	08/13/2021
Parameter (µg/L)																	
9-chlorohexadecafluoro-3-oxanone-1-sulfonic acid (9Cl-PF3ONS)	NCL	<0.0073	<0.0073	<0.0069	<0.008	<0.0071	<0.0097	<0.0071	<0.0073	<0.0069	<0.0072	<0.0068	<0.0069	<0.0068	<0.0069	<0.0072	<0.0071
11-chloroeicosafluoro-3-oxaundecane-1-sulfonic acid (11CL-PF3OUdS)	NCL	<0.0073	<0.0073	<0.0069	<0.008	<0.0071	<0.0097	<0.0071	<0.0073	<0.0069	<0.0072	<0.0068	<0.0069	<0.0068	<0.0069	<0.0072	<0.0071
4,8-dioxa-3H-perfluorononanoic acid (ADONA)	NCL	<0.0073	<0.0073	<0.0069	<0.008	<0.0071	<0.0097	<0.0071	<0.0073	<0.0069	<0.0072	<0.0068	<0.0069	<0.0068	<0.0069	<0.0072	<0.0071
1H,1H,2H,2H-perfluorohexane sulfonate (4:2FTS)	NCL	<0.0073	<0.0073	<0.0069	<0.008	<0.0071	<0.0097	<0.0071	<0.0073	<0.0069	<0.0072	<0.0068	<0.0069	<0.0068	<0.0069	<0.0072	<0.0071
6:2 Fluorotelomer sulfonic acid (6:2 FTS)	NCL	<0.0076	<0.0073	<0.0082	<0.008	<0.0071	<0.0069	<0.0071	<0.0073	<0.0069	<0.0069	<0.0068	<0.0069	<0.0068	<0.0069	<0.0072	<0.0071
8:2 Fluorotelomer sulfonic acid (8:2 FTS)	NCL	<0.0073	<0.0073	<0.0069	<0.008	<0.0071	<0.0097	<0.0071	<0.0073	<0.0069	<0.0072	<0.0068	<0.0069	<0.0068	<0.0069	<0.0072	<0.0071
N-ethylperfluoro-1-octanesulfonamidoacetic acid (EtFOSAA)	NCL	<0.0073	<0.0073	<0.0069	<0.008	<0.0071	<0.0097	<0.0071	<0.0073	<0.0069	<0.0072	<0.0068	<0.0069	<0.0068	<0.0069	<0.0072	<0.0071
N-methylperfluoro-1-octanesulfonamidoacetic acid (MeFOSAA)	NCL	<0.0073	<0.0073	<0.0069	<0.008	<0.0071	<0.0097	<0.0071	<0.0073	<0.0069	<0.0072	<0.0068	<0.0069	<0.0068	<0.0069	<0.0072	<0.0071
Perfluorobutane sulfonic acid (PFBS)	0.42 (A)	<0.0037	<0.0036	<0.0034	<0.004	<0.0035	<0.0048	<0.0035	<0.0037	<0.0035	<0.0036	<0.0034	<0.0034	<0.0034	0.0059	0.023	0.021
Perfluorodecane sulfonic acid (PFDS)	NCL	<0.0037	<0.0036	<0.0034	<0.004	<0.0035	<0.0048	<0.0035	<0.0037	<0.0035	<0.0036	<0.0034	<0.0034	<0.0034	<0.0035	<0.0036	<0.0036
Perfluoroheptane sulfonic acid (PFHpS)	NCL	<0.0037	<0.0036	<0.0034	<0.004	<0.0035	<0.0048	<0.0035	<0.0037	<0.0035	<0.0036	<0.0034	<0.0034	<0.0034	<0.0035	<0.0036	<0.0036
Perfluorononane sulfonic acid (PFNS)	NCL	<0.0037	<0.0036	<0.0034	<0.004	<0.0035	<0.0048	<0.0035	<0.0037	<0.0035	<0.0036	<0.0034	<0.0034	<0.0034	<0.0035	<0.0036	<0.0036
Perfluorooctane sulfonamide (FOSA)	NCL	<0.0037	<0.0036	<0.0034	<0.004	<0.0035	<0.0048	<0.0035	<0.0037	<0.0035	<0.0036	<0.0034	<0.0034	<0.0034	<0.0035	<0.0036	<0.0036
Perfluoropentane sulfonic acid (PFPeS)	NCL	<0.0037	<0.0036	<0.0034	<0.004	<0.0035	<0.0048	<0.0035	<0.0037	<0.0035	<0.0036	<0.0034	<0.0034	<0.0034	<0.0035	0.0099	0.01
Perfluorohexane sulfonic acid (PFHxS)	0.051 (A)	<0.0037	<0.0036	<0.0034	<0.004	<0.0035	<0.0048	<0.0035	<0.0037	<0.0035	<0.0036	<0.0034	<0.0034	<0.0034	<0.0035	0.0066	0.0064
Perfluorobutanoic acid (PFBA)	NCL	<0.0037	<0.0036	<0.0034	<0.004	<0.0035	<0.0048	<0.0035	<0.0037	<0.0035	<0.0036	<0.0034	<0.0034	<0.0034	<0.0035	<0.0036	<0.0036
Perfluorodecanoic acid (PFDA)	NCL	<0.0037	<0.0036	<0.0034	<0.004	<0.0035	<0.0048	<0.0035	<0.0037	<0.0035	<0.0036	<0.0034	<0.0034	<0.0034	<0.0035	<0.0036	<0.0036
Perfluorododecanoic acid (PFDoDA)	NCL	<0.0037	<0.0036	<0.0034	<0.004	<0.0035	<0.0048	<0.0035	<0.0037	<0.0035	<0.0036	<0.0034	<0.0034	<0.0034	<0.0035	<0.0036	<0.0036
Perfluoroheptanoic acid (PFHpA)	NCL	<0.0037	<0.0036	<0.0034	<0.004	<0.0035	<0.0048	<0.0035	<0.0037	<0.0035	<0.0036	<0.0034	<0.0034	<0.0034	<0.0035	<0.0036	<0.0036
Perfluorohexanoic acid (PFHxA)	400 (A)	<0.0037	0.0047	<0.0034	<0.004	<0.0035	<0.0048	<0.0035	<0.0037	<0.0035	<0.0036	<0.0034	<0.0034	<0.0034	<0.0035	<0.0036	<0.0036
Perfluorononanoic acid (PFNA)	0.006 (A)	<0.0037	<0.0036	<0.0034	<0.004	<0.0035	<0.0048	<0.0035	<0.0037	<0.0035	<0.0036	<0.0034	<0.0034	<0.0034	<0.0035	<0.0036	<0.0036
Perfluorooctanoic acid (PFOA)	0.008 (A)	<0.0037	<0.0036	<0.0034	<0.004	<0.0035	<0.0048	<0.0035	<0.0037	<0.0035	<0.0036	<0.0034	<0.0034	<0.0034	<0.0035	0.0043	0.0047
Perfluorooctane sulfonic acid (PFOS)	0.016 (A)	<0.0037	<0.0036	<0.0034	<0.004	<0.0035	<0.0048	<0.0035	<0.0037	<0.0035	<0.0036	<0.0034	<0.0034	<0.0034	<0.0035	<0.0036	<0.0036
Perfluoropentanoic acid (PFPeA)	NCL	<0.0037	0.0051	<0.0034	<0.004	<0.0035	<0.0048	<0.0035	<0.0037	<0.0035	<0.0036	<0.0034	<0.0034	<0.0034	<0.0035	<0.0036	<0.0036
Perfluorotetradecanoic acid (PFTeDA)	NCL	<0.0037	<0.0036	<0.0034	<0.004	<0.0035	<0.0048	<0.0035	<0.0037	<0.0035	<0.0036	<0.0034	<0.0034	<0.0034	<0.0035	<0.0036	<0.0036
Perfluorotridecanoic acid (PFTrDA)	NCL	<0.0037	<0.0036	<0.0034	<0.004	<0.0035	<0.0048	<0.0035	<0.0037	<0.0035	<0.0036	<0.0034	<0.0034	<0.0034	<0.0035	<0.0036	<0.0036
Perfluoroundecanoic acid (PFUnDA)	NCL	<0.0037	<0.0036	<0.0034	<0.004	<0.0035	<0.0048	<0.0035	<0.0037	<0.0035	<0.0036	<0.0034	<0.0034	<0.0034	<0.0035	<0.0036	<0.0036
Tetrafluoro-2-(heptafluoropropoxy)propanoic acid (GenX)	0.37 (A)	<0.0073	<0.0073	<0.0069	<0.008	<0.0071	<0.0097	<0.0071	<0.0073	<0.0069	<0.0072	<0.0068	<0.0069	<0.0068	<0.0069	<0.0072	<0.0071

TABLE 3
SUMMARY OF VAP GROUNDWATER SAMPLE ANALYSIS - PFAS
Perimeter
Algoma & Plainfield Townships, Kent County, Michigan

Sample Event	Part 201 Generic Residential Groundwater Cleanup Criteria - Drinking Water[2]	Area 5 (Dual Purpose)	Area 5 (Dual Purpose)	Area 5 (Dual Purpose)	Area 5 (Dual Purpose)	Area 5 (Dual Purpose)	Area 5 (Dual Purpose)	Area 5 (Dual Purpose)	Area 5 (Dual Purpose)	Area 5 (Dual Purpose)	Area 5 (Dual Purpose)	Area 5 (Dual Purpose)	Area 5 (Dual Purpose)	Perimeter	Perimeter	Perimeter	Perimeter
Vertical Aquifer Profiling (VAP) Location		HS-PMW-RI-103	HS-PMW-RI-103	HS-PMW-RI-104	HS-PMW-RI-104	HS-PMW-RI-104	HS-PMW-RI-104	HS-PMW-RI-104	HS-PMW-RI-104	HS-PMW-RI-104	HS-PMW-RI-104	HS-PMW-RI-104	HS-PMW-RI-104	HS-PMW-RI-105	HS-PMW-RI-105	HS-PMW-RI-105	HS-PMW-RI-105
Sample Name		HS-PMW-RI-103 (95-100)	HS-PMW-RI-103 (105-110)	HS-PMW-RI-104 (15-20)	HS-PMW-RI-104 (25-30)	HS-PMW-RI-104 (35-40)	HS-PMW-RI-104 (45-50)	HS-PMW-RI-104 (55-60)	HS-PMW-RI-104 (65-70)	HS-PMW-RI-104 (75-80)	HS-PMW-RI-104 (85-90)	HS-PMW-RI-104 (100-105)	HS-PMW-RI-104 (110-115)	HS-PMW-RI-105 (25-30)	HS-PMW-RI-105 (95-100)	HS-PMW-RI-105 (105-110)	HS-PMW-RI-105 (115-120)
Screen Interval (feet below ground surface)		95-100	105-110	15-20	25-30	35-40	45-50	55-60	65-70	75-80	85-90	100-105	110-115	25-30	95-100	105-110	115-120
Laboratory Sample ID		WH14013-003	WH14013-004	WI29039-001	WI29039-002	WI29039-003	WI29039-004	WI29039-005	WI29039-006	WI29039-007	WI29039-008	WJ08013-002	WJ08013-001	XH02005-001	XH02005-002	XH02005-003	XH02005-004
Sample Date		08/13/2021	08/13/2021	09/23/2021	09/24/2021	09/24/2021	09/24/2021	09/27/2021	09/27/2021	09/27/2021	09/27/2021	10/04/2021	10/04/2021	07/26/2022	07/27/2022	07/28/2022	07/28/2022
Parameter (µg/L)																	
9-chlorohexadecafluoro-3-oxanone-1-sulfonic acid (9Cl-PF3ONS)	NCL	<0.0069	<0.0071	<0.008	<0.0074	<0.0081	<0.007	<0.007	<0.007	<0.0069	<0.0075	<0.014	<0.02	<0.0069	<0.0069	<0.0072	<0.0068
11-chloroeicosafluoro-3-oxaundecane-1-sulfonic acid (11CL-PF3OUdS)	NCL	<0.0069	<0.0071	<0.008	<0.0074	<0.0081	<0.007	<0.007	<0.007	<0.0069	<0.0075	<0.014	<0.02	<0.0069	<0.0069	<0.0072	<0.0068
4,8-dioxa-3H-perfluorononanoic acid (ADONA)	NCL	<0.0069	<0.0071	<0.008	<0.0074	<0.0081	<0.007	<0.007	<0.007	<0.0069	<0.0075	<0.014	<0.02	<0.0069	<0.0069	<0.0072	<0.0068
1H,1H,2H,2H-perfluorohexane sulfonate (4:2FTS)	NCL	<0.0069	<0.0071	<0.008	<0.0074	<0.0081	<0.007	<0.007	<0.007	<0.0069	<0.0075	<0.014	<0.02	<0.0069	<0.0069	<0.0072	<0.0068
6:2 Fluorotelomer sulfonic acid (6:2 FTS)	NCL	<0.0069	<0.0071	<0.008	<0.0074	<0.0081	<0.007	<0.007	<0.007	<0.0069	<0.0075	<0.014	<0.02	<0.0069	<0.0069	<0.0072	<0.0068
8:2 Fluorotelomer sulfonic acid (8:2 FTS)	NCL	<0.0069	<0.0071	<0.008	<0.0074	<0.0081	<0.007	<0.007	<0.007	<0.0069	<0.0075	<0.014	<0.02	<0.0069	<0.0069	<0.0072	<0.0068
N-ethylperfluoro-1-octanesulfonamidoacetic acid (EtFOSAA)	NCL	<0.0069	<0.0071	<0.008	<0.0074	<0.0081	<0.007	<0.007	<0.007	<0.0069	<0.0075	<0.014	<0.02	<0.0069	<0.0069	<0.0072	<0.0068
N-methylperfluoro-1-octanesulfonamidoacetic acid (MeFOSAA)	NCL	<0.0069	<0.0071	<0.008	<0.0074	<0.0081	<0.007	<0.007	<0.007	<0.0069	<0.0075	<0.014	<0.02	<0.0069	<0.0069	<0.0072	<0.0068
Perfluorobutane sulfonic acid (PFBS)	0.42 (A)	0.0045	<0.0036	0.0058	0.0046	<0.004	0.013	0.022	0.018	0.19	0.16	<0.0068	<0.01	<0.0034	<0.0034	<0.0036	<0.0034
Perfluorodecane sulfonic acid (PFDS)	NCL	<0.0035	<0.0036	<0.004	<0.0037	<0.004	<0.0035	<0.0035	<0.0035	<0.0035	<0.0038	<0.0068	<0.01	<0.0034	<0.0034	<0.0036	<0.0034
Perfluoroheptane sulfonic acid (PFHpS)	NCL	<0.0035	<0.0036	<0.004	<0.0037	<0.004	<0.0035	<0.0035	<0.0035	<0.0035	<0.0038	<0.0068	<0.01	<0.0034	<0.0034	<0.0036	<0.0034
Perfluorononane sulfonic acid (PFNS)	NCL	<0.0035	<0.0036	<0.004	<0.0037	<0.004	<0.0035	<0.0035	<0.0035	<0.0035	<0.0038	<0.0068	<0.01	<0.0034	<0.0034	<0.0036	<0.0034
Perfluorooctane sulfonamide (FOSA)	NCL	<0.0035	<0.0036	<0.004	<0.0037	<0.004	<0.0035	<0.0035	<0.0035	<0.0035	<0.0038	<0.0068	<0.01	<0.0034	<0.0034	<0.0036	<0.0034
Perfluoropentane sulfonic acid (PFPeS)	NCL	<0.0035	<0.0036	<0.004	<0.0037	<0.004	0.0052	0.011	0.0093	0.15	0.1	<0.0068	<0.01	<0.0034	<0.0034	<0.0036	<0.0034
Perfluorohexane sulfonic acid (PFHxS)	0.051 (A)	0.0056	0.0059	<0.004	<0.0037	<0.004	<0.0035	<0.0035	<0.0035	***0.094***	0.043	<0.0068	<0.01	<0.0034	<0.0034	<0.0036	<0.0034
Perfluorobutanoic acid (PFBA)	NCL	<0.0035	<0.0036	<0.004	<0.0037	<0.004	0.0083	0.011	0.0082	0.069	0.061	<0.0068	<0.01	<0.0034	<0.0034	<0.0036	<0.0034
Perfluorodecanoic acid (PFDA)	NCL	<0.0035	<0.0036	<0.004	<0.0037	<0.004	<0.0035	<0.0035	<0.0035	<0.0035	<0.0038	<0.0068	<0.01	<0.0034	<0.0034	<0.0036	<0.0034
Perfluorododecanoic acid (PFDoDA)	NCL	<0.0035	<0.0036	<0.004	<0.0037	<0.004	<0.0035	<0.0035	<0.0035	<0.0035	<0.0038	<0.0068	<0.01	<0.0034	<0.0034	<0.0036	<0.0034
Perfluoroheptanoic acid (PFHpA)	NCL	<0.0035	<0.0036	<0.004	<0.0037	<0.004	<0.0035	0.0056	0.0061	0.093	0.06	<0.0068	<0.01	<0.0034	<0.0034	<0.0036	<0.0034
Perfluorohexanoic acid (PFHxA)	400 (A)	<0.0035	<0.0036	<0.004	<0.0037	<0.004	0.0091	0.016	0.014	0.13	0.11	<0.0068	<0.01	<0.0034	<0.0034	<0.0036	<0.0034
Perfluorononanoic acid (PFNA)	0.006 (A)	<0.0035	<0.0036	<0.004	<0.0037	<0.004	<0.0035	<0.0035	<0.0035	<0.0035	<0.0038	<0.0068	<0.01	<0.0034	<0.0034	<0.0036	<0.0034
Perfluorooctanoic acid (PFOA)	0.008 (A)	<0.0035	<0.0036	0.0057	<0.0037	<0.004	<0.0035	0.0045	0.0056	***0.14***	***0.079***	<0.0068	<0.01	0.0039	<0.0034	<0.0036	<0.0034
Perfluorooctane sulfonic acid (PFOS)	0.016 (A)	<0.0035	<0.0036	0.014	<0.0037	<0.004	<0.0035	<0.0035	<0.0035	<0.0035	<0.0038	<0.0068	<0.01	<0.0034	<0.0034	<0.0036	<0.0034
Perfluoropentanoic acid (PFPeA)	NCL	<0.0035	<0.0036	<0.004	<0.0037	<0.004	0.0063	0.011	0.0085	0.072	0.061	<0.0068	<0.01	<0.0034	<0.0034	<0.0036	<0.0034
Perfluorotetradecanoic acid (PFTeDA)	NCL	<0.0035	<0.0036	<0.004	<0.0037	<0.004	<0.0035	<0.0035	<0.0035	<0.0035	<0.0038	<0.0068	<0.01	<0.0034	<0.0034	<0.0036	<0.0034
Perfluorotridecanoic acid (PFTrDA)	NCL	<0.0035	<0.0036	<0.004	<0.0037	<0.004	<0.0035	<0.0035	<0.0035	<0.0035	<0.0038	<0.0068	<0.01	<0.0034	<0.0034	<0.0036	<0.0034
Perfluoroundecanoic acid (PFUnDA)	NCL	<0.0035	<0.0036	<0.004	<0.0037	<0.004	<0.0035	<0.0035	<0.0035	<0.0035	<0.0038	<0.0068	<0.01	<0.0034	<0.0034	<0.0036	<0.0034
Tetrafluoro-2-(heptafluoropropoxy)propanoic acid (GenX)	0.37 (A)	<0.0069	<0.0071	<0.008	<0.0074	<0.0081	<0.007	<0.007	<0.007	<0.0069	<0.0075	<0.014	<0.02	<0.0069	<0.0069	<0.0072	<0.0068

TABLE 3
SUMMARY OF VAP GROUNDWATER SAMPLE ANALYSIS - PFAS
Perimeter
Algoma & Plainfield Townships, Kent County, Michigan

Sample Event	Part 201 Generic Residential Groundwater Cleanup Criteria - Drinking Water[2]	Perimeter	Perimeter	Perimeter	Perimeter	Perimeter	Perimeter	Perimeter	Perimeter	Perimeter	Perimeter	Perimeter	Perimeter	Perimeter	Perimeter	Perimeter	Perimeter
Vertical Aquifer Profiling (VAP) Location		HS-PMW-RI-105	HS-PMW-RI-105	HS-PMW-RI-105	HS-PMW-RI-105	HS-PMW-RI-106	HS-PMW-RI-106	HS-PMW-RI-106	HS-PMW-RI-106	HS-PMW-RI-106	HS-PMW-RI-106	HS-PMW-RI-106	HS-PMW-RI-106	HS-PMW-RI-106	HS-PMW-RI-106	HS-PMW-RI-106	HS-PMW-RI-106
Sample Name		HS-PMW-RI-105 (125-130)	HS-PMW-RI-105 (135-140)	HS-PMW-RI-105 (145-150)	HS-PMW-RI-105 (153-158)	HS-PMW-RI-106 (40-45)	HS-PMW-RI-106 (50-55)	HS-PMW-RI-106 (60-65)	HS-PMW-RI-106 (100-105)	HS-PMW-RI-106 (110-115)	HS-PMW-RI-106 (120-125)	HS-PMW-RI-106 (130-135)	HS-PMW-RI-106 (130-135) DUP	HS-PMW-RI-106 (140-145)	HS-PMW-RI-106 (150-155)	HS-PMW-RI-106 (160-165)	HS-PMW-RI-106 (170-175)
Screen Interval (feet below ground surface)		125-130	135-140	145-150	153-158	40-45	50-55	60-65	100-105	110-115	120-125	130-135	130-135	140-145	150-155	160-165	170-175
Laboratory Sample ID		XH02005-005	XH02005-006	XH02005-007	XH02005-008	XG23005-001	XG23005-002	XG23005-003	XG23005-004	XG23005-005	XG23005-006	XG23005-007	XG23005-008	XG23005-009	XG23005-010	XG23005-011	XG23005-012
Sample Date		07/28/2022	07/28/2022	07/29/2022	07/29/2022	07/12/2022	07/12/2022	07/12/2022	07/14/2022	07/14/2022	07/15/2022	07/15/2022	07/15/2022	07/15/2022	07/18/2022	07/18/2022	07/18/2022
Parameter (µg/L)																	
9-chlorohexadecafluoro-3-oxanone-1-sulfonic acid (9Cl-PF3ONS)	NCL	<0.0069	<0.0069	<0.0068	<0.0068	<0.0075 [H]	<0.007 [H]	<0.0071 [H]	<0.007	<0.0071	<0.0069	<0.0076	<0.007	<0.007	<0.0068	<0.0068	<0.0067
11-chloroeicosafluoro-3-oxaundecane-1-sulfonic acid (11CL-PF3OUdS)	NCL	<0.0069	<0.0069	<0.0068	<0.0068	<0.0075 [H]	<0.007 [H]	<0.0071 [H]	<0.007	<0.0071	<0.0069	<0.0076	<0.007	<0.007	<0.0068	<0.0068	<0.0067
4,8-dioxa-3H-perfluorononanoic acid (ADONA)	NCL	<0.0069	<0.0069	<0.0068	<0.0068	<0.0075 [H]	<0.007 [H]	<0.0071 [H]	<0.007	<0.0071	<0.0069	<0.0076	<0.007	<0.007	<0.0068	<0.0068	<0.0067
1H,1H,2H,2H-perfluorohexane sulfonate (4:2FTS)	NCL	<0.0069	<0.0069	<0.0068	<0.0068	<0.0075 [H]	<0.007 [H]	<0.0071 [H]	<0.007	<0.0071	<0.0069	<0.0076	<0.007	<0.007	<0.0068	<0.0068	<0.0067
6:2 Fluorotelomer sulfonic acid (6:2 FTS)	NCL	<0.0069	<0.0069	<0.0068	<0.0068	<0.0075 [H]	<0.007 [H]	<0.0071 [H]	<0.007	<0.0071	<0.0069	<0.0076	<0.007	<0.007	<0.0068	<0.0068	<0.0067
8:2 Fluorotelomer sulfonic acid (8:2 FTS)	NCL	<0.0069	<0.0069	<0.0068	<0.0068	<0.0075 [H]	<0.007 [H]	<0.0071 [H]	<0.007	<0.0071	<0.0069	<0.0076	<0.007	<0.007	<0.0068	<0.0068	<0.0067
N-ethylperfluoro-1-octanesulfonamidoacetic acid (EtFOSAA)	NCL	<0.0069	<0.0069	<0.0068	<0.0068	<0.0075 [H]	<0.007 [H]	<0.0071 [H]	<0.007	<0.0071	<0.0069	<0.0076	<0.007	<0.007	<0.0068	<0.0068	<0.0067
N-methylperfluoro-1-octanesulfonamidoacetic acid (MeFOSAA)	NCL	<0.0069	<0.0069	<0.0068	<0.0068	<0.0075 [H]	<0.007 [H]	<0.0071 [H]	<0.007	<0.0071	<0.0069	<0.0076	<0.007	<0.007	<0.0068	<0.0068	<0.0067
Perfluorobutane sulfonic acid (PFBS)	0.42 (A)	<0.0035	<0.0034	<0.0034	<0.0034	<0.0037 [H]	<0.0035 [H]	<0.0036 [H]	<0.0035	<0.0036	<0.0035	<0.0038	<0.0035	<0.0035	<0.0034	<0.0034	<0.0033
Perfluorodecane sulfonic acid (PFDS)	NCL	<0.0035	<0.0034	<0.0034	<0.0034	<0.0037 [H]	<0.0035 [H]	<0.0036 [H]	<0.0035	<0.0036	<0.0035	<0.0038	<0.0035	<0.0035	<0.0034	<0.0034	<0.0033
Perfluoroheptane sulfonic acid (PFHpS)	NCL	<0.0035	<0.0034	<0.0034	<0.0034	<0.0037 [H]	<0.0035 [H]	<0.0036 [H]	<0.0035	<0.0036	<0.0035	<0.0038	<0.0035	<0.0035	<0.0034	<0.0034	<0.0033
Perfluorononane sulfonic acid (PFNS)	NCL	<0.0035	<0.0034	<0.0034	<0.0034	<0.0037 [H]	<0.0035 [H]	<0.0036 [H]	<0.0035	<0.0036	<0.0035	<0.0038	<0.0035	<0.0035	<0.0034	<0.0034	<0.0033
Perfluorooctane sulfonamide (FOSA)	NCL	<0.0035	<0.0034	<0.0034	<0.0034	<0.0037 [H]	<0.0035 [H]	<0.0036 [H]	<0.0035	<0.0036	<0.0035	<0.0038	<0.0035	<0.0035	<0.0034	<0.0034	<0.0033
Perfluoropentane sulfonic acid (PFPeS)	NCL	<0.0035	<0.0034	<0.0034	<0.0034	<0.0037 [H]	<0.0035 [H]	<0.0036 [H]	<0.0035	<0.0036	<0.0035	<0.0038	<0.0035	<0.0035	<0.0034	<0.0034	<0.0033
Perfluorohexane sulfonic acid (PFHxS)	0.051 (A)	<0.0035	<0.0034	<0.0034	<0.0034	<0.0037 [H]	<0.0035 [H]	<0.0036 [H]	<0.0035	<0.0036	<0.0035	<0.0038	<0.0035	<0.0035	<0.0034	<0.0034	<0.0033
Perfluorobutanoic acid (PFBA)	NCL	<0.0035	<0.0034	<0.0034	<0.0034	<0.0037 [H]	<0.0035 [H]	<0.0036 [H]	<0.0035	<0.0036	<0.0035	<0.0038	<0.0035	<0.0035	<0.0034	<0.0034	<0.0033
Perfluorodecanoic acid (PFDA)	NCL	<0.0035	<0.0034	<0.0034	<0.0034	<0.0037 [H]	<0.0035 [H]	<0.0036 [H]	<0.0035	<0.0036	<0.0035	<0.0038	<0.0035	<0.0035	<0.0034	<0.0034	<0.0033
Perfluorododecanoic acid (PFDoDA)	NCL	<0.0035	<0.0034	<0.0034	<0.0034	<0.0037 [H]	<0.0035 [H]	<0.0036 [H]	<0.0035	<0.0036	<0.0035	<0.0038	<0.0035	<0.0035	<0.0034	<0.0034	<0.0033
Perfluoroheptanoic acid (PFHpA)	NCL	<0.0035	<0.0034	<0.0034	<0.0034	<0.0037 [H]	<0.0035 [H]	<0.0036 [H]	<0.0035	<0.0036	<0.0035	<0.0038	<0.0035	<0.0035	<0.0034	<0.0034	<0.0033
Perfluorohexanoic acid (PFHxA)	400 (A)	<0.0035	<0.0034	<0.0034	<0.0034	<0.0037 [H]	<0.0035 [H]	<0.0036 [H]	<0.0035	<0.0036	<0.0035	<0.0038	<0.0035	<0.0035	<0.0034	<0.0034	<0.0033
Perfluorononanoic acid (PFNA)	0.006 (A)	<0.0035	<0.0034	<0.0034	<0.0034	<0.0037 [H]	<0.0035 [H]	<0.0036 [H]	<0.0035	<0.0036	<0.0035	<0.0038	<0.0035	<0.0035	<0.0034	<0.0034	<0.0033
Perfluorooctanoic acid (PFOA)	0.008 (A)	<0.0035	<0.0034	<0.0034	<0.0034	<0.0037 [H]	<0.0035 [H]	<0.0036 [H]	<0.0035	<0.0036	<0.0035	<0.0038	<0.0035	<0.0035	<0.0034	<0.0034	<0.0033
Perfluorooctane sulfonic acid (PFOS)	0.016 (A)	<0.0035	<0.0034	<0.0034	<0.0034	<0.0037 [H]	<0.0035 [H]	<0.0036 [H]	<0.0035	<0.0036	<0.0035	<0.0038	<0.0035	<0.0035	<0.0034	<0.0034	<0.0033
Perfluoropentanoic acid (PFPeA)	NCL	<0.0035	<0.0034	<0.0034	<0.0034	<0.0037 [H]	<0.0035 [H]	<0.0036 [H]	<0.0035	<0.0036	<0.0035	<0.0038	<0.0035	<0.0035	<0.0034	<0.0034	<0.0033
Perfluorotetradecanoic acid (PFTeDA)	NCL	<0.0035	<0.0034	<0.0034	<0.0034	<0.0037 [H]	<0.0035 [H]	<0.0036 [H]	<0.0035	<0.0036	<0.0035	<0.0038	<0.0035	<0.0035	<0.0034	<0.0034	<0.0033
Perfluorotridecanoic acid (PFTrDA)	NCL	<0.0035	<0.0034	<0.0034	<0.0034	<0.0037 [H]	<0.0035 [H]	<0.0036 [H]	<0.0035	<0.0036	<0.0035	<0.0038	<0.0035	<0.0035	<0.0034	<0.0034	<0.0033
Perfluoroundecanoic acid (PFUnDA)	NCL	<0.0035	<0.0034	<0.0034	<0.0034	<0.0037 [H]	<0.0035 [H]	<0.0036 [H]	<0.0035	<0.0036	<0.0035	<0.0038	<0.0035	<0.0035	<0.0034	<0.0034	<0.0033
Tetrafluoro-2-(heptafluoropropoxy)propanoic acid (GenX)	0.37 (A)	<0.0069	<0.0069	<0.0068	<0.0068	<0.0075 [H]	<0.007 [H]	<0.0071 [H]	<0.007	<0.0071	<0.0069	<0.0076	<0.007	<0.007	<0.0068	<0.0068	<0.0067

TABLE 3
SUMMARY OF VAP GROUNDWATER SAMPLE ANALYSIS - PFAS
Perimeter
Algoma & Plainfield Townships, Kent County, Michigan

Sample Event	Part 201 Generic Residential Groundwater Cleanup Criteria - Drinking Water[2]	Perimeter	Perimeter	Area 5 (Dual Purpose)	Area 5 (Dual Purpose)	Area 5 (Dual Purpose)	Area 5 (Dual Purpose)	Area 5 (Dual Purpose)	Area 5 (Dual Purpose)	Area 5 (Dual Purpose)	Area 5 (Dual Purpose)	Area 5 (Dual Purpose)	Area 5 (Dual Purpose)	Area 5 (Dual Purpose)	Area 5 (Dual Purpose)	Area 5 (Dual Purpose)	Area 5 (Dual Purpose)
Vertical Aquifer Profiling (VAP) Location		HS-PMW-RI-106	HS-PMW-RI-106	HS-PMW-RI-107	HS-PMW-RI-107	HS-PMW-RI-107	HS-PMW-RI-107	HS-PMW-RI-107	HS-PMW-RI-107	HS-PMW-RI-107	HS-PMW-RI-107	HS-PMW-RI-107	HS-PMW-RI-107	HS-PMW-RI-107	HS-PMW-RI-107	HS-PMW-RI-107	HS-PMW-RI-107
Sample Name		HS-PMW-RI-106 (180-185)	HS-PMW-RI-106 (201.5-206.5)	HS-PMW-RI-107 (45-50)	HS-PMW-RI-107 (55-60)	HS-PMW-RI-107 (65-70)	HS-PMW-RI-107 (75-80)	HS-PMW-RI-107 (85-90)	HS-PMW-RI-107 (95-100)	HS-PMW-RI-107(125-130)	HS-PMW-RI-107(135-140)	HS-PMW-RI-107(145-150)	HS-PMW-RI-107(145-150) DUP	HS-PMW-RI-107(155-160)	HS-PMW-RI-107(165-170)	HS-PMW-RI-107(175-180)	HS-PMW-RI-107(185-190)
Screen Interval (feet below ground surface)		180-185	201.5-206.5	45-50	55-60	65-70	75-80	85-90	95-100	125-130	135-140	145-150	145-150	155-160	165-170	175-180	185-190
Laboratory Sample ID		XG23005-013	XG23005-014	WJ12024 -001	WJ12024 -002	WJ12024 -003	WJ12024 -004	WJ12024 -005	WJ12024 -006	WJ25010-001	WJ25010-002	WJ25010-003	WJ25010-004	WJ25010-005	WJ25010-006	WJ25010-007	WJ25010-008
Sample Date		07/19/2022	07/20/2022	10/06/2021	10/06/2021	10/07/2021	10/07/2021	10/07/2021	10/07/2021	10/14/2021	10/14/2021	10/15/2021	10/15/2021	10/15/2021	10/18/2021	10/18/2021	10/19/2021
Parameter (µg/L)																	
9-chlorohexadecafluoro-3-oxanone-1-sulfonic acid (9Cl-PF3ONS)	NCL	<0.0068	<0.0068	<0.0071	<0.0074	<0.007	<0.0073	<0.0086	<0.0068	<0.0073	<0.0072	<0.0068	<0.0069	<0.0068	<0.0094	<0.0085	<0.0068
11-chloroeicosafluoro-3-oxaundecane-1-sulfonic acid (11CL-PF3OUdS)	NCL	<0.0068	<0.0068	<0.0071	<0.0074	<0.007	<0.0073	<0.0086	<0.0068	<0.0073	<0.0072	<0.0068	<0.0069	<0.0068	<0.0094	<0.0085	<0.0068
4,8-dioxa-3H-perfluorononanoic acid (ADONA)	NCL	<0.0068	<0.0068	<0.0071	<0.0074	<0.007	<0.0073	<0.0086	<0.0068	<0.0073	<0.0072	<0.0068	<0.0069	<0.0068	<0.0094	<0.0085	<0.0068
1H,1H,2H,2H-perfluorohexane sulfonate (4:2FTS)	NCL	<0.0068	<0.0068	<0.0071	<0.0074	<0.007	<0.0073	<0.0086	<0.0068	<0.0073	<0.0072	<0.0068	<0.0069	<0.0068	<0.0094	<0.0085	<0.0068
6:2 Fluorotelomer sulfonic acid (6:2 FTS)	NCL	<0.0068	<0.0068	<0.0071	<0.0074	<0.007	<0.0073	<0.0086	<0.0068	<0.0073	<0.0072	<0.0068	<0.0069	<0.0068	<0.0094	<0.0085	<0.0068
8:2 Fluorotelomer sulfonic acid (8:2 FTS)	NCL	<0.0068	<0.0068	<0.0071	<0.0074	<0.007	<0.0073	<0.0086	<0.0068	<0.0073	<0.0072	<0.0068	<0.0069	<0.0068	<0.0094	<0.0085	<0.0068
N-ethylperfluoro-1-octanesulfonamidoacetic acid (EtFOSAA)	NCL	<0.0068	<0.0068	<0.0071	<0.0074	<0.007	<0.0073	<0.0086	<0.0068	<0.0073	<0.0072	<0.0068	<0.0069	<0.0068	<0.0094	<0.0085	<0.0068
N-methylperfluoro-1-octanesulfonamidoacetic acid (MeFOSAA)	NCL	<0.0068	<0.0068	<0.0071	<0.0074	<0.007	<0.0073	<0.0086	<0.0068	<0.0073	<0.0072	<0.0068	<0.0069	<0.0068	<0.0094	<0.0085	<0.0068
Perfluorobutane sulfonic acid (PFBS)	0.42 (A)	<0.0034	<0.0034	<0.0035	<0.0037	<0.0035	<0.0036	<0.0043	<0.0034	<0.0036	<0.0036	<0.0034	<0.0034	<0.0034	<0.0047	<0.0043	<0.0034
Perfluorodecane sulfonic acid (PFDS)	NCL	<0.0034	<0.0034	<0.0035	<0.0037	<0.0035	<0.0036	<0.0043	<0.0034	<0.0036	<0.0036	<0.0034	<0.0034	<0.0034	<0.0047	<0.0043	<0.0034
Perfluoroheptane sulfonic acid (PFHpS)	NCL	<0.0034	<0.0034	<0.0035	<0.0037	<0.0035	<0.0036	<0.0043	<0.0034	<0.0036	<0.0036	<0.0034	<0.0034	<0.0034	<0.0047	<0.0043	<0.0034
Perfluorononane sulfonic acid (PFNS)	NCL	<0.0034	<0.0034	<0.0035	<0.0037	<0.0035	<0.0036	<0.0043	<0.0034	<0.0036	<0.0036	<0.0034	<0.0034	<0.0034	<0.0047	<0.0043	<0.0034
Perfluorooctane sulfonamide (FOSA)	NCL	<0.0034	<0.0034	<0.0035	<0.0037	<0.0035	<0.0036	<0.0043	<0.0034	<0.0036	<0.0036	<0.0034	<0.0034	<0.0034	<0.0047	<0.0043	<0.0034
Perfluoropentane sulfonic acid (PFPeS)	NCL	<0.0034	<0.0034	<0.0035	<0.0037	<0.0035	<0.0036	<0.0043	<0.0034	<0.0036	<0.0036	<0.0034	<0.0034	<0.0034	<0.0047	<0.0043	<0.0034
Perfluorohexane sulfonic acid (PFHxS)	0.051 (A)	<0.0034	<0.0034	<0.0035	<0.0037	<0.0035	<0.0036	<0.0043	<0.0034	<0.0036	<0.0036	<0.0034	<0.0034	<0.0034	<0.0047	<0.0043	<0.0034
Perfluorobutanoic acid (PFBA)	NCL	<0.0034	<0.0034	<0.0035	<0.0037	<0.0035	<0.0036	<0.0043	<0.0034	<0.0036	<0.0036	<0.0034	<0.0034	<0.0034	<0.0047	<0.0043	<0.0034
Perfluorodecanoic acid (PFDA)	NCL	<0.0034	<0.0034	<0.0035	<0.0037	<0.0035	<0.0036	<0.0043	<0.0034	<0.0036	<0.0036	<0.0034	<0.0034	<0.0034	<0.0047	<0.0043	<0.0034
Perfluorododecanoic acid (PFDoDA)	NCL	<0.0034	<0.0034	<0.0035	<0.0037	<0.0035	<0.0036	<0.0043	<0.0034	<0.0036	<0.0036	<0.0034	<0.0034	<0.0034	<0.0047	<0.0043	<0.0034
Perfluoroheptanoic acid (PFHpA)	NCL	<0.0034	<0.0034	<0.0035	<0.0037	<0.0035	<0.0036	<0.0043	<0.0034	<0.0036	<0.0036	<0.0034	<0.0034	<0.0034	<0.0047	<0.0043	<0.0034
Perfluorohexanoic acid (PFHxA)	400 (A)	<0.0034	<0.0034	<0.0035	<0.0037	<0.0035	<0.0036	<0.0043	<0.0034	<0.0036	<0.0036	<0.0034	<0.0034	<0.0034	<0.0047	<0.0043	<0.0034
Perfluorononanoic acid (PFNA)	0.006 (A)	<0.0034	<0.0034	<0.0035	<0.0037	<0.0035	<0.0036	<0.0043	<0.0034	<0.0036	<0.0036	<0.0034	<0.0034	<0.0034	<0.0047	<0.0043	<0.0034
Perfluorooctanoic acid (PFOA)	0.008 (A)	<0.0034	<0.0034	<0.0035	<0.0037	<0.0035	<0.0036	<0.0043	<0.0034	<0.0036	<0.0036	<0.0034	<0.0034	<0.0034	<0.0047	<0.0043	<0.0034
Perfluorooctane sulfonic acid (PFOS)	0.016 (A)	<0.0034	<0.0034	<0.0035	<0.0037	<0.0035	<0.0036	<0.0043	<0.0034	<0.0036	<0.0036	<0.0034	<0.0034	<0.0034	<0.0047	<0.0043	<0.0034
Perfluoropentanoic acid (PFPeA)	NCL	<0.0034	<0.0034	<0.0035	<0.0037	<0.0035	<0.0036	<0.0043	<0.0034	<0.0036	<0.0036	<0.0034	<0.0034	<0.0034	<0.0047	<0.0043	<0.0034
Perfluorotetradecanoic acid (PFTeDA)	NCL	<0.0034	<0.0034	<0.0035	<0.0037	<0.0035	<0.0036	<0.0043	<0.0034	<0.0036	<0.0036	<0.0034	<0.0034	<0.0034	<0.0047	<0.0043	<0.0034
Perfluorotridecanoic acid (PFTrDA)	NCL	<0.0034	<0.0034	<0.0035	<0.0037	<0.0035	<0.0036	<0.0043	<0.0034	<0.0036	<0.0036	<0.0034	<0.0034	<0.0034	<0.0047	<0.0043	<0.0034
Perfluoroundecanoic acid (PFUnDA)	NCL	<0.0034	<0.0034	<0.0035	<0.0037	<0.0035	<0.0036	<0.0043	<0.0034	<0.0036	<0.0036	<0.0034	<0.0034	<0.0034	<0.0047	<0.0043	<0.0034
Tetrafluoro-2-(heptafluoropropoxy)propanoic acid (GenX)	0.37 (A)	<0.0068	<0.0068	<0.0071	<0.0074	<0.007	<0.0073	<0.0086	<0.0068	<0.0073	<0.0072	<0.0068	<0.0069	<0.0068	<0.0094	<0.0085	<0.0068

TABLE 3
SUMMARY OF VAP GROUNDWATER SAMPLE ANALYSIS - PFAS
Perimeter
Algoma & Plainfield Townships, Kent County, Michigan

Sample Event	Part 201 Generic Residential Groundwater Cleanup Criteria - Drinking Water[2]	Area 5 (Dual Purpose)	Area 6 (Dual Purpose)	Area 6 (Dual Purpose)	Area 6 (Dual Purpose)	Area 6 (Dual Purpose)	Area 6 (Dual Purpose)	Area 6 (Dual Purpose)	Area 6 (Dual Purpose)	Area 6 (Dual Purpose)	Area 6 (Dual Purpose)	Area 6 (Dual Purpose)	Area 6 (Dual Purpose)	Area 6 (Dual Purpose)	Area 6 (Dual Purpose)	Area 6 (Dual Purpose)	Area 6 (Dual Purpose)
Vertical Aquifer Profiling (VAP) Location		HS-PMW-RI-107	HS-PMW-RI-108	HS-PMW-RI-108	HS-PMW-RI-108	HS-PMW-RI-108	HS-PMW-RI-108	HS-PMW-RI-108	HS-PMW-RI-108	HS-PMW-RI-108	HS-PMW-RI-108	HS-PMW-RI-108	HS-PMW-RI-108	HS-PMW-RI-108	HS-PMW-RI-108	HS-PMW-RI-108	HS-PMW-RI-108
Sample Name		HS-PMW-RI-107(194-199)	HS-PMW-RI-108 (20-25)	HS-PMW-RI-108 (50-55)	HS-PMW-RI-108 (50-55) DUP	HS-PMW-RI-108 (60-65)	HS-PMW-RI-108 (70-75)	HS-PMW-RI-108 (120-125)	HS-PMW-RI-108 (130-135)	HS-PMW-RI-108 (140-145)	HS-PMW-RI-108 (150-155)	HS-PMW-RI-108 (160-165)	HS-PMW-RI-108 (170-175)	HS-PMW-RI-108 (180-185)	HS-PMW-RI-108 (190-195)	HS-PMW-RI-108 (200-205)	HS-PMW-RI-108 (210-215)
Screen Interval (feet below ground surface)		194-199	20-25	50-55	50-55	60-65	70-75	120-125	130-135	140-145	150-155	160-165	170-175	180-185	190-195	200-205	210-215
Laboratory Sample ID		WJ25010-009	WC20012-001	WC20012-002	WC20012-003	WC20012-004	WC27013-001	WC27013-002	WC27013-003	WC27013-004	WC27013-005	WC27013-006	WD07041-001	WD07041-002	WD07041-003	WD07041-004	WD07041-005
Sample Date		10/20/2021	03/18/2021	03/19/2021	03/19/2021	03/19/2021	03/22/2021	03/25/2021	03/25/2021	03/25/2021	03/25/2021	03/26/2021	03/29/2021	03/30/2021	03/30/2021	03/30/2021	03/31/2021
Parameter (µg/L)																	
9-chlorohexadecafluoro-3-oxanone-1-sulfonic acid (9Cl-PF3ONS)	NCL	<0.007	<0.007	<0.0071	<0.0071	<0.0072	<0.0085	<0.0068	<0.009	<0.0068	<0.0069	<0.0069	<0.007	<0.0071	<0.007	<0.007	<0.0068
11-chloroeicosafluoro-3-oxaundecane-1-sulfonic acid (11CL-PF3OUdS)	NCL	<0.007	<0.007	<0.0071	<0.0071	<0.0072	<0.0085	<0.0068	<0.009	<0.0068	<0.0069	<0.0069	<0.007	<0.0071	<0.007	<0.007	<0.0068
4,8-dioxa-3H-perfluorononanoic acid (ADONA)	NCL	<0.007	<0.007	<0.0071	<0.0071	<0.0072	<0.0085	<0.0068	<0.009	<0.0068	<0.0069	<0.0069	<0.007	<0.0071	<0.007	<0.007	<0.0068
1H,1H,2H,2H-perfluorohexane sulfonate (4:2FTS)	NCL	<0.007	<0.007	<0.0071	<0.0071	<0.0072	<0.0085	<0.0068	<0.009	<0.0068	<0.0069	<0.0069	<0.007	<0.0071	<0.007	<0.007	<0.0068
6:2 Fluorotelomer sulfonic acid (6:2 FTS)	NCL	<0.007	<0.007	<0.0071	<0.0071	<0.0072	<0.0085	<0.0068	<0.009	<0.0068	<0.0069	<0.0069	<0.007	<0.0071	<0.007	<0.007	<0.0068
8:2 Fluorotelomer sulfonic acid (8:2 FTS)	NCL	<0.007	<0.007	<0.0071	<0.0071	<0.0072	<0.0085	<0.0068	<0.009	<0.0068	<0.0069	<0.0069	<0.007	<0.0071	<0.007	<0.007	<0.0068
N-ethylperfluoro-1-octanesulfonamidoacetic acid (EtFOSAA)	NCL	<0.007	<0.007	<0.0071	<0.0071	<0.0072	<0.0085	<0.0068	<0.009	<0.0068	<0.0069	<0.0069	<0.007	<0.0071	<0.007	<0.007	<0.0068
N-methylperfluoro-1-octanesulfonamidoacetic acid (MeFOSAA)	NCL	<0.007	<0.007	<0.0071	<0.0071	<0.0072	<0.0085	<0.0068	<0.009	<0.0068	<0.0069	<0.0069	<0.007	<0.0071	<0.007	<0.007	<0.0068
Perfluorobutane sulfonic acid (PFBS)	0.42 (A)	<0.0035	<0.0035	<0.0036	<0.0036	<0.0036	<0.0042	<0.0034	<0.0045	<0.0034	<0.0035	<0.0034	<0.0035	<0.0036	<0.0035	<0.0035	<0.0034
Perfluorodecane sulfonic acid (PFDS)	NCL	<0.0035	<0.0035	<0.0036	<0.0036	<0.0036	<0.0042	<0.0034	<0.0045	<0.0034	<0.0035	<0.0034	<0.0035	<0.0036	<0.0035	<0.0035	<0.0034
Perfluoroheptane sulfonic acid (PFHpS)	NCL	<0.0035	<0.0035	<0.0036	<0.0036	<0.0036	<0.0042	<0.0034	<0.0045	<0.0034	<0.0035	<0.0034	<0.0035	<0.0036	<0.0035	<0.0035	<0.0034
Perfluorononane sulfonic acid (PFNS)	NCL	<0.0035	<0.0035	<0.0036	<0.0036	<0.0036	<0.0042	<0.0034	<0.0045	<0.0034	<0.0035	<0.0034	<0.0035	<0.0036	<0.0035	<0.0035	<0.0034
Perfluorooctane sulfonamide (FOSA)	NCL	<0.0035	<0.0035	<0.0036	<0.0036	<0.0036	<0.0042	<0.0034	<0.0045	<0.0034	<0.0035	<0.0034	<0.0035	<0.0036	<0.0035	<0.0035	<0.0034
Perfluoropentane sulfonic acid (PFPeS)	NCL	<0.0035	<0.0035	<0.0036	<0.0036	<0.0036	<0.0042	<0.0034	<0.0045	<0.0034	<0.0035	<0.0034	<0.0035	<0.0036	<0.0035	<0.0035	<0.0034
Perfluorohexane sulfonic acid (PFHxS)	0.051 (A)	<0.0035	<0.0035	<0.0036	<0.0036	<0.0036	<0.0042	<0.0034	<0.0045	<0.0034	<0.0035	<0.0034	<0.0035	<0.0036	<0.0035	<0.0035	<0.0034
Perfluorobutanoic acid (PFBA)	NCL	<0.0035	<0.0035	<0.0036	<0.0036	<0.0036	<0.0042	<0.0034	<0.0045	<0.0034	<0.0035	<0.0034	<0.0035	<0.0036	<0.0035	<0.0035	<0.0034
Perfluorodecanoic acid (PFDA)	NCL	<0.0035	<0.0035	<0.0036	<0.0036	<0.0036	<0.0042	<0.0034	<0.0045	<0.0034	<0.0035	<0.0034	<0.0035	<0.0036	<0.0035	<0.0035	<0.0034
Perfluorododecanoic acid (PFDoDA)	NCL	<0.0035	<0.0035	<0.0036	<0.0036	<0.0036	<0.0042	<0.0034	<0.0045	<0.0034	<0.0035	<0.0034	<0.0035	<0.0036	<0.0035	<0.0035	<0.0034
Perfluoroheptanoic acid (PFHpA)	NCL	<0.0035	<0.0035	<0.0036	<0.0036	<0.0036	<0.0042	<0.0034	<0.0045	<0.0034	<0.0035	<0.0034	<0.0035	<0.0036	<0.0035	<0.0035	<0.0034
Perfluorohexanoic acid (PFHxA)	400 (A)	<0.0035	<0.0035	<0.0036	<0.0036	<0.0036	<0.0042	<0.0034	<0.0045	<0.0034	<0.0035	<0.0034	<0.0035	<0.0036	<0.0035	<0.0035	<0.0034
Perfluorononanoic acid (PFNA)	0.006 (A)	<0.0035	<0.0035	<0.0036	<0.0036	<0.0036	<0.0042	<0.0034	<0.0045	<0.0034	<0.0035	<0.0034	<0.0035	<0.0036	<0.0035	<0.0035	<0.0034
Perfluorooctanoic acid (PFOA)	0.008 (A)	<0.0035	<0.0035	<0.0036	<0.0036	<0.0036	<0.0042	<0.0034	<0.0045	<0.0034	<0.0035	<0.0034	<0.0035	<0.0036	<0.0035	<0.0035	<0.0034
Perfluorooctane sulfonic acid (PFOS)	0.016 (A)	<0.0035	<0.0035	<0.0036	<0.0036	<0.0036	<0.0042	<0.0034	<0.0045	<0.0034	<0.0035	<0.0034	<0.0035	<0.0036	<0.0035	<0.0035	<0.0034
Perfluoropentanoic acid (PFPeA)	NCL	<0.0035	<0.0035	<0.0036	<0.0036	<0.0036	<0.0042	<0.0034	<0.0045	<0.0034	<0.0035	<0.0034	<0.0035	<0.0036	<0.0035	<0.0035	<0.0034
Perfluorotetradecanoic acid (PFTeDA)	NCL	<0.0035	<0.0035	<0.0036	<0.0036	<0.0036	<0.0042	<0.0034	<0.0045	<0.0034	<0.0035	<0.0034	<0.0035	<0.0036	<0.0035	<0.0035	<0.0034
Perfluorotridecanoic acid (PFTrDA)	NCL	<0.0035	<0.0035	<0.0036	<0.0036	<0.0036	<0.0042	<0.0034	<0.0045	<0.0034	<0.0035	<0.0034	<0.0035	<0.0036	<0.0035	<0.0035	<0.0034
Perfluoroundecanoic acid (PFUnDA)	NCL	<0.0035	<0.0035	<0.0036	<0.0036	<0.0036	<0.0042	<0.0034	<0.0045	<0.0034	<0.0035	<0.0034	<0.0035	<0.0036	<0.0035	<0.0035	<0.0034
Tetrafluoro-2-(heptafluoropropoxy)propanoic acid (GenX)	0.37 (A)	<0.007	<0.007	<0.0071	<0.0071	<0.0072	<0.0085	<0.0068	<0.009	<0.0068	<0.0069	<0.0069	<0.007	<0.0071	<0.007	<0.007	<0.0068

TABLE 3
SUMMARY OF VAP GROUNDWATER SAMPLE ANALYSIS - PFAS
Perimeter
Algoma & Plainfield Townships, Kent County, Michigan

Sample Event	Part 201 Generic Residential Groundwater Cleanup Criteria - Drinking Water[2]	Area 6 (Dual Purpose)	Area 6 (Dual Purpose)	Area 6 (Dual Purpose)	Area 6 (Dual Purpose)	Area 6 (Dual Purpose)	Area 6 (Dual Purpose)	Area 6 (Dual Purpose)	Area 6 (Dual Purpose)	Area 6 (Dual Purpose)	Area 6 (Dual Purpose)	Area 6 (Dual Purpose)	Area 6 (Dual Purpose)	Areas 11/12 (Dual Purpose)	Areas 11/12 (Dual Purpose)	Areas 11/12 (Dual Purpose)	Areas 11/12 (Dual Purpose)
Vertical Aquifer Profiling (VAP) Location		HS-PMW-RI-108	HS-PMW-RI-109	HS-PMW-RI-109	HS-PMW-RI-109	HS-PMW-RI-109	HS-PMW-RI-109	HS-PMW-RI-109	HS-PMW-RI-109	HS-PMW-RI-109	HS-PMW-RI-109	HS-PMW-RI-109	HS-PMW-RI-109	HS-PMW-RI-111	HS-PMW-RI-111	HS-PMW-RI-111	HS-PMW-RI-111
Sample Name		HS-PMW-RI-108 (223-228	HS-PMW-RI-109 (14-19)	HS-PMW-RI-109 (65-70)	HS-PMW-RI-109 (75-80)	HS-PMW-RI-109 (85-90)	HS-PMW-RI-109 (95-100)	HS-PMW-RI-109 (105-110)	HS-PMW-RI-109 (115-120)	HS-PMW-RI-109 (125-130)	HS-PMW-RI-109 (135-140)	HS-PMW-R1-109 (145-150)	HS-PMW-R1-109 (155-160)	HS-PMW-R1-111 (10-15)	HS-PMW-R1-111 (19-24)	HS-PMW-R1-111 (29-34)	HS-PMW-R1-111 (39-44)
Screen Interval (feet below ground surface)		223-228	14-19	65-70	75-80	85-90	95-100	105-110	115-120	125-130	135-140	145-150	155-160	10-15	19-24	29-34	39-44
Laboratory Sample ID		WD03011-001	XB26002-001	XB26002-002	XB26002-003	XB26002-004	XB26002-005	XB26002-006	XB26002-007	XB26002-008	XB26002-009	XC05002-001	XC05002-002	XA15003-001	XA15003-002	XA15003-003	XA15003-004
Sample Date		04/02/2021	02/22/2022	02/23/2022	02/23/2022	02/24/2022	02/24/2022	02/24/2022	02/25/2022	02/25/2022	02/25/2022	02/28/2022	03/01/2022	01/11/2022	01/11/2022	01/11/2022	01/11/2022
Parameter (µg/L)																	
9-chlorohexadecafluoro-3-oxanone-1-sulfonic acid (9Cl-PF3ONS)	NCL	<0.0068	<0.0079	<0.0069	<0.0074	<0.008	<0.0074	<0.0071	<0.0071	<0.0071	<0.0069	<0.0079	<0.0073	<0.0067	<0.0072	<0.0084	<0.0068
11-chloroeicosafluoro-3-oxaundecane-1-sulfonic acid (11CL-PF3OUdS)	NCL	<0.0068	<0.0079	<0.0069	<0.0074	<0.008	<0.0074	<0.0071	<0.0071	<0.0071	<0.0069	<0.0079	<0.0073	<0.0067	<0.0072	<0.0084	<0.0068
4,8-dioxa-3H-perfluorononanoic acid (ADONA)	NCL	<0.0068	<0.0079	<0.0069	<0.0074	<0.008	<0.0074	<0.0071	<0.0071	<0.0071	<0.0069	<0.0079	<0.0073	<0.0067	<0.0072	<0.0084	<0.0068
1H,1H,2H,2H-perfluorohexane sulfonate (4:2FTS)	NCL	<0.0068	<0.0079	<0.0069	<0.0074	<0.008	<0.0074	<0.0071	<0.0071	<0.0071	<0.0069	<0.0079	<0.0073	<0.0067	<0.0072	<0.0084	<0.0068
6:2 Fluorotelomer sulfonic acid (6:2 FTS)	NCL	<0.0068	<0.0079	<0.0069	<0.0074	<0.008	<0.0074	<0.0071	<0.0071	<0.0071	<0.0069	<0.0079	<0.0073	<0.0067	<0.0072	<0.0084	<0.0068
8:2 Fluorotelomer sulfonic acid (8:2 FTS)	NCL	<0.0068	<0.0079	<0.0069	<0.0074	<0.008	<0.0074	<0.0071	<0.0071	<0.0071	<0.0069	<0.0079	<0.0073	<0.0067	<0.0072	<0.0084	<0.0068
N-ethylperfluoro-1-octanesulfonamidoacetic acid (EtFOSAA)	NCL	<0.0068	<0.0079	<0.0069	<0.0074	<0.008	<0.0074	<0.0071	<0.0071	<0.0071	<0.0069	<0.0079	<0.0073	<0.0067	<0.0072	<0.0084	<0.0068
N-methylperfluoro-1-octanesulfonamidoacetic acid (MeFOSAA)	NCL	<0.0068	<0.0079	<0.0069	<0.0074	<0.008	<0.0074	<0.0071	<0.0071	<0.0071	<0.0069	<0.0079	<0.0073	<0.0067	<0.0072	<0.0084	<0.0068
Perfluorobutane sulfonic acid (PFBS)	0.42 (A)	<0.0034	<0.004	<0.0035	<0.0037	<0.004	<0.0037	0.0059	0.0047	0.011	<0.0034	<0.004	<0.0037	0.008	0.0085	0.012	0.0096
Perfluorodecane sulfonic acid (PFDS)	NCL	<0.0034	<0.004	<0.0035	<0.0037	<0.004	<0.0037	<0.0035	<0.0035	<0.0036	<0.0034	<0.004	<0.0037	<0.0034	<0.0036	<0.0042	<0.0034
Perfluoroheptane sulfonic acid (PFHpS)	NCL	<0.0034	<0.004	<0.0035	<0.0037	<0.004	<0.0037	<0.0035	<0.0035	<0.0036	<0.0034	<0.004	<0.0037	<0.0034	<0.0036	<0.0042	<0.0034
Perfluorononane sulfonic acid (PFNS)	NCL	<0.0034	<0.004	<0.0035	<0.0037	<0.004	<0.0037	<0.0035	<0.0035	<0.0036	<0.0034	<0.004	<0.0037	<0.0034	<0.0036	<0.0042	<0.0034
Perfluorooctane sulfonamide (FOSA)	NCL	<0.0034	<0.004	<0.0035	<0.0037	<0.004	<0.0037	<0.0035	<0.0035	<0.0036	<0.0034	<0.004	<0.0037	<0.0034	<0.0036	<0.0042	<0.0034
Perfluoropentane sulfonic acid (PFPeS)	NCL	<0.0034	<0.004	<0.0035	<0.0037	<0.004	<0.0037	<0.0035	<0.0035	<0.0036	<0.0034	<0.004	<0.0037	<0.0034	<0.0036	<0.0042	<0.0034
Perfluorohexane sulfonic acid (PFHxS)	0.051 (A)	<0.0034	<0.004	<0.0035	<0.0037	<0.004	<0.0037	<0.0035	<0.0035	<0.0036	<0.0034	<0.004	<0.0037	0.0087	0.0085	0.01	0.007
Perfluorobutanoic acid (PFBA)	NCL	<0.0034	0.004	<0.0035	<0.0037	<0.004	<0.0037	<0.0035	<0.0035	<0.0036	<0.0034	<0.004	<0.0037	0.0044	0.0037	0.0051	0.0041
Perfluorodecanoic acid (PFDA)	NCL	<0.0034	<0.004	<0.0035	<0.0037	<0.004	<0.0037	<0.0035	<0.0035	<0.0036	<0.0034	<0.004	<0.0037	<0.0034	<0.0036	<0.0042	<0.0034
Perfluorododecanoic acid (PFDoDA)	NCL	<0.0034	<0.004	<0.0035	<0.0037	<0.004	<0.0037	<0.0035	<0.0035	<0.0036	<0.0034	<0.004	<0.0037	<0.0034	<0.0036	<0.0042	<0.0034
Perfluoroheptanoic acid (PFHpA)	NCL	<0.0034	<0.004	<0.0035	<0.0037	<0.004	<0.0037	<0.0035	<0.0035	<0.0036	<0.0034	<0.004	<0.0037	<0.0034	<0.0036	<0.0042	<0.0034
Perfluorohexanoic acid (PFHxA)	400 (A)	<0.0034	<0.004	<0.0035	<0.0037	<0.004	<0.0037	<0.0035	<0.0035	<0.0036	<0.0034	<0.004	<0.0037	0.0056	0.0051	0.0075	0.007
Perfluorononanoic acid (PFNA)	0.006 (A)	<0.0034	<0.004	<0.0035	<0.0037	<0.004	<0.0037	<0.0035	<0.0035	<0.0036	<0.0034	<0.004	<0.0037	<0.0034	<0.0036	<0.0042	<0.0034
Perfluorooctanoic acid (PFOA)	0.008 (A)	<0.0034	0.0049	<0.0035	<0.0037	<0.004	<0.0037	<0.0035	<0.0035	<0.0036	<0.0034	<0.004	<0.0037	***0.017***	***0.015***	***0.015***	0.0071
Perfluorooctane sulfonic acid (PFOS)	0.016 (A)	<0.0034	0.008	<0.0035	<0.0037	<0.004	<0.0037	<0.0035	<0.0035	<0.0036	<0.0034	<0.004	<0.0037	***0.038***	***0.029***	***0.029***	0.01
Perfluoropentanoic acid (PFPeA)	NCL	<0.0034	<0.004	<0.0035	<0.0037	<0.004	<0.0037	<0.0035	<0.0035	<0.0036	<0.0034	<0.004	<0.0037	<0.0034	0.0037	0.0053	0.006
Perfluorotetradecanoic acid (PFTeDA)	NCL	<0.0034	<0.004	<0.0035	<0.0037	<0.004	<0.0037	<0.0035	<0.0035	<0.0036	<0.0034	<0.004	<0.0037	<0.0034	<0.0036	<0.0042	<0.0034
Perfluorotridecanoic acid (PFTrDA)	NCL	<0.0034	<0.004	<0.0035	<0.0037	<0.004	<0.0037	<0.0035	<0.0035	<0.0036	<0.0034	<0.004	<0.0037	<0.0034	<0.0036	<0.0042	<0.0034
Perfluoroundecanoic acid (PFUnDA)	NCL	<0.0034	<0.004	<0.0035	<0.0037	<0.004	<0.0037	<0.0035	<0.0035	<0.0036	<0.0034	<0.004	<0.0037	<0.0034	<0.0036	<0.0042	<0.0034
Tetrafluoro-2-(heptafluoropropoxy)propanoic acid (GenX)	0.37 (A)	<0.0068	<0.0079	<0.0069	<0.0074	<0.008	<0.0074	<0.0071	<0.0071	<0.0071	<0.0069	<0.0079	<0.0073	<0.0067	<0.0072	<0.0084	<0.0068

TABLE 3
SUMMARY OF VAP GROUNDWATER SAMPLE ANALYSIS - PFAS
Perimeter
Algoma & Plainfield Townships, Kent County, Michigan

Sample Event	Part 201 Generic Residential Groundwater Cleanup Criteria - Drinking Water[2]	Areas 11/12 (Dual Purpose)	Areas 11/12 (Dual Purpose)	Areas 11/12 (Dual Purpose)	Areas 11/12 (Dual Purpose)	Areas 11/12 (Dual Purpose)	Areas 11/12 (Dual Purpose)	Areas 11/12 (Dual Purpose)	Areas 11/12 (Dual Purpose)	Areas 11/12 (Dual Purpose)	Areas 11/12 (Dual Purpose)	Area 19 (Dual Purpose)	Area 19 (Dual Purpose)	Area 19 (Dual Purpose)	Area 19 (Dual Purpose)	Area 19 (Dual Purpose)	Area 19 (Dual Purpose)
Vertical Aquifer Profiling (VAP) Location		HS-PMW-RI-111	HS-PMW-RI-112	HS-PMW-RI-112	HS-PMW-RI-112	HS-PMW-RI-112	HS-PMW-RI-112	HS-PMW-RI-112	HS-PMW-RI-112	HS-PMW-RI-112	HS-PMW-RI-112	AREA19-MW-8	AREA19-MW-8	AREA19-MW-8	AREA19-MW-8	AREA19-MW-9	AREA19-MW-9
Sample Name		HS-PMW-R1-111 (49-54)	HS-PW-RI-112 (10-15)	HS-PW-RI-112 (20-25)	HS-PW-RI-112 (30-35)	HS-PW-RI-112 (30-35) DUP	HS-PW-RI-112 (40-45)	HS-PW-RI-112 (50-55)	HS-PW-RI-112 (60-65)	HS-PW-RI-112 (70-75)	HS-PW-RI-112 (80-85)	AREA 19-MW-8 (27-32)	AREA 19-MW-8 (176-181)	AREA 19-MW-8 (234-239)	AREA 19-MW-8 (245-250)	Area19-MW-9 (10-15)	Area19-MW-9 (19-24)
Screen Interval (feet below ground surface)		49-54	10-15	20-25	30-35	30-35	40-45	50-55	60-65	70-75	80-85	27-32	176-181	234-239	245-250	10-15	19-24
Laboratory Sample ID		XA15003-005	WI08019-001	WI08019-002	WI08019-003	WI08019-004	WI08019-005	WI08019-006	WI08019-007	WI08019-008	WI08019-009	XF04009-001	XF04009-002	XF04009-003	XF04009-004	XL20006-001	XL20006-002
Sample Date		01/11/2022	09/02/2021	09/02/2021	09/03/2021	09/03/2021	09/03/2021	09/03/2021	09/07/2021	09/07/2021	09/07/2021	05/20/2022	05/31/2022	06/02/2022	06/03/2022	12/08/2022	12/08/2022
Parameter (µg/L)																	
9-chlorohexadecafluoro-3-oxanone-1-sulfonic acid (9Cl-PF3ONS)	NCL	<0.0081	<0.0072	<0.0071	<0.007	<0.007	<0.0074	<0.0069	<0.0068	<0.0068	<0.0066	<0.007	<0.007	<0.0069	<0.0071	<0.0069	<0.007
11-chloroeicosafluoro-3-oxaundecane-1-sulfonic acid (11CL-PF3OUdS)	NCL	<0.0081	<0.0072	<0.0071	<0.007	<0.007	<0.0074	<0.0069	<0.0068	<0.0068	<0.0066	<0.007	<0.007	<0.0069	<0.0071	<0.0069	<0.007
4,8-dioxa-3H-perfluorononanoic acid (ADONA)	NCL	<0.0081	<0.0072	<0.0071	<0.007	<0.007	<0.0074	<0.0069	<0.0068	<0.0068	<0.0066	<0.007	<0.007	<0.0069	<0.0071	<0.0069	<0.007
1H,1H,2H,2H-perfluorohexane sulfonate (4:2FTS)	NCL	<0.0081	<0.0072	<0.0071	<0.007	<0.007	<0.0074	<0.0069	<0.0068	<0.0068	<0.0066	<0.007	<0.007	<0.0069	<0.0071	<0.0069	<0.007
6:2 Fluorotelomer sulfonic acid (6:2 FTS)	NCL	<0.0081	<0.0072	<0.0071	<0.007	<0.007	<0.0074	<0.0069	<0.0068	<0.0068	<0.0066	<0.007	<0.007	<0.0069	<0.0071	<0.0069	<0.007
8:2 Fluorotelomer sulfonic acid (8:2 FTS)	NCL	<0.0081	<0.0072	<0.0071	<0.007	<0.007	<0.0074	<0.0069	<0.0068	<0.0068	<0.0066	<0.007	<0.007	<0.0069	<0.0071	<0.0069	<0.007
N-ethylperfluoro-1-octanesulfonamidoacetic acid (EtFOSAA)	NCL	<0.0081	<0.0072	<0.0071	<0.007	<0.007	<0.0074	<0.0069	<0.0068	<0.0068	<0.0066	<0.007	<0.007	<0.0069	<0.0071	<0.0069	<0.007
N-methylperfluoro-1-octanesulfonamidoacetic acid (MeFOSAA)	NCL	<0.0081	<0.0072	<0.0071	<0.007	<0.007	<0.0074	<0.0069	<0.0068	<0.0068	<0.0066	<0.007	<0.007	<0.0069	<0.0071	<0.0069	<0.007
Perfluorobutane sulfonic acid (PFBS)	0.42 (A)	0.009	0.0048	0.0053	0.0061	0.0057	0.0045	0.0049	0.0037	<0.0034	<0.0033	<0.0035	<0.0035	<0.0035	<0.0035	<0.0035	0.0078
Perfluorodecane sulfonic acid (PFDS)	NCL	<0.004	<0.0036	<0.0035	<0.0035	<0.0035	<0.0037	<0.0035	<0.0034	<0.0034	<0.0033	<0.0035	<0.0035	<0.0035	<0.0035	<0.0035	<0.0035
Perfluoroheptane sulfonic acid (PFHpS)	NCL	<0.004	<0.0036	<0.0035	<0.0035	<0.0035	<0.0037	<0.0035	<0.0034	<0.0034	<0.0033	<0.0035	<0.0035	<0.0035	<0.0035	<0.0035	<0.0035
Perfluorononane sulfonic acid (PFNS)	NCL	<0.004	<0.0036	<0.0035	<0.0035	<0.0035	<0.0037	<0.0035	<0.0034	<0.0034	<0.0033	<0.0035	<0.0035	<0.0035	<0.0035	<0.0035	<0.0035
Perfluorooctane sulfonamide (FOSA)	NCL	<0.004	<0.0036	<0.0035	<0.0035	<0.0035	<0.0037	<0.0035	<0.0034	<0.0034	<0.0033	<0.0035	<0.0035	<0.0035	<0.0035	<0.0035	<0.0035
Perfluoropentane sulfonic acid (PFPeS)	NCL	<0.004	<0.0036	<0.0035	<0.0035	<0.0035	<0.0037	<0.0035	<0.0034	<0.0034	<0.0033	<0.0035	<0.0035	<0.0035	<0.0035	<0.0035	<0.0035
Perfluorohexane sulfonic acid (PFHxS)	0.051 (A)	0.0044	0.0076	0.0088	0.0085	0.0087	0.0064	0.0064	0.0055	<0.0034	<0.0033	<0.0035	<0.0035	<0.0035	<0.0035	0.0035	0.0052
Perfluorobutanoic acid (PFBA)	NCL	<0.004	<0.0036	0.0036	0.0035	<0.0035	<0.0037	<0.0035	<0.0034	<0.0034	<0.0033	<0.0035	<0.0035	<0.0035	<0.0035	<0.0035	<0.0035
Perfluorodecanoic acid (PFDA)	NCL	<0.004	<0.0036	<0.0035	<0.0035	<0.0035	<0.0037	<0.0035	<0.0034	<0.0034	<0.0033	<0.0035	<0.0035	<0.0035	<0.0035	<0.0035	<0.0035
Perfluorododecanoic acid (PFDoDA)	NCL	<0.004	<0.0036	<0.0035	<0.0035	<0.0035	<0.0037	<0.0035	<0.0034	<0.0034	<0.0033	<0.0035	<0.0035	<0.0035	<0.0035	<0.0035	<0.0035
Perfluoroheptanoic acid (PFHpA)	NCL	<0.004	<0.0036	<0.0035	<0.0035	<0.0035	<0.0037	<0.0035	<0.0034	<0.0034	<0.0033	<0.0035	<0.0035	<0.0035	<0.0035	<0.0035	<0.0035
Perfluorohexanoic acid (PFHxA)	400 (A)	<0.004	0.0048	0.0055	0.0052	0.0052	0.0042	0.0037	<0.0034	<0.0034	<0.0033	<0.0035	<0.0035	<0.0035	<0.0035	<0.0035	<0.0035
Perfluorononanoic acid (PFNA)	0.006 (A)	<0.004	<0.0036	<0.0035	<0.0035	<0.0035	<0.0037	<0.0035	<0.0034	<0.0034	<0.0033	<0.0035	<0.0035	<0.0035	<0.0035	<0.0035	<0.0035
Perfluorooctanoic acid (PFOA)	0.008 (A)	<0.004	***0.01***	***0.012***	***0.011***	***0.012***	***0.0084***	0.0062	0.0046	<0.0034	<0.0033	***0.01***	<0.0035	<0.0035	<0.0035	<0.0035	0.0053
Perfluorooctane sulfonic acid (PFOS)	0.016 (A)	<0.004	0.016	***0.017***	***0.017***	***0.018***	0.011	0.0099	0.007	<0.0034	<0.0033	0.014	<0.0035	<0.0035	<0.0035	0.013	0.011
Perfluoropentanoic acid (PFPeA)	NCL	<0.004	<0.0036	<0.0035	<0.0035	<0.0035	<0.0037	<0.0035	<0.0034	<0.0034	<0.0033	<0.0035	<0.0035	<0.0035	<0.0035	<0.0035	<0.0035
Perfluorotetradecanoic acid (PFTeDA)	NCL	<0.004	<0.0036	<0.0035	<0.0035	<0.0035	<0.0037	<0.0035	<0.0034	<0.0034	<0.0033	<0.0035	<0.0035	<0.0035	<0.0035	<0.0035	<0.0035
Perfluorotridecanoic acid (PFTrDA)	NCL	<0.004	<0.0036	<0.0035	<0.0035	<0.0035	<0.0037	<0.0035	<0.0034	<0.0034	<0.0033	<0.0035	<0.0035	<0.0035	<0.0035	<0.0035	<0.0035
Perfluoroundecanoic acid (PFUnDA)	NCL	<0.004	<0.0036	<0.0035	<0.0035	<0.0035	<0.0037	<0.0035	<0.0034	<0.0034	<0.0033	<0.0035	<0.0035	<0.0035	<0.0035	<0.0035	<0.0035
Tetrafluoro-2-(heptafluoropropoxy)propanoic acid (GenX)	0.37 (A)	<0.0081	<0.0072	<0.0071	<0.007	<0.007	<0.0074	<0.0069	<0.0068	<0.0068	<0.0066	<0.007	<0.007	<0.0069	<0.0071	<0.0069	<0.007

TABLE 3
SUMMARY OF VAP GROUNDWATER SAMPLE ANALYSIS - PFAS
Perimeter
Algoma & Plainfield Townships, Kent County, Michigan

Sample Event	Part 201 Generic Residential Groundwater Cleanup Criteria - Drinking Water[2]	Area 19 (Dual Purpose)	Area 19 (Dual Purpose)	Area 19 (Dual Purpose)	Area 19 (Dual Purpose)	Area 19 (Dual Purpose)	Area 19 (Dual Purpose)	Area 19 (Dual Purpose)	Area 19 (Dual Purpose)	Area 19 (Dual Purpose)	Area 19 (Dual Purpose)	Area 19 (Dual Purpose)	Area 19 (Dual Purpose)	Area 19 (Dual Purpose)	Perimeter	Perimeter	Perimeter
Vertical Aquifer Profiling (VAP) Location		AREA19-MW-9	AREA19-MW-9	AREA19-MW-9	AREA19-MW-9	AREA19-MW-14	AREA19-MW-14	AREA19-MW-14	AREA19-MW-14	AREA19-MW-15	AREA19-MW-15	AREA19-MW-15	AREA19-MW-15	AREA19-MW-15	WV-PMW-RI-101	WV-PMW-RI-101	WV-PMW-RI-101
Sample Name		Area19-MW-9 (80-85)	Area19-MW-9 (89-94)	Area19-MW-9 (98-103)	Area19-MW-9 (157-162)	Area-19-MW-14 (10-15)	Area-19-MW-14 (10-15) DUP	Area-19-MW-14 (149-154)	Area-19-MW-14 (159-164)	Area19-MW-15 (44-49)	Area19-MW-15 (130-135)	Area19-MW-15 (140-145)	Area19-MW-15 (150-155)	Area19-MW-15 (160-165)	WV-PMW-RI-101 (40-45)	WV-PMW-RI-101 (249-254)	WV-PMW-RI-101 (259-264)
Screen Interval (feet below ground surface)		80-85	89-94	98-103	157-162	10-15	10-15	149-154	159-164	44-49	130-135	140-145	150-155	160-165	40-45	249-254	259-264
Laboratory Sample ID		XL20006-003	XL20006-004	XL20006-005	XL29016-001	YC14010-001	YC14010-002	YC14010-003	YC14010-004	XF20012-001	XF20012-002	XF20012-003	XF20012-004	XF20012-005	WK23060-001	WL03033-001	WL03033-002
Sample Date		12/12/2022	12/13/2022	12/13/2022	12/22/2022	03/08/2023	03/08/2023	03/09/2023	03/10/2023	06/09/2022	06/14/2022	06/14/2022	06/14/2022	06/15/2022	11/09/2021	11/29/2021	11/30/2021
Parameter (µg/L)																	
9-chlorohexadecafluoro-3-oxanone-1-sulfonic acid (9Cl-PF3ONS)	NCL	<0.0068	<0.0068	<0.0067	<0.0068	<0.0069	<0.007	<0.0068	<0.0067	<0.007	<0.007	<0.0072	<0.0071	<0.007	<0.0069	<0.0069	<0.007
11-chloroeicosafluoro-3-oxaundecane-1-sulfonic acid (11CL-PF3OUdS)	NCL	<0.0068	<0.0068	<0.0067	<0.0068	<0.0069	<0.007	<0.0068	<0.0067	<0.007	<0.007	<0.0072	<0.0071	<0.007	<0.0069	<0.0069	<0.007
4,8-dioxa-3H-perfluorononanoic acid (ADONA)	NCL	<0.0068	<0.0068	<0.0067	<0.0068	<0.0069	<0.007	<0.0068	<0.0067	<0.007	<0.007	<0.0072	<0.0071	<0.007	<0.0069	<0.0069	<0.007
1H,1H,2H,2H-perfluorohexane sulfonate (4:2FTS)	NCL	<0.0068	<0.0068	<0.0067	<0.0068	<0.0069	<0.007	<0.0068	<0.0067	<0.007	<0.007	<0.0072	<0.0071	<0.007	<0.0069	<0.0069	<0.007
6:2 Fluorotelomer sulfonic acid (6:2 FTS)	NCL	<0.0068	<0.0068	<0.0067	<0.0068	<0.0069	<0.007	<0.0068	<0.0067	<0.007	<0.007	<0.0072	<0.0071	<0.007	<0.0069	<0.0069	<0.007
8:2 Fluorotelomer sulfonic acid (8:2 FTS)	NCL	<0.0068	<0.0068	<0.0067	<0.0068	<0.0069	<0.007	<0.0068	<0.0067	<0.007	<0.007	<0.0072	<0.0071	<0.007	<0.0069	<0.0069	<0.007
N-ethylperfluoro-1-octanesulfonamidoacetic acid (EtFOSAA)	NCL	<0.0068	<0.0068	<0.0067	<0.0068	<0.0069	<0.007	<0.0068	<0.0067	<0.007	<0.007	<0.0072	<0.0071	<0.007	<0.0069	<0.0069	<0.007
N-methylperfluoro-1-octanesulfonamidoacetic acid (MeFOSAA)	NCL	<0.0068	<0.0068	<0.0067	<0.0068	<0.0069	<0.007	<0.0068	<0.0067	<0.007	<0.007	<0.0072	<0.0071	<0.007	<0.0069	<0.0069	<0.007
Perfluorobutane sulfonic acid (PFBS)	0.42 (A)	<0.0034	<0.0034	<0.0034	<0.0034	0.0047	0.0043	0.013	0.014	0.0038	<0.0035	<0.0036	<0.0036	<0.0035	0.0036	<0.0034	<0.0035
Perfluorodecane sulfonic acid (PFDS)	NCL	<0.0034	<0.0034	<0.0034	<0.0034	<0.0035	<0.0035	<0.0034	<0.0034	<0.0035	<0.0035	<0.0036	<0.0036	<0.0035	<0.0034	<0.0034	<0.0035
Perfluoroheptane sulfonic acid (PFHpS)	NCL	<0.0034	<0.0034	<0.0034	<0.0034	<0.0035	<0.0035	<0.0034	<0.0034	<0.0035	<0.0035	<0.0036	<0.0036	<0.0035	<0.0034	<0.0034	<0.0035
Perfluorononane sulfonic acid (PFNS)	NCL	<0.0034	<0.0034	<0.0034	<0.0034	<0.0035	<0.0035	<0.0034	<0.0034	<0.0035	<0.0035	<0.0036	<0.0036	<0.0035	<0.0034	<0.0034	<0.0035
Perfluorooctane sulfonamide (FOSA)	NCL	<0.0034	<0.0034	<0.0034	<0.0034	<0.0035	<0.0035	<0.0034	<0.0034	<0.0035	0.012	0.032	0.0077	0.008	<0.0034	<0.0034	<0.0035
Perfluoropentane sulfonic acid (PFPeS)	NCL	<0.0034	<0.0034	<0.0034	<0.0034	<0.0035	<0.0035	0.024	0.021	<0.0035	<0.0035	<0.0036	<0.0036	<0.0035	<0.0034	<0.0034	<0.0035
Perfluorohexane sulfonic acid (PFHxS)	0.051 (A)	<0.0034	<0.0034	<0.0034	<0.0034	<0.0035	<0.0035	0.016	0.011	<0.0035	<0.0035	<0.0036	<0.0036	<0.0035	<0.0034	<0.0034	<0.0035
Perfluorobutanoic acid (PFBA)	NCL	<0.0034	<0.0034	<0.0034	<0.0034	<0.0035	<0.0035	0.0058	0.0059	<0.0035	<0.0035	<0.0036	<0.0036	<0.0035	<0.0034	<0.0034	<0.0035
Perfluorodecanoic acid (PFDA)	NCL	<0.0034	<0.0034	<0.0034	<0.0034	<0.0035	<0.0035	<0.0034	<0.0034	<0.0035	<0.0035	<0.0036	<0.0036	<0.0035	<0.0034	<0.0034	<0.0035
Perfluorododecanoic acid (PFDoDA)	NCL	<0.0034	<0.0034	<0.0034	<0.0034	<0.0035	<0.0035	<0.0034	<0.0034	<0.0035	<0.0035	<0.0036	<0.0036	<0.0035	<0.0034	<0.0034	<0.0035
Perfluoroheptanoic acid (PFHpA)	NCL	<0.0034	<0.0034	<0.0034	<0.0034	<0.0035	<0.0035	0.029	0.024	<0.0035	<0.0035	<0.0036	<0.0036	<0.0035	<0.0034	<0.0034	<0.0035
Perfluorohexanoic acid (PFHxA)	400 (A)	<0.0034	<0.0034	<0.0034	<0.0034	<0.0035	<0.0035	0.015	0.014	<0.0035	<0.0035	<0.0036	<0.0036	<0.0035	<0.0034	<0.0034	<0.0035
Perfluorononanoic acid (PFNA)	0.006 (A)	<0.0034	<0.0034	<0.0034	<0.0034	<0.0035	<0.0035	<0.0034	<0.0034	<0.0035	<0.0035	<0.0036	<0.0036	<0.0035	<0.0034	<0.0034	<0.0035
Perfluorooctanoic acid (PFOA)	0.008 (A)	<0.0034	<0.0034	<0.0034	<0.0034	<0.0035	<0.0035	***0.067***	***0.044***	<0.0035	<0.0035	<0.0036	<0.0036	<0.0035	<0.0034	<0.0034	<0.0035
Perfluorooctane sulfonic acid (PFOS)	0.016 (A)	<0.0034	<0.0034	<0.0034	<0.0034	<0.0035	<0.0035	<0.0034	<0.0034	<0.0035	<0.0035	<0.0036	<0.0036	<0.0035	<0.0034	<0.0034	<0.0035
Perfluoropentanoic acid (PFPeA)	NCL	<0.0034	<0.0034	<0.0034	<0.0034	<0.0035	<0.0035	0.0063	0.0063	<0.0035	<0.0035	<0.0036	<0.0036	<0.0035	<0.0034	<0.0034	<0.0035
Perfluorotetradecanoic acid (PFTeDA)	NCL	<0.0034	<0.0034	<0.0034	<0.0034	<0.0035	<0.0035	<0.0034	<0.0034	<0.0035	<0.0035	<0.0036	<0.0036	<0.0035	<0.0034	<0.0034	<0.0035
Perfluorotridecanoic acid (PFTrDA)	NCL	<0.0034	<0.0034	<0.0034	<0.0034	<0.0035	<0.0035	<0.0034	<0.0034	<0.0035	<0.0035	<0.0036	<0.0036	<0.0035	<0.0034	<0.0034	<0.0035
Perfluoroundecanoic acid (PFUnDA)	NCL	<0.0034	<0.0034	<0.0034	<0.0034	<0.0035	<0.0035	<0.0034	<0.0034	<0.0035	<0.0035	<0.0036	<0.0036	<0.0035	<0.0034	<0.0034	<0.0035
Tetrafluoro-2-(heptafluoropropoxy)propanoic acid (GenX)	0.37 (A)	<0.0068	<0.0068	<0.0067	<0.0068	<0.0069	<0.007	<0.0068	<0.0067	<0.007	<0.007	<0.0072	<0.0071	<0.007	<0.0069	<0.0069	<0.007

TABLE 3
SUMMARY OF VAP GROUNDWATER SAMPLE ANALYSIS - PFAS
Perimeter
Algoma & Plainfield Townships, Kent County, Michigan

Sample Event	Part 201 Generic Residential Groundwater Cleanup Criteria - Drinking Water[2]	Perimeter	Perimeter	Perimeter	Perimeter	Perimeter	Perimeter	Perimeter	Perimeter	Perimeter	Perimeter	Perimeter	Perimeter	Perimeter	Perimeter	Perimeter	Perimeter
Vertical Aquifer Profiling (VAP) Location		WV-PMW-RI-101	WV-PMW-RI-101	WV-PMW-RI-102	WV-PMW-RI-104	WV-PMW-RI-104	WV-PMW-RI-104	WV-PMW-RI-104	WV-PMW-RI-105	WV-PMW-RI-105	WV-PMW-RI-105	WV-PMW-RI-105	WV-PMW-RI-105	WV-PMW-RI-106	WV-PMW-RI-106	WV-PMW-RI-106	WV-PMW-RI-106
Sample Name		WV-PMW-RI-101 (269-274)	WV-PMW-RI-101 (279-284)	WV-PMW-RI-102 (44-49)	WV-PMW-RI-104 (25-30)	WV-PMW-RI-104 (25-30) DUP	WV-PMW-RI-104 (120-125)	WV-PMW-RI-104 (130-135)	WV-PMW-RI-105 (24-29)	WV-PMW-RI-105 (34-39)	WV-PMW-RI-105 (44-49)	WV-PMW-RI-105 (69-74)	WV-PMW-RI-105 (79-84)	WV-PMW-RI-106 (10-15)	WV-PMW-RI-106 (25-30)	WV-PMW-RI-106 (35-40)	WV-PMW-RI-106 (45-50)
Screen Interval (feet below ground surface)		269-274	279-284	44-49	25-30	25-30	120-125	130-135	24-29	34-39	44-49	69-74	79-84	10-15	25-30	35-40	45-50
Laboratory Sample ID		WL03033-003	WL03033-004	XA26024-001	XJ17028-001	XJ17028-002	XJ17028-003	XJ17028-005	XI10006-001	XI10006-002	XI10006-003	XI10006-004	XI10006-005	WE28007-002	WE28007-003	WF03020-001	WF03020-002
Sample Date		12/01/2021	12/01/2021	01/17/2022	10/05/2022	10/05/2022	10/10/2022	10/11/2022	08/30/2022	08/30/2022	08/31/2022	09/06/2022	09/06/2022	05/26/2021	05/26/2021	05/27/2021	05/27/2021
Parameter (µg/L)																	
9-chlorohexadecafluoro-3-oxanone-1-sulfonic acid (9Cl-PF3ONS)	NCL	<0.0071	<0.0068	<0.0066	<0.0068	<0.0068	<0.0068	<0.007	<0.0069 [H]	<0.0071 [H]	<0.007 [H]	<0.0069 [H]	<0.0069 [H]	<0.0078	<0.0074	<0.0074	<0.0075
11-chloroeicosafluoro-3-oxaundecane-1-sulfonic acid (11CL-PF3OUdS)	NCL	<0.0071	<0.0068	<0.0066	<0.0068	<0.0068	<0.0068	<0.007	<0.0069 [H]	<0.0071 [H]	<0.007 [H]	<0.0069 [H]	<0.0069 [H]	<0.0078	<0.0074	<0.0074	<0.0075
4,8-dioxa-3H-perfluorononanoic acid (ADONA)	NCL	<0.0071	<0.0068	<0.0066	<0.0068	<0.0068	<0.0068	<0.007	<0.0069 [H]	<0.0071 [H]	<0.007 [H]	<0.0069 [H]	<0.0069 [H]	<0.0078	<0.0074	<0.0074	<0.0075
1H,1H,2H,2H-perfluorohexane sulfonate (4:2FTS)	NCL	<0.0071	<0.0068	<0.0066	<0.0068	<0.0068	<0.0068	<0.007	<0.0069 [H]	<0.0071 [H]	<0.007 [H]	<0.0069 [H]	<0.0069 [H]	<0.0078	<0.0074	<0.0074	<0.0075
6:2 Fluorotelomer sulfonic acid (6:2 FTS)	NCL	<0.0071	<0.0068	<0.0066	<0.0068	<0.0068	<0.0068	<0.007	<0.0069 [H]	<0.0071 [H]	<0.007 [H]	<0.0069 [H]	<0.0069 [H]	<0.0078	<0.0074	<0.0074	<0.0075
8:2 Fluorotelomer sulfonic acid (8:2 FTS)	NCL	<0.0071	<0.0068	<0.0066	<0.0068	<0.0068	<0.0068	<0.007	<0.0069 [H]	<0.0071 [H]	<0.007 [H]	<0.0069 [H]	<0.0069 [H]	<0.0078	<0.0074	<0.0074	<0.0075
N-ethylperfluoro-1-octanesulfonamidoacetic acid (EtFOSAA)	NCL	<0.0071	<0.0068	<0.0066	<0.0068	<0.0068	<0.0068	<0.007	<0.0069 [H]	<0.0071 [H]	<0.007 [H]	<0.0069 [H]	<0.0069 [H]	<0.0078	<0.0074	<0.0074	<0.0075
N-methylperfluoro-1-octanesulfonamidoacetic acid (MeFOSAA)	NCL	<0.0071	<0.0068	<0.0066	<0.0068	<0.0068	<0.0068	<0.007	<0.0069 [H]	<0.0071 [H]	<0.007 [H]	<0.0069 [H]	<0.0069 [H]	<0.0078	<0.0074	<0.0074	<0.0075
Perfluorobutane sulfonic acid (PFBS)	0.42 (A)	<0.0036	<0.0034	0.004	0.004	0.0039	<0.0034	<0.0035	0.0057 [H]	0.0057 [H]	<0.0035 [H]	<0.0034 [H]	<0.0035 [H]	0.013	0.013	0.016	0.013
Perfluorodecane sulfonic acid (PFDS)	NCL	<0.0036	<0.0034	<0.0033	<0.0034	<0.0034	<0.0034	<0.0035	<0.0035 [H]	<0.0035 [H]	<0.0035 [H]	<0.0034 [H]	<0.0035 [H]	<0.0039	<0.0037	<0.0037	<0.0038
Perfluoroheptane sulfonic acid (PFHpS)	NCL	<0.0036	<0.0034	<0.0033	<0.0034	<0.0034	<0.0034	<0.0035	<0.0035 [H]	<0.0035 [H]	<0.0035 [H]	<0.0034 [H]	<0.0035 [H]	<0.0039	<0.0037	<0.0037	<0.0038
Perfluorononane sulfonic acid (PFNS)	NCL	<0.0036	<0.0034	<0.0033	<0.0034	<0.0034	<0.0034	<0.0035	<0.0035 [H]	<0.0035 [H]	<0.0035 [H]	<0.0034 [H]	<0.0035 [H]	<0.0039	<0.0037	<0.0037	<0.0038
Perfluorooctane sulfonamide (FOSA)	NCL	<0.0036	<0.0034	<0.0033	<0.0034	<0.0034	<0.0034	<0.0035	<0.0035 [H]	<0.0035 [H]	<0.0035 [H]	<0.0034 [H]	<0.0035 [H]	<0.0039	<0.0037	<0.0037	<0.0038
Perfluoropentane sulfonic acid (PFPeS)	NCL	<0.0036	<0.0034	<0.0033	<0.0034	<0.0034	<0.0034	<0.0035	<0.0035 [H]	<0.0035 [H]	<0.0035 [H]	<0.0034 [H]	<0.0035 [H]	<0.0039	0.0041	0.0051	0.0056
Perfluorohexane sulfonic acid (PFHxS)	0.051 (A)	<0.0036	<0.0034	<0.0033	<0.0034	<0.0034	<0.0034	<0.0035	<0.0035 [H]	<0.0035 [H]	<0.0035 [H]	<0.0034 [H]	<0.0035 [H]	0.0043	0.01	0.012	0.022
Perfluorobutanoic acid (PFBA)	NCL	<0.0036	<0.0034	<0.0033	<0.0034	<0.0034	<0.0034	<0.0035	<0.0035 [H]	<0.0035 [H]	<0.0035 [H]	<0.0034 [H]	<0.0035 [H]	<0.0039	<0.0037	<0.0037	0.0059
Perfluorodecanoic acid (PFDA)	NCL	<0.0036	<0.0034	<0.0033	<0.0034	<0.0034	<0.0034	<0.0035	<0.0035 [H]	<0.0035 [H]	<0.0035 [H]	<0.0034 [H]	<0.0035 [H]	<0.0039	<0.0037	<0.0037	<0.0038
Perfluorododecanoic acid (PFDoDA)	NCL	<0.0036	<0.0034	<0.0033	<0.0034	<0.0034	<0.0034	<0.0035	<0.0035 [H]	<0.0035 [H]	<0.0035 [H]	<0.0034 [H]	<0.0035 [H]	<0.0039	<0.0037	<0.0037	<0.0038
Perfluoroheptanoic acid (PFHpA)	NCL	<0.0036	<0.0034	<0.0033	<0.0034	<0.0034	<0.0034	<0.0035	<0.0035 [H]	<0.0035 [H]	<0.0035 [H]	<0.0034 [H]	<0.0035 [H]	0.0043	<0.0037	<0.0037	0.011
Perfluorohexanoic acid (PFHxA)	400 (A)	<0.0036	<0.0034	<0.0033	<0.0034	<0.0034	<0.0034	<0.0035	<0.0035 [H]	<0.0035 [H]	<0.0035 [H]	<0.0034 [H]	<0.0035 [H]	<0.0039	<0.0037	<0.0037	0.016
Perfluorononanoic acid (PFNA)	0.006 (A)	<0.0036	<0.0034	<0.0033	<0.0034	<0.0034	<0.0034	<0.0035	<0.0035 [H]	<0.0035 [H]	<0.0035 [H]	<0.0034 [H]	<0.0035 [H]	<0.0039	<0.0037	<0.0037	<0.0038
Perfluorooctanoic acid (PFOA)	0.008 (A)	<0.0036	<0.0034	<0.0033	0.005	0.005	<0.0034	<0.0035	<0.0035 [H]	<0.0035 [H]	<0.0035 [H]	<0.0034 [H]	<0.0035 [H]	***0.039***	***0.0097***	***0.011***	***0.041***
Perfluorooctane sulfonic acid (PFOS)	0.016 (A)	<0.0036	<0.0034	<0.0033	0.014	0.014	<0.0034	<0.0035	<0.0035 [H]	<0.0035 [H]	<0.0035 [H]	<0.0034 [H]	<0.0035 [H]	***0.036***	<0.0037	<0.0037	***0.019***
Perfluoropentanoic acid (PFPeA)	NCL	<0.0036	<0.0034	<0.0033	<0.0034	<0.0034	<0.0034	<0.0035	<0.0035 [H]	<0.0035 [H]	<0.0035 [H]	<0.0034 [H]	<0.0035 [H]	<0.0039	<0.0037	<0.0037	0.012
Perfluorotetradecanoic acid (PFTeDA)	NCL	<0.0036	<0.0034	<0.0033	<0.0034	<0.0034	<0.0034	<0.0035	<0.0035 [H]	<0.0035 [H]	<0.0035 [H]	<0.0034 [H]	<0.0035 [H]	<0.0039	<0.0037	<0.0037	<0.0038
Perfluorotridecanoic acid (PFTrDA)	NCL	<0.0036	<0.0034	<0.0033	<0.0034	<0.0034	<0.0034	<0.0035	<0.0035 [H]	<0.0035 [H]	<0.0035 [H]	<0.0034 [H]	<0.0035 [H]	<0.0039	<0.0037	<0.0037	<0.0038
Perfluoroundecanoic acid (PFUnDA)	NCL	<0.0036	<0.0034	<0.0033	<0.0034	<0.0034	<0.0034	<0.0035	<0.0035 [H]	<0.0035 [H]	<0.0035 [H]	<0.0034 [H]	<0.0035 [H]	<0.0039	<0.0037	<0.0037	<0.0038
Tetrafluoro-2-(heptafluoropropoxy)propanoic acid (GenX)	0.37 (A)	<0.0071	<0.0068	<0.0066	<0.0068	<0.0068	<0.0068	<0.007	<0.0069 [H]	<0.0071 [H]	<0.007 [H]	<0.0069 [H]	<0.0069 [H]	<0.0078	<0.0074	<0.0074	<0.0075

TABLE 3
SUMMARY OF VAP GROUNDWATER SAMPLE ANALYSIS - PFAS
Perimeter
Algoma & Plainfield Townships, Kent County, Michigan

Sample Event	Part 201 Generic Residential Groundwater Cleanup Criteria - Drinking Water[2]	Perimeter	Perimeter	Perimeter	Perimeter	Perimeter	Perimeter	Perimeter
Vertical Aquifer Profiling (VAP) Location		WV-PMW-RI-106	WV-PMW-RI-106	WV-PMW-RI-106	WV-PMW-RI-106	WV-PMW-RI-106	WV-PMW-RI-107	WV-PMW-RI-108
Sample Name		WV-PMW-RI-106 (54-59)	WV-PMW-RI-106 (65-70)	WV-PMW-RI-106 (75-80)	WV-PMW-RI-106 (75-80) DUP	WV-PMW-RI-106 (169-174)	WV-PMW-RI-107 (185-190)	WV-PMW-RI-108 (10-15)
Screen Interval (feet below ground surface)		54-59	65-70	75-80	75-80	169-174	185-190	10-15
Laboratory Sample ID		WF03020-003	WF03020-004	WF03020-005	WF03020-006	WF14036-001	WE28007-001	XK07020-001
Sample Date		05/27/2021	06/01/2021	06/01/2021	06/01/2021	06/08/2021	05/24/2021	10/17/2022
Parameter (µg/L)								
9-chlorohexadecafluoro-3-oxanone-1-sulfonic acid (9Cl-PF3ONS)	NCL	<0.0071	<0.007	<0.0069	<0.007	<0.0068	<0.0081	<0.0073
11-chloroeicosafluoro-3-oxaundecane-1-sulfonic acid (11CL-PF3OUdS)	NCL	<0.0071	<0.007	<0.0069	<0.007	<0.0068	<0.0081	<0.0073
4,8-dioxa-3H-perfluorononanoic acid (ADONA)	NCL	<0.0071	<0.007	<0.0069	<0.007	<0.0068	<0.0081	<0.0073
1H,1H,2H,2H-perfluorohexane sulfonate (4:2FTS)	NCL	<0.0071	<0.007	<0.0069	<0.007	<0.0068	<0.0081	<0.0073
6:2 Fluorotelomer sulfonic acid (6:2 FTS)	NCL	<0.0071	0.0073	<0.0069	<0.007	<0.0068	<0.0081	<0.0073
8:2 Fluorotelomer sulfonic acid (8:2 FTS)	NCL	<0.0071	<0.007	<0.0069	<0.007	<0.0068	<0.0081	<0.0073
N-ethylperfluoro-1-octanesulfonamidoacetic acid (EtFOSAA)	NCL	<0.0071	<0.007	<0.0069	<0.007	<0.0068	<0.0081	<0.0073
N-methylperfluoro-1-octanesulfonamidoacetic acid (MeFOSAA)	NCL	<0.0071	<0.007	<0.0069	<0.007	<0.0068	<0.0081	<0.0073
Perfluorobutane sulfonic acid (PFBS)	0.42 (A)	0.02	<0.0035	<0.0034	<0.0035	<0.0034	<0.004	0.01
Perfluorodecane sulfonic acid (PFDS)	NCL	<0.0035	<0.0035	<0.0034	<0.0035	<0.0034	<0.004	<0.0037
Perfluoroheptane sulfonic acid (PFHpS)	NCL	0.0036	<0.0035	<0.0034	<0.0035	<0.0034	<0.004	<0.0037
Perfluorononane sulfonic acid (PFNS)	NCL	<0.0035	<0.0035	<0.0034	<0.0035	<0.0034	<0.004	<0.0037
Perfluorooctane sulfonamide (FOSA)	NCL	<0.0035	<0.0035	<0.0034	<0.0035	<0.0034	<0.004	<0.0037
Perfluoropentane sulfonic acid (PFPeS)	NCL	<0.0035	<0.0035	<0.0034	<0.0035	<0.0034	<0.004	<0.0037
Perfluorohexane sulfonic acid (PFHxS)	0.051 (A)	0.012	<0.0035	<0.0034	<0.0035	<0.0034	<0.004	0.011
Perfluorobutanoic acid (PFBA)	NCL	0.014	<0.0035	<0.0034	<0.0035	<0.0034	<0.004	<0.0037
Perfluorodecanoic acid (PFDA)	NCL	<0.0035	<0.0035	<0.0034	<0.0035	<0.0034	<0.004	<0.0037
Perfluorododecanoic acid (PFDoDA)	NCL	<0.0035	<0.0035	<0.0034	<0.0035	<0.0034	<0.004	<0.0037
Perfluoroheptanoic acid (PFHpA)	NCL	0.018	<0.0035	<0.0034	<0.0035	<0.0034	<0.004	<0.0037
Perfluorohexanoic acid (PFHxA)	400 (A)	0.049	<0.0035	<0.0034	<0.0035	<0.0034	<0.004	<0.0037
Perfluorononanoic acid (PFNA)	0.006 (A)	<0.0035	<0.0035	<0.0034	<0.0035	<0.0034	<0.004	<0.0037
Perfluorooctanoic acid (PFOA)	0.008 (A)	***0.064***	<0.0035	<0.0034	<0.0035	<0.0034	<0.004	<0.0037
Perfluorooctane sulfonic acid (PFOS)	0.016 (A)	***0.032***	<0.0035	<0.0034	<0.0035	<0.0034	<0.004	<0.0037
Perfluoropentanoic acid (PFPeA)	NCL	0.043	<0.0035	<0.0034	<0.0035	<0.0034	<0.004	<0.0037
Perfluorotetradecanoic acid (PFTeDA)	NCL	<0.0035	<0.0035	<0.0034	<0.0035	<0.0034	<0.004	<0.0037
Perfluorotridecanoic acid (PFTrDA)	NCL	<0.0035	<0.0035	<0.0034	<0.0035	<0.0034	<0.004	<0.0037
Perfluoroundecanoic acid (PFUnDA)	NCL	<0.0035	<0.0035	<0.0034	<0.0035	<0.0034	<0.004	<0.0037
Tetrafluoro-2-(heptafluoropropoxy)propanoic acid (GenX)	0.37 (A)	<0.0071	<0.007	<0.0069	<0.007	<0.0068	<0.0081	<0.0073

TABLE 3 NOTES
Perimeter
Algoma & Plainfield Townships, Kent County, Michigan

NOTES:

1. Concentration and criteria units are micrograms per Liter (µg/L) or approximately parts per billion (ppb).
2. Michigan Part 201 Groundwater Cleanup Criteria are based on "Table 1, Groundwater: Residential and Nonresidential Part 201 Generic Cleanup Criteria and Screening Levels/Part 213 Tier I Risk Based Screening Levels," Michigan Administrative Code, Cleanup Criteria Requirements for Response Activity, Rules 299.44 and 299.49, effective December 30, 2013; last updated October 12, 2023.
   Abbreviations Include:
   "NCL" indicates no criterion listed in EGLE Table 1.
   Footnotes Include:
   (A) - The criterion is the State of Michigan drinking water standard.
   Abbreviations Include:
   "NA" indicates not available.
3. Bold, italic number with thick line border or italic analyte name indicates that parameter was detected above the Michigan Part 201 Groundwater Cleanup Criteria listed.
4. Abbreviations include:
   "< LOQ" indicates the analyte was analyzed for but not detected above the limit of quantitation (LOQ).
   "H" indicates the parameter was analyzed out of hold time.
   "DUP" indicates a duplicate sample.
5. Screen interval presented is the top of the screen to the bottom of the screen in feet below ground surface.

TABLE 4A
SUMMARY OF MONITORING WELL GROUNDWATER SAMPLE ANALYSIS - PFAS
Perimeter
Algoma & Plainfield Townships, Kent County, Michigan

Sample Event	Part 201 Generic Residential Groundwater Cleanup Criteria - Drinking Water[2]	Area 6/Perimeter - Q2 2023	Area 6/Perimeter - Q3 2023	Perimeter - Q4 2023	Perimeter - Q1 2024	Area 6/Perimeter - Q2 2023	Area 6/Perimeter - Q3 2023	Perimeter - Q4 2023	Perimeter - Q1 2024	Area 6/Perimeter - Q2 2023	Area 6/Perimeter - Q3 2023	Perimeter - Q4 2023	Perimeter - Q1 2024	Area 6/Perimeter - Q2 2023	Area 6/Perimeter - Q3 2023	Perimeter - Q4 2023	Perimeter - Q1 2024
Well		HS-MW-13A	HS-MW-13A	HS-MW-13A	HS-MW-13A	HS-MW-13B	HS-MW-13B	HS-MW-13B	HS-MW-13B	HS-MW-13C	HS-MW-13C	HS-MW-13C	HS-MW-13C	HS-PMW-16A	HS-PMW-16A	HS-PMW-16A	HS-PMW-16A
Sample Name		HS-MW-13A	HS-MW-13A	HS-MW-13A	HS-MW-13A	HS-MW-13B	HS-MW-13B	HS-MW-13B	HS-MW-13B	HS-MW-13C	HS-MW-13C	HS-MW-13C	HS-MW-13C	HS-PMW-16A	HS-PMW-16A	HS-PMW-16A	HS-PMW-16A
Screen Interval (feet below ground surface)		79.2-84	79.2-84	79.2-84	79.2-84	148.8-153.6	148.8-153.6	148.8-153.6	148.8-153.6	199.4-204.2	199.4-204.2	199.4-204.2	199.4-204.2	89.3-94.3	89.3-94.3	89.3-94.3	89.3-94.3
Laboratory Sample ID		YD26033-001	YH05006-002	YL21056-008	ZB03013-016	YD26033-003	YH05006-001	YL21056-009	ZB03013-014	YE09016-005	YH05006-005	YL21056-001	ZB03013-015	YD26033-005	YH02030-004	YL21056-002	ZB13011-015
Sample Date		04/25/2023	08/01/2023	12/15/2023	01/31/2024	04/25/2023	08/01/2023	12/15/2023	01/31/2024	05/05/2023	08/04/2023	12/18/2023	01/31/2024	04/24/2023	07/31/2023	12/18/2023	02/12/2024
Parameter (µg/L)																	
9-chlorohexadecafluoro-3-oxanone-1-sulfonic acid (9Cl-PF3ONS)	NCL	<0.0069	<0.0069	<0.0077	<0.0076	<0.0075	<0.0076	<0.0074	<0.0072	<0.0073	<0.0068	<0.0076	<0.008	<0.0069	<0.0072	<0.0076	<0.0073
11-chloroeicosafluoro-3-oxaundecane-1-sulfonic acid (11CL-PF3OUdS)	NCL	<0.0069	<0.0069	<0.0077	<0.0076	<0.0075	<0.0076	<0.0074	<0.0072	<0.0073	<0.0068	<0.0076	<0.008	<0.0069	<0.0072	<0.0076	<0.0073
4,8-dioxa-3H-perfluorononanoic acid (ADONA)	NCL	<0.0069	<0.0069	<0.0077	<0.0076	<0.0075	<0.0076	<0.0074	<0.0072	<0.0073	<0.0068	<0.0076	<0.008	<0.0069	<0.0072	<0.0076	<0.0073
1H,1H,2H,2H-perfluorohexane sulfonate (4:2FTS)	NCL	<0.0069	<0.0069	<0.0077	<0.0076	<0.0075	<0.0076	<0.0074	<0.0072	<0.0073	<0.0068	<0.0076	<0.008	<0.0069	<0.0072	<0.0076	<0.0073
6:2 Fluorotelomer sulfonic acid (6:2 FTS)	NCL	<0.0069	<0.0069	<0.0077	<0.0076	<0.0075	<0.0076	<0.0074	<0.0072	<0.0073	<0.0068	<0.0076	<0.008	<0.0069	<0.0072	<0.0076	<0.0073
8:2 Fluorotelomer sulfonic acid (8:2 FTS)	NCL	<0.0069	<0.0069	<0.0077	<0.0076	<0.0075	<0.0076	<0.0074	<0.0072	<0.0073	<0.0068	<0.0076	<0.008	<0.0069	<0.0072	<0.0076	<0.0073
N-ethylperfluoro-1-octanesulfonamidoacetic acid (EtFOSAA)	NCL	<0.0069	<0.0069	<0.0077	<0.0076	<0.0075	<0.0076	<0.0074	<0.0072	<0.0073	<0.0068	<0.0076	<0.008	<0.0069	<0.0072	<0.0076	<0.0073
N-methylperfluoro-1-octanesulfonamidoacetic acid (MeFOSAA)	NCL	<0.0069	<0.0069	<0.0077	<0.0076	<0.0075	<0.0076	<0.0074	<0.0072	<0.0073	<0.0068	<0.0076	<0.008	<0.0069	<0.0072	<0.0076	<0.0073
Perfluorobutane sulfonic acid (PFBS)	0.42 (A)	0.008	0.0073	0.0093	0.0092	<0.0038	<0.0038	0.0043	0.0043	<0.0036	<0.0034	<0.0038	<0.004	0.0063	<0.0036	0.0084	0.01
Perfluorodecane sulfonic acid (PFDS)	NCL	<0.0035	<0.0034	<0.0038	<0.0038	<0.0038	<0.0038	<0.0037	<0.0036	<0.0036	<0.0034	<0.0038	<0.004	<0.0034	<0.0036	<0.0038	<0.0036
Perfluoroheptane sulfonic acid (PFHpS)	NCL	<0.0035	<0.0034	<0.0038	<0.0038	<0.0038	<0.0038	<0.0037	<0.0036	<0.0036	<0.0034	<0.0038	<0.004	<0.0034	<0.0036	<0.0038	<0.0036
Perfluorononane sulfonic acid (PFNS)	NCL	<0.0035	<0.0034	<0.0038	<0.0038	<0.0038	<0.0038	<0.0037	<0.0036	<0.0036	<0.0034	<0.0038	<0.004	<0.0034	<0.0036	<0.0038	<0.0036
Perfluorooctane sulfonamide (FOSA)	NCL	<0.0035	<0.0034	<0.0038	<0.0038	<0.0038	<0.0038	<0.0037	<0.0036	<0.0036	<0.0034	<0.0038	<0.004	<0.0034	<0.0036	<0.0038	<0.0036
Perfluoropentane sulfonic acid (PFPeS)	NCL	<0.0035	<0.0034	<0.0038	<0.0038	<0.0038	<0.0038	<0.0037	<0.0036	<0.0036	<0.0034	<0.0038	<0.004	<0.0034	<0.0036	<0.0038	<0.0036
Perfluorohexane sulfonic acid (PFHxS)	0.051 (A)	0.0099	0.0083	0.009	0.0086	<0.0038	<0.0038	<0.0037	<0.0036	<0.0036	<0.0034	<0.0038	<0.004	0.0035	<0.0036	<0.0038	<0.0036
Perfluorobutanoic acid (PFBA)	NCL	<0.0035	<0.0034	<0.0038	<0.0038	<0.0038	<0.0038	<0.0037	<0.0036	<0.0036	<0.0034	<0.0038	<0.004	<0.0034	<0.0036	<0.0038	<0.0036
Perfluorodecanoic acid (PFDA)	NCL	<0.0035	<0.0034	<0.0038	<0.0038	<0.0038	<0.0038	<0.0037	<0.0036	<0.0036	<0.0034	<0.0038	<0.004	<0.0034	<0.0036	<0.0038	<0.0036
Perfluorododecanoic acid (PFDoDA)	NCL	<0.0035	<0.0034	<0.0038	<0.0038	<0.0038	<0.0038	<0.0037	<0.0036	<0.0036	<0.0034	<0.0038	<0.004	<0.0034	<0.0036	<0.0038	<0.0036
Perfluoroheptanoic acid (PFHpA)	NCL	<0.0035	<0.0034	<0.0038	<0.0038	<0.0038	<0.0038	<0.0037	<0.0036	<0.0036	<0.0034	<0.0038	<0.004	<0.0034	<0.0036	<0.0038	<0.0036
Perfluorohexanoic acid (PFHxA)	400 (A)	<0.0035	<0.0034	<0.0038	0.0042	<0.0038	<0.0038	<0.0037	<0.0036	<0.0036	<0.0034	<0.0038	<0.004	0.0044	<0.0036	<0.0038	0.0036
Perfluorononanoic acid (PFNA)	0.006 (A)	<0.0035	<0.0034	<0.0038	<0.0038	<0.0038	<0.0038	<0.0037	<0.0036	<0.0036	<0.0034	<0.0038	<0.004	<0.0034	<0.0036	<0.0038	<0.0036
Perfluorooctanoic acid (PFOA)	0.008 (A)	<0.0035	<0.0034	0.0039	0.0048	<0.0038	<0.0038	<0.0037	0.0037	<0.0036	<0.0034	<0.0038	<0.004	0.0076	<0.0036	0.0073	0.0075
Perfluorooctane sulfonic acid (PFOS)	0.016 (A)	<0.0035	<0.0034	<0.0038	<0.0038	<0.0038	<0.0038	<0.0037	<0.0036	<0.0036	<0.0034	<0.0038	<0.004	0.0038	<0.0036	<0.0038	0.0043
Perfluoropentanoic acid (PFPeA)	NCL	<0.0035	<0.0034	<0.0038	<0.0038	<0.0038	<0.0038	<0.0037	<0.0036	<0.0036	<0.0034	<0.0038	<0.004	0.0036	<0.0036	<0.0038	<0.0036
Perfluorotetradecanoic acid (PFTeDA)	NCL	<0.0035	<0.0034	<0.0038	<0.0038	<0.0038	<0.0038	<0.0037	<0.0036	<0.0036	<0.0034	<0.0038	<0.004	<0.0034	<0.0036	<0.0038	<0.0036
Perfluorotridecanoic acid (PFTrDA)	NCL	<0.0035	<0.0034	<0.0038	<0.0038	<0.0038	<0.0038	<0.0037	<0.0036	<0.0036	<0.0034	<0.0038	<0.004	<0.0034	<0.0036	<0.0038	<0.0036
Perfluoroundecanoic acid (PFUnDA)	NCL	<0.0035	<0.0034	<0.0038	<0.0038	<0.0038	<0.0038	<0.0037	<0.0036	<0.0036	<0.0034	<0.0038	<0.004	<0.0034	<0.0036	<0.0038	<0.0036
Tetrafluoro-2-(heptafluoropropoxy)propanoic acid (GenX)	0.37 (A)	<0.0069	<0.0069	<0.0077	<0.0076	<0.0075	<0.0076	<0.0074	<0.0072	<0.0073	<0.0068	<0.0076	<0.008	<0.0069	<0.0072	<0.0076	<0.0073

TABLE 4A
SUMMARY OF MONITORING WELL GROUNDWATER SAMPLE ANALYSIS - PFAS
Perimeter
Algoma & Plainfield Townships, Kent County, Michigan

Sample Event	Part 201 Generic Residential Groundwater Cleanup Criteria - Drinking Water[2]	Perimeter - Q1 2024	Area 6/Perimeter - Q2 2023	Area 6/Perimeter - Q3 2023	Perimeter - Q4 2023	Perimeter - Q1 2024	Area 6/Perimeter - Q2 2023	Area 6/Perimeter - Q3 2023	Perimeter - Q4 2023	Perimeter - Q4 2023	Perimeter - Q1 2024	Perimeter - Q2 2023	Perimeter - Q3 2023	Perimeter - Q4 2023	Perimeter - Q1 2024	Perimeter - Q2 2023	Perimeter - Q3 2023
Well		HS-PMW-16A	HS-PMW-16B	HS-PMW-16B	HS-PMW-16B	HS-PMW-16B	HS-PMW-16C	HS-PMW-16C	HS-PMW-16C	HS-PMW-16C	HS-PMW-16C	HS-PMW-22	HS-PMW-22	HS-PMW-22	HS-PMW-22	HS-MW-32A	HS-MW-32A
Sample Name		HS-PMW-16A-DUP	HS-PMW-16B	HS-PMW-16B	HS-PMW-RI-16B	HS-PMW-16B	HS-PMW-16C	HS-PMW-16C	HS-PMW-16C	HS-PMW-16C DUP	HS-PMW-16C	HS-PMW-22	HS-PMW-22	HS-PMW-22	HS-PMW-22	HS-MW-32A	HS-MW-32A
Screen Interval (feet below ground surface)		89.3-94.3	118.7-123.7	118.7-123.7	118.7-123.7	118.7-123.7	161.6-166.6	161.6-166.6	161.6-166.6	161.6-166.6	161.6-166.6	169.3-174.3	169.3-174.3	169.3-174.3	169.3-174.3	60.9-65.5	60.9-65.5
Laboratory Sample ID		ZB13011-016	YD26033-004	YH02030-005	YL21056-016	ZB13011-017	YD26033-002	YH05006-008	YL21056-014	YL21056-012	ZB13011-018	YF22007-014	YH31008-003	YK04005-003	ZB21017-019	YF14023-002	YH24014-002
Sample Date		02/12/2024	04/24/2023	07/31/2023	12/18/2023	02/12/2024	04/25/2023	08/04/2023	12/18/2023	12/18/2023	02/12/2024	06/21/2023	08/30/2023	11/02/2023	02/15/2024	06/12/2023	08/21/2023
Parameter (µg/L)																	
9-chlorohexadecafluoro-3-oxanone-1-sulfonic acid (9Cl-PF3ONS)	NCL	<0.0072	<0.0079	<0.0069	<0.0084	<0.0079	<0.0075	<0.008	<0.0079	<0.0079	<0.0077	<0.0076	<0.0068	<0.0073	<0.0072	<0.008	<0.0073
11-chloroeicosafluoro-3-oxaundecane-1-sulfonic acid (11CL-PF3OUdS)	NCL	<0.0072	<0.0079	<0.0069	<0.0084	<0.0079	<0.0075	<0.008	<0.0079	<0.0079	<0.0077	<0.0076	<0.0068	<0.0073	<0.0072	<0.008	<0.0073
4,8-dioxa-3H-perfluorononanoic acid (ADONA)	NCL	<0.0072	<0.0079	<0.0069	<0.0084	<0.0079	<0.0075	<0.008	<0.0079	<0.0079	<0.0077	<0.0076	<0.0068	<0.0073	<0.0072	<0.008	<0.0073
1H,1H,2H,2H-perfluorohexane sulfonate (4:2FTS)	NCL	<0.0072	<0.0079	<0.0069	<0.0084	<0.0079	<0.0075	<0.008	<0.0079	<0.0079	<0.0077	<0.0076	<0.0068	<0.0073	<0.0072	<0.008	<0.0073
6:2 Fluorotelomer sulfonic acid (6:2 FTS)	NCL	<0.0072	<0.0079	<0.0069	<0.0084	<0.0079	<0.0075	<0.008	<0.0079	<0.0079	<0.0077	<0.0076	<0.0068	<0.0073	<0.0072	<0.008	<0.0073
8:2 Fluorotelomer sulfonic acid (8:2 FTS)	NCL	<0.0072	<0.0079	<0.0069	<0.0084	<0.0079	<0.0075	<0.008	<0.0079	<0.0079	<0.0077	<0.0076	<0.0068	<0.0073	<0.0072	<0.008	<0.0073
N-ethylperfluoro-1-octanesulfonamidoacetic acid (EtFOSAA)	NCL	<0.0072	<0.0079	<0.0069	<0.0084	<0.0079	<0.0075	<0.008	<0.0079	<0.0079	<0.0077	<0.0076	<0.0068	<0.0073	<0.0072	<0.008	<0.0073
N-methylperfluoro-1-octanesulfonamidoacetic acid (MeFOSAA)	NCL	<0.0072	<0.0079	<0.0069	<0.0084	<0.0079	<0.0075	<0.008	<0.0079	<0.0079	<0.0077	<0.0076	<0.0068	<0.0073	<0.0072	<0.008	<0.0073
Perfluorobutane sulfonic acid (PFBS)	0.42 (A)	0.0098	0.0061	<0.0034	0.0058	0.0067	<0.0037	<0.004	<0.004	<0.0039	<0.0039	0.011	0.0097	0.0099	0.011	<0.004	<0.0036
Perfluorodecane sulfonic acid (PFDS)	NCL	<0.0036	<0.0039	<0.0034	<0.0042	<0.0039	<0.0037	<0.004	<0.004	<0.0039	<0.0039	<0.0038	<0.0034	<0.0037	<0.0036	<0.004	<0.0036
Perfluoroheptane sulfonic acid (PFHpS)	NCL	<0.0036	<0.0039	<0.0034	<0.0042	<0.0039	<0.0037	<0.004	<0.004	<0.0039	<0.0039	<0.0038	<0.0034	<0.0037	<0.0036	<0.004	<0.0036
Perfluorononane sulfonic acid (PFNS)	NCL	<0.0036	<0.0039	<0.0034	<0.0042	<0.0039	<0.0037	<0.004	<0.004	<0.0039	<0.0039	<0.0038	<0.0034	<0.0037	<0.0036	<0.004	<0.0036
Perfluorooctane sulfonamide (FOSA)	NCL	<0.0036	<0.0039	<0.0034	<0.0042	<0.0039	<0.0037	<0.004	<0.004	<0.0039	<0.0039	<0.0038	<0.0034	<0.0037	<0.0036	<0.004	<0.0036
Perfluoropentane sulfonic acid (PFPeS)	NCL	<0.0036	<0.0039	<0.0034	<0.0042	<0.0039	<0.0037	<0.004	<0.004	<0.0039	<0.0039	<0.0038	<0.0034	<0.0037	<0.0036	<0.004	<0.0036
Perfluorohexane sulfonic acid (PFHxS)	0.051 (A)	<0.0036	<0.0039	<0.0034	<0.0042	<0.0039	<0.0037	<0.004	<0.004	<0.0039	<0.0039	<0.0038	<0.0034	<0.0037	<0.0036	<0.004	<0.0036
Perfluorobutanoic acid (PFBA)	NCL	<0.0036	<0.0039	<0.0034	<0.0042	<0.0039	<0.0037	<0.004	<0.004	<0.0039	<0.0039	0.0041	0.004	0.004	0.0045	<0.004	<0.0036
Perfluorodecanoic acid (PFDA)	NCL	<0.0036	<0.0039	<0.0034	<0.0042	<0.0039	<0.0037	<0.004	<0.004	<0.0039	<0.0039	<0.0038	<0.0034	<0.0037	<0.0036	<0.004	<0.0036
Perfluorododecanoic acid (PFDoDA)	NCL	<0.0036	<0.0039	<0.0034	<0.0042	<0.0039	<0.0037	<0.004	<0.004	<0.0039	<0.0039	<0.0038	<0.0034	<0.0037	<0.0036	<0.004	<0.0036
Perfluoroheptanoic acid (PFHpA)	NCL	<0.0036	<0.0039	<0.0034	<0.0042	<0.0039	<0.0037	<0.004	<0.004	<0.0039	<0.0039	<0.0038	<0.0034	<0.0037	<0.0036	<0.004	<0.0036
Perfluorohexanoic acid (PFHxA)	400 (A)	0.0036	0.0054	<0.0034	0.0049	0.0058	<0.0037	<0.004	<0.004	0.0042	<0.0039	<0.0038	<0.0034	<0.0037	<0.0036	<0.004	<0.0036
Perfluorononanoic acid (PFNA)	0.006 (A)	<0.0036	<0.0039	<0.0034	<0.0042	<0.0039	<0.0037	<0.004	<0.004	<0.0039	<0.0039	<0.0038	<0.0034	<0.0037	<0.0036	<0.004	<0.0036
Perfluorooctanoic acid (PFOA)	0.008 (A)	0.0077	0.0051	<0.0034	0.0061	0.0052	<0.0037	<0.004	<0.004	<0.0039	<0.0039	0.0058	0.0054	0.0055	0.005	<0.004	<0.0036
Perfluorooctane sulfonic acid (PFOS)	0.016 (A)	0.0043	<0.0039	<0.0034	<0.0042	<0.0039	<0.0037	<0.004	<0.004	<0.0039	<0.0039	<0.0038	<0.0034	<0.0037	<0.0036	<0.004	<0.0036
Perfluoropentanoic acid (PFPeA)	NCL	<0.0036	0.005	<0.0034	0.0057	0.0054	0.0045	0.0046	0.0053	0.0065	0.0043	<0.0038	<0.0034	<0.0037	<0.0036	<0.004	<0.0036
Perfluorotetradecanoic acid (PFTeDA)	NCL	<0.0036	<0.0039	<0.0034	<0.0042	<0.0039	<0.0037	<0.004	<0.004	<0.0039	<0.0039	<0.0038	<0.0034	<0.0037	<0.0036	<0.004	<0.0036
Perfluorotridecanoic acid (PFTrDA)	NCL	<0.0036	<0.0039	<0.0034	<0.0042	<0.0039	<0.0037	<0.004	<0.004	<0.0039	<0.0039	<0.0038	<0.0034	<0.0037	<0.0036	<0.004	<0.0036
Perfluoroundecanoic acid (PFUnDA)	NCL	<0.0036	<0.0039	<0.0034	<0.0042	<0.0039	<0.0037	<0.004	<0.004	<0.0039	<0.0039	<0.0038	<0.0034	<0.0037	<0.0036	<0.004	<0.0036
Tetrafluoro-2-(heptafluoropropoxy)propanoic acid (GenX)	0.37 (A)	<0.0072	<0.0079	<0.0069	<0.0084	<0.0079	<0.0075	<0.008	<0.0079	<0.0079	<0.0077	<0.0076	<0.0068	<0.0073	<0.0072	<0.008	<0.0073

TABLE 4A
SUMMARY OF MONITORING WELL GROUNDWATER SAMPLE ANALYSIS - PFAS
Perimeter
Algoma & Plainfield Townships, Kent County, Michigan

Sample Event	Part 201 Generic Residential Groundwater Cleanup Criteria - Drinking Water[2]	Perimeter - Q4 2023	Perimeter - Q1 2024	Perimeter - Q2 2023	Perimeter - Q3 2023	Perimeter - Q4 2023	Perimeter - Q1 2024	Perimeter - Q2 2023	Perimeter - Q3 2023	Perimeter - Q4 2023	Perimeter - Q1 2024	Perimeter - Q2 2023	Perimeter - Q3 2023	Perimeter - Q4 2023	Perimeter - Q1 2024	Area 5/Perimeter - Q2 2023	Area 5/Perimeter - Q3 2023
Well		HS-MW-32A	HS-MW-32A	HS-MW-32B	HS-MW-32B	HS-MW-32B	HS-MW-32B	HS-MW-32C	HS-MW-32C	HS-MW-32C	HS-MW-32C	HS-MW-32D	HS-MW-32D	HS-MW-32D	HS-MW-32D	AREA5-RI-3A	AREA5-RI-3A
Sample Name		HS-MW-32A	HS-MW-32A	HS-MW-32B	HS-MW-32B	HS-MW-32B	HS-MW-32B	HS-MW-32C	HS-MW-32C	HS-MW-32C	HS-MW-32C	HS-MW-32D	HS-MW-32D	HS-MW-32D	HS-MW-32D	Area5-RI-3A	Area5-RI-3A
Screen Interval (feet below ground surface)		60.9-65.5	60.9-65.5	79.1-83.7	79.1-83.7	79.1-83.7	79.1-83.7	108.8-113.4	108.8-113.4	108.8-113.4	108.8-113.4	142.3-146.9	142.3-146.9	142.3-146.9	142.3-146.9	59.4-64.4	59.4-64.4
Laboratory Sample ID		YK02016-010	ZA27002-026	YF14023-003	YH24014-001	YK02016-011	ZA27002-027	YF14023-005	YH24014-003	YK02016-009	ZA27002-029	YF14023-006	YH24014-004	YK02016-014	ZC06019-001	YD21036-001	YG28047-001
Sample Date		10/24/2023	01/19/2024	06/12/2023	08/21/2023	10/24/2023	01/19/2024	06/12/2023	08/21/2023	10/24/2023	01/19/2024	06/12/2023	08/21/2023	10/25/2023	03/01/2024	04/17/2023	07/27/2023
Parameter (µg/L)																	
9-chlorohexadecafluoro-3-oxanone-1-sulfonic acid (9Cl-PF3ONS)	NCL	<0.0077	<0.0078	<0.0071	<0.0078	<0.0082	<0.0078	<0.0081	<0.0074	<0.0073	<0.0076	<0.0079	<0.0074	<0.007	<0.0077	<0.007	<0.0068
11-chloroeicosafluoro-3-oxaundecane-1-sulfonic acid (11CL-PF3OUdS)	NCL	<0.0077	<0.0078	<0.0071	<0.0078	<0.0082	<0.0078	<0.0081	<0.0074	<0.0073	<0.0076	<0.0079	<0.0074	<0.007	<0.0077	<0.007	<0.0068
4,8-dioxa-3H-perfluorononanoic acid (ADONA)	NCL	<0.0077	<0.0078	<0.0071	<0.0078	<0.0082	<0.0078	<0.0081	<0.0074	<0.0073	<0.0076	<0.0079	<0.0074	<0.007	<0.0077	<0.007	<0.0068
1H,1H,2H,2H-perfluorohexane sulfonate (4:2FTS)	NCL	<0.0077	<0.0078	<0.0071	<0.0078	<0.0082	<0.0078	<0.0081	<0.0074	<0.0073	<0.0076	<0.0079	<0.0074	<0.007	<0.0077	<0.007	<0.0068
6:2 Fluorotelomer sulfonic acid (6:2 FTS)	NCL	<0.0077	<0.0078	<0.0071	<0.0078	<0.0082	<0.0078	<0.0081	<0.0074	<0.0073	<0.0076	<0.0079	<0.0074	<0.007	<0.0077	<0.007	<0.0068
8:2 Fluorotelomer sulfonic acid (8:2 FTS)	NCL	<0.0077	<0.0078	<0.0071	<0.0078	<0.0082	<0.0078	<0.0081	<0.0074	<0.0073	<0.0076	<0.0079	<0.0074	<0.007	<0.0077	<0.007	<0.0068
N-ethylperfluoro-1-octanesulfonamidoacetic acid (EtFOSAA)	NCL	<0.0077	<0.0078	<0.0071	<0.0078	<0.0082	<0.0078	<0.0081	<0.0074	<0.0073	<0.0076	<0.0079	<0.0074	<0.007	<0.0077	<0.007	<0.0068
N-methylperfluoro-1-octanesulfonamidoacetic acid (MeFOSAA)	NCL	<0.0077	<0.0078	<0.0071	<0.0078	<0.0082	<0.0078	<0.0081	<0.0074	<0.0073	<0.0076	<0.0079	<0.0074	<0.007	<0.0077	<0.007	<0.0068
Perfluorobutane sulfonic acid (PFBS)	0.42 (A)	<0.0038	<0.0039	<0.0036	<0.0039	<0.0041	<0.0039	<0.0041	<0.0037	<0.0036	<0.0038	<0.004	<0.0037	<0.0035	<0.0039	0.0047	0.0041
Perfluorodecane sulfonic acid (PFDS)	NCL	<0.0038	<0.0039	<0.0036	<0.0039	<0.0041	<0.0039	<0.0041	<0.0037	<0.0036	<0.0038	<0.004	<0.0037	<0.0035	<0.0039	<0.0035	<0.0034
Perfluoroheptane sulfonic acid (PFHpS)	NCL	<0.0038	<0.0039	<0.0036	<0.0039	<0.0041	<0.0039	<0.0041	<0.0037	<0.0036	<0.0038	<0.004	<0.0037	<0.0035	<0.0039	<0.0035	<0.0034
Perfluorononane sulfonic acid (PFNS)	NCL	<0.0038	<0.0039	<0.0036	<0.0039	<0.0041	<0.0039	<0.0041	<0.0037	<0.0036	<0.0038	<0.004	<0.0037	<0.0035	<0.0039	<0.0035	<0.0034
Perfluorooctane sulfonamide (FOSA)	NCL	<0.0038	<0.0039	<0.0036	<0.0039	<0.0041	<0.0039	<0.0041	<0.0037	<0.0036	<0.0038	<0.004	<0.0037	<0.0035	<0.0039	<0.0035	<0.0034
Perfluoropentane sulfonic acid (PFPeS)	NCL	<0.0038	<0.0039	<0.0036	<0.0039	<0.0041	<0.0039	<0.0041	<0.0037	<0.0036	<0.0038	<0.004	<0.0037	<0.0035	<0.0039	<0.0035	<0.0034
Perfluorohexane sulfonic acid (PFHxS)	0.051 (A)	<0.0038	<0.0039	<0.0036	<0.0039	<0.0041	<0.0039	<0.0041	<0.0037	<0.0036	<0.0038	<0.004	<0.0037	<0.0035	<0.0039	<0.0035	<0.0034
Perfluorobutanoic acid (PFBA)	NCL	<0.0038	<0.0039	<0.0036	<0.0039	<0.0041	<0.0039	<0.0041	<0.0037	<0.0036	<0.0038	<0.004	<0.0037	<0.0035	<0.0039	<0.0035	<0.0034
Perfluorodecanoic acid (PFDA)	NCL	<0.0038	<0.0039	<0.0036	<0.0039	<0.0041	<0.0039	<0.0041	<0.0037	<0.0036	<0.0038	<0.004	<0.0037	<0.0035	<0.0039	<0.0035	<0.0034
Perfluorododecanoic acid (PFDoDA)	NCL	<0.0038	<0.0039	<0.0036	<0.0039	<0.0041	<0.0039	<0.0041	<0.0037	<0.0036	<0.0038	<0.004	<0.0037	<0.0035	<0.0039	<0.0035	<0.0034
Perfluoroheptanoic acid (PFHpA)	NCL	<0.0038	<0.0039	<0.0036	<0.0039	<0.0041	<0.0039	<0.0041	<0.0037	<0.0036	<0.0038	<0.004	<0.0037	<0.0035	<0.0039	<0.0035	<0.0034
Perfluorohexanoic acid (PFHxA)	400 (A)	<0.0038	<0.0039	<0.0036	<0.0039	<0.0041	<0.0039	<0.0041	<0.0037	<0.0036	<0.0038	<0.004	<0.0037	<0.0037 [H]	<0.0039	<0.0035	<0.0034
Perfluorononanoic acid (PFNA)	0.006 (A)	<0.0038	<0.0039	<0.0036	<0.0039	<0.0041	<0.0039	<0.0041	<0.0037	<0.0036	<0.0038	<0.004	<0.0037	<0.0035	<0.0039	<0.0035	<0.0034
Perfluorooctanoic acid (PFOA)	0.008 (A)	<0.0038	<0.0039	<0.0036	<0.0039	<0.0041	<0.0039	<0.0041	<0.0037	<0.0036	<0.0038	<0.004	<0.0037	<0.0035	<0.0039	<0.0035	<0.0034
Perfluorooctane sulfonic acid (PFOS)	0.016 (A)	<0.0038	<0.0039	<0.0036	<0.0039	<0.0041	<0.0039	<0.0041	<0.0037	<0.0036	<0.0038	<0.004	<0.0037	<0.0035	<0.0039	<0.0035	<0.0034
Perfluoropentanoic acid (PFPeA)	NCL	<0.0038	<0.0039	<0.0036	<0.0039	<0.0041	<0.0039	<0.0041	<0.0037	<0.0036	<0.0038	<0.004	<0.0037	<0.0035	<0.0039	<0.0035	<0.0034
Perfluorotetradecanoic acid (PFTeDA)	NCL	<0.0038	<0.0039	<0.0036	<0.0039	<0.0041	<0.0039	<0.0041	<0.0037	<0.0036	<0.0038	<0.004	<0.0037	<0.0035	<0.0039	<0.0035	<0.0034
Perfluorotridecanoic acid (PFTrDA)	NCL	<0.0038	<0.0039	<0.0036	<0.0039	<0.0041	<0.0039	<0.0041	<0.0037	<0.0036	<0.0038	<0.004	<0.0037	<0.0035	<0.0039	<0.0035	<0.0034
Perfluoroundecanoic acid (PFUnDA)	NCL	<0.0038	<0.0039	<0.0036	<0.0039	<0.0041	<0.0039	<0.0041	<0.0037	<0.0036	<0.0038	<0.004	<0.0037	<0.0035	<0.0039	<0.0035	<0.0034
Tetrafluoro-2-(heptafluoropropoxy)propanoic acid (GenX)	0.37 (A)	<0.0077	<0.0078	<0.0071	<0.0078	<0.0082	<0.0078	<0.0081	<0.0074	<0.0073	<0.0076	<0.0079	<0.0074	<0.007	<0.0077	<0.007	<0.0068

TABLE 4A
SUMMARY OF MONITORING WELL GROUNDWATER SAMPLE ANALYSIS - PFAS
Perimeter
Algoma & Plainfield Townships, Kent County, Michigan

Sample Event	Part 201 Generic Residential Groundwater Cleanup Criteria - Drinking Water[2]	Area 5/Perimeter - Q4 2023	Perimeter - Q1 2024	Area 5/Perimeter - Q2 2023	Area 5/Perimeter - Q3 2023	Area 5/Perimeter - Q4 2023	Perimeter - Q1 2024	Area 5/Perimeter - Q2 2023	Area 5/Perimeter - Q3 2023	Area 5/Perimeter - Q3 2023	Area 5/Perimeter - Q4 2023	Perimeter - Q1 2024	Area 5/Perimeter - Q2 2023	Area 5/Perimeter - Q3 2023	Area 5/Perimeter - Q4 2023	Perimeter - Q1 2024	Area 5/Perimeter - Q2 2023
Well		AREA5-RI-3A	AREA5-RI-3A	AREA5-RI-3B	AREA5-RI-3B	AREA5-RI-3B	AREA5-RI-3B	AREA5-RI-8A	AREA5-RI-8A	AREA5-RI-8A	AREA5-RI-8A	AREA5-RI-8A	AREA5-RI-8B	AREA5-RI-8B	AREA5-RI-8B	AREA5-RI-8B	AREA5-RI-8C
Sample Name		AREA5-RI-3A	AREA5-RI-3A	Area5-RI-3B	Area5-RI-3B	AREA5-RI-3B	AREA5-RI-3B	Area5-RI-8A	AREA5-RI-8A	AREA5-RI-8A DUP	AREA5-RI-8A	Area5-RI-8A	Area5-RI-8B	AREA5-RI-8B	AREA5-RI-8B	Area5-RI-8B	AREA5-RI-8C
Screen Interval (feet below ground surface)		59.4-64.4	59.4-64.4	106.7-111.7	106.7-111.7	106.7-111.7	106.7-111.7	85.6-90.6	85.6-90.6	85.6-90.6	85.6-90.6	85.6-90.6	156.7-161.7	156.7-161.7	156.7-161.7	156.7-161.7	174.7-179.7
Laboratory Sample ID		YJ12024-012	ZB13011-014	YD21036-002	YG28047-002	YJ12024-013	ZB13011-013	YD26033-010	YG21010-001	YG21010-002	YJ12024-004	ZB03013-005	YD26033-009	YG21010-003	YJ12024-005	ZB03013-004	YE03019-001
Sample Date		10/10/2023	02/09/2024	04/17/2023	07/27/2023	10/10/2023	02/09/2024	04/21/2023	07/20/2023	07/20/2023	10/09/2023	01/30/2024	04/21/2023	07/20/2023	10/09/2023	01/30/2024	05/02/2023
Parameter (µg/L)																	
9-chlorohexadecafluoro-3-oxanone-1-sulfonic acid (9Cl-PF3ONS)	NCL	<0.0071	<0.0071	<0.0068	<0.0075	<0.0074	<0.008	<0.0068	<0.0077	<0.0073	<0.0077	<0.0074	<0.0073	<0.0075	<0.0081	<0.0077	<0.0071
11-chloroeicosafluoro-3-oxaundecane-1-sulfonic acid (11CL-PF3OUdS)	NCL	<0.0071	<0.0071	<0.0068	<0.0075	<0.0074	<0.008	<0.0068	<0.0077	<0.0073	<0.0077	<0.0074	<0.0073	<0.0075	<0.0081	<0.0077	<0.0071
4,8-dioxa-3H-perfluorononanoic acid (ADONA)	NCL	<0.0071	<0.0071	<0.0068	<0.0075	<0.0074	<0.008	<0.0068	<0.0077	<0.0073	<0.0077	<0.0074	<0.0073	<0.0075	<0.0081	<0.0077	<0.0071
1H,1H,2H,2H-perfluorohexane sulfonate (4:2FTS)	NCL	<0.0071	<0.0071	<0.0068	<0.0075	<0.0074	<0.008	<0.0068	<0.0077	<0.0073	<0.0077	<0.0074	<0.0073	<0.0075	<0.0081	<0.0077	<0.0071
6:2 Fluorotelomer sulfonic acid (6:2 FTS)	NCL	<0.0071	<0.0071	<0.0068	<0.0075	<0.0074	<0.008	<0.0068	<0.0077	<0.0073	<0.0077	<0.0074	<0.0073	<0.0075	<0.0081	<0.0077	<0.0071
8:2 Fluorotelomer sulfonic acid (8:2 FTS)	NCL	<0.0071	<0.0071	<0.0068	<0.0075	<0.0074	<0.008	<0.0068	<0.0077	<0.0073	<0.0077	<0.0074	<0.0073	<0.0075	<0.0081	<0.0077	<0.0071
N-ethylperfluoro-1-octanesulfonamidoacetic acid (EtFOSAA)	NCL	<0.0071	<0.0071	<0.0068	<0.0075	<0.0074	<0.008	<0.0068	<0.0077	<0.0073	<0.0077	<0.0074	<0.0073	<0.0075	<0.0081	<0.0077	<0.0071
N-methylperfluoro-1-octanesulfonamidoacetic acid (MeFOSAA)	NCL	<0.0071	<0.0071	<0.0068	<0.0075	<0.0074	<0.008	<0.0068	<0.0077	<0.0073	<0.0077	<0.0074	<0.0073	<0.0075	<0.0081	<0.0077	<0.0071
Perfluorobutane sulfonic acid (PFBS)	0.42 (A)	0.004	0.004	<0.0034	<0.0038	<0.0037	<0.004	<0.0034	0.005	0.0049	0.0059	<0.0037	<0.0036	<0.0037	<0.004	<0.0038	0.0043
Perfluorodecane sulfonic acid (PFDS)	NCL	<0.0035	<0.0035	<0.0034	<0.0038	<0.0037	<0.004	<0.0034	<0.0039	<0.0037	<0.0039	<0.0037	<0.0036	<0.0037	<0.004	<0.0038	<0.0036
Perfluoroheptane sulfonic acid (PFHpS)	NCL	<0.0035	<0.0035	<0.0034	<0.0038	<0.0037	<0.004	<0.0034	<0.0039	<0.0037	<0.0039	<0.0037	<0.0036	<0.0037	<0.004	<0.0038	<0.0036
Perfluorononane sulfonic acid (PFNS)	NCL	<0.0035	<0.0035	<0.0034	<0.0038	<0.0037	<0.004	<0.0034	<0.0039	<0.0037	<0.0039	<0.0037	<0.0036	<0.0037	<0.004	<0.0038	<0.0036
Perfluorooctane sulfonamide (FOSA)	NCL	<0.0035	<0.0035	<0.0034	<0.0038	<0.0037	<0.004	<0.0034	<0.0039	<0.0037	<0.0039	<0.0037	<0.0036	<0.0037	<0.004	<0.0038	<0.0036
Perfluoropentane sulfonic acid (PFPeS)	NCL	<0.0035	<0.0035	<0.0034	<0.0038	<0.0037	<0.004	<0.0034	<0.0039	<0.0037	<0.0039	<0.0037	<0.0036	<0.0037	<0.004	<0.0038	<0.0036
Perfluorohexane sulfonic acid (PFHxS)	0.051 (A)	<0.0035	<0.0035	<0.0034	<0.0038	<0.0037	<0.004	<0.0034	<0.0039	<0.0037	<0.0039	<0.0037	<0.0036	<0.0037	<0.004	<0.0038	<0.0036
Perfluorobutanoic acid (PFBA)	NCL	<0.0035	<0.0035	<0.0034	<0.0038	<0.0037	<0.004	<0.0034	<0.0039	<0.0037	<0.0039	<0.0037	<0.0036	<0.0037	<0.004	<0.0038	<0.0036
Perfluorodecanoic acid (PFDA)	NCL	<0.0035	<0.0035	<0.0034	<0.0038	<0.0037	<0.004	<0.0034	<0.0039	<0.0037	<0.0039	<0.0037	<0.0036	<0.0037	<0.004	<0.0038	<0.0036
Perfluorododecanoic acid (PFDoDA)	NCL	<0.0035	<0.0035	<0.0034	<0.0038	<0.0037	<0.004	<0.0034	<0.0039	<0.0037	<0.0039	<0.0037	<0.0036	<0.0037	<0.004	<0.0038	<0.0036
Perfluoroheptanoic acid (PFHpA)	NCL	<0.0035	<0.0035	<0.0034	<0.0038	<0.0037	<0.004	<0.0034	<0.0039	<0.0037	<0.0039	<0.0037	<0.0036	<0.0037	<0.004	<0.0038	<0.0036
Perfluorohexanoic acid (PFHxA)	400 (A)	<0.0035	<0.0035	<0.0034	<0.0038	<0.0037	<0.004	<0.0034	<0.0039	<0.0037	<0.0039	<0.0037	<0.0036	<0.0037	<0.004	<0.0038	<0.0036
Perfluorononanoic acid (PFNA)	0.006 (A)	<0.0035	<0.0035	<0.0034	<0.0038	<0.0037	<0.004	<0.0034	<0.0039	<0.0037	<0.0039	<0.0037	<0.0036	<0.0037	<0.004	<0.0038	<0.0036
Perfluorooctanoic acid (PFOA)	0.008 (A)	<0.0035	<0.0035	<0.0034	<0.0038	<0.0037	<0.004	<0.0034	<0.0039	<0.0037	<0.0039	<0.0037	<0.0036	<0.0037	<0.004	<0.0038	<0.0036
Perfluorooctane sulfonic acid (PFOS)	0.016 (A)	<0.0035	<0.0035	<0.0034	<0.0038	<0.0037	<0.004	<0.0034	<0.0039	<0.0037	<0.0039	<0.0037	<0.0036	<0.0037	<0.004	<0.0038	<0.0036
Perfluoropentanoic acid (PFPeA)	NCL	<0.0035	<0.0035	<0.0034	<0.0038	<0.0037	<0.004	<0.0034	<0.0039	<0.0037	<0.0039	<0.0037	<0.0036	<0.0037	<0.004	<0.0038	<0.0036
Perfluorotetradecanoic acid (PFTeDA)	NCL	<0.0035	<0.0035	<0.0034	<0.0038	<0.0037	<0.004	<0.0034	<0.0039	<0.0037	<0.0039	<0.0037	<0.0036	<0.0037	<0.004	<0.0038	<0.0036
Perfluorotridecanoic acid (PFTrDA)	NCL	<0.0035	<0.0035	<0.0034	<0.0038	<0.0037	<0.004	<0.0034	<0.0039	<0.0037	<0.0039	<0.0037	<0.0036	<0.0037	<0.004	<0.0038	<0.0036
Perfluoroundecanoic acid (PFUnDA)	NCL	<0.0035	<0.0035	<0.0034	<0.0038	<0.0037	<0.004	<0.0034	<0.0039	<0.0037	<0.0039	<0.0037	<0.0036	<0.0037	<0.004	<0.0038	<0.0036
Tetrafluoro-2-(heptafluoropropoxy)propanoic acid (GenX)	0.37 (A)	<0.0071	<0.0071	<0.0068	<0.0075	<0.0074	<0.008	<0.0068	<0.0077	<0.0073	<0.0077	<0.0074	<0.0073	<0.0075	<0.0081	<0.0077	<0.0071

TABLE 4A
SUMMARY OF MONITORING WELL GROUNDWATER SAMPLE ANALYSIS - PFAS
Perimeter
Algoma & Plainfield Townships, Kent County, Michigan

Sample Event	Part 201 Generic Residential Groundwater Cleanup Criteria - Drinking Water[2]	Area 5/Perimeter - Q3 2023	Area 5/Perimeter - Q4 2023	Perimeter - Q1 2024	Area 5/Perimeter - Q2 2023	Area 5/Perimeter - Q3 2023	Area 5/Perimeter - Q4 2023	Perimeter - Q1 2024	Area 5/Perimeter - Q2 2023	Area 5/Perimeter - Q3 2023	Area 5/Perimeter - Q4 2023	Perimeter - Q1 2024	Area 5/Perimeter - Q2 2023	Area 5/Perimeter - Q3 2023	Area 5/Perimeter - Q4 2023	Perimeter - Q1 2024	Area 5/Perimeter - Q2 2023
Well		AREA5-RI-8C	AREA5-RI-8C	AREA5-RI-8C	AREA5-RI-9A	AREA5-RI-9A	AREA5-RI-9A	AREA5-RI-9A	AREA5-RI-9B	AREA5-RI-9B	AREA5-RI-9B	AREA5-RI-9B	AREA5-RI-9C	AREA5-RI-9C	AREA5-RI-9C	AREA5-RI-9C	AREA5-RI-11A
Sample Name		AREA5-RI-8C	AREA5-RI-8C	Area5-RI-8C	Area5-RI-9A	Area5-RI-9A	AREA5-RI-9A	Area5-RI-9A	AREA5-RI-9B	Area5-RI-9B	AREA5-RI-9B	Area5-RI-9B	AREA5-RI-9C	Area5-RI-9C	AREA5-RI-9C	Area5-RI-9C	Area5-RI-11A
Screen Interval (feet below ground surface)		174.7-179.7	174.7-179.7	174.7-179.7	96.4-101.4	96.4-101.4	96.4-101.4	96.4-101.4	149-154	149-154	149-154	149-154	218.9-223.9	218.9-223.9	218.9-223.9	218.9-223.9	106.8-111.8
Laboratory Sample ID		YG21010-004	YJ12024-006	ZB03013-007	YD26033-012	YH05004-010	YJ12024-016	ZB03013-011	YE02034-002	YH05004-011	YJ12024-017	ZB03013-013	YE02034-001	YH05004-012	YJ12024-018	ZB03013-012	YD21036-011
Sample Date		07/20/2023	10/09/2023	01/30/2024	04/21/2023	08/03/2023	10/11/2023	01/31/2024	04/28/2023	08/03/2023	10/11/2023	01/31/2024	04/28/2023	08/03/2023	10/11/2023	01/31/2024	04/19/2023
Parameter (µg/L)																	
9-chlorohexadecafluoro-3-oxanone-1-sulfonic acid (9Cl-PF3ONS)	NCL	<0.0078	<0.0076	<0.0072	<0.0072	<0.0076	<0.0073	<0.0077	<0.0076	<0.0073	<0.0075	<0.0079	<0.007	<0.0083	<0.0072	<0.0076	<0.0068
11-chloroeicosafluoro-3-oxaundecane-1-sulfonic acid (11CL-PF3OUdS)	NCL	<0.0078	<0.0076	<0.0072	<0.0072	<0.0076	<0.0073	<0.0077	<0.0076	<0.0073	<0.0075	<0.0079	<0.007	<0.0083	<0.0072	<0.0076	<0.0068
4,8-dioxa-3H-perfluorononanoic acid (ADONA)	NCL	<0.0078	<0.0076	<0.0072	<0.0072	<0.0076	<0.0073	<0.0077	<0.0076	<0.0073	<0.0075	<0.0079	<0.007	<0.0083	<0.0072	<0.0076	<0.0068
1H,1H,2H,2H-perfluorohexane sulfonate (4:2FTS)	NCL	<0.0078	<0.0076	<0.0072	<0.0072	<0.0076	<0.0073	<0.0077	<0.0076	<0.0073	<0.0075	<0.0079	<0.007	<0.0083	<0.0072	<0.0076	<0.0068
6:2 Fluorotelomer sulfonic acid (6:2 FTS)	NCL	<0.0078	<0.0076	<0.0072	<0.0072	<0.0076	<0.0073	<0.0077	<0.0076	<0.0073	<0.0075	<0.0079	<0.007	<0.0083	<0.0072	<0.0076	<0.0068
8:2 Fluorotelomer sulfonic acid (8:2 FTS)	NCL	<0.0078	<0.0076	<0.0072	<0.0072	<0.0076	<0.0073	<0.0077	<0.0076	<0.0073	<0.0075	<0.0079	<0.007	<0.0083	<0.0072	<0.0076	<0.0068
N-ethylperfluoro-1-octanesulfonamidoacetic acid (EtFOSAA)	NCL	<0.0078	<0.0076	<0.0072	<0.0072	<0.0076	<0.0073	<0.0077	<0.0076	<0.0073	<0.0075	<0.0079	<0.007	<0.0083	<0.0072	<0.0076	<0.0068
N-methylperfluoro-1-octanesulfonamidoacetic acid (MeFOSAA)	NCL	<0.0078	<0.0076	<0.0072	<0.0072	<0.0076	<0.0073	<0.0077	<0.0076	<0.0073	<0.0075	<0.0079	<0.007	<0.0083	<0.0072	<0.0076	<0.0068
Perfluorobutane sulfonic acid (PFBS)	0.42 (A)	<0.0039	0.0043	0.0039	<0.0036	<0.0038	<0.0037	<0.0039	<0.0038	<0.0037	<0.0038	<0.0039	<0.0035	<0.0042	<0.0036	<0.0038	<0.0034
Perfluorodecane sulfonic acid (PFDS)	NCL	<0.0039	<0.0038	<0.0036	<0.0036	<0.0038	<0.0037	<0.0039	<0.0038	<0.0037	<0.0038	<0.0039	<0.0035	<0.0042	<0.0036	<0.0038	<0.0034
Perfluoroheptane sulfonic acid (PFHpS)	NCL	<0.0039	<0.0038	<0.0036	<0.0036	<0.0038	<0.0037	<0.0039	<0.0038	<0.0037	<0.0038	<0.0039	<0.0035	<0.0042	<0.0036	<0.0038	<0.0034
Perfluorononane sulfonic acid (PFNS)	NCL	<0.0039	<0.0038	<0.0036	<0.0036	<0.0038	<0.0037	<0.0039	<0.0038	<0.0037	<0.0038	<0.0039	<0.0035	<0.0042	<0.0036	<0.0038	<0.0034
Perfluorooctane sulfonamide (FOSA)	NCL	<0.0039	<0.0038	<0.0036	<0.0036	<0.0038	<0.0037	<0.0039	<0.0038	<0.0037	<0.0038	<0.0039	<0.0035	<0.0042	<0.0036	<0.0038	<0.0034
Perfluoropentane sulfonic acid (PFPeS)	NCL	<0.0039	<0.0038	<0.0036	<0.0036	<0.0038	<0.0037	<0.0039	<0.0038	<0.0037	<0.0038	<0.0039	<0.0035	<0.0042	<0.0036	<0.0038	<0.0034
Perfluorohexane sulfonic acid (PFHxS)	0.051 (A)	<0.0039	<0.0038	<0.0036	<0.0036	<0.0038	<0.0037	<0.0039	<0.0038	<0.0037	<0.0038	<0.0039	<0.0035	<0.0042	<0.0036	<0.0038	<0.0034
Perfluorobutanoic acid (PFBA)	NCL	<0.0039	<0.0038	<0.0036	<0.0036	<0.0038	<0.0037	<0.0039	<0.0038	<0.0037	<0.0038	<0.0039	<0.0035	<0.0042	<0.0036	<0.0038	<0.0034
Perfluorodecanoic acid (PFDA)	NCL	<0.0039	<0.0038	<0.0036	<0.0036	<0.0038	<0.0037	<0.0039	<0.0038	<0.0037	<0.0038	<0.0039	<0.0035	<0.0042	<0.0036	<0.0038	<0.0034
Perfluorododecanoic acid (PFDoDA)	NCL	<0.0039	<0.0038	<0.0036	<0.0036	<0.0038	<0.0037	<0.0039	<0.0038	<0.0037	<0.0038	<0.0039	<0.0035	<0.0042	<0.0036	<0.0038	<0.0034
Perfluoroheptanoic acid (PFHpA)	NCL	<0.0039	<0.0038	<0.0036	<0.0036	<0.0038	<0.0037	<0.0039	<0.0038	<0.0037	<0.0038	<0.0039	<0.0035	<0.0042	<0.0036	<0.0038	<0.0034
Perfluorohexanoic acid (PFHxA)	400 (A)	<0.0039	<0.0038	<0.0036	<0.0036	<0.0038	<0.0037	<0.0039	<0.0038	<0.0037	<0.0038	<0.0039	<0.0035	<0.0042	<0.0036	<0.0038	<0.0034
Perfluorononanoic acid (PFNA)	0.006 (A)	<0.0039	<0.0038	<0.0036	<0.0036	<0.0038	<0.0037	<0.0039	<0.0038	<0.0037	<0.0038	<0.0039	<0.0035	<0.0042	<0.0036	<0.0038	<0.0034
Perfluorooctanoic acid (PFOA)	0.008 (A)	<0.0039	<0.0038	<0.0036	<0.0036	<0.0038	<0.0037	<0.0039	<0.0038	<0.0037	<0.0038	<0.0039	<0.0035	<0.0042	<0.0036	<0.0038	<0.0034
Perfluorooctane sulfonic acid (PFOS)	0.016 (A)	<0.0039	<0.0038	<0.0036	<0.0036	<0.0038	<0.0037	<0.0039	<0.0038	<0.0037	<0.0038	<0.0039	<0.0035	<0.0042	<0.0036	<0.0038	<0.0034
Perfluoropentanoic acid (PFPeA)	NCL	<0.0039	<0.0038	<0.0036	<0.0036	<0.0038	<0.0037	<0.0039	<0.0038	<0.0037	<0.0038	<0.0039	<0.0035	<0.0042	<0.0036	<0.0038	<0.0034
Perfluorotetradecanoic acid (PFTeDA)	NCL	<0.0039	<0.0038	<0.0036	<0.0036	<0.0038	<0.0037	<0.0039	<0.0038	<0.0037	<0.0038	<0.0039	<0.0035	<0.0042	<0.0036	<0.0038	<0.0034
Perfluorotridecanoic acid (PFTrDA)	NCL	<0.0039	<0.0038	<0.0036	<0.0036	<0.0038	<0.0037	<0.0039	<0.0038	<0.0037	<0.0038	<0.0039	<0.0035	<0.0042	<0.0036	<0.0038	<0.0034
Perfluoroundecanoic acid (PFUnDA)	NCL	<0.0039	<0.0038	<0.0036	<0.0036	<0.0038	<0.0037	<0.0039	<0.0038	<0.0037	<0.0038	<0.0039	<0.0035	<0.0042	<0.0036	<0.0038	<0.0034
Tetrafluoro-2-(heptafluoropropoxy)propanoic acid (GenX)	0.37 (A)	<0.0078	<0.0076	<0.0072	<0.0072	<0.0076	<0.0073	<0.0077	<0.0076	<0.0073	<0.0075	<0.0079	<0.007	<0.0083	<0.0072	<0.0076	<0.0068

TABLE 4A
SUMMARY OF MONITORING WELL GROUNDWATER SAMPLE ANALYSIS - PFAS
Perimeter
Algoma & Plainfield Townships, Kent County, Michigan

Sample Event	Part 201 Generic Residential Groundwater Cleanup Criteria - Drinking Water[2]	Area 5/Perimeter - Q3 2023	Area 5/Perimeter - Q4 2023	Perimeter - Q1 2024	Area 5/Perimeter - Q2 2023	Area 5/Perimeter - Q3 2023	Area 5/Perimeter - Q4 2023	Perimeter - Q1 2024	Area 5/Perimeter - Q2 2023	Area 5/Perimeter - Q3 2023	Area 5/Perimeter - Q4 2023	Perimeter - Q1 2024	Area 5/Perimeter - Q2 2023	Area 5/Perimeter - Q3 2023	Area 5/Perimeter - Q4 2023	Perimeter - Q1 2024	Perimeter - Q2 2023
Well		AREA5-RI-11A	AREA5-RI-11A	AREA5-RI-11A	AREA5-RI-11B	AREA5-RI-11B	AREA5-RI-11B	AREA5-RI-11B	AREA5-RI-11C	AREA5-RI-11C	AREA5-RI-11C	AREA5-RI-11C	AREA5-RI-11D	AREA5-RI-11D	AREA5-RI-11D	AREA5-RI-11D	HS-PMW-RI-101A
Sample Name		AREA5-RI-11A	AREA5-RI-11A	Area5-RI-11A	Area5-RI-11B	AREA5-RI-11B	AREA5-RI-11B	Area5-RI-11B	Area5-RI-11C	Area5-RI-11C	AREA5-RI-11C	Area5-RI-11C	Area5-RI-11D	Area5-RI-11D	AREA5-RI-11D	Area5-RI-11D	HS-PMW-RI-101A
Screen Interval (feet below ground surface)		106.8-111.8	106.8-111.8	106.8-111.8	137-142	137-142	137-142	137-142	229.5-234.5	229.5-234.5	229.5-234.5	229.5-234.5	259-264	259-264	259-264	259-264	10.3-15.3
Laboratory Sample ID		YG20008-010	YJ17028-002	ZB03013-002	YD21036-010	YG20008-011	YJ17028-001	ZB03013-001	YD21036-012	YH02032-003	YJ17028-003	ZB03013-003	YD21036-013	YH02032-004	YJ17028-005	ZB03013-006	YF16032-004
Sample Date		07/19/2023	10/12/2023	01/29/2024	04/19/2023	07/19/2023	10/12/2023	01/29/2024	04/19/2023	07/28/2023	10/12/2023	01/29/2024	04/19/2023	07/28/2023	10/12/2023	01/30/2024	06/14/2023
Parameter (µg/L)																	
9-chlorohexadecafluoro-3-oxanone-1-sulfonic acid (9Cl-PF3ONS)	NCL	<0.0075	<0.0076	<0.0078	<0.0072	<0.0075	<0.0081	<0.0079	<0.0071	<0.0067	<0.0074	<0.0077	<0.0071	<0.0076	<0.0076	<0.0074	<0.0073
11-chloroeicosafluoro-3-oxaundecane-1-sulfonic acid (11CL-PF3OUdS)	NCL	<0.0075	<0.0076	<0.0078	<0.0072	<0.0075	<0.0081	<0.0079	<0.0071	<0.0067	<0.0074	<0.0077	<0.0071	<0.0076	<0.0076	<0.0074	<0.0073
4,8-dioxa-3H-perfluorononanoic acid (ADONA)	NCL	<0.0075	<0.0076	<0.0078	<0.0072	<0.0075	<0.0081	<0.0079	<0.0071	<0.0067	<0.0074	<0.0077	<0.0071	<0.0076	<0.0076	<0.0074	<0.0073
1H,1H,2H,2H-perfluorohexane sulfonate (4:2FTS)	NCL	<0.0075	<0.0076	<0.0078	<0.0072	<0.0075	<0.0081	<0.0079	<0.0071	<0.0067	<0.0074	<0.0077	<0.0071	<0.0076	<0.0076	<0.0074	<0.0073
6:2 Fluorotelomer sulfonic acid (6:2 FTS)	NCL	<0.0075	<0.0076	<0.0078	<0.0072	<0.0075	<0.0081	<0.0079	<0.0071	<0.0067	<0.0074	<0.0077	<0.0071	<0.0076	<0.0076	<0.0074	<0.0073
8:2 Fluorotelomer sulfonic acid (8:2 FTS)	NCL	<0.0075	<0.0076	<0.0078	<0.0072	<0.0075	<0.0081	<0.0079	<0.0071	<0.0067	<0.0074	<0.0077	<0.0071	<0.0076	<0.0076	<0.0074	<0.0073
N-ethylperfluoro-1-octanesulfonamidoacetic acid (EtFOSAA)	NCL	<0.0075	<0.0076	<0.0078	<0.0072	<0.0075	<0.0081	<0.0079	<0.0071	<0.0067	<0.0074	<0.0077	<0.0071	<0.0076	<0.0076	<0.0074	<0.0073
N-methylperfluoro-1-octanesulfonamidoacetic acid (MeFOSAA)	NCL	<0.0075	<0.0076	<0.0078	<0.0072	<0.0075	<0.0081	<0.0079	<0.0071	<0.0067	<0.0074	<0.0077	<0.0071	<0.0076	<0.0076	<0.0074	<0.0073
Perfluorobutane sulfonic acid (PFBS)	0.42 (A)	<0.0037	<0.0038	<0.0039	<0.0036	<0.0038	<0.0041	<0.004	0.0043	0.0045	0.0048	<0.0038	<0.0036	<0.0038	<0.0038	<0.0037	<0.0036
Perfluorodecane sulfonic acid (PFDS)	NCL	<0.0037	<0.0038	<0.0039	<0.0036	<0.0038	<0.0041	<0.004	<0.0036	<0.0034	<0.0037	<0.0038	<0.0036	<0.0038	<0.0038	<0.0037	<0.0036
Perfluoroheptane sulfonic acid (PFHpS)	NCL	<0.0037	<0.0038	<0.0039	<0.0036	<0.0038	<0.0041	<0.004	<0.0036	<0.0034	<0.0037	<0.0038	<0.0036	<0.0038	<0.0038	<0.0037	<0.0036
Perfluorononane sulfonic acid (PFNS)	NCL	<0.0037	<0.0038	<0.0039	<0.0036	<0.0038	<0.0041	<0.004	<0.0036	<0.0034	<0.0037	<0.0038	<0.0036	<0.0038	<0.0038	<0.0037	<0.0036
Perfluorooctane sulfonamide (FOSA)	NCL	<0.0037	<0.0038	<0.0039	<0.0036	<0.0038	<0.0041	<0.004	<0.0036	<0.0034	<0.0037	<0.0038	<0.0036	<0.0038	<0.0038	<0.0037	<0.0036
Perfluoropentane sulfonic acid (PFPeS)	NCL	<0.0037	<0.0038	<0.0039	<0.0036	<0.0038	<0.0041	<0.004	<0.0036	<0.0034	<0.0037	<0.0038	<0.0036	<0.0038	<0.0038	<0.0037	<0.0036
Perfluorohexane sulfonic acid (PFHxS)	0.051 (A)	<0.0037	<0.0038	<0.0039	<0.0036	<0.0038	<0.0041	<0.004	<0.0036	<0.0034	<0.0037	<0.0038	<0.0036	<0.0038	<0.0038	<0.0037	<0.0036
Perfluorobutanoic acid (PFBA)	NCL	<0.0037	<0.0038	<0.0039	<0.0036	<0.0038	<0.0041	<0.004	<0.0036	<0.0034	<0.0037	<0.0038	<0.0036	<0.0038	<0.0038	<0.0037	<0.0036
Perfluorodecanoic acid (PFDA)	NCL	<0.0037	<0.0038	<0.0039	<0.0036	<0.0038	<0.0041	<0.004	<0.0036	<0.0034	<0.0037	<0.0038	<0.0036	<0.0038	<0.0038	<0.0037	<0.0036
Perfluorododecanoic acid (PFDoDA)	NCL	<0.0037	<0.0038	<0.0039	<0.0036	<0.0038	<0.0041	<0.004	<0.0036	<0.0034	<0.0037	<0.0038	<0.0036	<0.0038	<0.0038	<0.0037	<0.0036
Perfluoroheptanoic acid (PFHpA)	NCL	<0.0037	<0.0038	<0.0039	<0.0036	<0.0038	<0.0041	<0.004	<0.0036	<0.0034	<0.0037	<0.0038	<0.0036	<0.0038	<0.0038	<0.0037	<0.0036
Perfluorohexanoic acid (PFHxA)	400 (A)	<0.0037	<0.0038	<0.0039	<0.0036	<0.0038	<0.0041	<0.004	<0.0036	<0.0034	<0.0037	<0.0038	<0.0036	<0.0038	<0.0038	<0.0037	<0.0036
Perfluorononanoic acid (PFNA)	0.006 (A)	<0.0037	<0.0038	<0.0039	<0.0036	<0.0038	<0.0041	<0.004	<0.0036	<0.0034	<0.0037	<0.0038	<0.0036	<0.0038	<0.0038	<0.0037	<0.0036
Perfluorooctanoic acid (PFOA)	0.008 (A)	<0.0037	<0.0038	<0.0039	<0.0036	<0.0038	<0.0041	<0.004	<0.0036	<0.0034	<0.0037	<0.0038	<0.0036	<0.0038	<0.0038	<0.0037	<0.0036
Perfluorooctane sulfonic acid (PFOS)	0.016 (A)	<0.0037	<0.0038	<0.0039	<0.0036	<0.0038	<0.0041	<0.004	<0.0036	<0.0034	<0.0037	<0.0038	<0.0036	<0.0038	<0.0038	<0.0037	<0.0036
Perfluoropentanoic acid (PFPeA)	NCL	<0.0037	<0.0038	<0.0039	<0.0036	<0.0038	<0.0041	<0.004	<0.0036	<0.0034	<0.0037	<0.0038	<0.0036	<0.0038	<0.0038	<0.0037	<0.0036
Perfluorotetradecanoic acid (PFTeDA)	NCL	<0.0037	<0.0038	<0.0039	<0.0036	<0.0038	<0.0041	<0.004	<0.0036	<0.0034	<0.0037	<0.0038	<0.0036	<0.0038	<0.0038	<0.0037	<0.0036
Perfluorotridecanoic acid (PFTrDA)	NCL	<0.0037	<0.0038	<0.0039	<0.0036	<0.0038	<0.0041	<0.004	<0.0036	<0.0034	<0.0037	<0.0038	<0.0036	<0.0038	<0.0038	<0.0037	<0.0036
Perfluoroundecanoic acid (PFUnDA)	NCL	<0.0037	<0.0038	<0.0039	<0.0036	<0.0038	<0.0041	<0.004	<0.0036	<0.0034	<0.0037	<0.0038	<0.0036	<0.0038	<0.0038	<0.0037	<0.0036
Tetrafluoro-2-(heptafluoropropoxy)propanoic acid (GenX)	0.37 (A)	<0.0075	<0.0076	<0.0078	<0.0072	<0.0075	<0.0081	<0.0079	<0.0071	<0.0067	<0.0074	<0.0077	<0.0071	<0.0076	<0.0076	<0.0074	<0.0073

TABLE 4A
SUMMARY OF MONITORING WELL GROUNDWATER SAMPLE ANALYSIS - PFAS
Perimeter
Algoma & Plainfield Townships, Kent County, Michigan

Sample Event	Part 201 Generic Residential Groundwater Cleanup Criteria - Drinking Water[2]	Perimeter - Q3 2023	Perimeter - Q4 2023	Perimeter - Q1 2024	Perimeter - Q2 2023	Perimeter - Q3 2023	Perimeter - Q4 2023	Perimeter - Q1 2024	Perimeter - Initial Sampling	Perimeter - Q2 2023	Perimeter - Q3 2023	Perimeter - Q4 2023	Perimeter - Q1 2024	Perimeter - Initial Sampling	Perimeter - Q2 2023	Perimeter - Q3 2023	Perimeter - Q4 2023
Well		HS-PMW-RI-101A	HS-PMW-RI-101A	HS-PMW-RI-101A	HS-PMW-RI-101B	HS-PMW-RI-101B	HS-PMW-RI-101B	HS-PMW-RI-101B	HS-PMW-RI-102A	HS-PMW-RI-102A	HS-PMW-RI-102A	HS-PMW-RI-102A	HS-PMW-RI-102A	HS-PMW-RI-102B	HS-PMW-RI-102B	HS-PMW-RI-102B	HS-PMW-RI-102B
Sample Name		HS-PMW-RI-101A	HS-PMW-RI-101A	HS-PMW-RI-101A	HS-PMW-RI-101B	HS-PMW-RI-101B	HS-PMW-RI-101B	HS-PMW-RI-101B	HS-PMW-RI-102A	HS-PMW-RI-102A	HS-PMW-RI-102A	HS-PMW-RI-102A	HS-PMW-RI-102A	HS-PMW-RI-102B	HS-PMW-RI-102B	HS-PMW-RI-102B	HS-PMW-RI-102B
Screen Interval (feet below ground surface)		10.3-15.3	10.3-15.3	10.3-15.3	79.9-84.9	79.9-84.9	79.9-84.9	79.9-84.9	45.1-50.1	45.1-50.1	45.1-50.1	45.1-50.1	45.1-50.1	99.4-104.4	99.4-104.4	99.4-104.4	99.4-104.4
Laboratory Sample ID		YH31008-006	YK02016-008	ZB13011-001	YF16032-003	YH31008-004	YK02016-007	ZB13011-003	XJ19047-001	YF16032-006	YH24014-005	YK02016-022	ZB13011-009	XJ19047-002	YF16032-007	YH24014-006	YK02016-023
Sample Date		08/29/2023	10/24/2023	02/07/2024	06/14/2023	08/29/2023	10/24/2023	02/07/2024	10/12/2022	06/14/2023	08/22/2023	10/26/2023	02/08/2024	10/12/2022	06/14/2023	08/22/2023	10/26/2023
Parameter (µg/L)																	
9-chlorohexadecafluoro-3-oxanone-1-sulfonic acid (9Cl-PF3ONS)	NCL	<0.0073	<0.0075	<0.0073	<0.0077	<0.0069	<0.0072	<0.0082	<0.007	<0.0078	<0.0068	<0.008	<0.0069	<0.0069	<0.0072	<0.0072	<0.0077
11-chloroeicosafluoro-3-oxaundecane-1-sulfonic acid (11CL-PF3OUdS)	NCL	<0.0073	<0.0075	<0.0073	<0.0077	<0.0069	<0.0072	<0.0082	<0.007	<0.0078	<0.0068	<0.008	<0.0069	<0.0069	<0.0072	<0.0072	<0.0077
4,8-dioxa-3H-perfluorononanoic acid (ADONA)	NCL	<0.0073	<0.0075	<0.0073	<0.0077	<0.0069	<0.0072	<0.0082	<0.007	<0.0078	<0.0068	<0.008	<0.0069	<0.0069	<0.0072	<0.0072	<0.0077
1H,1H,2H,2H-perfluorohexane sulfonate (4:2FTS)	NCL	<0.0073	<0.0075	<0.0073	<0.0077	<0.0069	<0.0072	<0.0082	<0.007	<0.0078	<0.0068	<0.008	<0.0069	<0.0069	<0.0072	<0.0072	<0.0077
6:2 Fluorotelomer sulfonic acid (6:2 FTS)	NCL	<0.0073	<0.0075	<0.0073	<0.0077	<0.0069	<0.0072	<0.0082	<0.007	<0.0078	<0.0068	<0.008	<0.0069	<0.0069	<0.0072	<0.0072	<0.0077
8:2 Fluorotelomer sulfonic acid (8:2 FTS)	NCL	<0.0073	<0.0075	<0.0073	<0.0077	<0.0069	<0.0072	<0.0082	<0.007	<0.0078	<0.0068	<0.008	<0.0069	<0.0069	<0.0072	<0.0072	<0.0077
N-ethylperfluoro-1-octanesulfonamidoacetic acid (EtFOSAA)	NCL	<0.0073	<0.0075	<0.0073	<0.0077	<0.0069	<0.0072	<0.0082	<0.007	<0.0078	<0.0068	<0.008	<0.0069	<0.0069	<0.0072	<0.0072	<0.0077
N-methylperfluoro-1-octanesulfonamidoacetic acid (MeFOSAA)	NCL	<0.0073	<0.0075	<0.0073	<0.0077	<0.0069	<0.0072	<0.0082	<0.007	<0.0078	<0.0068	<0.008	<0.0069	<0.0069	<0.0072	<0.0072	<0.0077
Perfluorobutane sulfonic acid (PFBS)	0.42 (A)	<0.0036	<0.0037	<0.0037	<0.0038	<0.0035	<0.0036	<0.0041	<0.0035	<0.0039	<0.0034	<0.004	<0.0035	<0.0035	<0.0036	<0.0036	<0.0038
Perfluorodecane sulfonic acid (PFDS)	NCL	<0.0036	<0.0037	<0.0037	<0.0038	<0.0035	<0.0036	<0.0041	<0.0035	<0.0039	<0.0034	<0.004	<0.0035	<0.0035	<0.0036	<0.0036	<0.0038
Perfluoroheptane sulfonic acid (PFHpS)	NCL	<0.0036	<0.0037	<0.0037	<0.0038	<0.0035	<0.0036	<0.0041	<0.0035	<0.0039	<0.0034	<0.004	<0.0035	<0.0035	<0.0036	<0.0036	<0.0038
Perfluorononane sulfonic acid (PFNS)	NCL	<0.0036	<0.0037	<0.0037	<0.0038	<0.0035	<0.0036	<0.0041	<0.0035	<0.0039	<0.0034	<0.004	<0.0035	<0.0035	<0.0036	<0.0036	<0.0038
Perfluorooctane sulfonamide (FOSA)	NCL	<0.0036	<0.0037	<0.0037	<0.0038	<0.0035	<0.0036	<0.0041	<0.0035	<0.0039	<0.0034	<0.004	<0.0035	<0.0035	<0.0036	<0.0036	<0.0038
Perfluoropentane sulfonic acid (PFPeS)	NCL	<0.0036	<0.0037	<0.0037	<0.0038	<0.0035	<0.0036	<0.0041	<0.0035	<0.0039	<0.0034	<0.004	<0.0035	<0.0035	<0.0036	<0.0036	<0.0038
Perfluorohexane sulfonic acid (PFHxS)	0.051 (A)	<0.0036	<0.0037	<0.0037	<0.0038	<0.0035	<0.0036	<0.0041	<0.0035	<0.0039	<0.0034	<0.004	<0.0035	<0.0035	<0.0036	<0.0036	<0.0038
Perfluorobutanoic acid (PFBA)	NCL	<0.0036	0.0038	0.0058	<0.0038	<0.0035	<0.0036	<0.0041	<0.0035	<0.0039	<0.0034	<0.004	<0.0035	<0.0035	<0.0036	<0.0036	<0.0038
Perfluorodecanoic acid (PFDA)	NCL	<0.0036	<0.0037	<0.0037	<0.0038	<0.0035	<0.0036	<0.0041	<0.0035	<0.0039	<0.0034	<0.004	<0.0035	<0.0035	<0.0036	<0.0036	<0.0038
Perfluorododecanoic acid (PFDoDA)	NCL	<0.0036	<0.0037	<0.0037	<0.0038	<0.0035	<0.0036	<0.0041	<0.0035	<0.0039	<0.0034	<0.004	<0.0035	<0.0035	<0.0036	<0.0036	<0.0038
Perfluoroheptanoic acid (PFHpA)	NCL	<0.0036	<0.0037	<0.0037	<0.0038	<0.0035	<0.0036	<0.0041	<0.0035	<0.0039	<0.0034	<0.004	<0.0035	<0.0035	<0.0036	<0.0036	<0.0038
Perfluorohexanoic acid (PFHxA)	400 (A)	<0.0036	<0.0037	<0.0037	<0.0038	<0.0035	<0.0036	<0.0041	<0.0035	<0.0039	<0.0034	<0.004	<0.0035	<0.0035	<0.0036	<0.0036	0.0093
Perfluorononanoic acid (PFNA)	0.006 (A)	<0.0036	<0.0037	<0.0037	<0.0038	<0.0035	<0.0036	<0.0041	<0.0035	<0.0039	<0.0034	<0.004	<0.0035	<0.0035	<0.0036	<0.0036	<0.0038
Perfluorooctanoic acid (PFOA)	0.008 (A)	<0.0036	<0.0037	0.0041	<0.0038	<0.0035	<0.0036	<0.0041	<0.0035	<0.0039	<0.0034	<0.004	<0.0035	<0.0035	<0.0036	<0.0036	0.0039
Perfluorooctane sulfonic acid (PFOS)	0.016 (A)	<0.0036	<0.0037	<0.0037	<0.0038	<0.0035	<0.0036	<0.0041	<0.0035	<0.0039	<0.0034	<0.004	<0.0035	<0.0035	<0.0036	<0.0036	<0.0038
Perfluoropentanoic acid (PFPeA)	NCL	<0.0036	<0.0037	<0.0037	<0.0038	<0.0035	<0.0036	<0.0041	<0.0035	<0.0039	<0.0034	<0.004	<0.0035	<0.0035	<0.0036	<0.0036	0.011
Perfluorotetradecanoic acid (PFTeDA)	NCL	<0.0036	<0.0037	<0.0037	<0.0038	<0.0035	<0.0036	<0.0041	<0.0035	<0.0039	<0.0034	<0.004	<0.0035	<0.0035	<0.0036	<0.0036	<0.0038
Perfluorotridecanoic acid (PFTrDA)	NCL	<0.0036	<0.0037	<0.0037	<0.0038	<0.0035	<0.0036	<0.0041	<0.0035	<0.0039	<0.0034	<0.004	<0.0035	<0.0035	<0.0036	<0.0036	<0.0038
Perfluoroundecanoic acid (PFUnDA)	NCL	<0.0036	<0.0037	<0.0037	<0.0038	<0.0035	<0.0036	<0.0041	<0.0035	<0.0039	<0.0034	<0.004	<0.0035	<0.0035	<0.0036	<0.0036	<0.0038
Tetrafluoro-2-(heptafluoropropoxy)propanoic acid (GenX)	0.37 (A)	<0.0073	<0.0075	<0.0073	<0.0077	<0.0069	<0.0072	<0.0082	<0.007	<0.0078	<0.0068	<0.008	<0.0069	<0.0069	<0.0072	<0.0072	<0.0077

TABLE 4A
SUMMARY OF MONITORING WELL GROUNDWATER SAMPLE ANALYSIS - PFAS
Perimeter
Algoma & Plainfield Townships, Kent County, Michigan

Sample Event	Part 201 Generic Residential Groundwater Cleanup Criteria - Drinking Water[2]	Perimeter - Q4 2023	Perimeter - Q1 2024	Perimeter - Initial Sampling	Perimeter - Q2 2023	Perimeter - Q3 2023	Perimeter - Q4 2023	Perimeter - Q1 2024	Perimeter - Q1 2024	Perimeter - Initial Sampling	Perimeter - Initial Sampling	Perimeter - Q2 2023	Perimeter - Q3 2023	Perimeter - Q4 2023	Perimeter - Q1 2024	Perimeter - Q1 2024	Area 5/Perimeter - Q2 2023
Well		HS-PMW-RI-102B	HS-PMW-RI-102B	HS-PMW-RI-102C	HS-PMW-RI-102C	HS-PMW-RI-102C	HS-PMW-RI-102C	HS-PMW-RI-102C	HS-PMW-RI-102C	HS-PMW-RI-102D	HS-PMW-RI-102D	HS-PMW-RI-102D	HS-PMW-RI-102D	HS-PMW-RI-102D	HS-PMW-RI-102D	HS-PMW-RI-102D	HS-PMW-RI-103A
Sample Name		HS-PMW-RI-102B DUP	HS-PMW-RI-102B	HS-PMW-RI-102C	HS-PMW-RI-102C	HS-PMW-RI-102C	HS-PMW-RI-102C	HS-PMW-RI-102C	HS-PMW-RI-102C-DUP	HS-PMW-RI-102D	HS-PMW-RI-102D DUP	HS-PMW-RI-102D	HS-PMW-RI-102D	HS-PMW-RI-102D	HS-PMW-RI-102D	HS-PMW-RI-102D-DUP	HS-PMW-RI-103A
Screen Interval (feet below ground surface)		99.4-104.4	99.4-104.4	134.3-139.3	134.3-139.3	134.3-139.3	134.3-139.3	134.3-139.3	134.3-139.3	174.1-179.1	174.1-179.1	174.1-179.1	174.1-179.1	174.1-179.1	174.1-179.1	174.1-179.1	87.2-92.2
Laboratory Sample ID		YK02016-024	ZB13011-010	XJ19047-003	YF16032-002	YH24014-008	YK02016-025	ZB13011-005	ZB13011-006	XJ19047-004	XJ19047-005	YF16032-005	YH24014-007	YK02016-026	ZB13011-007	ZB13011-008	YD26033-013
Sample Date		10/26/2023	02/08/2024	10/12/2022	06/14/2023	08/22/2023	10/27/2023	02/08/2024	02/08/2024	10/12/2022	10/12/2022	06/14/2023	08/22/2023	10/27/2023	02/08/2024	02/08/2024	04/21/2023
Parameter (µg/L)																	
9-chlorohexadecafluoro-3-oxanone-1-sulfonic acid (9Cl-PF3ONS)	NCL	<0.0079	<0.0069	<0.0071	<0.0071	<0.0074	<0.0074	<0.0073	<0.007	<0.0068	<0.0069	<0.0083	<0.008	<0.0073	<0.0068	<0.0071	<0.0068
11-chloroeicosafluoro-3-oxaundecane-1-sulfonic acid (11CL-PF3OUdS)	NCL	<0.0079	<0.0069	<0.0071	<0.0071	<0.0074	<0.0074	<0.0073	<0.007	<0.0068	<0.0069	<0.0083	<0.008	<0.0073	<0.0068	<0.0071	<0.0068
4,8-dioxa-3H-perfluorononanoic acid (ADONA)	NCL	<0.0079	<0.0069	<0.0071	<0.0071	<0.0074	<0.0074	<0.0073	<0.007	<0.0068	<0.0069	<0.0083	<0.008	<0.0073	<0.0068	<0.0071	<0.0068
1H,1H,2H,2H-perfluorohexane sulfonate (4:2FTS)	NCL	<0.0079	<0.0069	<0.0071	<0.0071	<0.0074	<0.0074	<0.0073	<0.007	<0.0068	<0.0069	<0.0083	<0.008	<0.0073	<0.0068	<0.0071	<0.0068
6:2 Fluorotelomer sulfonic acid (6:2 FTS)	NCL	<0.0079	<0.0069	<0.0071	<0.0071	<0.0074	<0.0074	<0.0073	<0.007	<0.0068	<0.0069	<0.0083	<0.008	<0.0073	<0.0068	<0.0071	<0.0068
8:2 Fluorotelomer sulfonic acid (8:2 FTS)	NCL	<0.0079	<0.0069	<0.0071	<0.0071	<0.0074	<0.0074	<0.0073	<0.007	<0.0068	<0.0069	<0.0083	<0.008	<0.0073	<0.0068	<0.0071	<0.0068
N-ethylperfluoro-1-octanesulfonamidoacetic acid (EtFOSAA)	NCL	<0.0079	<0.0069	<0.0071	<0.0071	<0.0074	<0.0074	<0.0073	<0.007	<0.0068	<0.0069	<0.0083	<0.008	<0.0073	<0.0068	<0.0071	<0.0068
N-methylperfluoro-1-octanesulfonamidoacetic acid (MeFOSAA)	NCL	<0.0079	<0.0069	<0.0071	<0.0071	<0.0074	<0.0074	<0.0073	<0.007	<0.0068	<0.0069	<0.0083	<0.008	<0.0073	<0.0068	<0.0071	<0.0068
Perfluorobutane sulfonic acid (PFBS)	0.42 (A)	<0.0039	<0.0034	<0.0035	<0.0035	<0.0037	<0.0037	<0.0037	<0.0035	<0.0034	<0.0035	<0.0041	<0.004	<0.0036	<0.0034	<0.0035	0.014
Perfluorodecane sulfonic acid (PFDS)	NCL	<0.0039	<0.0034	<0.0035	<0.0035	<0.0037	<0.0037	<0.0037	<0.0035	<0.0034	<0.0035	<0.0041	<0.004	<0.0036	<0.0034	<0.0035	<0.0034
Perfluoroheptane sulfonic acid (PFHpS)	NCL	<0.0039	<0.0034	<0.0035	<0.0035	<0.0037	<0.0037	<0.0037	<0.0035	<0.0034	<0.0035	<0.0041	<0.004	<0.0036	<0.0034	<0.0035	<0.0034
Perfluorononane sulfonic acid (PFNS)	NCL	<0.0039	<0.0034	<0.0035	<0.0035	<0.0037	<0.0037	<0.0037	<0.0035	<0.0034	<0.0035	<0.0041	<0.004	<0.0036	<0.0034	<0.0035	<0.0034
Perfluorooctane sulfonamide (FOSA)	NCL	<0.0039	<0.0034	<0.0035	<0.0035	<0.0037	<0.0037	<0.0037	<0.0035	<0.0034	<0.0035	<0.0041	<0.004	<0.0036	<0.0034	<0.0035	<0.0034
Perfluoropentane sulfonic acid (PFPeS)	NCL	<0.0039	<0.0034	<0.0035	<0.0035	<0.0037	<0.0037	<0.0037	<0.0035	<0.0034	<0.0035	<0.0041	<0.004	<0.0036	<0.0034	<0.0035	0.012
Perfluorohexane sulfonic acid (PFHxS)	0.051 (A)	<0.0039	<0.0034	<0.0035	<0.0035	<0.0037	<0.0037	<0.0037	<0.0035	<0.0034	<0.0035	<0.0041	<0.004	<0.0036	<0.0034	<0.0035	0.017
Perfluorobutanoic acid (PFBA)	NCL	<0.0039	<0.0034	<0.0035	<0.0035	<0.0037	<0.0037	<0.0037	<0.0035	<0.0034	<0.0035	<0.0041	<0.004	<0.0036	<0.0034	<0.0035	<0.0034
Perfluorodecanoic acid (PFDA)	NCL	<0.0039	<0.0034	<0.0035	<0.0035	<0.0037	<0.0037	<0.0037	<0.0035	<0.0034	<0.0035	<0.0041	<0.004	<0.0036	<0.0034	<0.0035	<0.0034
Perfluorododecanoic acid (PFDoDA)	NCL	<0.0039	<0.0034	<0.0035	<0.0035	<0.0037	<0.0037	<0.0037	<0.0035	<0.0034	<0.0035	<0.0041	<0.004	<0.0036	<0.0034	<0.0035	<0.0034
Perfluoroheptanoic acid (PFHpA)	NCL	<0.0039	<0.0034	<0.0035	<0.0035	<0.0037	<0.0037	<0.0037	<0.0035	<0.0034	<0.0035	<0.0041	<0.004	<0.0036	<0.0034	<0.0035	<0.0034
Perfluorohexanoic acid (PFHxA)	400 (A)	0.011	0.0043	<0.0035	<0.0035	<0.0037	<0.0037	<0.0037	<0.0035	<0.0034	<0.0035	<0.0041	<0.004	<0.0036	<0.0034	<0.0035	<0.0034
Perfluorononanoic acid (PFNA)	0.006 (A)	<0.0039	<0.0034	<0.0035	<0.0035	<0.0037	<0.0037	<0.0037	<0.0035	<0.0034	<0.0035	<0.0041	<0.004	<0.0036	<0.0034	<0.0035	<0.0034
Perfluorooctanoic acid (PFOA)	0.008 (A)	0.0043	***0.012***	<0.0035	<0.0035	<0.0037	<0.0037	<0.0037	<0.0035	<0.0034	<0.0035	<0.0041	<0.004	<0.0036	<0.0034	<0.0035	0.0066
Perfluorooctane sulfonic acid (PFOS)	0.016 (A)	<0.0039	<0.0034	<0.0035	<0.0035	<0.0037	<0.0037	<0.0037	<0.0035	<0.0034	<0.0035	<0.0041	<0.004	<0.0036	<0.0034	<0.0035	<0.0034
Perfluoropentanoic acid (PFPeA)	NCL	0.011	0.0049	<0.0035	<0.0035	<0.0037	<0.0037	<0.0037	<0.0035	<0.0034	<0.0035	<0.0041	<0.004	<0.0036	<0.0034	<0.0035	<0.0034
Perfluorotetradecanoic acid (PFTeDA)	NCL	<0.0039	<0.0034	<0.0035	<0.0035	<0.0037	<0.0037	<0.0037	<0.0035	<0.0034	<0.0035	<0.0041	<0.004	<0.0036	<0.0034	<0.0035	<0.0034
Perfluorotridecanoic acid (PFTrDA)	NCL	<0.0039	<0.0034	<0.0035	<0.0035	<0.0037	<0.0037	<0.0037	<0.0035	<0.0034	<0.0035	<0.0041	<0.004	<0.0036	<0.0034	<0.0035	<0.0034
Perfluoroundecanoic acid (PFUnDA)	NCL	<0.0039	<0.0034	<0.0035	<0.0035	<0.0037	<0.0037	<0.0037	<0.0035	<0.0034	<0.0035	<0.0041	<0.004	<0.0036	<0.0034	<0.0035	<0.0034
Tetrafluoro-2-(heptafluoropropoxy)propanoic acid (GenX)	0.37 (A)	<0.0079	<0.0069	<0.0071	<0.0071	<0.0074	<0.0074	<0.0073	<0.007	<0.0068	<0.0069	<0.0083	<0.008	<0.0073	<0.0068	<0.0071	<0.0068

TABLE 4A
SUMMARY OF MONITORING WELL GROUNDWATER SAMPLE ANALYSIS - PFAS
Perimeter
Algoma & Plainfield Townships, Kent County, Michigan

Sample Event	Part 201 Generic Residential Groundwater Cleanup Criteria - Drinking Water[2]	Area 5/Perimeter - Q3 2023	Area 5/Perimeter - Q4 2023	Perimeter - Q1 2024	Area 5/Perimeter - Q2 2023	Area 5/Perimeter - Q3 2023	Area 5/Perimeter - Q4 2023	Perimeter - Q1 2024	Area 5/Perimeter - Q2 2023	Area 5/Perimeter - Q3 2023	Area 5/Perimeter - Q4 2023	Perimeter - Q1 2024	Area 5/Perimeter - Q2 2023	Area 5/Perimeter - Q3 2023	Area 5/Perimeter - Q4 2023	Area 5/Perimeter - Q4 2023	Perimeter - Q1 2024
Well		HS-PMW-RI-103A	HS-PMW-RI-103A	HS-PMW-RI-103A	HS-PMW-RI-103B	HS-PMW-RI-103B	HS-PMW-RI-103B	HS-PMW-RI-103B	HS-PMW-RI-104A	HS-PMW-RI-104A	HS-PMW-RI-104A	HS-PMW-RI-104A	HS-PMW-RI-104B	HS-PMW-RI-104B	HS-PMW-RI-104B	HS-PMW-RI-104B	HS-PMW-RI-104B
Sample Name		HS-PMW-RI-103A	HS-PMW-RI-103A	HS-PMW-RI-103A	HS-PMW-RI-103B	HS-PMW-RI-103B	HS-PMW-RI-103B	HS-PMW-RI-103B	HS-PMW-RI-104A	HS-PMW-RI-104A	HS-PMW-RI-104A	HS-PMW-RI-104A	HS-PMW-RI-104B	HS-PMW-RI-104B	HS-PMW-RI-104B	HS-PMW-RI-104B DUP	HS-PMW-RI-104B
Screen Interval (feet below ground surface)		87.2-92.2	87.2-92.2	87.2-92.2	106-111	106-111	106-111	106-111	15.1-20.1	15.1-20.1	15.1-20.1	15.1-20.1	45.9-50.9	45.9-50.9	45.9-50.9	45.9-50.9	45.9-50.9
Laboratory Sample ID		YH05004-007	YJ07009-010	ZB21017-017	YD26033-011	YH05004-008	YJ07009-011	ZB21017-018	YD21036-027	YG20008-001	YJ07009-003	ZA27002-004	YD21036-028	YG20008-002	YJ07009-004	YJ07009-005	ZA27002-003
Sample Date		08/02/2023	10/05/2023	02/15/2024	04/21/2023	08/02/2023	10/05/2023	02/15/2024	04/20/2023	07/17/2023	10/04/2023	01/17/2024	04/20/2023	07/17/2023	10/04/2023	10/04/2023	01/17/2024
Parameter (µg/L)																	
9-chlorohexadecafluoro-3-oxanone-1-sulfonic acid (9Cl-PF3ONS)	NCL	<0.0079	<0.0078	<0.0073	<0.0069	<0.0075	<0.0073	<0.0081	<0.0068	<0.0075	<0.0072	<0.0077	<0.0072	<0.0076	<0.0075	<0.0079	<0.0079
11-chloroeicosafluoro-3-oxaundecane-1-sulfonic acid (11CL-PF3OUdS)	NCL	<0.0079	<0.0078	<0.0073	<0.0069	<0.0075	<0.0073	<0.0081	<0.0068	<0.0075	<0.0072	<0.0077	<0.0072	<0.0076	<0.0075	<0.0079	<0.0079
4,8-dioxa-3H-perfluorononanoic acid (ADONA)	NCL	<0.0079	<0.0078	<0.0073	<0.0069	<0.0075	<0.0073	<0.0081	<0.0068	<0.0075	<0.0072	<0.0077	<0.0072	<0.0076	<0.0075	<0.0079	<0.0079
1H,1H,2H,2H-perfluorohexane sulfonate (4:2FTS)	NCL	<0.0079	<0.0078	<0.0073	<0.0069	<0.0075	<0.0073	<0.0081	<0.0068	<0.0075	<0.0072	<0.0077	<0.0072	<0.0076	<0.0075	<0.0079	<0.0079
6:2 Fluorotelomer sulfonic acid (6:2 FTS)	NCL	<0.0079	<0.0078	<0.0073	<0.0069	<0.0075	<0.0073	<0.0081	<0.0068	<0.0075	<0.0072	<0.0077	<0.0072	<0.0076	<0.0075	<0.0079	<0.0079
8:2 Fluorotelomer sulfonic acid (8:2 FTS)	NCL	<0.0079	<0.0078	<0.0073	<0.0069	<0.0075	<0.0073	<0.0081	<0.0068	<0.0075	<0.0072	<0.0077	<0.0072	<0.0076	<0.0075	<0.0079	<0.0079
N-ethylperfluoro-1-octanesulfonamidoacetic acid (EtFOSAA)	NCL	<0.0079	<0.0078	<0.0073	<0.0069	<0.0075	<0.0073	<0.0081	<0.0068	<0.0075	<0.0072	<0.0077	<0.0072	<0.0076	<0.0075	<0.0079	<0.0079
N-methylperfluoro-1-octanesulfonamidoacetic acid (MeFOSAA)	NCL	<0.0079	<0.0078	<0.0073	<0.0069	<0.0075	<0.0073	<0.0081	<0.0068	<0.0075	<0.0072	<0.0077	<0.0072	<0.0076	<0.0075	<0.0079	<0.0079
Perfluorobutane sulfonic acid (PFBS)	0.42 (A)	0.014	0.013	0.021	0.0045	0.005	0.0076	0.0075	0.025	0.013	0.045	0.065	0.0047	0.0064	0.0096	0.009	0.0074
Perfluorodecane sulfonic acid (PFDS)	NCL	<0.004	<0.0039	<0.0036	<0.0034	<0.0038	<0.0037	<0.004	<0.0034	<0.0037	<0.0036	<0.0039	<0.0036	<0.0038	<0.0038	<0.004	<0.0039
Perfluoroheptane sulfonic acid (PFHpS)	NCL	<0.004	<0.0039	<0.0036	<0.0034	<0.0038	<0.0037	<0.004	<0.0034	<0.0037	<0.0036	<0.0039	<0.0036	<0.0038	<0.0038	<0.004	<0.0039
Perfluorononane sulfonic acid (PFNS)	NCL	<0.004	<0.0039	<0.0036	<0.0034	<0.0038	<0.0037	<0.004	<0.0034	<0.0037	<0.0036	<0.0039	<0.0036	<0.0038	<0.0038	<0.004	<0.0039
Perfluorooctane sulfonamide (FOSA)	NCL	<0.004	<0.0039	<0.0036	<0.0034	<0.0038	<0.0037	<0.004	<0.0034	<0.0037	<0.0036	<0.0039	<0.0036	<0.0038	<0.0038	<0.004	<0.0039
Perfluoropentane sulfonic acid (PFPeS)	NCL	0.01	0.0094	0.011	0.0045	0.0041	0.0041	0.0042	<0.0034	<0.0037	<0.0036	<0.0039	<0.0036	<0.0038	<0.0038	<0.004	<0.0039
Perfluorohexane sulfonic acid (PFHxS)	0.051 (A)	0.015	0.017	0.015	0.013	0.013	0.01	0.0093	<0.0034	0.0037	0.0077	0.0048	<0.0036	<0.0038	<0.0038	<0.004	<0.0039
Perfluorobutanoic acid (PFBA)	NCL	<0.004	0.0044	<0.0036	<0.0034	<0.0038	<0.0037	<0.004	0.0046	0.0037	0.0069	0.005	0.0054	0.004	0.007	0.0064	0.0048
Perfluorodecanoic acid (PFDA)	NCL	<0.004	<0.0039	<0.0036	<0.0034	<0.0038	<0.0037	<0.004	<0.0034	<0.0037	<0.0036	<0.0039	<0.0036	<0.0038	<0.0038	<0.004	<0.0039
Perfluorododecanoic acid (PFDoDA)	NCL	<0.004	<0.0039	<0.0036	<0.0034	<0.0038	<0.0037	<0.004	<0.0034	<0.0037	<0.0036	<0.0039	<0.0036	<0.0038	<0.0038	<0.004	<0.0039
Perfluoroheptanoic acid (PFHpA)	NCL	<0.004	0.005	<0.0036	<0.0034	<0.0038	<0.0037	<0.004	<0.0034	<0.0037	0.0063	0.0043	<0.0036	<0.0038	<0.0038	<0.004	<0.0039
Perfluorohexanoic acid (PFHxA)	400 (A)	0.0053	0.0075	0.0053	<0.0034	<0.0038	<0.0037	<0.004	0.0036	0.0053	0.018	0.0083	<0.0036	<0.0038	0.0052	0.0047	0.0046
Perfluorononanoic acid (PFNA)	0.006 (A)	<0.004	<0.0039	<0.0036	<0.0034	<0.0038	<0.0037	<0.004	<0.0034	<0.0037	<0.0036	<0.0039	<0.0036	<0.0038	<0.0038	<0.004	<0.0039
Perfluorooctanoic acid (PFOA)	0.008 (A)	0.0076	***0.0086***	0.0062	<0.0034	<0.0038	<0.0037	<0.004	***0.009***	***0.01***	***0.027***	***0.013***	<0.0036	<0.0038	<0.0038	<0.004	<0.0039
Perfluorooctane sulfonic acid (PFOS)	0.016 (A)	<0.004	<0.0039	<0.0036	<0.0034	<0.0038	<0.0037	<0.004	***0.017***	***0.026***	***0.024***	***0.021***	<0.0036	<0.0038	<0.0038	<0.004	<0.0039
Perfluoropentanoic acid (PFPeA)	NCL	<0.004	0.0042	<0.0036	<0.0034	<0.0038	<0.0037	<0.004	<0.0034	0.0037	0.01	0.0057	<0.0036	<0.0038	<0.0038	<0.004	<0.0039
Perfluorotetradecanoic acid (PFTeDA)	NCL	<0.004	<0.0039	<0.0036	<0.0034	<0.0038	<0.0037	<0.004	<0.0034	<0.0037	<0.0036	<0.0039	<0.0036	<0.0038	<0.0038	<0.004	<0.0039
Perfluorotridecanoic acid (PFTrDA)	NCL	<0.004	<0.0039	<0.0036	<0.0034	<0.0038	<0.0037	<0.004	<0.0034	<0.0037	<0.0036	<0.0039	<0.0036	<0.0038	<0.0038	<0.004	<0.0039
Perfluoroundecanoic acid (PFUnDA)	NCL	<0.004	<0.0039	<0.0036	<0.0034	<0.0038	<0.0037	<0.004	<0.0034	<0.0037	<0.0036	<0.0039	<0.0036	<0.0038	<0.0038	<0.004	<0.0039
Tetrafluoro-2-(heptafluoropropoxy)propanoic acid (GenX)	0.37 (A)	<0.0079	<0.0078	<0.0073	<0.0069	<0.0075	<0.0073	<0.0081	<0.0068	<0.0075	<0.0072	<0.0077	<0.0072	<0.0076	<0.0075	<0.0079	<0.0079

TABLE 4A
SUMMARY OF MONITORING WELL GROUNDWATER SAMPLE ANALYSIS - PFAS
Perimeter
Algoma & Plainfield Townships, Kent County, Michigan

Sample Event	Part 201 Generic Residential Groundwater Cleanup Criteria - Drinking Water[2]	Area 5/Perimeter - Q2 2023	Area 5/Perimeter - Q3 2023	Area 5/Perimeter - Q4 2023	Perimeter - Q1 2024	Perimeter - Q1 2024	Area 5/Perimeter - Q2 2023	Area 5/Perimeter - Q3 2023	Area 5/Perimeter - Q4 2023	Perimeter - Q1 2024	Perimeter - Q2 2023	Perimeter - Q3 2023	Perimeter - Q4 2023	Perimeter - Q1 2024	Perimeter - Q2 2023	Perimeter - Q3 2023	Perimeter - Q4 2023
Well		HS-PMW-RI-104C	HS-PMW-RI-104C	HS-PMW-RI-104C	HS-PMW-RI-104C	HS-PMW-RI-104C	HS-PMW-RI-104D	HS-PMW-RI-104D	HS-PMW-RI-104D	HS-PMW-RI-104D	HS-PMW-RI-105A	HS-PMW-RI-105A	HS-PMW-RI-105A	HS-PMW-RI-105A	HS-PMW-RI-105B	HS-PMW-RI-105B	HS-PMW-RI-105B
Sample Name		HS-PMW-RI-104C	HS-PMW-RI-104C	HS-PMW-RI-104C	HS-PMW-RI-104C	HS-PMW-RI-104C DUP	HS-PMW-RI-104D	HS-PMW-RI-104D	HS-PMW-RI-104D	HS-PMW-RI-104D	HS-PMW-RI-105A	HS-PMW-RI-105A	HS-PMW-RI-105A	HS-PMW-RI-105A	HS-PMW-RI-105B	HS-PMW-RI-105B	HS-PMW-RI-105B
Screen Interval (feet below ground surface)		74.8-79.8	74.8-79.8	74.8-79.8	74.8-79.8	74.8-79.8	112.1-117.1	112.1-117.1	112.1-117.1	112.1-117.1	25-30	25-30	25-30	25-30	153.4-158.4	153.4-158.4	153.4-158.4
Laboratory Sample ID		YD21036-029	YG20008-003	YJ07009-002	ZA27002-009	ZA27002-008	YD21036-025	YG20008-004	YJ07009-001	ZA27002-005	YF14023-001	YI01015-005	YK02016-012	ZA27002-024	YF14023-004	YI01015-006	YK02016-013
Sample Date		04/20/2023	07/17/2023	10/04/2023	01/17/2024	01/17/2024	04/20/2023	07/17/2023	10/04/2023	01/17/2024	06/12/2023	08/31/2023	10/25/2023	01/19/2024	06/12/2023	08/31/2023	10/25/2023
Parameter (µg/L)																	
9-chlorohexadecafluoro-3-oxanone-1-sulfonic acid (9Cl-PF3ONS)	NCL	<0.0076	<0.0071	<0.0076	<0.007	<0.0073	<0.0073	<0.0077	<0.0071	<0.0079	<0.0074	<0.0069	<0.0079	<0.0072	<0.0069	<0.008	<0.0074
11-chloroeicosafluoro-3-oxaundecane-1-sulfonic acid (11CL-PF3OUdS)	NCL	<0.0076	<0.0071	<0.0076	<0.007	<0.0073	<0.0073	<0.0077	<0.0071	<0.0079	<0.0074	<0.0069	<0.0079	<0.0072	<0.0069	<0.008	<0.0074
4,8-dioxa-3H-perfluorononanoic acid (ADONA)	NCL	<0.0076	<0.0071	<0.0076	<0.007	<0.0073	<0.0073	<0.0077	<0.0071	<0.0079	<0.0074	<0.0069	<0.0079	<0.0072	<0.0069	<0.008	<0.0074
1H,1H,2H,2H-perfluorohexane sulfonate (4:2FTS)	NCL	<0.0076	<0.0071	<0.0076	<0.007	<0.0073	<0.0073	<0.0077	<0.0071	<0.0079	<0.0074	<0.0069	<0.0079	<0.0072	<0.0069	<0.008	<0.0074
6:2 Fluorotelomer sulfonic acid (6:2 FTS)	NCL	<0.0076	<0.0071	<0.0076	<0.007	<0.0073	<0.0073	<0.0077	<0.0071	<0.0079	<0.0074	<0.0069	<0.0079	<0.0072	<0.0069	<0.008	<0.0074
8:2 Fluorotelomer sulfonic acid (8:2 FTS)	NCL	<0.0076	<0.0071	<0.0076	<0.007	<0.0073	<0.0073	<0.0077	<0.0071	<0.0079	<0.0074	<0.0069	<0.0079	<0.0072	<0.0069	<0.008	<0.0074
N-ethylperfluoro-1-octanesulfonamidoacetic acid (EtFOSAA)	NCL	<0.0076	<0.0071	<0.0076	<0.007	<0.0073	<0.0073	<0.0077	<0.0071	<0.0079	<0.0074	<0.0069	<0.0079	<0.0072	<0.0069	<0.008	<0.0074
N-methylperfluoro-1-octanesulfonamidoacetic acid (MeFOSAA)	NCL	<0.0076	<0.0071	<0.0076	<0.007	<0.0073	<0.0073	<0.0077	<0.0071	<0.0079	<0.0074	<0.0069	<0.0079	<0.0072	<0.0069	<0.008	<0.0074
Perfluorobutane sulfonic acid (PFBS)	0.42 (A)	0.1	0.071	0.11	0.083	0.11	<0.0036	<0.0038	<0.0036	<0.0039	0.0037	0.0046	<0.0039	0.0039	<0.0035	<0.004	<0.0037
Perfluorodecane sulfonic acid (PFDS)	NCL	<0.0038	<0.0036	<0.0038	<0.0035	<0.0036	<0.0036	<0.0038	<0.0036	<0.0039	<0.0037	<0.0034	<0.0039	<0.0036	<0.0035	<0.004	<0.0037
Perfluoroheptane sulfonic acid (PFHpS)	NCL	<0.0038	<0.0036	<0.0038	<0.0035	<0.0036	<0.0036	<0.0038	<0.0036	<0.0039	<0.0037	<0.0034	<0.0039	<0.0036	<0.0035	<0.004	<0.0037
Perfluorononane sulfonic acid (PFNS)	NCL	<0.0038	<0.0036	<0.0038	<0.0035	<0.0036	<0.0036	<0.0038	<0.0036	<0.0039	<0.0037	<0.0034	<0.0039	<0.0036	<0.0035	<0.004	<0.0037
Perfluorooctane sulfonamide (FOSA)	NCL	<0.0038	<0.0036	<0.0038	<0.0035	<0.0036	<0.0036	<0.0038	<0.0036	<0.0039	<0.0037	<0.0034	<0.0039	<0.0036	<0.0035	<0.004	<0.0037
Perfluoropentane sulfonic acid (PFPeS)	NCL	0.079	0.053	0.085	0.058	0.077	<0.0036	<0.0038	<0.0036	<0.0039	<0.0037	<0.0034	<0.0039	<0.0036	<0.0035	<0.004	<0.0037
Perfluorohexane sulfonic acid (PFHxS)	0.051 (A)	***0.058***	0.035	0.051	0.025	0.038	<0.0036	<0.0038	<0.0036	<0.0039	<0.0037	<0.0034	<0.0039	<0.0036	<0.0035	<0.004	<0.0037
Perfluorobutanoic acid (PFBA)	NCL	0.038	0.027	0.041	0.032	0.036	<0.0036	<0.0038	<0.0036	<0.0039	<0.0037	<0.0034	<0.0039	<0.0036	<0.0035	<0.004	<0.0037
Perfluorodecanoic acid (PFDA)	NCL	<0.0038	<0.0036	<0.0038	<0.0035	<0.0036	<0.0036	<0.0038	<0.0036	<0.0039	<0.0037	<0.0034	<0.0039	<0.0036	<0.0035	<0.004	<0.0037
Perfluorododecanoic acid (PFDoDA)	NCL	<0.0038	<0.0036	<0.0038	<0.0035	<0.0036	<0.0036	<0.0038	<0.0036	<0.0039	<0.0037	<0.0034	<0.0039	<0.0036	<0.0035	<0.004	<0.0037
Perfluoroheptanoic acid (PFHpA)	NCL	0.048	0.03	0.049	0.035	0.043	<0.0036	<0.0038	<0.0036	<0.0039	<0.0037	<0.0034	<0.0039	<0.0036	<0.0035	<0.004	<0.0037
Perfluorohexanoic acid (PFHxA)	400 (A)	0.074	0.052	0.075	0.054	0.066	<0.0036	<0.0038	<0.0036	<0.0039	<0.0037	<0.0034	0.0042	<0.0036	<0.0035	<0.004	<0.0037
Perfluorononanoic acid (PFNA)	0.006 (A)	<0.0038	<0.0036	<0.0038	<0.0035	<0.0036	<0.0036	<0.0038	<0.0036	<0.0039	<0.0037	<0.0034	<0.0039	<0.0036	<0.0035	<0.004	<0.0037
Perfluorooctanoic acid (PFOA)	0.008 (A)	***0.094***	***0.049***	***0.074***	***0.043***	***0.057***	<0.0036	<0.0038	<0.0036	<0.0039	<0.0037	0.0051	***0.0099***	0.0062	<0.0035	<0.004	<0.0037
Perfluorooctane sulfonic acid (PFOS)	0.016 (A)	<0.0038	<0.0036	<0.0038	<0.0035	<0.0036	<0.0036	<0.0038	<0.0036	<0.0039	<0.0037	<0.0034	<0.0039	<0.0036	<0.0035	<0.004	<0.0037
Perfluoropentanoic acid (PFPeA)	NCL	0.037	0.028	0.041	0.032	0.036	<0.0036	<0.0038	<0.0036	<0.0039	<0.0037	<0.0034	<0.0039	<0.0036	<0.0035	<0.004	<0.0037
Perfluorotetradecanoic acid (PFTeDA)	NCL	<0.0038	<0.0036	<0.0038	<0.0035	<0.0036	<0.0036	<0.0038	<0.0036	<0.0039	<0.0037	<0.0034	<0.0039	<0.0036	<0.0035	<0.004	<0.0037
Perfluorotridecanoic acid (PFTrDA)	NCL	<0.0038	<0.0036	<0.0038	<0.0035	<0.0036	<0.0036	<0.0038	<0.0036	<0.0039	<0.0037	<0.0034	<0.0039	<0.0036	<0.0035	<0.004	<0.0037
Perfluoroundecanoic acid (PFUnDA)	NCL	<0.0038	<0.0036	<0.0038	<0.0035	<0.0036	<0.0036	<0.0038	<0.0036	<0.0039	<0.0037	<0.0034	<0.0039	<0.0036	<0.0035	<0.004	<0.0037
Tetrafluoro-2-(heptafluoropropoxy)propanoic acid (GenX)	0.37 (A)	<0.0076	<0.0071	<0.0076	<0.007	<0.0073	<0.0073	<0.0077	<0.0071	<0.0079	<0.0074	<0.0069	<0.0079	<0.0072	<0.0069	<0.008	<0.0074

TABLE 4A
SUMMARY OF MONITORING WELL GROUNDWATER SAMPLE ANALYSIS - PFAS
Perimeter
Algoma & Plainfield Townships, Kent County, Michigan

Sample Event	Part 201 Generic Residential Groundwater Cleanup Criteria - Drinking Water[2]	Perimeter - Q1 2024	Perimeter - Q2 2023	Perimeter - Q3 2023	Perimeter - Q4 2023	Perimeter - Q1 2024	Perimeter - Q2 2023	Perimeter - Q3 2023	Perimeter - Q4 2023	Perimeter - Q1 2024	Area 5/Perimeter - Q2 2023	Area 5/Perimeter - Q2 2023	Area 5/Perimeter - Q3 2023	Area 5/Perimeter - Q3 2023	Area 5/erimeter - Q4 2023	Perimeter - Q1 2024	Area 5/Perimeter - Q2 2023
Well		HS-PMW-RI-105B	HS-PMW-RI-106A	HS-PMW-RI-106A	HS-PMW-RI-106A	HS-PMW-RI-106A	HS-PMW-RI-106B	HS-PMW-RI-106B	HS-PMW-RI-106B	HS-PMW-RI-106B	HS-PMW-RI-107A	HS-PMW-RI-107A	HS-PMW-RI-107A	HS-PMW-RI-107A	HS-PMW-RI-107A	HS-PMW-RI-107A	HS-PMW-RI-107B
Sample Name		HS-PMW-RI-105B	HS-PMW-RI-106A	HS-PMW-RI-106A	HS-PMW-RI-106A	HS-PMW-RI-106A	HS-PMW-RI-106B	HS-PMW-RI-106B	HS-PMW-RI-106B	HS-PMW-RI-106B	HS-PMW-RI-107A	HS-PMW-RI-107ADUP	HS-PMW-RI-107A	HS-PMW-RI-107ADUP	HS-PMW-RI-107A	HS-PMW-RI-107A	HS-PMW-RI-107B
Screen Interval (feet below ground surface)		153.4-158.4	45.3-50.3	45.3-50.3	45.3-50.3	45.3-50.3	205.3-210.3	205.3-210.3	205.3-210.3	205.3-210.3	76.5-81.5	76.5-81.5	76.5-81.5	76.5-81.5	76.5-81.5	76.5-81.5	172.7-177.7
Laboratory Sample ID		ZA27002-023	YF22007-004	YH31008-002	YK02016-039	ZB13011-011	YF22007-009	YH31008-001	YK02016-040	ZB13011-012	YE02034-003	YE02034-008	YH05004-004	YH05004-005	YJ17028-007	ZB21017-001	YE02034-004
Sample Date		01/19/2024	06/20/2023	08/30/2023	10/30/2023	02/09/2024	06/20/2023	08/30/2023	10/30/2023	02/09/2024	05/01/2023	05/01/2023	08/01/2023	08/01/2023	10/13/2023	02/13/2024	05/01/2023
Parameter (µg/L)																	
9-chlorohexadecafluoro-3-oxanone-1-sulfonic acid (9Cl-PF3ONS)	NCL	<0.0078	<0.0076	<0.0075	<0.0076	<0.0069	<0.0071	<0.0073	<0.0073	<0.0073	<0.0069	<0.007	<0.0074	<0.0072	<0.0075	<0.0078	<0.0069
11-chloroeicosafluoro-3-oxaundecane-1-sulfonic acid (11CL-PF3OUdS)	NCL	<0.0078	<0.0076	<0.0075	<0.0076	<0.0069	<0.0071	<0.0073	<0.0073	<0.0073	<0.0069	<0.007	<0.0074	<0.0072	<0.0075	<0.0078	<0.0069
4,8-dioxa-3H-perfluorononanoic acid (ADONA)	NCL	<0.0078	<0.0076	<0.0075	<0.0076	<0.0069	<0.0071	<0.0073	<0.0073	<0.0073	<0.0069	<0.007	<0.0074	<0.0072	<0.0075	<0.0078	<0.0069
1H,1H,2H,2H-perfluorohexane sulfonate (4:2FTS)	NCL	<0.0078	<0.0076	<0.0075	<0.0076	<0.0069	<0.0071	<0.0073	<0.0073	<0.0073	<0.0069	<0.007	<0.0074	<0.0072	<0.0075	<0.0078	<0.0069
6:2 Fluorotelomer sulfonic acid (6:2 FTS)	NCL	<0.0078	<0.0076	<0.0075	<0.0076	<0.0069	<0.0071	<0.0073	<0.0073	<0.0073	<0.0069	<0.007	<0.0074	<0.0072	<0.0075	<0.0078	<0.0069
8:2 Fluorotelomer sulfonic acid (8:2 FTS)	NCL	<0.0078	<0.0076	<0.0075	<0.0076	<0.0069	<0.0071	<0.0073	<0.0073	<0.0073	<0.0069	<0.007	<0.0074	<0.0072	<0.0075	<0.0078	<0.0069
N-ethylperfluoro-1-octanesulfonamidoacetic acid (EtFOSAA)	NCL	<0.0078	<0.0076	<0.0075	<0.0076	<0.0069	<0.0071	<0.0073	<0.0073	<0.0073	<0.0069	<0.007	<0.0074	<0.0072	<0.0075	<0.0078	<0.0069
N-methylperfluoro-1-octanesulfonamidoacetic acid (MeFOSAA)	NCL	<0.0078	<0.0076	<0.0075	<0.0076	<0.0069	<0.0071	<0.0073	<0.0073	<0.0073	<0.0069	<0.007	<0.0074	<0.0072	<0.0075	<0.0078	<0.0069
Perfluorobutane sulfonic acid (PFBS)	0.42 (A)	<0.0039	<0.0038	<0.0037	<0.0038	<0.0035	<0.0035	<0.0036	<0.0037	<0.0036	<0.0035	<0.0035	<0.0037	<0.0036	<0.0038	<0.0039	0.0045
Perfluorodecane sulfonic acid (PFDS)	NCL	<0.0039	<0.0038	<0.0037	<0.0038	<0.0035	<0.0035	<0.0036	<0.0037	<0.0036	<0.0035	<0.0035	<0.0037	<0.0036	<0.0038	<0.0039	<0.0034
Perfluoroheptane sulfonic acid (PFHpS)	NCL	<0.0039	<0.0038	<0.0037	<0.0038	<0.0035	<0.0035	<0.0036	<0.0037	<0.0036	<0.0035	<0.0035	<0.0037	<0.0036	<0.0038	<0.0039	<0.0034
Perfluorononane sulfonic acid (PFNS)	NCL	<0.0039	<0.0038	<0.0037	<0.0038	<0.0035	<0.0035	<0.0036	<0.0037	<0.0036	<0.0035	<0.0035	<0.0037	<0.0036	<0.0038	<0.0039	<0.0034
Perfluorooctane sulfonamide (FOSA)	NCL	<0.0039	<0.0038	<0.0037	<0.0038	<0.0035	<0.0035	<0.0036	<0.0037	<0.0036	<0.0035	<0.0035	<0.0037	<0.0036	<0.0038	<0.0039	<0.0034
Perfluoropentane sulfonic acid (PFPeS)	NCL	<0.0039	<0.0038	<0.0037	<0.0038	<0.0035	<0.0035	<0.0036	<0.0037	<0.0036	<0.0035	<0.0035	<0.0037	<0.0036	<0.0038	<0.0039	<0.0034
Perfluorohexane sulfonic acid (PFHxS)	0.051 (A)	<0.0039	<0.0038	<0.0037	<0.0038	<0.0035	<0.0035	<0.0036	<0.0037	<0.0036	<0.0035	<0.0035	<0.0037	<0.0036	<0.0038	<0.0039	<0.0034
Perfluorobutanoic acid (PFBA)	NCL	<0.0039	<0.0038	<0.0037	<0.0038	<0.0035	<0.0035	<0.0036	<0.0037	<0.0036	<0.0035	<0.0035	<0.0037	<0.0036	<0.0038	<0.0039	<0.0034
Perfluorodecanoic acid (PFDA)	NCL	<0.0039	<0.0038	<0.0037	<0.0038	<0.0035	<0.0035	<0.0036	<0.0037	<0.0036	<0.0035	<0.0035	<0.0037	<0.0036	<0.0038	<0.0039	<0.0034
Perfluorododecanoic acid (PFDoDA)	NCL	<0.0039	<0.0038	<0.0037	<0.0038	<0.0035	<0.0035	<0.0036	<0.0037	<0.0036	<0.0035	<0.0035	<0.0037	<0.0036	<0.0038	<0.0039	<0.0034
Perfluoroheptanoic acid (PFHpA)	NCL	<0.0039	<0.0038	<0.0037	<0.0038	<0.0035	<0.0035	<0.0036	<0.0037	<0.0036	<0.0035	<0.0035	<0.0037	<0.0036	<0.0038	<0.0039	<0.0034
Perfluorohexanoic acid (PFHxA)	400 (A)	<0.0039	<0.0038	<0.0037	<0.0038	<0.0035	<0.0035	<0.0036	<0.0037	<0.0036	<0.0035	<0.0035	<0.0037	<0.0036	<0.0038	<0.0039	<0.0034
Perfluorononanoic acid (PFNA)	0.006 (A)	<0.0039	<0.0038	<0.0037	<0.0038	<0.0035	<0.0035	<0.0036	<0.0037	<0.0036	<0.0035	<0.0035	<0.0037	<0.0036	<0.0038	<0.0039	<0.0034
Perfluorooctanoic acid (PFOA)	0.008 (A)	<0.0039	<0.0038	<0.0037	<0.0038	<0.0035	<0.0035	<0.0036	<0.0037	<0.0036	<0.0035	<0.0035	<0.0037	<0.0036	<0.0038	<0.0039	<0.0034
Perfluorooctane sulfonic acid (PFOS)	0.016 (A)	<0.0039	<0.0038	<0.0037	<0.0038	<0.0035	<0.0035	<0.0036	<0.0037	<0.0036	<0.0035	<0.0035	<0.0037	<0.0036	<0.0038	<0.0039	<0.0034
Perfluoropentanoic acid (PFPeA)	NCL	<0.0039	<0.0038	<0.0037	<0.0038	<0.0035	<0.0035	<0.0036	<0.0037	<0.0036	<0.0035	<0.0035	<0.0037	<0.0036	<0.0038	<0.0039	<0.0034
Perfluorotetradecanoic acid (PFTeDA)	NCL	<0.0039	<0.0038	<0.0037	<0.0038	<0.0035	<0.0035	<0.0036	<0.0037	<0.0036	<0.0035	<0.0035	<0.0037	<0.0036	<0.0038	<0.0039	<0.0034
Perfluorotridecanoic acid (PFTrDA)	NCL	<0.0039	<0.0038	<0.0037	<0.0038	<0.0035	<0.0035	<0.0036	<0.0037	<0.0036	<0.0035	<0.0035	<0.0037	<0.0036	<0.0038	<0.0039	<0.0034
Perfluoroundecanoic acid (PFUnDA)	NCL	<0.0039	<0.0038	<0.0037	<0.0038	<0.0035	<0.0035	<0.0036	<0.0037	<0.0036	<0.0035	<0.0035	<0.0037	<0.0036	<0.0038	<0.0039	<0.0034
Tetrafluoro-2-(heptafluoropropoxy)propanoic acid (GenX)	0.37 (A)	<0.0078	<0.0076	<0.0075	<0.0076	<0.0069	<0.0071	<0.0073	<0.0073	<0.0073	<0.0069	<0.007	<0.0074	<0.0072	<0.0075	<0.0078	<0.0069

TABLE 4A
SUMMARY OF MONITORING WELL GROUNDWATER SAMPLE ANALYSIS - PFAS
Perimeter
Algoma & Plainfield Townships, Kent County, Michigan

Sample Event	Part 201 Generic Residential Groundwater Cleanup Criteria - Drinking Water[2]	Area 5/Perimeter - Q3 2023	Area 5/Perimeter - Q4 2023	Perimeter - Q1 2024	Area 5/Perimeter - Q2 2023	Area 5/Perimeter - Q3 2023	Area 5/Perimeter - Q4 2023	Perimeter - Q1 2024	Area 5/Perimeter - Q2 2023	Area 5/Perimeter - Q3 2023	Area 5/Perimeter - Q4 2023	Perimeter - Q1 2024	Area 6/Perimeter - Q2 2023	Area 6/Perimeter - Q3 2023	Perimeter - Q4 2023	Perimeter - Q4 2023	Perimeter - Q1 2024
Well		HS-PMW-RI-107B	HS-PMW-RI-107B	HS-PMW-RI-107B	HS-PMW-RI-107C	HS-PMW-RI-107C	HS-PMW-RI-107C	HS-PMW-RI-107C	HS-PMW-RI-107D	HS-PMW-RI-107D	HS-PMW-RI-107D	HS-PMW-RI-107D	HS-PMW-RI-108A	HS-PMW-RI-108A	HS-PMW-RI-108A	HS-PMW-RI-108A	HS-PMW-RI-108A
Sample Name		HS-PMW-RI-107B	HS-PMW-RI-107B	HS-PMW-RI-107B	HS-PMW-RI-107C	HS-PMW-RI-107C	HS-PMW-RI-107C	HS-PMW-RI-107C	HS-PMW-RI-107D	HS-PMW-RI-107D	HS-PMW-RI-107D	HS-PMW-RI-107D	HS-PMW-RI-108A	HS-PMW-RI-108A	HS-PMW-RI-108A	HS-PMW-RI-108A DUP	HS-PMW-RI-108A
Screen Interval (feet below ground surface)		172.7-177.7	172.7-177.7	172.7-177.7	182.8-187.8	182.8-187.8	182.8-187.8	182.8-187.8	197.8-202.8	197.8-202.8	197.8-202.8	197.8-202.8	65.8-70.8	65.8-70.8	65.8-70.8	65.8-70.8	65.8-70.8
Laboratory Sample ID		YH05004-006	YJ17028-008	ZB21017-004	YE04021-001	YH05004-001	YJ17028-009	ZB21017-002	YE04021-002	YH05004-002	YJ17028-010	ZB21017-003	YD28011-001	YH05006-016	YL21056-017	YL21056-018	ZB21017-005
Sample Date		08/01/2023	10/13/2023	02/13/2024	05/03/2023	08/01/2023	10/13/2023	02/13/2024	05/03/2023	08/01/2023	10/13/2023	02/13/2024	04/26/2023	08/03/2023	12/19/2023	12/19/2023	02/13/2024
Parameter (µg/L)																	
9-chlorohexadecafluoro-3-oxanone-1-sulfonic acid (9Cl-PF3ONS)	NCL	<0.0068	<0.0067	<0.0079	<0.0067	<0.0075	<0.0071	<0.0076	<0.0072	<0.008	<0.0082	<0.0079	<0.007	<0.0078	<0.0077	<0.0076	<0.0079
11-chloroeicosafluoro-3-oxaundecane-1-sulfonic acid (11CL-PF3OUdS)	NCL	<0.0068	<0.0067	<0.0079	<0.0067	<0.0075	<0.0071	<0.0076	<0.0072	<0.008	<0.0082	<0.0079	<0.007	<0.0078	<0.0077	<0.0076	<0.0079
4,8-dioxa-3H-perfluorononanoic acid (ADONA)	NCL	<0.0068	<0.0067	<0.0079	<0.0067	<0.0075	<0.0071	<0.0076	<0.0072	<0.008	<0.0082	<0.0079	<0.007	<0.0078	<0.0077	<0.0076	<0.0079
1H,1H,2H,2H-perfluorohexane sulfonate (4:2FTS)	NCL	<0.0068	<0.0067	<0.0079	<0.0067	<0.0075	<0.0071	<0.0076	<0.0072	<0.008	<0.0082	<0.0079	<0.007	<0.0078	<0.0077	<0.0076	<0.0079
6:2 Fluorotelomer sulfonic acid (6:2 FTS)	NCL	<0.0068	<0.0067	<0.0079	<0.0067	<0.0075	<0.0071	<0.0076	<0.0072	<0.008	<0.0082	<0.0079	<0.007	<0.0078	<0.0077	<0.0076	<0.0079
8:2 Fluorotelomer sulfonic acid (8:2 FTS)	NCL	<0.0068	<0.0067	<0.0079	<0.0067	<0.0075	<0.0071	<0.0076	<0.0072	<0.008	<0.0082	<0.0079	<0.007	<0.0078	<0.0077	<0.0076	<0.0079
N-ethylperfluoro-1-octanesulfonamidoacetic acid (EtFOSAA)	NCL	<0.0068	<0.0067	<0.0079	<0.0067	<0.0075	<0.0071	<0.0076	<0.0072	<0.008	<0.0082	<0.0079	<0.007	<0.0078	<0.0077	<0.0076	<0.0079
N-methylperfluoro-1-octanesulfonamidoacetic acid (MeFOSAA)	NCL	<0.0068	<0.0067	<0.0079	<0.0067	<0.0075	<0.0071	<0.0076	<0.0072	<0.008	<0.0082	<0.0079	<0.007	<0.0078	<0.0077	<0.0076	<0.0079
Perfluorobutane sulfonic acid (PFBS)	0.42 (A)	0.0042	0.0044	0.0047	0.0043	0.004	0.0043	0.0046	<0.0036	<0.004	<0.0041	<0.004	<0.0035	<0.0039	<0.0039	<0.0038	<0.0039
Perfluorodecane sulfonic acid (PFDS)	NCL	<0.0034	<0.0034	<0.004	<0.0033	<0.0037	<0.0035	<0.0038	<0.0036	<0.004	<0.0041	<0.004	<0.0035	<0.0039	<0.0039	<0.0038	<0.0039
Perfluoroheptane sulfonic acid (PFHpS)	NCL	<0.0034	<0.0034	<0.004	<0.0033	<0.0037	<0.0035	<0.0038	<0.0036	<0.004	<0.0041	<0.004	<0.0035	<0.0039	<0.0039	<0.0038	<0.0039
Perfluorononane sulfonic acid (PFNS)	NCL	<0.0034	<0.0034	<0.004	<0.0033	<0.0037	<0.0035	<0.0038	<0.0036	<0.004	<0.0041	<0.004	<0.0035	<0.0039	<0.0039	<0.0038	<0.0039
Perfluorooctane sulfonamide (FOSA)	NCL	<0.0034	<0.0034	<0.004	<0.0033	<0.0037	<0.0035	<0.0038	<0.0036	<0.004	<0.0041	<0.004	<0.0035	<0.0039	<0.0039	<0.0038	<0.0039
Perfluoropentane sulfonic acid (PFPeS)	NCL	<0.0034	<0.0034	<0.004	<0.0033	<0.0037	<0.0035	<0.0038	<0.0036	<0.004	<0.0041	<0.004	<0.0035	<0.0039	<0.0039	<0.0038	<0.0039
Perfluorohexane sulfonic acid (PFHxS)	0.051 (A)	<0.0034	<0.0034	<0.004	<0.0033	<0.0037	<0.0035	<0.0038	<0.0036	<0.004	<0.0041	<0.004	<0.0035	<0.0039	<0.0039	<0.0038	<0.0039
Perfluorobutanoic acid (PFBA)	NCL	<0.0034	<0.0034	<0.004	<0.0033	<0.0037	<0.0035	<0.0038	<0.0036	<0.004	<0.0041	<0.004	<0.0035	<0.0039	<0.0039	<0.0038	<0.0039
Perfluorodecanoic acid (PFDA)	NCL	<0.0034	<0.0034	<0.004	<0.0033	<0.0037	<0.0035	<0.0038	<0.0036	<0.004	<0.0041	<0.004	<0.0035	<0.0039	<0.0039	<0.0038	<0.0039
Perfluorododecanoic acid (PFDoDA)	NCL	<0.0034	<0.0034	<0.004	<0.0033	<0.0037	<0.0035	<0.0038	<0.0036	<0.004	<0.0041	<0.004	<0.0035	<0.0039	<0.0039	<0.0038	<0.0039
Perfluoroheptanoic acid (PFHpA)	NCL	<0.0034	<0.0034	<0.004	<0.0033	<0.0037	<0.0035	<0.0038	<0.0036	<0.004	<0.0041	<0.004	<0.0035	<0.0039	<0.0039	<0.0038	<0.0039
Perfluorohexanoic acid (PFHxA)	400 (A)	<0.0034	<0.0034	<0.004	<0.0033	<0.0037	<0.0035	<0.0038	<0.0036	<0.004	<0.0041	<0.004	<0.0035	<0.0039	<0.0039	<0.0038	<0.0039
Perfluorononanoic acid (PFNA)	0.006 (A)	<0.0034	<0.0034	<0.004	<0.0033	<0.0037	<0.0035	<0.0038	<0.0036	<0.004	<0.0041	<0.004	<0.0035	<0.0039	<0.0039	<0.0038	<0.0039
Perfluorooctanoic acid (PFOA)	0.008 (A)	<0.0034	<0.0034	<0.004	<0.0033	<0.0037	<0.0035	<0.0038	<0.0036	<0.004	<0.0041	<0.004	<0.0035	<0.0039	<0.0039	<0.0038	<0.0039
Perfluorooctane sulfonic acid (PFOS)	0.016 (A)	<0.0034	<0.0034	<0.004	<0.0033	<0.0037	<0.0035	<0.0038	<0.0036	<0.004	<0.0041	<0.004	<0.0035	<0.0039	<0.0039	<0.0038	<0.0039
Perfluoropentanoic acid (PFPeA)	NCL	<0.0034	<0.0034	<0.004	<0.0033	<0.0037	<0.0035	<0.0038	<0.0036	<0.004	<0.0041	<0.004	<0.0035	<0.0039	<0.0039	<0.0038	<0.0039
Perfluorotetradecanoic acid (PFTeDA)	NCL	<0.0034	<0.0034	<0.004	<0.0033	<0.0037	<0.0035	<0.0038	<0.0036	<0.004	<0.0041	<0.004	<0.0035	<0.0039	<0.0039	<0.0038	<0.0039
Perfluorotridecanoic acid (PFTrDA)	NCL	<0.0034	<0.0034	<0.004	<0.0033	<0.0037	<0.0035	<0.0038	<0.0036	<0.004	<0.0041	<0.004	<0.0035	<0.0039	<0.0039	<0.0038	<0.0039
Perfluoroundecanoic acid (PFUnDA)	NCL	<0.0034	<0.0034	<0.004	<0.0033	<0.0037	<0.0035	<0.0038	<0.0036	<0.004	<0.0041	<0.004	<0.0035	<0.0039	<0.0039	<0.0038	<0.0039
Tetrafluoro-2-(heptafluoropropoxy)propanoic acid (GenX)	0.37 (A)	<0.0068	<0.0067	<0.0079	<0.0067	<0.0075	<0.0071	<0.0076	<0.0072	<0.008	<0.0082	<0.0079	<0.007	<0.0078	<0.0077	<0.0076	<0.0079

TABLE 4A
SUMMARY OF MONITORING WELL GROUNDWATER SAMPLE ANALYSIS - PFAS
Perimeter
Algoma & Plainfield Townships, Kent County, Michigan

Sample Event	Part 201 Generic Residential Groundwater Cleanup Criteria - Drinking Water[2]	Area 6/Perimeter - Q2 2023	Area 6/Perimeter - Q3 2023	Perimeter - Q4 2023	Perimeter - Q1 2024	Area 6/Perimeter - Q2 2023	Area 6/Perimeter - Q3 2023	Perimeter - Q4 2023	Perimeter - Q1 2024	Area 6/Perimeter - Q2 2023	Area 6/Perimeter - Q3 2023	Perimeter - Q4 2023	Perimeter - Q1 2024	Area 6/Perimeter - Q2 2023	Area 6/Perimeter - Q3 2023	Perimeter - Q4 2023	Perimeter - Q1 2024
Well		HS-PMW-RI-108B	HS-PMW-RI-108B	HS-PMW-RI-108B	HS-PMW-RI-108B	HS-PMW-RI-108D	HS-PMW-RI-108D	HS-PMW-RI-108D	HS-PMW-RI-108D	HS-PMW-RI-109A	HS-PMW-RI-109A	HS-PMW-RI-109A	HS-PMW-RI-109A	HS-PMW-RI-109B	HS-PMW-RI-109B	HS-PMW-RI-109B	HS-PMW-RI-109B
Sample Name		HS-PMW-RI-108B	HS-PMW-RI-108B	HS-PMW-RI-108B	HS-PMW-RI-108B	HS-PMW-RI-108D	HS-PMW-RI-108D	HS-PMW-RI-108D	HS-PMW-RI-108D	HS-PMW-RI-109A	HS-PMW-RI-109A	HS-PMW-RI-109A	HS-PMW-RI-109A	HS-PMW-RI-109B	HS-PMW-RI-109B	HS-PMW-RI-109B	HS-PMW-RI-109B
Screen Interval (feet below ground surface)		132.1-137.1	132.1-137.1	132.1-137.1	132.1-137.1	223.3-228.3	223.3-228.3	223.3-228.3	223.3-228.3	14-19	14-19	14-19	14-19	125-130	125-130	125-130	125-130
Laboratory Sample ID		YD28011-004	YH05006-014	YL21056-019	ZB21017-006	YE05016-001	YH05006-015	YL21056-020	ZB21017-007	YD26033-008	YH05006-003	YL21056-005	ZA27002-022	YD26033-007	YH05006-004	YL21056-007	ZA27002-007
Sample Date		04/26/2023	08/03/2023	12/19/2023	02/13/2024	05/04/2023	08/03/2023	12/19/2023	02/13/2024	04/24/2023	08/01/2023	12/14/2023	01/24/2024	04/24/2023	08/01/2023	12/14/2023	01/24/2024
Parameter (µg/L)																	
9-chlorohexadecafluoro-3-oxanone-1-sulfonic acid (9Cl-PF3ONS)	NCL	<0.0071	<0.08	<0.0075	<0.007	<0.0072	<0.0073	<0.0072	<0.0074	<0.0069	<0.0071	<0.008	<0.0069	<0.0072	<0.0069	<0.0078	<0.0076
11-chloroeicosafluoro-3-oxaundecane-1-sulfonic acid (11CL-PF3OUdS)	NCL	<0.0071	<0.08	<0.0075	<0.007	<0.0072	<0.0073	<0.0072	<0.0074	<0.0069	<0.0071	<0.008	<0.0069	<0.0072	<0.0069	<0.0078	<0.0076
4,8-dioxa-3H-perfluorononanoic acid (ADONA)	NCL	<0.0071	<0.08	<0.0075	<0.007	<0.0072	<0.0073	<0.0072	<0.0074	<0.0069	<0.0071	<0.008	<0.0069	<0.0072	<0.0069	<0.0078	<0.0076
1H,1H,2H,2H-perfluorohexane sulfonate (4:2FTS)	NCL	<0.0071	<0.08	<0.0075	<0.007	<0.0072	<0.0073	<0.0072	<0.0074	<0.0069	<0.0071	<0.008	<0.0069	<0.0072	<0.0069	<0.0078	<0.0076
6:2 Fluorotelomer sulfonic acid (6:2 FTS)	NCL	<0.0071	<0.08	<0.0075	<0.007	<0.0072	<0.0073	<0.0072	<0.0074	<0.0069	<0.0071	<0.008	<0.0069	<0.0072	<0.0069	<0.0078	<0.0076
8:2 Fluorotelomer sulfonic acid (8:2 FTS)	NCL	<0.0071	<0.08	<0.0075	<0.007	<0.0072	<0.0073	<0.0072	<0.0074	<0.0069	<0.0071	<0.008	<0.0069	<0.0072	<0.0069	<0.0078	<0.0076
N-ethylperfluoro-1-octanesulfonamidoacetic acid (EtFOSAA)	NCL	<0.0071	<0.08	<0.0075	<0.007	<0.0072	<0.0073	<0.0072	<0.0074	<0.0069	<0.0071	<0.008	<0.0069	<0.0072	<0.0069	<0.0078	<0.0076
N-methylperfluoro-1-octanesulfonamidoacetic acid (MeFOSAA)	NCL	<0.0071	<0.08	<0.0075	<0.007	<0.0072	<0.0073	<0.0072	<0.0074	<0.0069	<0.0071	<0.008	<0.0069	<0.0072	<0.0069	<0.0078	<0.0076
Perfluorobutane sulfonic acid (PFBS)	0.42 (A)	<0.0035	<0.04	<0.0037	<0.0035	<0.0036	<0.0036	<0.0036	<0.0037	<0.0034	<0.0035	<0.004	<0.0034	0.011	0.011	0.011	0.0085
Perfluorodecane sulfonic acid (PFDS)	NCL	<0.0035	<0.04	<0.0037	<0.0035	<0.0036	<0.0036	<0.0036	<0.0037	<0.0034	<0.0035	<0.004	<0.0034	<0.0036	<0.0034	<0.0039	<0.0038
Perfluoroheptane sulfonic acid (PFHpS)	NCL	<0.0035	<0.04	<0.0037	<0.0035	<0.0036	<0.0036	<0.0036	<0.0037	<0.0034	<0.0035	<0.004	<0.0034	<0.0036	<0.0034	<0.0039	<0.0038
Perfluorononane sulfonic acid (PFNS)	NCL	<0.0035	<0.04	<0.0037	<0.0035	<0.0036	<0.0036	<0.0036	<0.0037	<0.0034	<0.0035	<0.004	<0.0034	<0.0036	<0.0034	<0.0039	<0.0038
Perfluorooctane sulfonamide (FOSA)	NCL	<0.0035	<0.04	<0.0037	<0.0035	<0.0036	<0.0036	<0.0036	<0.0037	<0.0034	<0.0035	<0.004	<0.0034	<0.0036	<0.0034	<0.0039	<0.0038
Perfluoropentane sulfonic acid (PFPeS)	NCL	<0.0035	<0.04	<0.0037	<0.0035	<0.0036	<0.0036	<0.0036	<0.0037	<0.0034	<0.0035	<0.004	<0.0034	<0.0036	<0.0034	<0.0039	<0.0038
Perfluorohexane sulfonic acid (PFHxS)	0.051 (A)	<0.0035	<0.04	<0.0037	<0.0035	<0.0036	<0.0036	<0.0036	<0.0037	<0.0034	<0.0035	<0.004	<0.0034	<0.0036	<0.0034	<0.0039	<0.0038
Perfluorobutanoic acid (PFBA)	NCL	<0.0035	<0.04	<0.0037	<0.0035	<0.0036	<0.0036	<0.0036	<0.0037	<0.0034	<0.0035	<0.004	<0.0034	<0.0036	<0.0034	<0.0039	<0.0038
Perfluorodecanoic acid (PFDA)	NCL	<0.0035	<0.04	<0.0037	<0.0035	<0.0036	<0.0036	<0.0036	<0.0037	<0.0034	<0.0035	<0.004	<0.0034	<0.0036	<0.0034	<0.0039	<0.0038
Perfluorododecanoic acid (PFDoDA)	NCL	<0.0035	<0.04	<0.0037	<0.0035	<0.0036	<0.0036	<0.0036	<0.0037	<0.0034	<0.0035	<0.004	<0.0034	<0.0036	<0.0034	<0.0039	<0.0038
Perfluoroheptanoic acid (PFHpA)	NCL	<0.0035	<0.04	<0.0037	<0.0035	<0.0036	<0.0036	<0.0036	<0.0037	<0.0034	<0.0035	<0.004	<0.0034	<0.0036	<0.0034	<0.0039	<0.0038
Perfluorohexanoic acid (PFHxA)	400 (A)	<0.0035	<0.04	<0.0037	<0.0035	<0.0036	<0.0036	<0.0036	<0.0037	<0.0034	<0.0035	<0.004	<0.0034	<0.0036	<0.0034	<0.0039	<0.0038
Perfluorononanoic acid (PFNA)	0.006 (A)	<0.0035	<0.04	<0.0037	<0.0035	<0.0036	<0.0036	<0.0036	<0.0037	<0.0034	<0.0035	<0.004	<0.0034	<0.0036	<0.0034	<0.0039	<0.0038
Perfluorooctanoic acid (PFOA)	0.008 (A)	<0.0035	<0.04	<0.0037	<0.0035	<0.0036	<0.0036	<0.0036	<0.0037	<0.0034	<0.0035	<0.004	<0.0034	<0.0036	<0.0034	<0.0039	<0.0038
Perfluorooctane sulfonic acid (PFOS)	0.016 (A)	<0.0035	<0.04	<0.0037	<0.0035	<0.0036	<0.0036	<0.0036	<0.0037	0.0058	0.0071	0.0057	0.0049	<0.0036	<0.0034	<0.0039	<0.0038
Perfluoropentanoic acid (PFPeA)	NCL	<0.0035	<0.04	<0.0037	<0.0035	<0.0036	<0.0036	<0.0036	<0.0037	<0.0034	<0.0035	<0.004	<0.0034	<0.0036	<0.0034	<0.0039	<0.0038
Perfluorotetradecanoic acid (PFTeDA)	NCL	<0.0035	<0.04	<0.0037	<0.0035	<0.0036	<0.0036	<0.0036	<0.0037	<0.0034	<0.0035	<0.004	<0.0034	<0.0036	<0.0034	<0.0039	<0.0038
Perfluorotridecanoic acid (PFTrDA)	NCL	<0.0035	<0.04	<0.0037	<0.0035	<0.0036	<0.0036	<0.0036	<0.0037	<0.0034	<0.0035	<0.004	<0.0034	<0.0036	<0.0034	<0.0039	<0.0038
Perfluoroundecanoic acid (PFUnDA)	NCL	<0.0035	<0.04	<0.0037	<0.0035	<0.0036	<0.0036	<0.0036	<0.0037	<0.0034	<0.0035	<0.004	<0.0034	<0.0036	<0.0034	<0.0039	<0.0038
Tetrafluoro-2-(heptafluoropropoxy)propanoic acid (GenX)	0.37 (A)	<0.0071	<0.08	<0.0075	<0.007	<0.0072	<0.0073	<0.0072	<0.0074	<0.0069	<0.0071	<0.008	<0.0069	<0.0072	<0.0069	<0.0078	<0.0076

TABLE 4A
SUMMARY OF MONITORING WELL GROUNDWATER SAMPLE ANALYSIS - PFAS
Perimeter
Algoma & Plainfield Townships, Kent County, Michigan

Sample Event	Part 201 Generic Residential Groundwater Cleanup Criteria - Drinking Water[2]	Area 6/Perimeter - Q2 2023	Area 6/Perimeter - Q3 2023	Perimeter - Q4 2023	Perimeter - Q1 2024	Area 11 12/Perimeter - Q2 2023	Area 11 12/Perimeter - Q3 2023	Perimeter - Q4 2023	Perimeter - Q1 2024	Area 11 12/Perimeter - Q2 2023	Area 11 12/erimeter - Q3 2023	Perimeter - Q4 2023	Perimeter - Q1 2024	Area 11 12/Perimeter - Q2 2023	Area 11 12/Perimeter - Q3 2023	Perimeter - Q4 2023	Perimeter - Q1 2024
Well		HS-PMW-RI-109C	HS-PMW-RI-109C	HS-PMW-RI-109C	HS-PMW-RI-109C	HS-PMW-RI-111A	HS-PMW-RI-111A	HS-PMW-RI-111A	HS-PMW-RI-111A	HS-PMW-RI-111B	HS-PMW-RI-111B	HS-PMW-RI-111B	HS-PMW-RI-111B	HS-PMW-RI-112A	HS-PMW-RI-112A	HS-PMW-RI-112A	HS-PMW-RI-112A
Sample Name		HS-PMW-RI-109C	HS-PMW-RI-109C	HS-PMW-RI-109C	HS-PMW-RI-109C	HS-PMW-RI-111A	HS-PMW-RI-111A	HS-PMW-RI-111A	HS-PMW-RI-111A	HS-PMW-RI-111B	HS-PMW-RI-111B	HS-PMW-RI-111B	HS-PMW-RI-111B	HS-PMW-RI-112A	HS-PMW-112A	HS-PMW-RI-112A	HS-PMW-RI-112A
Screen Interval (feet below ground surface)		144.1-149.1	144.1-149.1	144.1-149.1	144.1-149.1	10.2-15.2	10.2-15.2	10.2-15.2	10.2-15.2	45-50	45-50	45-50	45-50	24.7-29.7	24.7-29.7	24.7-29.7	24.7-29.7
Laboratory Sample ID		YD26033-006	YH05006-009	YL21056-006	ZA27002-021	YD14015-002	YG14043-010	YL14005-009	ZB03013-022	YD14015-001	YG14043-009	YL14005-010	ZB03013-023	YD14015-004	YG12019-001	YL21056-011	ZB03013-024
Sample Date		04/24/2023	08/01/2023	12/14/2023	01/24/2024	04/11/2023	07/13/2023	12/13/2023	02/01/2024	04/11/2023	07/13/2023	12/13/2023	02/01/2024	04/11/2023	07/11/2023	12/15/2023	02/02/2024
Parameter (µg/L)																	
9-chlorohexadecafluoro-3-oxanone-1-sulfonic acid (9Cl-PF3ONS)	NCL	<0.0079	<0.0077	<0.0069	<0.0077	<0.0068	<0.0073	<0.0069	<0.0079	<0.0076	<0.007	<0.0081	<0.0077	<0.007	<0.0069	<0.0074	<0.0075
11-chloroeicosafluoro-3-oxaundecane-1-sulfonic acid (11CL-PF3OUdS)	NCL	<0.0079	<0.0077	<0.0069	<0.0077	<0.0068	<0.0073	<0.0069	<0.0079	<0.0076	<0.007	<0.0081	<0.0077	<0.007	<0.0069	<0.0074	<0.0075
4,8-dioxa-3H-perfluorononanoic acid (ADONA)	NCL	<0.0079	<0.0077	<0.0069	<0.0077	<0.0068	<0.0073	<0.0069	<0.0079	<0.0076	<0.007	<0.0081	<0.0077	<0.007	<0.0069	<0.0074	<0.0075
1H,1H,2H,2H-perfluorohexane sulfonate (4:2FTS)	NCL	<0.0079	<0.0077	<0.0069	<0.0077	<0.0068	<0.0073	<0.0069	<0.0079	<0.0076	<0.007	<0.0081	<0.0077	<0.007	<0.0069	<0.0074	<0.0075
6:2 Fluorotelomer sulfonic acid (6:2 FTS)	NCL	<0.0079	<0.0077	<0.0069	<0.0077	<0.0068	<0.0073	<0.0069	<0.0079	<0.0076	<0.007	<0.0081	<0.0077	<0.007	<0.0069	<0.0074	<0.0075
8:2 Fluorotelomer sulfonic acid (8:2 FTS)	NCL	<0.0079	<0.0077	<0.0069	<0.0077	<0.0068	<0.0073	<0.0069	<0.0079	<0.0076	<0.007	<0.0081	<0.0077	<0.007	<0.0069	<0.0074	<0.0075
N-ethylperfluoro-1-octanesulfonamidoacetic acid (EtFOSAA)	NCL	<0.0079	<0.0077	<0.0069	<0.0077	<0.0068	<0.0073	<0.0069	<0.0079	<0.0076	<0.007	<0.0081	<0.0077	<0.007	<0.0069	<0.0074	<0.0075
N-methylperfluoro-1-octanesulfonamidoacetic acid (MeFOSAA)	NCL	<0.0079	<0.0077	<0.0069	<0.0077	<0.0068	<0.0073	<0.0069	<0.0079	<0.0076	<0.007	<0.0081	<0.0077	<0.007	<0.0069	<0.0074	<0.0075
Perfluorobutane sulfonic acid (PFBS)	0.42 (A)	<0.0039	<0.0038	<0.0034	<0.0038	0.0052	0.0093	0.0072	0.0067	0.0097	0.0098	0.0095	0.011	0.0049	0.0069	0.0064	0.0055
Perfluorodecane sulfonic acid (PFDS)	NCL	<0.0039	<0.0038	<0.0034	<0.0038	<0.0034	<0.0037	<0.0035	<0.0039	<0.0038	<0.0035	<0.0041	<0.0038	<0.0035	<0.0034	<0.0037	<0.0038
Perfluoroheptane sulfonic acid (PFHpS)	NCL	<0.0039	<0.0038	<0.0034	<0.0038	<0.0034	<0.0037	<0.0035	<0.0039	<0.0038	<0.0035	<0.0041	<0.0038	<0.0035	0.0034	<0.0037	<0.0038
Perfluorononane sulfonic acid (PFNS)	NCL	<0.0039	<0.0038	<0.0034	<0.0038	<0.0034	<0.0037	<0.0035	<0.0039	<0.0038	<0.0035	<0.0041	<0.0038	<0.0035	<0.0034	<0.0037	<0.0038
Perfluorooctane sulfonamide (FOSA)	NCL	<0.0039	<0.0038	<0.0034	<0.0038	<0.0034	<0.0037	<0.0035	<0.0039	<0.0038	<0.0035	<0.0041	<0.0038	<0.0035	<0.0034	<0.0037	<0.0038
Perfluoropentane sulfonic acid (PFPeS)	NCL	<0.0039	<0.0038	<0.0034	<0.0038	<0.0034	<0.0037	<0.0035	<0.0039	<0.0038	<0.0035	<0.0041	<0.0038	<0.0035	<0.0034	<0.0037	<0.0038
Perfluorohexane sulfonic acid (PFHxS)	0.051 (A)	<0.0039	<0.0038	<0.0034	<0.0038	0.0042	0.0064	0.0076	0.0074	0.0055	0.0071	0.0057	0.005	0.0086	0.0092	0.011	0.0078
Perfluorobutanoic acid (PFBA)	NCL	<0.0039	<0.0038	<0.0034	<0.0038	0.0044	<0.0037	0.0039	0.0039	<0.0038	0.0044	<0.0041	<0.0038	<0.0035	0.0036	0.0046	<0.0038
Perfluorodecanoic acid (PFDA)	NCL	<0.0039	<0.0038	<0.0034	<0.0038	<0.0034	<0.0037	<0.0035	<0.0039	<0.0038	<0.0035	<0.0041	<0.0038	<0.0035	<0.0034	<0.0037	<0.0038
Perfluorododecanoic acid (PFDoDA)	NCL	<0.0039	<0.0038	<0.0034	<0.0038	<0.0034	<0.0037	<0.0035	<0.0039	<0.0038	<0.0035	<0.0041	<0.0038	<0.0035	<0.0034	<0.0037	<0.0038
Perfluoroheptanoic acid (PFHpA)	NCL	<0.0039	<0.0038	<0.0034	<0.0038	<0.0034	<0.0037	<0.0035	<0.0039	<0.0038	<0.0035	<0.0041	<0.0038	<0.0035	<0.0034	<0.0037	<0.0038
Perfluorohexanoic acid (PFHxA)	400 (A)	<0.0039	<0.0038	<0.0034	<0.0038	0.0042	0.0052	0.005	0.0056	0.0042	0.0047	0.007	0.0053	0.0042	0.0062	0.008	0.0063
Perfluorononanoic acid (PFNA)	0.006 (A)	<0.0039	<0.0038	<0.0034	<0.0038	<0.0034	<0.0037	<0.0035	<0.0039	<0.0038	<0.0035	<0.0041	<0.0038	<0.0035	<0.0034	<0.0037	<0.0038
Perfluorooctanoic acid (PFOA)	0.008 (A)	<0.0039	<0.0038	<0.0034	<0.0038	***0.015***	0.0051	***0.015***	***0.016***	0.0054	***0.012***	0.0059	0.0057	***0.012***	***0.013***	***0.015***	***0.011***
Perfluorooctane sulfonic acid (PFOS)	0.016 (A)	<0.0039	<0.0038	<0.0034	<0.0038	***0.027***	0.0068	***0.033***	***0.033***	0.0071	***0.023***	0.0068	0.0066	***0.018***	***0.021***	***0.027***	***0.018***
Perfluoropentanoic acid (PFPeA)	NCL	<0.0039	<0.0038	<0.0034	<0.0038	<0.0034	0.004	<0.0035	<0.0039	<0.0038	<0.0035	0.0056	0.0046	<0.0035	0.0035	0.0048	<0.0038
Perfluorotetradecanoic acid (PFTeDA)	NCL	<0.0039	<0.0038	<0.0034	<0.0038	<0.0034	<0.0037	<0.0035	<0.0039	<0.0038	<0.0035	<0.0041	<0.0038	<0.0035	<0.0034	<0.0037	<0.0038
Perfluorotridecanoic acid (PFTrDA)	NCL	<0.0039	<0.0038	<0.0034	<0.0038	<0.0034	<0.0037	<0.0035	<0.0039	<0.0038	<0.0035	<0.0041	<0.0038	<0.0035	<0.0034	<0.0037	<0.0038
Perfluoroundecanoic acid (PFUnDA)	NCL	<0.0039	<0.0038	<0.0034	<0.0038	<0.0034	<0.0037	<0.0035	<0.0039	<0.0038	<0.0035	<0.0041	<0.0038	<0.0035	<0.0034	<0.0037	<0.0038
Tetrafluoro-2-(heptafluoropropoxy)propanoic acid (GenX)	0.37 (A)	<0.0079	<0.0077	<0.0069	<0.0077	<0.0068	<0.0073	<0.0069	<0.0079	<0.0076	<0.007	<0.0081	<0.0077	<0.007	<0.0069	<0.0074	<0.0075

TABLE 4A
SUMMARY OF MONITORING WELL GROUNDWATER SAMPLE ANALYSIS - PFAS
Perimeter
Algoma & Plainfield Townships, Kent County, Michigan

Sample Event	Part 201 Generic Residential Groundwater Cleanup Criteria - Drinking Water[2]	Area 11 12/Perimeter - Q2 2023	Area 11 12/Perimeter - Q3 2023	Perimeter - Q4 2023	Perimeter - Q1 2024	Perimeter - Q2 2023	Perimeter - Q3 2023	Perimeter - Q4 2023	Perimeter - Q1 2024	Perimeter - Q2 2023	Perimeter - Q3 2023	Perimeter - Q4 2023	Perimeter - Q1 2024	Perimeter - Q2 2023	Perimeter - Q3 2023	Perimeter - Q4 2023	Perimeter - Q1 2024
Well		HS-PMW-RI-112B	HS-PMW-RI-112B	HS-PMW-RI-112B	HS-PMW-RI-112B	WV-MW-4	WV-MW-4	WV-MW-4	WV-MW-4	WV-MW-5S	WV-MW-5S	WV-MW-5S	WV-MW-5S	WV-MW-5D	WV-MW-5D	WV-MW-5D	WV-MW-5D
Sample Name		HS-PMW-RI-112B	HS-PMW-112B	HS-PMW-RI-112B	HS-PMW-RI-112B	WV-MW-4	WV-MW-4	WV-MW-4	WV-MW-4	WV-MW-5S	WV-MW-5S	WV-MW-5S	WV-MW-5S	WV-MW-5D	WV-MW-5D	WV-MW-5D	WV-MW-5D
Screen Interval (feet below ground surface)		69.8-74.8	69.8-74.8	69.8-74.8	69.8-74.8	130.2-135.2	130.2-135.2	130.2-135.2	130.2-135.2	61.5-66.5	61.5-66.5	61.5-66.5	61.5-66.5	68.7-73.7	68.7-73.7	68.7-73.7	68.7-73.7
Laboratory Sample ID		YD14015-003	YG12019-002	YL21056-010	ZB03013-025	YF22007-015	YH31008-005	YK04005-001	ZB21017-016	YF14023-019	YH31008-010	YK02016-036	ZB21017-012	YF14023-020	YH31008-011	YK02016-035	ZB21017-013
Sample Date		04/11/2023	07/11/2023	12/15/2023	02/02/2024	06/21/2023	08/29/2023	11/01/2023	02/14/2024	06/13/2023	08/28/2023	10/31/2023	02/14/2024	06/13/2023	08/28/2023	10/31/2023	02/14/2024
Parameter (µg/L)																	
9-chlorohexadecafluoro-3-oxanone-1-sulfonic acid (9Cl-PF3ONS)	NCL	<0.0079	<0.007	<0.0077	<0.0078	<0.0074	<0.0067	<0.0071	<0.0075	<0.0074	<0.0074	<0.0079	<0.0076	<0.0069	<0.0074	<0.007	<0.0077
11-chloroeicosafluoro-3-oxaundecane-1-sulfonic acid (11CL-PF3OUdS)	NCL	<0.0079	<0.007	<0.0077	<0.0078	<0.0074	<0.0067	<0.0071	<0.0075	<0.0074	<0.0074	<0.0079	<0.0076	<0.0069	<0.0074	<0.007	<0.0077
4,8-dioxa-3H-perfluorononanoic acid (ADONA)	NCL	<0.0079	<0.007	<0.0077	<0.0078	<0.0074	<0.0067	<0.0071	<0.0075	<0.0074	<0.0074	<0.0079	<0.0076	<0.0069	<0.0074	<0.007	<0.0077
1H,1H,2H,2H-perfluorohexane sulfonate (4:2FTS)	NCL	<0.0079	<0.007	<0.0077	<0.0078	<0.0074	<0.0067	<0.0071	<0.0075	<0.0074	<0.0074	<0.0079	<0.0076	<0.0069	<0.0074	<0.007	<0.0077
6:2 Fluorotelomer sulfonic acid (6:2 FTS)	NCL	<0.0079	<0.007	<0.0077	<0.0078	<0.0074	<0.0067	<0.0071	<0.0075	<0.0074	<0.0074	<0.0079	<0.0076	<0.0069	<0.0074	<0.007	<0.0077
8:2 Fluorotelomer sulfonic acid (8:2 FTS)	NCL	<0.0079	<0.007	<0.0077	<0.0078	<0.0074	<0.0067	<0.0071	<0.0075	<0.0074	<0.0074	<0.0079	<0.0076	<0.0069	<0.0074	<0.007	<0.0077
N-ethylperfluoro-1-octanesulfonamidoacetic acid (EtFOSAA)	NCL	<0.0079	<0.007	<0.0077	<0.0078	<0.0074	<0.0067	<0.0071	<0.0075	<0.0074	<0.0074	<0.0079	<0.0076	<0.0069	<0.0074	<0.007	<0.0077
N-methylperfluoro-1-octanesulfonamidoacetic acid (MeFOSAA)	NCL	<0.0079	<0.007	<0.0077	<0.0078	<0.0074	<0.0067	<0.0071	<0.0075	<0.0074	<0.0074	<0.0079	<0.0076	<0.0069	<0.0074	<0.007	<0.0077
Perfluorobutane sulfonic acid (PFBS)	0.42 (A)	<0.0039	<0.0035	<0.0039	<0.0039	<0.0037	<0.0034	<0.0035	<0.0037	0.009	0.0098	0.021	0.021	0.014	0.013	0.01	0.022
Perfluorodecane sulfonic acid (PFDS)	NCL	<0.0039	<0.0035	<0.0039	<0.0039	<0.0037	<0.0034	<0.0035	<0.0037	<0.0037	<0.0037	<0.004	<0.0038	<0.0034	<0.0037	<0.0035	<0.0039
Perfluoroheptane sulfonic acid (PFHpS)	NCL	<0.0039	<0.0035	<0.0039	<0.0039	<0.0037	<0.0034	<0.0035	<0.0037	<0.0037	<0.0037	<0.004	<0.0038	<0.0034	<0.0037	<0.0035	<0.0039
Perfluorononane sulfonic acid (PFNS)	NCL	<0.0039	<0.0035	<0.0039	<0.0039	<0.0037	<0.0034	<0.0035	<0.0037	<0.0037	<0.0037	<0.004	<0.0038	<0.0034	<0.0037	<0.0035	<0.0039
Perfluorooctane sulfonamide (FOSA)	NCL	<0.0039	<0.0035	<0.0039	<0.0039	<0.0037	<0.0034	<0.0035	<0.0037	<0.0037	<0.0037	<0.004	<0.0038	<0.0034	<0.0037	<0.0035	<0.0039
Perfluoropentane sulfonic acid (PFPeS)	NCL	<0.0039	<0.0035	<0.0039	<0.0039	<0.0037	<0.0034	<0.0035	<0.0037	<0.0037	<0.0037	<0.004	<0.0038	<0.0034	<0.0037	<0.0035	<0.0039
Perfluorohexane sulfonic acid (PFHxS)	0.051 (A)	<0.0039	<0.0035	<0.0039	<0.0039	<0.0037	<0.0034	<0.0035	<0.0037	0.0039	<0.0037	0.004	<0.0038	0.0038	<0.0037	<0.0035	<0.0039
Perfluorobutanoic acid (PFBA)	NCL	<0.0039	<0.0035	<0.0039	<0.0039	<0.0037	<0.0034	<0.0035	<0.0037	<0.0037	<0.0037	<0.004	<0.0038	0.0038	<0.0037	<0.0035	<0.0039
Perfluorodecanoic acid (PFDA)	NCL	<0.0039	<0.0035	<0.0039	<0.0039	<0.0037	<0.0034	<0.0035	<0.0037	<0.0037	<0.0037	<0.004	<0.0038	<0.0034	<0.0037	<0.0035	<0.0039
Perfluorododecanoic acid (PFDoDA)	NCL	<0.0039	<0.0035	<0.0039	<0.0039	<0.0037	<0.0034	<0.0035	<0.0037	<0.0037	<0.0037	<0.004	<0.0038	<0.0034	<0.0037	<0.0035	<0.0039
Perfluoroheptanoic acid (PFHpA)	NCL	<0.0039	<0.0035	<0.0039	<0.0039	<0.0037	<0.0034	<0.0035	<0.0037	<0.0037	<0.0037	<0.004	<0.0038	<0.0034	<0.0037	<0.0035	<0.0039
Perfluorohexanoic acid (PFHxA)	400 (A)	<0.0039	<0.0035	<0.0039	<0.0039	<0.0037	<0.0034	<0.0035	<0.0037	<0.0037	<0.0037	0.0051	0.0047	0.0034	<0.0037	0.0043	<0.0039
Perfluorononanoic acid (PFNA)	0.006 (A)	<0.0039	<0.0035	<0.0039	<0.0039	<0.0037	<0.0034	<0.0035	<0.0037	<0.0037	<0.0037	<0.004	<0.0038	<0.0034	<0.0037	<0.0035	<0.0039
Perfluorooctanoic acid (PFOA)	0.008 (A)	<0.0039	<0.0035	<0.0039	<0.0039	<0.0037	<0.0034	<0.0035	<0.0037	0.0059	0.0063	***0.0085***	***0.0084***	0.0066	0.0057	0.0065	0.0074
Perfluorooctane sulfonic acid (PFOS)	0.016 (A)	<0.0039	<0.0035	<0.0039	<0.0039	<0.0037	<0.0034	<0.0035	<0.0037	<0.0037	<0.0037	<0.004	<0.0038	<0.0034	<0.0037	<0.0035	<0.0039
Perfluoropentanoic acid (PFPeA)	NCL	<0.0039	<0.0035	<0.0039	<0.0039	<0.0037	<0.0034	<0.0035	<0.0037	<0.0037	<0.0037	<0.004	<0.0038	<0.0034	<0.0037	<0.0035	<0.0039
Perfluorotetradecanoic acid (PFTeDA)	NCL	<0.0039	<0.0035	<0.0039	<0.0039	<0.0037	<0.0034	<0.0035	<0.0037	<0.0037	<0.0037	<0.004	<0.0038	<0.0034	<0.0037	<0.0035	<0.0039
Perfluorotridecanoic acid (PFTrDA)	NCL	<0.0039	<0.0035	<0.0039	<0.0039	<0.0037	<0.0034	<0.0035	<0.0037	<0.0037	<0.0037	<0.004	<0.0038	<0.0034	<0.0037	<0.0035	<0.0039
Perfluoroundecanoic acid (PFUnDA)	NCL	<0.0039	<0.0035	<0.0039	<0.0039	<0.0037	<0.0034	<0.0035	<0.0037	<0.0037	<0.0037	<0.004	<0.0038	<0.0034	<0.0037	<0.0035	<0.0039
Tetrafluoro-2-(heptafluoropropoxy)propanoic acid (GenX)	0.37 (A)	<0.0079	<0.007	<0.0077	<0.0078	<0.0074	<0.0067	<0.0071	<0.0075	<0.0074	<0.0074	<0.0079	<0.0076	<0.0069	<0.0074	<0.007	<0.0077

TABLE 4A
SUMMARY OF MONITORING WELL GROUNDWATER SAMPLE ANALYSIS - PFAS
Perimeter
Algoma & Plainfield Townships, Kent County, Michigan

Sample Event	Part 201 Generic Residential Groundwater Cleanup Criteria - Drinking Water[2]	Perimeter - Q2 2023	Perimeter - Q3 2023	Perimeter - Q3 2023	Perimeter - Q4 2023	Perimeter - Q1 2024	Perimeter - Q2 2023	Perimeter - Q3 2023	Perimeter - Q4 2023	Perimeter - Q1 2024	Perimeter - Q1 2024	Perimeter - Q2 2023	Perimeter - Q2 2023	Perimeter - Q3 2023	Perimeter - Q4 2023	Perimeter - Q1 2024	Perimeter - Q2 2023
Well		WV-MW-11S	WV-MW-11S	WV-MW-11S	WV-MW-11S	WV-MW-11S	WV-MW-11D	WV-MW-11D	WV-MW-11D	WV-MW-11D	WV-MW-11D	WV-MW-15A	WV-MW-15A	WV-MW-15A	WV-MW-15A	WV-MW-15A	WV-MW-15B
Sample Name		WV-MW-11S	WV-MW-11S	WV-MW-11S-DUP	WV-MW-11S	WV-MW-11S	WV-MW-11D	WV-MW-11D	WV-MW-11D	WV-MW-11D	WV-MW-11D-DUP	WV-MW-15A	WV-MW-15A DUP	WV-MW-15A	WV-MW-15A	WV-MW-15A	WV-MW-15B
Screen Interval (feet below ground surface)		29.4-34.4	29.4-34.4	29.4-34.4	29.4-34.4	29.4-34.4	158.9-163.9	158.9-163.9	158.9-163.9	158.9-163.9	158.9-163.9	9-14	9-14	9-14	9-14	9-14	33.1-38.1
Laboratory Sample ID		YF14023-012	YH24014-009	YH24014-018	YK02016-005	ZA27002-032	YF14023-015	YH24014-010	YK02016-006	ZA27002-031	ZA27002-033	YF14023-017	YF14023-018	YI01015-004	YK02016-003	ZA27002-016	YF14023-013
Sample Date		06/13/2023	08/22/2023	08/22/2023	10/23/2023	01/26/2024	06/13/2023	08/22/2023	10/24/2023	01/26/2024	01/26/2024	06/13/2023	06/13/2023	08/31/2023	10/23/2023	01/18/2024	06/13/2023
Parameter (µg/L)																	
9-chlorohexadecafluoro-3-oxanone-1-sulfonic acid (9Cl-PF3ONS)	NCL	<0.0071	<0.0075	<0.0075	<0.0079	<0.0077	<0.0069	<0.0067	<0.0072	<0.0075	<0.0073	<0.0077	<0.0081	<0.0077	<0.0072	<0.0075	<0.0078
11-chloroeicosafluoro-3-oxaundecane-1-sulfonic acid (11CL-PF3OUdS)	NCL	<0.0071	<0.0075	<0.0075	<0.0079	<0.0077	<0.0069	<0.0067	<0.0072	<0.0075	<0.0073	<0.0077	<0.0081	<0.0077	<0.0072	<0.0075	<0.0078
4,8-dioxa-3H-perfluorononanoic acid (ADONA)	NCL	<0.0071	<0.0075	<0.0075	<0.0079	<0.0077	<0.0069	<0.0067	<0.0072	<0.0075	<0.0073	<0.0077	<0.0081	<0.0077	<0.0072	<0.0075	<0.0078
1H,1H,2H,2H-perfluorohexane sulfonate (4:2FTS)	NCL	<0.0071	<0.0075	<0.0075	<0.0079	<0.0077	<0.0069	<0.0067	<0.0072	<0.0075	<0.0073	<0.0077	<0.0081	<0.0077	<0.0072	<0.0075	<0.0078
6:2 Fluorotelomer sulfonic acid (6:2 FTS)	NCL	<0.0071	<0.0075	<0.0075	<0.0079	<0.0077	<0.0069	<0.0067	<0.0072	<0.0075	<0.0073	<0.0077	<0.0081	<0.0077	<0.0072	<0.0075	<0.0078
8:2 Fluorotelomer sulfonic acid (8:2 FTS)	NCL	<0.0071	<0.0075	<0.0075	<0.0079	<0.0077	<0.0069	<0.0067	<0.0072	<0.0075	<0.0073	<0.0077	<0.0081	<0.0077	<0.0072	<0.0075	<0.0078
N-ethylperfluoro-1-octanesulfonamidoacetic acid (EtFOSAA)	NCL	<0.0071	<0.0075	<0.0075	<0.0079	<0.0077	<0.0069	<0.0067	<0.0072	<0.0075	<0.0073	<0.0077	<0.0081	<0.0077	<0.0072	<0.0075	<0.0078
N-methylperfluoro-1-octanesulfonamidoacetic acid (MeFOSAA)	NCL	<0.0071	<0.0075	<0.0075	<0.0079	<0.0077	<0.0069	<0.0067	<0.0072	<0.0075	<0.0073	<0.0077	<0.0081	<0.0077	<0.0072	<0.0075	<0.0078
Perfluorobutane sulfonic acid (PFBS)	0.42 (A)	0.0057	0.0046	0.0046	0.0053	0.0039	<0.0035	<0.0033	<0.0036	<0.0037	<0.0037	<0.0038	<0.004	<0.0039	<0.0036	<0.0037	<0.0039
Perfluorodecane sulfonic acid (PFDS)	NCL	<0.0035	<0.0037	<0.0037	<0.004	<0.0038	<0.0035	<0.0033	<0.0036	<0.0037	<0.0037	<0.0038	<0.004	<0.0039	<0.0036	<0.0037	<0.0039
Perfluoroheptane sulfonic acid (PFHpS)	NCL	<0.0035	<0.0037	<0.0037	<0.004	<0.0038	<0.0035	<0.0033	<0.0036	<0.0037	<0.0037	<0.0038	<0.004	<0.0039	<0.0036	<0.0037	<0.0039
Perfluorononane sulfonic acid (PFNS)	NCL	<0.0035	<0.0037	<0.0037	<0.004	<0.0038	<0.0035	<0.0033	<0.0036	<0.0037	<0.0037	<0.0038	<0.004	<0.0039	<0.0036	<0.0037	<0.0039
Perfluorooctane sulfonamide (FOSA)	NCL	<0.0035	<0.0037	<0.0037	<0.004	<0.0038	<0.0035	<0.0033	<0.0036	<0.0037	<0.0037	<0.0038	<0.004	<0.0039	<0.0036	<0.0037	<0.0039
Perfluoropentane sulfonic acid (PFPeS)	NCL	<0.0035	<0.0037	<0.0037	<0.004	<0.0038	<0.0035	<0.0033	<0.0036	<0.0037	<0.0037	<0.0038	<0.004	<0.0039	<0.0036	<0.0037	<0.0039
Perfluorohexane sulfonic acid (PFHxS)	0.051 (A)	<0.0035	<0.0037	<0.0037	<0.004	<0.0038	<0.0035	<0.0033	<0.0036	<0.0037	<0.0037	<0.0038	<0.004	<0.0039	<0.0036	<0.0037	<0.0039
Perfluorobutanoic acid (PFBA)	NCL	<0.0035	<0.0037	<0.0037	<0.004	<0.0038	<0.0035	<0.0033	<0.0036	<0.0037	<0.0037	<0.0038	<0.004	<0.0039	<0.0036	<0.0037	<0.0039
Perfluorodecanoic acid (PFDA)	NCL	<0.0035	<0.0037	<0.0037	<0.004	<0.0038	<0.0035	<0.0033	<0.0036	<0.0037	<0.0037	<0.0038	<0.004	<0.0039	<0.0036	<0.0037	<0.0039
Perfluorododecanoic acid (PFDoDA)	NCL	<0.0035	<0.0037	<0.0037	<0.004	<0.0038	<0.0035	<0.0033	<0.0036	<0.0037	<0.0037	<0.0038	<0.004	<0.0039	<0.0036	<0.0037	<0.0039
Perfluoroheptanoic acid (PFHpA)	NCL	<0.0035	<0.0037	<0.0037	<0.004	<0.0038	<0.0035	<0.0033	<0.0036	<0.0037	<0.0037	<0.0038	<0.004	<0.0039	<0.0036	<0.0037	<0.0039
Perfluorohexanoic acid (PFHxA)	400 (A)	<0.0035	<0.0037	<0.0037	<0.004	<0.0038	<0.0035	<0.0033	<0.0036	<0.0037	<0.0037	<0.0038	<0.004	<0.0039	<0.0036	<0.0037	<0.0039
Perfluorononanoic acid (PFNA)	0.006 (A)	<0.0035	<0.0037	<0.0037	<0.004	<0.0038	<0.0035	<0.0033	<0.0036	<0.0037	<0.0037	<0.0038	<0.004	<0.0039	<0.0036	<0.0037	<0.0039
Perfluorooctanoic acid (PFOA)	0.008 (A)	<0.0035	<0.0037	<0.0037	<0.004	<0.0038	<0.0035	<0.0033	<0.0036	<0.0037	<0.0037	<0.0038	<0.004	<0.0039	<0.0036	<0.0037	<0.0039
Perfluorooctane sulfonic acid (PFOS)	0.016 (A)	<0.0035	<0.0037	<0.0037	<0.004	<0.0038	<0.0035	<0.0033	<0.0036	<0.0037	<0.0037	<0.0038	<0.004	<0.0039	<0.0036	<0.0037	<0.0039
Perfluoropentanoic acid (PFPeA)	NCL	<0.0035	<0.0037	<0.0037	<0.004	<0.0038	<0.0035	<0.0033	<0.0036	<0.0037	<0.0037	<0.0038	<0.004	<0.0039	<0.0036	<0.0037	<0.0039
Perfluorotetradecanoic acid (PFTeDA)	NCL	<0.0035	<0.0037	<0.0037	<0.004	<0.0038	<0.0035	<0.0033	<0.0036	<0.0037	<0.0037	<0.0038	<0.004	<0.0039	<0.0036	<0.0037	<0.0039
Perfluorotridecanoic acid (PFTrDA)	NCL	<0.0035	<0.0037	<0.0037	<0.004	<0.0038	<0.0035	<0.0033	<0.0036	<0.0037	<0.0037	<0.0038	<0.004	<0.0039	<0.0036	<0.0037	<0.0039
Perfluoroundecanoic acid (PFUnDA)	NCL	<0.0035	<0.0037	<0.0037	<0.004	<0.0038	<0.0035	<0.0033	<0.0036	<0.0037	<0.0037	<0.0038	<0.004	<0.0039	<0.0036	<0.0037	<0.0039
Tetrafluoro-2-(heptafluoropropoxy)propanoic acid (GenX)	0.37 (A)	<0.0071	<0.0075	<0.0075	<0.0079	<0.0077	<0.0069	<0.0067	<0.0072	<0.0075	<0.0073	<0.0077	<0.0081	<0.0077	<0.0072	<0.0075	<0.0078

TABLE 4A
SUMMARY OF MONITORING WELL GROUNDWATER SAMPLE ANALYSIS - PFAS
Perimeter
Algoma & Plainfield Townships, Kent County, Michigan

Sample Event	Part 201 Generic Residential Groundwater Cleanup Criteria - Drinking Water[2]	Perimeter - Q3 2023	Perimeter - Q4 2023	Perimeter - Q1 2024	Perimeter - Q2 2023	Perimeter - Q3 2023	Perimeter - Q4 2023	Perimeter - Q1 2024	Perimeter - Q2 2023	Perimeter - Q3 2023	Perimeter - Q4 2023	Perimeter - Q1 2024	Perimeter - Q2 2023	Area 19/Perimeter - Q3 2023	Perimeter - Q4 2023	Perimeter - Q1 2024	Perimeter - Q2 2023
Well		WV-MW-15B	WV-MW-15B	WV-MW-15B	WV-MW-15C	WV-MW-15C	WV-MW-15C	WV-MW-15C	WV-MW-15D	WV-MW-15D	WV-MW-15D	WV-MW-15D	AREA19-MW-8A	AREA19-MW-8A	AREA19-MW-8A	AREA19-MW-8A	AREA19-MW-8B
Sample Name		WV-MW-15B	WV-MW-15B	WV-MW-15B	WV-MW-15C	WV-MW-15C	WV-MW-15C	WV-MW-15C	WV-MW-15D	WV-MW-15D	WV-MW-15D	WV-MW-15D	AREA19-MW-8A	Area19-MW-8A	AREA19-MW-8A	Area19-MW-8A	AREA19-MW-8B
Screen Interval (feet below ground surface)		33.1-38.1	33.1-38.1	33.1-38.1	43.7-48.5	43.7-48.5	43.7-48.5	43.7-48.5	135.1-137.8	135.1-137.8	135.1-137.8	135.1-137.8	27.4-32.4	27.4-32.4	27.4-32.4	27.4-32.4	178.7-183.7
Laboratory Sample ID		YI01015-003	YK02016-004	ZA27002-006	YF14023-016	YI01015-001	YK02016-002	ZA27002-013	YF14023-014	YI01015-002	YK02016-001	ZA27002-012	YF22007-013	YI09004-012	YL14005-003	ZB03013-008	YF22007-012
Sample Date		08/31/2023	10/23/2023	01/18/2024	06/13/2023	08/31/2023	10/23/2023	01/18/2024	06/13/2023	08/31/2023	10/23/2023	01/18/2024	06/19/2023	09/08/2023	12/11/2023	01/30/2024	06/19/2023
Parameter (µg/L)																	
9-chlorohexadecafluoro-3-oxanone-1-sulfonic acid (9Cl-PF3ONS)	NCL	<0.0073	<0.0076	<0.0076	<0.0074	<0.0072	<0.0074	<0.007	<0.0075	<0.0069	<0.0071	<0.0073	<0.0071	<0.0069	<0.0071	<0.0077	<0.0075
11-chloroeicosafluoro-3-oxaundecane-1-sulfonic acid (11CL-PF3OUdS)	NCL	<0.0073	<0.0076	<0.0076	<0.0074	<0.0072	<0.0074	<0.007	<0.0075	<0.0069	<0.0071	<0.0073	<0.0071	<0.0069	<0.0071	<0.0077	<0.0075
4,8-dioxa-3H-perfluorononanoic acid (ADONA)	NCL	<0.0073	<0.0076	<0.0076	<0.0074	<0.0072	<0.0074	<0.007	<0.0075	<0.0069	<0.0071	<0.0073	<0.0071	<0.0069	<0.0071	<0.0077	<0.0075
1H,1H,2H,2H-perfluorohexane sulfonate (4:2FTS)	NCL	<0.0073	<0.0076	<0.0076	<0.0074	<0.0072	<0.0074	<0.007	<0.0075	<0.0069	<0.0071	<0.0073	<0.0071	<0.0069	<0.0071	<0.0077	<0.0075
6:2 Fluorotelomer sulfonic acid (6:2 FTS)	NCL	<0.0073	<0.0076	<0.0076	<0.0074	<0.0072	<0.0074	<0.007	<0.0075	<0.0069	<0.0071	<0.0073	<0.0071	<0.0069	<0.0071	<0.0077	<0.0075
8:2 Fluorotelomer sulfonic acid (8:2 FTS)	NCL	<0.0073	<0.0076	<0.0076	<0.0074	<0.0072	<0.0074	<0.007	<0.0075	<0.0069	<0.0071	<0.0073	<0.0071	<0.0069	<0.0071	<0.0077	<0.0075
N-ethylperfluoro-1-octanesulfonamidoacetic acid (EtFOSAA)	NCL	<0.0073	<0.0076	<0.0076	<0.0074	<0.0072	<0.0074	<0.007	<0.0075	<0.0069	<0.0071	<0.0073	<0.0071	<0.0069	<0.0071	<0.0077	<0.0075
N-methylperfluoro-1-octanesulfonamidoacetic acid (MeFOSAA)	NCL	<0.0073	<0.0076	<0.0076	<0.0074	<0.0072	<0.0074	<0.007	<0.0075	<0.0069	<0.0071	<0.0073	<0.0071	<0.0069	<0.0071	<0.0077	<0.0075
Perfluorobutane sulfonic acid (PFBS)	0.42 (A)	<0.0037	<0.0038	<0.0038	<0.0037	<0.0036	<0.0037	<0.0035	<0.0037	<0.0034	<0.0036	<0.0036	<0.0036	<0.0035	<0.0036	<0.0039	<0.0038
Perfluorodecane sulfonic acid (PFDS)	NCL	<0.0037	<0.0038	<0.0038	<0.0037	<0.0036	<0.0037	<0.0035	<0.0037	<0.0034	<0.0036	<0.0036	<0.0036	<0.0035	<0.0036	<0.0039	<0.0038
Perfluoroheptane sulfonic acid (PFHpS)	NCL	<0.0037	<0.0038	<0.0038	<0.0037	<0.0036	<0.0037	<0.0035	<0.0037	<0.0034	<0.0036	<0.0036	<0.0036	<0.0035	<0.0036	<0.0039	<0.0038
Perfluorononane sulfonic acid (PFNS)	NCL	<0.0037	<0.0038	<0.0038	<0.0037	<0.0036	<0.0037	<0.0035	<0.0037	<0.0034	<0.0036	<0.0036	<0.0036	<0.0035	<0.0036	<0.0039	<0.0038
Perfluorooctane sulfonamide (FOSA)	NCL	<0.0037	<0.0038	<0.0038	<0.0037	<0.0036	<0.0037	<0.0035	<0.0037	<0.0034	<0.0036	<0.0036	<0.0036	<0.0035	<0.0036	<0.0039	<0.0038
Perfluoropentane sulfonic acid (PFPeS)	NCL	<0.0037	<0.0038	<0.0038	<0.0037	<0.0036	<0.0037	<0.0035	<0.0037	<0.0034	<0.0036	<0.0036	<0.0036	<0.0035	<0.0036	<0.0039	<0.0038
Perfluorohexane sulfonic acid (PFHxS)	0.051 (A)	<0.0037	<0.0038	<0.0038	<0.0037	<0.0036	<0.0037	<0.0035	<0.0037	<0.0034	<0.0036	<0.0036	<0.0036	<0.0035	0.004	<0.0039	<0.0038
Perfluorobutanoic acid (PFBA)	NCL	<0.0037	<0.0038	<0.0038	<0.0037	<0.0036	<0.0037	<0.0035	<0.0037	<0.0034	<0.0036	<0.0036	<0.0036	<0.0035	<0.0036	<0.0039	<0.0038
Perfluorodecanoic acid (PFDA)	NCL	<0.0037	<0.0038	<0.0038	<0.0037	<0.0036	<0.0037	<0.0035	<0.0037	<0.0034	<0.0036	<0.0036	<0.0036	<0.0035	<0.0036	<0.0039	<0.0038
Perfluorododecanoic acid (PFDoDA)	NCL	<0.0037	<0.0038	<0.0038	<0.0037	<0.0036	<0.0037	<0.0035	<0.0037	<0.0034	<0.0036	<0.0036	<0.0036	<0.0035	<0.0036	<0.0039	<0.0038
Perfluoroheptanoic acid (PFHpA)	NCL	<0.0037	<0.0038	<0.0038	<0.0037	<0.0036	<0.0037	<0.0035	<0.0037	<0.0034	<0.0036	<0.0036	<0.0036	<0.0035	<0.0036	<0.0039	<0.0038
Perfluorohexanoic acid (PFHxA)	400 (A)	<0.0037	<0.0038	<0.0038	<0.0037	<0.0036	<0.0037	<0.0035	<0.0037	<0.0034	<0.0036	<0.0036	<0.0036	<0.0035	<0.0036	<0.0039	<0.0038
Perfluorononanoic acid (PFNA)	0.006 (A)	<0.0037	<0.0038	<0.0038	<0.0037	<0.0036	<0.0037	<0.0035	<0.0037	<0.0034	<0.0036	<0.0036	<0.0036	<0.0035	<0.0036	<0.0039	<0.0038
Perfluorooctanoic acid (PFOA)	0.008 (A)	<0.0037	<0.0038	<0.0038	<0.0037	<0.0036	<0.0037	<0.0035	<0.0037	<0.0034	<0.0036	<0.0036	0.008	0.0066	0.006	0.0053	<0.0038
Perfluorooctane sulfonic acid (PFOS)	0.016 (A)	<0.0037	<0.0038	<0.0038	<0.0037	<0.0036	<0.0037	<0.0035	<0.0037	<0.0034	<0.0036	<0.0036	0.0084	0.0043	0.0066	0.0073	<0.0038
Perfluoropentanoic acid (PFPeA)	NCL	<0.0037	<0.0038	<0.0038	<0.0037	<0.0036	<0.0037	<0.0035	<0.0037	<0.0034	<0.0036	<0.0036	<0.0036	<0.0035	<0.0036	<0.0039	<0.0038
Perfluorotetradecanoic acid (PFTeDA)	NCL	<0.0037	<0.0038	<0.0038	<0.0037	<0.0036	<0.0037	<0.0035	<0.0037	<0.0034	<0.0036	<0.0036	<0.0036	<0.0035	<0.0036	<0.0039	<0.0038
Perfluorotridecanoic acid (PFTrDA)	NCL	<0.0037	<0.0038	<0.0038	<0.0037	<0.0036	<0.0037	<0.0035	<0.0037	<0.0034	<0.0036	<0.0036	<0.0036	<0.0035	<0.0036	<0.0039	<0.0038
Perfluoroundecanoic acid (PFUnDA)	NCL	<0.0037	<0.0038	<0.0038	<0.0037	<0.0036	<0.0037	<0.0035	<0.0037	<0.0034	<0.0036	<0.0036	<0.0036	<0.0035	<0.0036	<0.0039	<0.0038
Tetrafluoro-2-(heptafluoropropoxy)propanoic acid (GenX)	0.37 (A)	<0.0073	<0.0076	<0.0076	<0.0074	<0.0072	<0.0074	<0.007	<0.0075	<0.0069	<0.0071	<0.0073	<0.0071	<0.0069	<0.0071	<0.0077	<0.0075

TABLE 4A
SUMMARY OF MONITORING WELL GROUNDWATER SAMPLE ANALYSIS - PFAS
Perimeter
Algoma & Plainfield Townships, Kent County, Michigan

Sample Event	Part 201 Generic Residential Groundwater Cleanup Criteria - Drinking Water[2]	Area 19/Perimeter - Q3 2023	Perimeter - Q4 2023	Perimeter - Q1 2024	Perimeter - Q2 2023	Area 19/Perimeter - Q3 2023	Perimeter - Q4 2023	Perimeter - Q1 2024	Perimeter - Q2 2023	Area 19/Perimeter - Q3 2023	Perimeter - Q4 2023	Perimeter - Q1 2024	Perimeter - Q2 2023	Area 19/Perimeter - Q3 2023	Perimeter - Q4 2023	Perimeter - Q1 2024	Perimeter - Q2 2023
Well		AREA19-MW-8B	AREA19-MW-8B	AREA19-MW-8B	AREA19-MW-8C	AREA19-MW-8C	AREA19-MW-8C	AREA19-MW-8C	AREA19-MW-9A	AREA19-MW-9A	AREA19-MW-9A	AREA19-MW-9A	AREA19-MW-9B	AREA19-MW-9B	AREA19-MW-9B	AREA19-MW-9B	AREA19-MW-9C
Sample Name		Area19-MW-8B	AREA19-MW-8B	Area19-MW-8B	Area19-MW-8C	Area19-MW-8C	AREA19-MW-8C	Area19-MW-8C	Area19-MW-9A	Area19-MW-9A	AREA19-MW-9A	AREA19-MW-9A	Area19-MW-9B	Area19-MW-9B	AREA19-MW-9B	AREA19-MW-9B	Area19-MW-9C
Screen Interval (feet below ground surface)		178.7-183.7	178.7-183.7	178.7-183.7	244.6-249.6	244.6-249.6	244.6-249.6	244.6-249.6	19.2-24.2	19.2-24.2	19.2-24.2	19.2-24.2	93.2-98.2	93.2-98.2	93.2-98.2	93.2-98.2	157.5-162.5
Laboratory Sample ID		YI09004-014	YL14005-002	ZB03013-010	YF22007-001	YI09004-013	YL14005-001	ZB03013-009	YF16032-001	YI09004-009	YL14005-006	ZA27002-019	YF16032-010	YI09004-010	YL14005-005	ZA27002-018	YF16032-011
Sample Date		09/08/2023	12/11/2023	01/30/2024	06/20/2023	09/08/2023	12/11/2023	01/30/2024	06/14/2023	09/07/2023	12/12/2023	01/23/2024	06/15/2023	09/07/2023	12/12/2023	01/23/2024	06/15/2023
Parameter (µg/L)																	
9-chlorohexadecafluoro-3-oxanone-1-sulfonic acid (9Cl-PF3ONS)	NCL	<0.007	<0.0073	<0.0074	<0.0073	<0.0077	<0.0072	<0.0079	<0.0077	<0.0075	<0.0069	<0.0075	<0.0075	<0.0079	<0.007	<0.0076	<0.0073
11-chloroeicosafluoro-3-oxaundecane-1-sulfonic acid (11CL-PF3OUdS)	NCL	<0.007	<0.0073	<0.0074	<0.0073	<0.0077	<0.0072	<0.0079	<0.0077	<0.0075	<0.0069	<0.0075	<0.0075	<0.0079	<0.007	<0.0076	<0.0073
4,8-dioxa-3H-perfluorononanoic acid (ADONA)	NCL	<0.007	<0.0073	<0.0074	<0.0073	<0.0077	<0.0072	<0.0079	<0.0077	<0.0075	<0.0069	<0.0075	<0.0075	<0.0079	<0.007	<0.0076	<0.0073
1H,1H,2H,2H-perfluorohexane sulfonate (4:2FTS)	NCL	<0.007	<0.0073	<0.0074	<0.0073	<0.0077	<0.0072	<0.0079	<0.0077	<0.0075	<0.0069	<0.0075	<0.0075	<0.0079	<0.007	<0.0076	<0.0073
6:2 Fluorotelomer sulfonic acid (6:2 FTS)	NCL	<0.007	<0.0073	<0.0074	<0.0073	<0.0077	<0.0072	<0.0079	<0.0077	<0.0075	<0.0069	<0.0075	<0.0075	<0.0079	<0.007	<0.0076	<0.0073
8:2 Fluorotelomer sulfonic acid (8:2 FTS)	NCL	<0.007	<0.0073	<0.0074	<0.0073	<0.0077	<0.0072	<0.0079	<0.0077	<0.0075	<0.0069	<0.0075	<0.0075	<0.0079	<0.007	<0.0076	<0.0073
N-ethylperfluoro-1-octanesulfonamidoacetic acid (EtFOSAA)	NCL	<0.007	<0.0073	<0.0074	<0.0073	<0.0077	<0.0072	<0.0079	<0.0077	<0.0075	<0.0069	<0.0075	<0.0075	<0.0079	<0.007	<0.0076	<0.0073
N-methylperfluoro-1-octanesulfonamidoacetic acid (MeFOSAA)	NCL	<0.007	<0.0073	<0.0074	<0.0073	<0.0077	<0.0072	<0.0079	<0.0077	<0.0075	<0.0069	<0.0075	<0.0075	<0.0079	<0.007	<0.0076	<0.0073
Perfluorobutane sulfonic acid (PFBS)	0.42 (A)	<0.0035	<0.0037	<0.0037	<0.0036	<0.0039	<0.0036	<0.0039	0.0043	0.0049	0.0043	0.0038	<0.0037	<0.0039	<0.0035	<0.0038	<0.0037
Perfluorodecane sulfonic acid (PFDS)	NCL	<0.0035	<0.0037	<0.0037	<0.0036	<0.0039	<0.0036	<0.0039	<0.0038	<0.0038	<0.0034	<0.0038	<0.0037	<0.0039	<0.0035	<0.0038	<0.0037
Perfluoroheptane sulfonic acid (PFHpS)	NCL	<0.0035	<0.0037	<0.0037	<0.0036	<0.0039	<0.0036	<0.0039	<0.0038	<0.0038	<0.0034	<0.0038	<0.0037	<0.0039	<0.0035	<0.0038	<0.0037
Perfluorononane sulfonic acid (PFNS)	NCL	<0.0035	<0.0037	<0.0037	<0.0036	<0.0039	<0.0036	<0.0039	<0.0038	<0.0038	<0.0034	<0.0038	<0.0037	<0.0039	<0.0035	<0.0038	<0.0037
Perfluorooctane sulfonamide (FOSA)	NCL	<0.0035	<0.0037	<0.0037	<0.0036	<0.0039	<0.0036	<0.0039	<0.0038	<0.0038	<0.0034	<0.0038	<0.0037	<0.0039	<0.0035	<0.0038	<0.0037
Perfluoropentane sulfonic acid (PFPeS)	NCL	<0.0035	<0.0037	<0.0037	<0.0036	<0.0039	<0.0036	<0.0039	<0.0038	<0.0038	<0.0034	<0.0038	<0.0037	<0.0039	<0.0035	<0.0038	<0.0037
Perfluorohexane sulfonic acid (PFHxS)	0.051 (A)	<0.0035	<0.0037	<0.0037	<0.0036	<0.0039	<0.0036	<0.0039	<0.0038	<0.0038	<0.0034	<0.0038	<0.0037	<0.0039	<0.0035	<0.0038	<0.0037
Perfluorobutanoic acid (PFBA)	NCL	<0.0035	<0.0037	<0.0037	<0.0036	<0.0039	<0.0036	<0.0039	<0.0038	<0.0038	<0.0034	<0.0038	<0.0037	<0.0039	<0.0035	<0.0038	<0.0037
Perfluorodecanoic acid (PFDA)	NCL	<0.0035	<0.0037	<0.0037	<0.0036	<0.0039	<0.0036	<0.0039	<0.0038	<0.0038	<0.0034	<0.0038	<0.0037	<0.0039	<0.0035	<0.0038	<0.0037
Perfluorododecanoic acid (PFDoDA)	NCL	<0.0035	<0.0037	<0.0037	<0.0036	<0.0039	<0.0036	<0.0039	<0.0038	<0.0038	<0.0034	<0.0038	<0.0037	<0.0039	<0.0035	<0.0038	<0.0037
Perfluoroheptanoic acid (PFHpA)	NCL	<0.0035	<0.0037	<0.0037	<0.0036	<0.0039	<0.0036	<0.0039	<0.0038	<0.0038	<0.0034	<0.0038	<0.0037	<0.0039	<0.0035	<0.0038	<0.0037
Perfluorohexanoic acid (PFHxA)	400 (A)	<0.0035	<0.0037	<0.0037	<0.0036	<0.0039	<0.0036	<0.0039	<0.0038	<0.0038	<0.0034	<0.0038	<0.0037	<0.0039	<0.0035	<0.0038	<0.0037
Perfluorononanoic acid (PFNA)	0.006 (A)	<0.0035	<0.0037	<0.0037	<0.0036	<0.0039	<0.0036	<0.0039	<0.0038	<0.0038	<0.0034	<0.0038	<0.0037	<0.0039	<0.0035	<0.0038	<0.0037
Perfluorooctanoic acid (PFOA)	0.008 (A)	<0.0035	<0.0037	<0.0037	<0.0036	<0.0039	<0.0036	<0.0039	<0.0038	<0.0038	<0.0034	<0.0038	<0.0037	<0.0039	<0.0035	<0.0038	<0.0037
Perfluorooctane sulfonic acid (PFOS)	0.016 (A)	<0.0035	<0.0037	<0.0037	<0.0036	<0.0039	<0.0036	<0.0039	0.0064	0.0061	0.0065	0.0057	<0.0037	<0.0039	<0.0035	<0.0038	<0.0037
Perfluoropentanoic acid (PFPeA)	NCL	<0.0035	<0.0037	<0.0037	<0.0036	<0.0039	<0.0036	<0.0039	<0.0038	<0.0038	<0.0034	<0.0038	<0.0037	<0.0039	<0.0035	<0.0038	<0.0037
Perfluorotetradecanoic acid (PFTeDA)	NCL	<0.0035	<0.0037	<0.0037	<0.0036	<0.0039	<0.0036	<0.0039	<0.0038	<0.0038	<0.0034	<0.0038	<0.0037	<0.0039	<0.0035	<0.0038	<0.0037
Perfluorotridecanoic acid (PFTrDA)	NCL	<0.0035	<0.0037	<0.0037	<0.0036	<0.0039	<0.0036	<0.0039	<0.0038	<0.0038	<0.0034	<0.0038	<0.0037	<0.0039	<0.0035	<0.0038	<0.0037
Perfluoroundecanoic acid (PFUnDA)	NCL	<0.0035	<0.0037	<0.0037	<0.0036	<0.0039	<0.0036	<0.0039	<0.0038	<0.0038	<0.0034	<0.0038	<0.0037	<0.0039	<0.0035	<0.0038	<0.0037
Tetrafluoro-2-(heptafluoropropoxy)propanoic acid (GenX)	0.37 (A)	<0.007	<0.0073	<0.0074	<0.0073	<0.0077	<0.0072	<0.0079	<0.0077	<0.0075	<0.0069	<0.0075	<0.0075	<0.0079	<0.007	<0.0076	<0.0073

TABLE 4A
SUMMARY OF MONITORING WELL GROUNDWATER SAMPLE ANALYSIS - PFAS
Perimeter
Algoma & Plainfield Townships, Kent County, Michigan

Sample Event	Part 201 Generic Residential Groundwater Cleanup Criteria - Drinking Water[2]	Area 19/Perimeter - Q3 2023	Perimeter - Q4 2023	Perimeter - Q1 2024	Area 19/Perimeter - Q3 2023	Perimeter - Q4 2023	Perimeter - Q1 2024	Area 19/Perimeter - Q3 2023	Perimeter - Q4 2023	Perimeter - Q1 2024	Perimeter - Q2 2023	Area 19/Perimeter - Q3 2023	Perimeter - Q4 2023	Perimeter - Q1 2024	Perimeter - Q2 2023	Area 19/Perimeter - Q3 2023	Perimeter - Q4 2023
Well		AREA19-MW-9C	AREA19-MW-9C	AREA19-MW-9C	AREA19-MW-14A	AREA19-MW-14A	AREA19-MW-14A	AREA19-MW-14B	AREA19-MW-14B	AREA19-MW-14B	AREA19-MW-15A	AREA19-MW-15A	AREA19-MW-15A	AREA19-MW-15A	AREA19-MW-15B	AREA19-MW-15B	AREA19-MW-15B
Sample Name		Area19-MW-9C	AREA19-MW-9C	AREA19-MW-9C	Area19-MW-14A	AREA19-MW-14A	AREA19-MW-14A	Area19-MW-14B	AREA19-MW-14B	AREA19-MW-14B	AREA19-MW-15A	Area19-MW-15A	AREA19-MW-15A	Area19-MW-15A	AREA19-MW-15B	Area19-MW-15B	AREA19-MW-15B
Screen Interval (feet below ground surface)		157.5-162.5	157.5-162.5	157.5-162.5	149.6-154.6	149.6-154.6	149.6-154.6	163.8-168.8	163.8-168.8	163.8-168.8	45-50	45-50	45-50	45-50	129.1-134.1	129.1-134.1	129.1-134.1
Laboratory Sample ID		YI09004-011	YL14005-004	ZA27002-017	YI16024-004	YL14005-011	ZB21017-020	YI16024-005	YL21056-004	ZB21017-021	YF22007-005	YI09004-006	YL21056-003	ZB03013-020	YF22007-006	YI09004-007	YL14005-007
Sample Date		09/07/2023	12/12/2023	01/23/2024	09/15/2023	12/13/2023	02/16/2024	09/15/2023	12/14/2023	02/16/2024	06/16/2023	09/07/2023	12/14/2023	02/01/2024	06/16/2023	09/07/2023	12/12/2023
Parameter (µg/L)																	
9-chlorohexadecafluoro-3-oxanone-1-sulfonic acid (9Cl-PF3ONS)	NCL	<0.0072	<0.0074	<0.0069	<0.0071	<0.007	<0.0076	<0.0081	<0.0074	<0.008	<0.0069	<0.0068	<0.0082	<0.0076	<0.0077	<0.0068	<0.0072
11-chloroeicosafluoro-3-oxaundecane-1-sulfonic acid (11CL-PF3OUdS)	NCL	<0.0072	<0.0074	<0.0069	<0.0071	<0.007	<0.0076	<0.0081	<0.0074	<0.008	<0.0069	<0.0068	<0.0082	<0.0076	<0.0077	<0.0068	<0.0072
4,8-dioxa-3H-perfluorononanoic acid (ADONA)	NCL	<0.0072	<0.0074	<0.0069	<0.0071	<0.007	<0.0076	<0.0081	<0.0074	<0.008	<0.0069	<0.0068	<0.0082	<0.0076	<0.0077	<0.0068	<0.0072
1H,1H,2H,2H-perfluorohexane sulfonate (4:2FTS)	NCL	<0.0072	<0.0074	<0.0069	<0.0071	<0.007	<0.0076	<0.0081	<0.0074	<0.008	<0.0069	<0.0068	<0.0082	<0.0076	<0.0077	<0.0068	<0.0072
6:2 Fluorotelomer sulfonic acid (6:2 FTS)	NCL	<0.0072	<0.0074	<0.0069	<0.0071	<0.007	<0.0076	<0.0081	<0.0074	<0.008	<0.0069	<0.0068	<0.0082	<0.0076	<0.0077	<0.0068	<0.0072
8:2 Fluorotelomer sulfonic acid (8:2 FTS)	NCL	<0.0072	<0.0074	<0.0069	<0.0071	<0.007	<0.0076	<0.0081	<0.0074	<0.008	<0.0069	<0.0068	<0.0082	<0.0076	<0.0077	<0.0068	<0.0072
N-ethylperfluoro-1-octanesulfonamidoacetic acid (EtFOSAA)	NCL	<0.0072	<0.0074	<0.0069	<0.0071	<0.007	<0.0076	<0.0081	<0.0074	<0.008	<0.0069	<0.0068	<0.0082	<0.0076	<0.0077	<0.0068	<0.0072
N-methylperfluoro-1-octanesulfonamidoacetic acid (MeFOSAA)	NCL	<0.0072	<0.0074	<0.0069	<0.0071	<0.007	<0.0076	<0.0081	<0.0074	<0.008	<0.0069	<0.0068	<0.0082	<0.0076	<0.0077	<0.0068	<0.0072
Perfluorobutane sulfonic acid (PFBS)	0.42 (A)	<0.0036	<0.0037	<0.0035	0.032	0.037	0.048	<0.004	<0.0037	<0.004	0.013	0.011	0.011	0.012	<0.0039	<0.0034	<0.0036
Perfluorodecane sulfonic acid (PFDS)	NCL	<0.0036	<0.0037	<0.0035	<0.0036	<0.0035	<0.0038	<0.004	<0.0037	<0.004	<0.0034	<0.0034	<0.0041	<0.0038	<0.0039	<0.0034	<0.0036
Perfluoroheptane sulfonic acid (PFHpS)	NCL	<0.0036	<0.0037	<0.0035	<0.0036	<0.0035	<0.0038	<0.004	<0.0037	<0.004	<0.0034	<0.0034	<0.0041	<0.0038	<0.0039	<0.0034	<0.0036
Perfluorononane sulfonic acid (PFNS)	NCL	<0.0036	<0.0037	<0.0035	<0.0036	<0.0035	<0.0038	<0.004	<0.0037	<0.004	<0.0034	<0.0034	<0.0041	<0.0038	<0.0039	<0.0034	<0.0036
Perfluorooctane sulfonamide (FOSA)	NCL	<0.0036	<0.0037	<0.0035	<0.0036	<0.0035	<0.0038	<0.004	<0.0037	<0.004	<0.0034	<0.0034	<0.0041	<0.0038	<0.0039	<0.0034	<0.0036
Perfluoropentane sulfonic acid (PFPeS)	NCL	<0.0036	<0.0037	<0.0035	0.048	0.061	0.07	<0.004	<0.0037	<0.004	<0.0034	<0.0034	<0.0041	<0.0038	<0.0039	<0.0034	<0.0036
Perfluorohexane sulfonic acid (PFHxS)	0.051 (A)	<0.0036	<0.0037	<0.0035	0.031	0.035	0.04	<0.004	<0.0037	<0.004	<0.0034	<0.0034	<0.0041	<0.0038	<0.0039	<0.0034	<0.0036
Perfluorobutanoic acid (PFBA)	NCL	<0.0036	<0.0037	<0.0035	0.012	0.015	0.017	<0.004	<0.0037	<0.004	<0.0034	<0.0034	<0.0041	<0.0038	<0.0039	<0.0034	<0.0036
Perfluorodecanoic acid (PFDA)	NCL	<0.0036	<0.0037	<0.0035	<0.0036	<0.0035	<0.0038	<0.004	<0.0037	<0.004	<0.0034	<0.0034	<0.0041	<0.0038	<0.0039	<0.0034	<0.0036
Perfluorododecanoic acid (PFDoDA)	NCL	<0.0036	<0.0037	<0.0035	<0.0036	<0.0035	<0.0038	<0.004	<0.0037	<0.004	<0.0034	<0.0034	<0.0041	<0.0038	<0.0039	<0.0034	<0.0036
Perfluoroheptanoic acid (PFHpA)	NCL	<0.0036	<0.0037	<0.0035	0.052	0.066	0.069	<0.004	<0.0037	<0.004	<0.0034	<0.0034	<0.0041	<0.0038	<0.0039	<0.0034	<0.0036
Perfluorohexanoic acid (PFHxA)	400 (A)	<0.0036	<0.0037	<0.0035	0.034	0.038	0.046	<0.004	<0.0037	<0.004	<0.0034	<0.0034	<0.0041	<0.0038	<0.0039	<0.0034	<0.0036
Perfluorononanoic acid (PFNA)	0.006 (A)	<0.0036	<0.0037	<0.0035	<0.0036	<0.0035	<0.0038	<0.004	<0.0037	<0.004	<0.0034	<0.0034	<0.0041	<0.0038	<0.0039	<0.0034	<0.0036
Perfluorooctanoic acid (PFOA)	0.008 (A)	<0.0036	<0.0037	<0.0035	***0.11***	***0.13***	***0.17***	<0.004	<0.0037	<0.004	<0.0034	<0.0034	<0.0041	<0.0038	<0.0039	<0.0034	<0.0036
Perfluorooctane sulfonic acid (PFOS)	0.016 (A)	<0.0036	<0.0037	<0.0035	<0.0036	<0.0035	<0.0038	<0.004	<0.0037	<0.004	<0.0034	<0.0034	<0.0041	<0.0038	<0.0039	<0.0034	<0.0036
Perfluoropentanoic acid (PFPeA)	NCL	<0.0036	<0.0037	<0.0035	0.015	0.017	0.018	<0.004	<0.0037	<0.004	<0.0034	<0.0034	<0.0041	<0.0038	<0.0039	<0.0034	<0.0036
Perfluorotetradecanoic acid (PFTeDA)	NCL	<0.0036	<0.0037	<0.0035	<0.0036	<0.0035	<0.0038	<0.004	<0.0037	<0.004	<0.0034	<0.0034	<0.0041	<0.0038	<0.0039	<0.0034	<0.0036
Perfluorotridecanoic acid (PFTrDA)	NCL	<0.0036	<0.0037	<0.0035	<0.0036	<0.0035	<0.0038	<0.004	<0.0037	<0.004	<0.0034	<0.0034	<0.0041	<0.0038	<0.0039	<0.0034	<0.0036
Perfluoroundecanoic acid (PFUnDA)	NCL	<0.0036	<0.0037	<0.0035	<0.0036	<0.0035	<0.0038	<0.004	<0.0037	<0.004	<0.0034	<0.0034	<0.0041	<0.0038	<0.0039	<0.0034	<0.0036
Tetrafluoro-2-(heptafluoropropoxy)propanoic acid (GenX)	0.37 (A)	<0.0072	<0.0074	<0.0069	<0.0071	<0.007	<0.0076	<0.0081	<0.0074	<0.008	<0.0069	<0.0068	<0.0082	<0.0076	<0.0077	<0.0068	<0.0072

TABLE 4A
SUMMARY OF MONITORING WELL GROUNDWATER SAMPLE ANALYSIS - PFAS
Perimeter
Algoma & Plainfield Townships, Kent County, Michigan

Sample Event	Part 201 Generic Residential Groundwater Cleanup Criteria - Drinking Water[2]	Perimeter - Q1 2024	Perimeter - Q2 2023	Area 19/Perimeter - Q3 2023	Perimeter - Q4 2023	Perimeter - Q1 2024	Perimeter - Initial Sampling	Perimeter - Q2 2023	Perimeter - Q3 2023	Perimeter - Q4 2023	Perimeter - Q1 2024	Perimeter - Initial Sampling	Perimeter - Q2 2023	Perimeter - Q3 2023	Perimeter - Q4 2023	Perimeter - Q1 2024	Perimeter - Initial Sampling
Well		AREA19-MW-15B	AREA19-MW-15C	AREA19-MW-15C	AREA19-MW-15C	AREA19-MW-15C	WV-PMW-RI-101A	WV-PMW-RI-101A	WV-PMW-RI-101A	WV-PMW-RI-101A	WV-PMW-RI-101A	WV-PMW-RI-101B	WV-PMW-RI-101B	WV-PMW-RI-101B	WV-PMW-RI-101B	WV-PMW-RI-101B	WV-PMW-RI-102
Sample Name		Area19-MW-15B	AREA19-MW-15C	Area19-MW-15C	AREA19-MW-15C	Area19-MW-15C	WV-PMW-RI-101A	WV-PMW-RI-101A	WV-PMW-RI-101A	WV-PMW-RI-101A	WV-PMW-RI-101A	WV-PMW-RI-101B	WV-PMW-RI-101B	WV-PMW-RI-101B	WV-PMW-RI-101B	WV-PMW-RI-101B	WV-PMW-RI-102A
Screen Interval (feet below ground surface)		129.1-134.1	164.7-169.7	164.7-169.7	164.7-169.7	164.7-169.7	39.7-44.7	39.7-44.7	39.7-44.7	39.7-44.7	39.7-44.7	278.6-283.6	278.6-283.6	278.6-283.6	278.6-283.6	278.6-283.6	44.9-49.9
Laboratory Sample ID		ZB03013-021	YF22007-007	YI09004-005	YL14005-008	ZB03013-019	XJ19047-006	YF22007-002	YH31008-009	YK02016-037	ZB21017-010	XJ19047-007	YF22007-003	YH31008-008	YK11013-001	ZB21017-011	XJ19047-008
Sample Date		02/01/2024	06/16/2023	09/07/2023	12/12/2023	02/01/2024	10/13/2022	06/20/2023	08/29/2023	10/31/2023	02/14/2024	10/13/2022	06/20/2023	08/29/2023	11/09/2023	02/14/2024	10/18/2022
Parameter (µg/L)																	
9-chlorohexadecafluoro-3-oxanone-1-sulfonic acid (9Cl-PF3ONS)	NCL	<0.0075	<0.0081	<0.0078	<0.0071	<0.0075	<0.0068	<0.0081	<0.0072	<0.0076	<0.0077	<0.0068	<0.0074	<0.0072	<0.0072	<0.0073	<0.0068
11-chloroeicosafluoro-3-oxaundecane-1-sulfonic acid (11CL-PF3OUdS)	NCL	<0.0075	<0.0081	<0.0078	<0.0071	<0.0075	<0.0068	<0.0081	<0.0072	<0.0076	<0.0077	<0.0068	<0.0074	<0.0072	<0.0072	<0.0073	<0.0068
4,8-dioxa-3H-perfluorononanoic acid (ADONA)	NCL	<0.0075	<0.0081	<0.0078	<0.0071	<0.0075	<0.0068	<0.0081	<0.0072	<0.0076	<0.0077	<0.0068	<0.0074	<0.0072	<0.0072	<0.0073	<0.0068
1H,1H,2H,2H-perfluorohexane sulfonate (4:2FTS)	NCL	<0.0075	<0.0081	<0.0078	<0.0071	<0.0075	<0.0068	<0.0081	<0.0072	<0.0076	<0.0077	<0.0068	<0.0074	<0.0072	<0.0072	<0.0073	<0.0068
6:2 Fluorotelomer sulfonic acid (6:2 FTS)	NCL	<0.0075	<0.0081	<0.0078	<0.0071	<0.0075	<0.0068	<0.0081	<0.0072	<0.0076	<0.0077	<0.0068	<0.0074	<0.0072	<0.0072	<0.0073	<0.0068
8:2 Fluorotelomer sulfonic acid (8:2 FTS)	NCL	<0.0075	<0.0081	<0.0078	<0.0071	<0.0075	<0.0068	<0.0081	<0.0072	<0.0076	<0.0077	<0.0068	<0.0074	<0.0072	<0.0072	<0.0073	<0.0068
N-ethylperfluoro-1-octanesulfonamidoacetic acid (EtFOSAA)	NCL	<0.0075	<0.0081	<0.0078	<0.0071	<0.0075	<0.0068	<0.0081	<0.0072	<0.0076	<0.0077	<0.0068	<0.0074	<0.0072	<0.0072	<0.0073	<0.0068
N-methylperfluoro-1-octanesulfonamidoacetic acid (MeFOSAA)	NCL	<0.0075	<0.0081	<0.0078	<0.0071	<0.0075	<0.0068	<0.0081	<0.0072	<0.0076	<0.0077	<0.0068	<0.0074	<0.0072	<0.0072	<0.0073	<0.0068
Perfluorobutane sulfonic acid (PFBS)	0.42 (A)	<0.0037	<0.004	<0.0039	<0.0035	<0.0037	0.0078	0.017	0.01	0.0079	0.0052	<0.0034	<0.0037	<0.0036	<0.0036	<0.0037	0.0042
Perfluorodecane sulfonic acid (PFDS)	NCL	<0.0037	<0.004	<0.0039	<0.0035	<0.0037	<0.0034	<0.004	<0.0036	<0.0038	<0.0038	<0.0034	<0.0037	<0.0036	<0.0036	<0.0037	<0.0034
Perfluoroheptane sulfonic acid (PFHpS)	NCL	<0.0037	<0.004	<0.0039	<0.0035	<0.0037	<0.0034	<0.004	<0.0036	<0.0038	<0.0038	<0.0034	<0.0037	<0.0036	<0.0036	<0.0037	<0.0034
Perfluorononane sulfonic acid (PFNS)	NCL	<0.0037	<0.004	<0.0039	<0.0035	<0.0037	<0.0034	<0.004	<0.0036	<0.0038	<0.0038	<0.0034	<0.0037	<0.0036	<0.0036	<0.0037	<0.0034
Perfluorooctane sulfonamide (FOSA)	NCL	<0.0037	<0.004	<0.0039	<0.0035	<0.0037	<0.0034	<0.004	<0.0036	<0.0038	<0.0038	<0.0034	<0.0037	<0.0036	<0.0036	<0.0037	<0.0034
Perfluoropentane sulfonic acid (PFPeS)	NCL	<0.0037	<0.004	<0.0039	<0.0035	<0.0037	<0.0034	<0.004	<0.0036	<0.0038	<0.0038	<0.0034	<0.0037	<0.0036	<0.0036	<0.0037	<0.0034
Perfluorohexane sulfonic acid (PFHxS)	0.051 (A)	<0.0037	<0.004	<0.0039	<0.0035	<0.0037	0.0036	0.004	0.0041	0.0038	<0.0038	<0.0034	<0.0037	<0.0036	<0.0036	<0.0037	0.004
Perfluorobutanoic acid (PFBA)	NCL	<0.0037	<0.004	<0.0039	<0.0035	<0.0037	<0.0034	<0.004	<0.0036	<0.0038	<0.0038	<0.0034	<0.0037	<0.0036	<0.0036	<0.0037	<0.0034
Perfluorodecanoic acid (PFDA)	NCL	<0.0037	<0.004	<0.0039	<0.0035	<0.0037	<0.0034	<0.004	<0.0036	<0.0038	<0.0038	<0.0034	<0.0037	<0.0036	<0.0036	<0.0037	<0.0034
Perfluorododecanoic acid (PFDoDA)	NCL	<0.0037	<0.004	<0.0039	<0.0035	<0.0037	<0.0034	<0.004	<0.0036	<0.0038	<0.0038	<0.0034	<0.0037	<0.0036	<0.0036	<0.0037	<0.0034
Perfluoroheptanoic acid (PFHpA)	NCL	<0.0037	<0.004	<0.0039	<0.0035	<0.0037	<0.0034	<0.004	<0.0036	<0.0038	<0.0038	<0.0034	<0.0037	<0.0036	<0.0036	<0.0037	<0.0034
Perfluorohexanoic acid (PFHxA)	400 (A)	<0.0037	<0.004	<0.0039	<0.0035	<0.0037	<0.0034	<0.004	0.0037	0.0065	<0.0038	<0.0034	<0.0037	<0.0036	<0.0036	<0.0037	<0.0034
Perfluorononanoic acid (PFNA)	0.006 (A)	<0.0037	<0.004	<0.0039	<0.0035	<0.0037	<0.0034	<0.004	<0.0036	<0.0038	<0.0038	<0.0034	<0.0037	<0.0036	<0.0036	<0.0037	<0.0034
Perfluorooctanoic acid (PFOA)	0.008 (A)	<0.0037	<0.004	<0.0039	<0.0035	<0.0037	<0.0034	0.0042	0.0038	0.006	<0.0038	<0.0034	<0.0037	<0.0036	<0.0036	<0.0037	<0.0034
Perfluorooctane sulfonic acid (PFOS)	0.016 (A)	<0.0037	<0.004	<0.0039	<0.0035	<0.0037	<0.0034	<0.004	<0.0036	<0.0038	<0.0038	<0.0034	<0.0037	<0.0036	<0.0036	<0.0037	<0.0034
Perfluoropentanoic acid (PFPeA)	NCL	<0.0037	<0.004	<0.0039	<0.0035	<0.0037	<0.0034	<0.004	<0.0036	0.0052	<0.0038	<0.0034	<0.0037	<0.0036	<0.0036	<0.0037	<0.0034
Perfluorotetradecanoic acid (PFTeDA)	NCL	<0.0037	<0.004	<0.0039	<0.0035	<0.0037	<0.0034	<0.004	<0.0036	<0.0038	<0.0038	<0.0034	<0.0037	<0.0036	<0.0036	<0.0037	<0.0034
Perfluorotridecanoic acid (PFTrDA)	NCL	<0.0037	<0.004	<0.0039	<0.0035	<0.0037	<0.0034	<0.004	<0.0036	<0.0038	<0.0038	<0.0034	<0.0037	<0.0036	<0.0036	<0.0037	<0.0034
Perfluoroundecanoic acid (PFUnDA)	NCL	<0.0037	<0.004	<0.0039	<0.0035	<0.0037	<0.0034	<0.004	<0.0036	<0.0038	<0.0038	<0.0034	<0.0037	<0.0036	<0.0036	<0.0037	<0.0034
Tetrafluoro-2-(heptafluoropropoxy)propanoic acid (GenX)	0.37 (A)	<0.0075	<0.0081	<0.0078	<0.0071	<0.0075	<0.0068	<0.0081	<0.0072	<0.0076	<0.0077	<0.0068	<0.0074	<0.0072	<0.0072	<0.0073	<0.0068

TABLE 4A
SUMMARY OF MONITORING WELL GROUNDWATER SAMPLE ANALYSIS - PFAS
Perimeter
Algoma & Plainfield Townships, Kent County, Michigan

Sample Event	Part 201 Generic Residential Groundwater Cleanup Criteria - Drinking Water[2]	Perimeter - Q2 2023	Perimeter - Q3 2023	Perimeter - Q4 2023	Perimeter - Q1 2024	Perimeter - Q1 2024	Perimeter - Q2 2023	Perimeter - Q3 2023	Perimeter - Q4 2023	Perimeter - Q1 2024	Perimeter - Q2 2023	Perimeter - Q3 2023	Perimeter - Q4 2023	Perimeter - Q1 2024	Perimeter - Q2 2023	Perimeter - Q3 2023	Perimeter - Q4 2023
Well		WV-PMW-RI-102	WV-PMW-RI-102	WV-PMW-RI-102	WV-PMW-RI-102	WV-PMW-RI-102	WV-PMW-RI-104A	WV-PMW-RI-104A	WV-PMW-RI-104A	WV-PMW-RI-104A	WV-PMW-RI-104B	WV-PMW-RI-104B	WV-PMW-RI-104B	WV-PMW-RI-104B	WV-PMW-RI-105A	WV-PMW-RI-105A	WV-PMW-RI-105A
Sample Name		WV-PMW-RI-102A	WV-PMW-RI-102	WV-PMW-RI-102	WV-PMW-RI-102	WV-PMW-RI-102 DUP	WV-PMW-RI-104A	WV-PMW-RI-104A	WV-PMW-RI-104A	WV-PMW-RI-104A	WV-PMW-RI-104B	WV-PMW-RI-104B	WV-PMW-RI-104B	WV-PMW-RI-104B	WV-PMW-RI-104A	WV-PMW-RI-105A	WV-PMW-RI-105A
Screen Interval (feet below ground surface)		44.9-49.9	44.9-49.9	44.9-49.9	44.9-49.9	44.9-49.9	26-31	26-31	26-31	26-31	130.3-135.3	130.3-135.3	130.3-135.3	130.3-135.3	35-40	35-40	35-40
Laboratory Sample ID		YF22007-008	YH24014-011	YK02016-041	ZB21017-008	ZB21017-009	YF22007-011	YH31008-013	YK02016-018	ZA27002-014	YF22007-010	YH31008-012	YK02016-019	ZA27002-015	YF16032-008	YI01015-008	YK02016-021
Sample Date		06/20/2023	08/22/2023	10/30/2023	02/14/2024	02/14/2024	06/19/2023	08/28/2023	10/26/2023	01/18/2024	06/19/2023	08/28/2023	10/26/2023	01/18/2024	06/15/2023	08/31/2023	10/26/2023
Parameter (µg/L)																	
9-chlorohexadecafluoro-3-oxanone-1-sulfonic acid (9Cl-PF3ONS)	NCL	<0.0073	<0.0074	<0.0072	<0.0075	<0.0075	<0.0072	<0.0072	<0.0076	<0.008	<0.0077	<0.0067	<0.0076	<0.0081	<0.0071	<0.0071	<0.0073
11-chloroeicosafluoro-3-oxaundecane-1-sulfonic acid (11CL-PF3OUdS)	NCL	<0.0073	<0.0074	<0.0072	<0.0075	<0.0075	<0.0072	<0.0072	<0.0076	<0.008	<0.0077	<0.0067	<0.0076	<0.0081	<0.0071	<0.0071	<0.0073
4,8-dioxa-3H-perfluorononanoic acid (ADONA)	NCL	<0.0073	<0.0074	<0.0072	<0.0075	<0.0075	<0.0072	<0.0072	<0.0076	<0.008	<0.0077	<0.0067	<0.0076	<0.0081	<0.0071	<0.0071	<0.0073
1H,1H,2H,2H-perfluorohexane sulfonate (4:2FTS)	NCL	<0.0073	<0.0074	<0.0072	<0.0075	<0.0075	<0.0072	<0.0072	<0.0076	<0.008	<0.0077	<0.0067	<0.0076	<0.0081	<0.0071	<0.0071	<0.0073
6:2 Fluorotelomer sulfonic acid (6:2 FTS)	NCL	<0.0073	<0.0074	<0.0072	<0.0075	<0.0075	<0.0072	<0.0072	<0.0076	<0.008	<0.0077	<0.0067	<0.0076	<0.0081	<0.0071	<0.0071	<0.0073
8:2 Fluorotelomer sulfonic acid (8:2 FTS)	NCL	<0.0073	<0.0074	<0.0072	<0.0075	<0.0075	<0.0072	<0.0072	<0.0076	<0.008	<0.0077	<0.0067	<0.0076	<0.0081	<0.0071	<0.0071	<0.0073
N-ethylperfluoro-1-octanesulfonamidoacetic acid (EtFOSAA)	NCL	<0.0073	<0.0074	<0.0072	<0.0075	<0.0075	<0.0072	<0.0072	<0.0076	<0.008	<0.0077	<0.0067	<0.0076	<0.0081	<0.0071	<0.0071	<0.0073
N-methylperfluoro-1-octanesulfonamidoacetic acid (MeFOSAA)	NCL	<0.0073	<0.0074	<0.0072	<0.0075	<0.0075	<0.0072	<0.0072	<0.0076	<0.008	<0.0077	<0.0067	<0.0076	<0.0081	<0.0071	<0.0071	<0.0073
Perfluorobutane sulfonic acid (PFBS)	0.42 (A)	0.0048	0.0048	0.0049	0.0046	0.0046	0.0049	0.0037	<0.0038	<0.004	<0.0039	<0.0034	<0.0038	<0.004	0.0047	0.0059	0.0061
Perfluorodecane sulfonic acid (PFDS)	NCL	<0.0037	<0.0037	<0.0036	<0.0037	<0.0038	<0.0036	<0.0036	<0.0038	<0.004	<0.0039	<0.0034	<0.0038	<0.004	<0.0035	<0.0036	<0.0037
Perfluoroheptane sulfonic acid (PFHpS)	NCL	<0.0037	<0.0037	<0.0036	<0.0037	<0.0038	<0.0036	<0.0036	<0.0038	<0.004	<0.0039	<0.0034	<0.0038	<0.004	<0.0035	<0.0036	<0.0037
Perfluorononane sulfonic acid (PFNS)	NCL	<0.0037	<0.0037	<0.0036	<0.0037	<0.0038	<0.0036	<0.0036	<0.0038	<0.004	<0.0039	<0.0034	<0.0038	<0.004	<0.0035	<0.0036	<0.0037
Perfluorooctane sulfonamide (FOSA)	NCL	<0.0037	<0.0037	<0.0036	<0.0037	<0.0038	<0.0036	<0.0036	<0.0038	<0.004	<0.0039	<0.0034	<0.0038	<0.004	<0.0035	<0.0036	<0.0037
Perfluoropentane sulfonic acid (PFPeS)	NCL	<0.0037	<0.0037	<0.0036	<0.0037	<0.0038	<0.0036	<0.0036	<0.0038	<0.004	<0.0039	<0.0034	<0.0038	<0.004	<0.0035	<0.0036	<0.0037
Perfluorohexane sulfonic acid (PFHxS)	0.051 (A)	0.0042	0.0038	<0.0036	<0.0037	<0.0038	<0.0036	<0.0036	<0.0038	<0.004	<0.0039	<0.0034	<0.0038	<0.004	<0.0035	<0.0036	<0.0037
Perfluorobutanoic acid (PFBA)	NCL	<0.0037	<0.0037	<0.0036	<0.0037	<0.0038	<0.0036	<0.0036	<0.0038	<0.004	<0.0039	<0.0034	<0.0038	<0.004	<0.0035	<0.0036	<0.0037
Perfluorodecanoic acid (PFDA)	NCL	<0.0037	<0.0037	<0.0036	<0.0037	<0.0038	<0.0036	<0.0036	<0.0038	<0.004	<0.0039	<0.0034	<0.0038	<0.004	<0.0035	<0.0036	<0.0037
Perfluorododecanoic acid (PFDoDA)	NCL	<0.0037	<0.0037	<0.0036	<0.0037	<0.0038	<0.0036	<0.0036	<0.0038	<0.004	<0.0039	<0.0034	<0.0038	<0.004	<0.0035	<0.0036	<0.0037
Perfluoroheptanoic acid (PFHpA)	NCL	<0.0037	<0.0037	<0.0036	<0.0037	<0.0038	<0.0036	<0.0036	<0.0038	<0.004	<0.0039	<0.0034	<0.0038	<0.004	<0.0035	<0.0036	<0.0037
Perfluorohexanoic acid (PFHxA)	400 (A)	<0.0037	<0.0037	<0.0036	<0.0037	<0.0038	<0.0036	<0.0036	<0.0038	<0.004	<0.0039	<0.0034	<0.0038	<0.004	<0.0035	<0.0036	<0.0037
Perfluorononanoic acid (PFNA)	0.006 (A)	<0.0037	<0.0037	<0.0036	<0.0037	<0.0038	<0.0036	<0.0036	<0.0038	<0.004	<0.0039	<0.0034	<0.0038	<0.004	<0.0035	<0.0036	<0.0037
Perfluorooctanoic acid (PFOA)	0.008 (A)	<0.0037	<0.0037	<0.0036	<0.0037	<0.0038	0.0047	0.0039	0.0044	0.0044	<0.0039	<0.0034	<0.0038	<0.004	<0.0035	<0.0036	<0.0037
Perfluorooctane sulfonic acid (PFOS)	0.016 (A)	<0.0037	<0.0037	<0.0036	<0.0037	<0.0038	0.01	0.009	0.011	0.0087	<0.0039	<0.0034	<0.0038	<0.004	<0.0035	<0.0036	<0.0037
Perfluoropentanoic acid (PFPeA)	NCL	<0.0037	<0.0037	<0.0036	<0.0037	<0.0038	<0.0036	<0.0036	<0.0038	<0.004	<0.0039	<0.0034	<0.0038	<0.004	<0.0035	<0.0036	<0.0037
Perfluorotetradecanoic acid (PFTeDA)	NCL	<0.0037	<0.0037	<0.0036	<0.0037	<0.0038	<0.0036	<0.0036	<0.0038	<0.004	<0.0039	<0.0034	<0.0038	<0.004	<0.0035	<0.0036	<0.0037
Perfluorotridecanoic acid (PFTrDA)	NCL	<0.0037	<0.0037	<0.0036	<0.0037	<0.0038	<0.0036	<0.0036	<0.0038	<0.004	<0.0039	<0.0034	<0.0038	<0.004	<0.0035	<0.0036	<0.0037
Perfluoroundecanoic acid (PFUnDA)	NCL	<0.0037	<0.0037	<0.0036	<0.0037	<0.0038	<0.0036	<0.0036	<0.0038	<0.004	<0.0039	<0.0034	<0.0038	<0.004	<0.0035	<0.0036	<0.0037
Tetrafluoro-2-(heptafluoropropoxy)propanoic acid (GenX)	0.37 (A)	<0.0073	<0.0074	<0.0072	<0.0075	<0.0075	<0.0072	<0.0072	<0.0076	<0.008	<0.0077	<0.0067	<0.0076	<0.0081	<0.0071	<0.0071	<0.0073

TABLE 4A
SUMMARY OF MONITORING WELL GROUNDWATER SAMPLE ANALYSIS - PFAS
Perimeter
Algoma & Plainfield Townships, Kent County, Michigan

Sample Event	Part 201 Generic Residential Groundwater Cleanup Criteria - Drinking Water[2]	Perimeter - Q1 2024	Perimeter - Q2 2023	Perimeter - Q3 2023	Perimeter - Q4 2023	Perimeter - Q1 2024	Perimeter - Initial Sampling	Perimeter - Q2 2023	Perimeter - Q3 2023	Perimeter - Q4 2023	Perimeter - Q1 2024	Perimeter - Initial Sampling	Perimeter - Q2 2023	Perimeter - Q3 2023	Perimeter - Q4 2023	Perimeter - Q1 2024	Perimeter - Initial Sampling
Well		WV-PMW-RI-105A	WV-PMW-RI-105B	WV-PMW-RI-105B	WV-PMW-RI-105B	WV-PMW-RI-105B	WV-PMW-RI-106A	WV-PMW-RI-106A	WV-PMW-RI-106A	WV-PMW-RI-106A	WV-PMW-RI-106A	WV-PMW-RI-106B	WV-PMW-RI-106B	WV-PMW-RI-106B	WV-PMW-RI-106B	WV-PMW-RI-106B	WV-PMW-RI-106C
Sample Name		WV-PMW-RI-105A	WV-PMW-RI-104B	WV-PMW-RI-105B	WV-PMW-RI-105B	WV-PMW-RI-105B	WV-PMW-RI-106A	WV-PMW-RI-106A	WV-PMW-RI-106A	WV-PMW-RI-106A	WV-PMW-RI-106A	WV-PMW-RI-106B	WV-PMW-RI-106B	WV-PMW-RI-106B	WV-PMW-RI-106B	WV-PMW-RI-106B	WV-PMW-RI-106C
Screen Interval (feet below ground surface)		35-40	79.6-84.6	79.6-84.6	79.6-84.6	79.6-84.6	19.1-24.1	19.1-24.1	19.1-24.1	19.1-24.1	19.1-24.1	34.4-39.4	34.4-39.4	34.4-39.4	34.4-39.4	34.4-39.4	54.4-59.4
Laboratory Sample ID		ZA27002-028	YF16032-009	YI01015-007	YK02016-020	ZA27002-025	XA21096-004	YF14023-007	YH24014-012	YK02016-016	ZA27002-002	XA21096-001	YF14023-010	YH24014-014	YK02016-017	ZA27002-001	XA21096-002
Sample Date		01/19/2024	06/15/2023	08/31/2023	10/26/2023	01/19/2024	01/18/2022	06/12/2023	08/23/2023	10/25/2023	01/22/2024	01/17/2022	06/12/2023	08/23/2023	10/25/2023	01/22/2024	01/17/2022
Parameter (µg/L)																	
9-chlorohexadecafluoro-3-oxanone-1-sulfonic acid (9Cl-PF3ONS)	NCL	<0.0079	<0.0071	<0.0072	<0.0072	<0.0081	<0.0074	<0.0071	<0.0074	<0.0079	<0.0076	<0.0075	<0.0078	<0.0074	<0.0073	<0.0079	<0.0076
11-chloroeicosafluoro-3-oxaundecane-1-sulfonic acid (11CL-PF3OUdS)	NCL	<0.0079	<0.0071	<0.0072	<0.0072	<0.0081	<0.0074	<0.0071	<0.0074	<0.0079	<0.0076	<0.0075	<0.0078	<0.0074	<0.0073	<0.0079	<0.0076
4,8-dioxa-3H-perfluorononanoic acid (ADONA)	NCL	<0.0079	<0.0071	<0.0072	<0.0072	<0.0081	<0.0074	<0.0071	<0.0074	<0.0079	<0.0076	<0.0075	<0.0078	<0.0074	<0.0073	<0.0079	<0.0076
1H,1H,2H,2H-perfluorohexane sulfonate (4:2FTS)	NCL	<0.0079	<0.0071	<0.0072	<0.0072	<0.0081	<0.0074	<0.0071	<0.0074	<0.0079	<0.0076	<0.0075	<0.0078	<0.0074	<0.0073	<0.0079	<0.0076
6:2 Fluorotelomer sulfonic acid (6:2 FTS)	NCL	<0.0079	<0.0071	<0.0072	<0.0072	<0.0081	<0.0074	<0.0071	<0.0074	<0.0079	<0.0076	<0.0075	<0.0078	<0.0074	<0.0073	<0.0079	<0.0076
8:2 Fluorotelomer sulfonic acid (8:2 FTS)	NCL	<0.0079	<0.0071	<0.0072	<0.0072	<0.0081	<0.0074	<0.0071	<0.0074	<0.0079	<0.0076	<0.0075	<0.0078	<0.0074	<0.0073	<0.0079	<0.0076
N-ethylperfluoro-1-octanesulfonamidoacetic acid (EtFOSAA)	NCL	<0.0079	<0.0071	<0.0072	<0.0072	<0.0081	<0.0074	<0.0071	<0.0074	<0.0079	<0.0076	<0.0075	<0.0078	<0.0074	<0.0073	<0.0079	<0.0076
N-methylperfluoro-1-octanesulfonamidoacetic acid (MeFOSAA)	NCL	<0.0079	<0.0071	<0.0072	<0.0072	<0.0081	<0.0074	<0.0071	<0.0074	<0.0079	<0.0076	<0.0075	<0.0078	<0.0074	<0.0073	<0.0079	<0.0076
Perfluorobutane sulfonic acid (PFBS)	0.42 (A)	0.0043	<0.0035	<0.0036	<0.0036	<0.0041	0.021	0.019	0.018	0.029	0.02	0.015	0.012	0.012	0.012	0.011	0.018
Perfluorodecane sulfonic acid (PFDS)	NCL	<0.004	<0.0035	<0.0036	<0.0036	<0.0041	<0.0037	<0.0036	<0.0037	<0.004	<0.0038	<0.0038	<0.0039	<0.0037	<0.0036	<0.004	<0.0038
Perfluoroheptane sulfonic acid (PFHpS)	NCL	<0.004	<0.0035	<0.0036	<0.0036	<0.0041	<0.0037	0.0047	<0.0037	<0.004	<0.0038	<0.0038	<0.0039	<0.0037	<0.0036	<0.004	<0.0038
Perfluorononane sulfonic acid (PFNS)	NCL	<0.004	<0.0035	<0.0036	<0.0036	<0.0041	<0.0037	<0.0036	<0.0037	<0.004	<0.0038	<0.0038	<0.0039	<0.0037	<0.0036	<0.004	<0.0038
Perfluorooctane sulfonamide (FOSA)	NCL	<0.004	<0.0035	<0.0036	<0.0036	<0.0041	<0.0037	<0.0036	<0.0037	<0.004	<0.0038	<0.0038	<0.0039	<0.0037	<0.0036	<0.004	<0.0038
Perfluoropentane sulfonic acid (PFPeS)	NCL	<0.004	<0.0035	<0.0036	<0.0036	<0.0041	0.0052	<0.0036	<0.0037	0.0068	0.0041	0.0054	0.004	0.0038	0.0044	<0.004	<0.0038
Perfluorohexane sulfonic acid (PFHxS)	0.051 (A)	<0.004	<0.0035	<0.0036	<0.0036	<0.0041	0.016	0.0079	0.012	0.022	0.013	0.015	0.012	0.012	0.013	0.011	0.014
Perfluorobutanoic acid (PFBA)	NCL	<0.004	<0.0035	<0.0036	<0.0036	<0.0041	0.011	<0.0036	<0.0037	0.0045	<0.0038	<0.0038	<0.0039	<0.0037	<0.0036	<0.004	0.012
Perfluorodecanoic acid (PFDA)	NCL	<0.004	<0.0035	<0.0036	<0.0036	<0.0041	<0.0037	<0.0036	<0.0037	<0.004	<0.0038	<0.0038	<0.0039	<0.0037	<0.0036	<0.004	<0.0038
Perfluorododecanoic acid (PFDoDA)	NCL	<0.004	<0.0035	<0.0036	<0.0036	<0.0041	<0.0037	<0.0036	<0.0037	<0.004	<0.0038	<0.0038	<0.0039	<0.0037	<0.0036	<0.004	<0.0038
Perfluoroheptanoic acid (PFHpA)	NCL	<0.004	<0.0035	<0.0036	<0.0036	<0.0041	0.016	0.0074	0.008	0.014	0.0098	<0.0038	<0.0039	<0.0037	<0.0036	<0.004	0.016
Perfluorohexanoic acid (PFHxA)	400 (A)	<0.004	<0.0035	<0.0036	<0.0036	<0.0041	0.014	0.0056	0.0052	0.011	0.0071	<0.0038	<0.0039	<0.0037	<0.0036	<0.004	0.044
Perfluorononanoic acid (PFNA)	0.006 (A)	<0.004	<0.0035	<0.0036	<0.0036	<0.0041	<0.0037	<0.0036	<0.0037	<0.004	<0.0038	<0.0038	<0.0039	<0.0037	<0.0036	<0.004	<0.0038
Perfluorooctanoic acid (PFOA)	0.008 (A)	<0.004	<0.0035	<0.0036	<0.0036	<0.0041	***0.077***	***0.049***	***0.034***	***0.048***	***0.04***	***0.015***	***0.012***	***0.01***	***0.012***	***0.011***	***0.056***
Perfluorooctane sulfonic acid (PFOS)	0.016 (A)	<0.004	<0.0035	<0.0036	<0.0036	<0.0041	0.0071	***0.025***	0.012	<0.004	0.011	<0.0038	<0.0039	<0.0037	<0.0036	<0.004	***0.039***
Perfluoropentanoic acid (PFPeA)	NCL	<0.004	<0.0035	<0.0036	<0.0036	<0.0041	0.0059	<0.0036	<0.0037	<0.004	<0.0038	<0.0038	<0.0039	<0.0037	<0.0036	<0.004	0.04
Perfluorotetradecanoic acid (PFTeDA)	NCL	<0.004	<0.0035	<0.0036	<0.0036	<0.0041	<0.0037	<0.0036	<0.0037	<0.004	<0.0038	<0.0038	<0.0039	<0.0037	<0.0036	<0.004	<0.0038
Perfluorotridecanoic acid (PFTrDA)	NCL	<0.004	<0.0035	<0.0036	<0.0036	<0.0041	<0.0037	<0.0036	<0.0037	<0.004	<0.0038	<0.0038	<0.0039	<0.0037	<0.0036	<0.004	<0.0038
Perfluoroundecanoic acid (PFUnDA)	NCL	<0.004	<0.0035	<0.0036	<0.0036	<0.0041	<0.0037	<0.0036	<0.0037	<0.004	<0.0038	<0.0038	<0.0039	<0.0037	<0.0036	<0.004	<0.0038
Tetrafluoro-2-(heptafluoropropoxy)propanoic acid (GenX)	0.37 (A)	<0.0079	<0.0071	<0.0072	<0.0072	<0.0081	<0.0074	<0.0071	<0.0074	<0.0079	<0.0076	<0.0075	<0.0078	<0.0074	<0.0073	<0.0079	<0.0076

TABLE 4A
SUMMARY OF MONITORING WELL GROUNDWATER SAMPLE ANALYSIS - PFAS
Perimeter
Algoma & Plainfield Townships, Kent County, Michigan

Sample Event	Part 201 Generic Residential Groundwater Cleanup Criteria - Drinking Water[2]	Perimeter - Q2 2023	Perimeter - Q3 2023	Perimeter - Q4 2023	Perimeter - Q1 2024	Perimeter - Initial Sampling	Perimeter - Q2 2023	Perimeter - Q3 2023	Perimeter - Q4 2023	Perimeter - Q1 2024	Perimeter - Initial Sampling	Perimeter - Q2 2023	Perimeter - Q3 2023	Perimeter - Q4 2023	Perimeter - Q1 2024	Perimeter - Initial Sampling	Perimeter - Q2 2023
Well		WV-PMW-RI-106C	WV-PMW-RI-106C	WV-PMW-RI-106C	WV-PMW-RI-106C	WV-PMW-RI-106D	WV-PMW-RI-106D	WV-PMW-RI-106D	WV-PMW-RI-106D	WV-PMW-RI-106D	WV-PMW-RI-106E	WV-PMW-RI-106E	WV-PMW-RI-106E	WV-PMW-RI-106E	WV-PMW-RI-106E	WV-PMW-RI-107	WV-PMW-RI-107
Sample Name		WV-PMW-RI-106C	WV-PMW-RI-106C	WV-PMW-RI-106C	WV-PMW-RI-106C	WV-PMW-RI-106D	WV-PMW-RI-106D	WV-PMW-RI-106D	WV-PMW-RI-106D	WV-PMW-RI-106D	WV-PMW-RI-106E	WV-PMW-RI-106E	WV-PMW-RI-106E	WV-PMW-RI-106E	WV-PMW-RI-106E	WV-PMW-RI-107	WV-PMW-RI-107
Screen Interval (feet below ground surface)		54.4-59.4	54.4-59.4	54.4-59.4	54.4-59.4	70.5-75.5	70.5-75.5	70.5-75.5	70.5-75.5	70.5-75.5	176.5-181.5	176.5-181.5	176.5-181.5	176.5-181.5	176.5-181.5	187-192	187-192
Laboratory Sample ID		YF14023-008	YH24014-017	YK02016-015	ZA27002-011	XA21096-003	YF14023-009	YH24014-013	YK02016-027	ZA27002-010	XA21096-005	YF14023-011	YH24014-015	YK04005-004	ZB21017-022	XA21096-006	YF22007-016
Sample Date		06/12/2023	08/23/2023	10/25/2023	01/22/2024	01/18/2022	06/12/2023	08/23/2023	10/27/2023	01/22/2024	01/18/2022	06/12/2023	08/23/2023	11/02/2023	02/16/2024	01/20/2022	06/21/2023
Parameter (µg/L)																	
9-chlorohexadecafluoro-3-oxanone-1-sulfonic acid (9Cl-PF3ONS)	NCL	<0.0081	<0.0074	<0.0083	<0.0078	<0.0074	<0.0073	<0.0074	<0.0075	<0.0077	<0.0099	<0.0069	<0.0068	<0.0072	<0.0071	<0.0076	<0.0072
11-chloroeicosafluoro-3-oxaundecane-1-sulfonic acid (11CL-PF3OUdS)	NCL	<0.0081	<0.0074	<0.0083	<0.0078	<0.0074	<0.0073	<0.0074	<0.0075	<0.0077	<0.0099	<0.0069	<0.0068	<0.0072	<0.0071	<0.0076	<0.0072
4,8-dioxa-3H-perfluorononanoic acid (ADONA)	NCL	<0.0081	<0.0074	<0.0083	<0.0078	<0.0074	<0.0073	<0.0074	<0.0075	<0.0077	<0.0099	<0.0069	<0.0068	<0.0072	<0.0071	<0.0076	<0.0072
1H,1H,2H,2H-perfluorohexane sulfonate (4:2FTS)	NCL	<0.0081	<0.0074	<0.0083	<0.0078	<0.0074	<0.0073	<0.0074	<0.0075	<0.0077	<0.0099	<0.0069	<0.0068	<0.0072	<0.0071	<0.0076	<0.0072
6:2 Fluorotelomer sulfonic acid (6:2 FTS)	NCL	<0.0081	<0.0074	<0.0083	<0.0078	<0.0074	<0.0073	<0.0074	<0.0075	<0.0077	<0.0099	<0.0069	<0.0068	<0.0072	<0.0071	<0.0076	<0.0072
8:2 Fluorotelomer sulfonic acid (8:2 FTS)	NCL	<0.0081	<0.0074	<0.0083	<0.0078	<0.0074	<0.0073	<0.0074	<0.0075	<0.0077	<0.0099	<0.0069	<0.0068	<0.0072	<0.0071	<0.0076	<0.0072
N-ethylperfluoro-1-octanesulfonamidoacetic acid (EtFOSAA)	NCL	<0.0081	<0.0074	<0.0083	<0.0078	<0.0074	<0.0073	<0.0074	<0.0075	<0.0077	<0.0099	<0.0069	<0.0068	<0.0072	<0.0071	<0.0076	<0.0072
N-methylperfluoro-1-octanesulfonamidoacetic acid (MeFOSAA)	NCL	<0.0081	<0.0074	<0.0083	<0.0078	<0.0074	<0.0073	<0.0074	<0.0075	<0.0077	<0.0099	<0.0069	<0.0068	<0.0072	<0.0071	<0.0076	<0.0072
Perfluorobutane sulfonic acid (PFBS)	0.42 (A)	0.019	0.031	0.033	0.027	<0.0037	<0.0036	<0.0037	<0.0037	<0.0039	<0.0049	<0.0035	<0.0034	<0.0036	<0.0036	<0.0038	<0.0036
Perfluorodecane sulfonic acid (PFDS)	NCL	<0.004	<0.0037	<0.0042	<0.0039	<0.0037	<0.0036	<0.0037	<0.0037	<0.0039	<0.0049	<0.0035	<0.0034	<0.0036	<0.0036	<0.0038	<0.0036
Perfluoroheptane sulfonic acid (PFHpS)	NCL	0.0041	<0.0037	<0.0042	<0.0039	<0.0037	<0.0036	<0.0037	<0.0037	<0.0039	<0.0049	<0.0035	<0.0034	<0.0036	<0.0036	<0.0038	<0.0036
Perfluorononane sulfonic acid (PFNS)	NCL	<0.004	<0.0037	<0.0042	<0.0039	<0.0037	<0.0036	<0.0037	<0.0037	<0.0039	<0.0049	<0.0035	<0.0034	<0.0036	<0.0036	<0.0038	<0.0036
Perfluorooctane sulfonamide (FOSA)	NCL	<0.004	<0.0037	<0.0042	<0.0039	<0.0037	<0.0036	<0.0037	<0.0037	<0.0039	<0.0049	<0.0035	<0.0034	<0.0036	<0.0036	<0.0038	<0.0036
Perfluoropentane sulfonic acid (PFPeS)	NCL	<0.004	<0.0037	<0.0042	<0.0039	<0.0037	<0.0036	<0.0037	<0.0037	<0.0039	<0.0049	<0.0035	<0.0034	<0.0036	<0.0036	<0.0038	<0.0036
Perfluorohexane sulfonic acid (PFHxS)	0.051 (A)	0.014	0.0099	0.013	0.0087	<0.0037	<0.0036	<0.0037	<0.0037	<0.0039	<0.0049	<0.0035	<0.0034	<0.0036	<0.0036	<0.0038	<0.0036
Perfluorobutanoic acid (PFBA)	NCL	0.012	0.021	0.02	0.017	<0.0037	<0.0036	<0.0037	<0.0037	<0.0039	<0.0049	<0.0035	<0.0034	<0.0036	<0.0036	<0.0038	<0.0036
Perfluorodecanoic acid (PFDA)	NCL	<0.004	<0.0037	<0.0042	<0.0039	<0.0037	<0.0036	<0.0037	<0.0037	<0.0039	<0.0049	<0.0035	<0.0034	<0.0036	<0.0036	<0.0038	<0.0036
Perfluorododecanoic acid (PFDoDA)	NCL	<0.004	<0.0037	<0.0042	<0.0039	<0.0037	<0.0036	<0.0037	<0.0037	<0.0039	<0.0049	<0.0035	<0.0034	<0.0036	<0.0036	<0.0038	<0.0036
Perfluoroheptanoic acid (PFHpA)	NCL	0.015	0.019	0.02	0.015	<0.0037	<0.0036	<0.0037	<0.0037	<0.0039	<0.0049	<0.0035	<0.0034	<0.0036	<0.0036	<0.0038	<0.0036
Perfluorohexanoic acid (PFHxA)	400 (A)	0.04	0.074	0.074	0.071	<0.0037	<0.0036	<0.0037	<0.0037	<0.0039	<0.0049	<0.0035	<0.0034	<0.0036	<0.0036	<0.0038	<0.0036
Perfluorononanoic acid (PFNA)	0.006 (A)	<0.004	<0.0037	<0.0042	<0.0039	<0.0037	<0.0036	<0.0037	<0.0037	<0.0039	<0.0049	<0.0035	<0.0034	<0.0036	<0.0036	<0.0038	<0.0036
Perfluorooctanoic acid (PFOA)	0.008 (A)	***0.059***	***0.07***	***0.071***	***0.066***	<0.0037	<0.0036	<0.0037	<0.0037	<0.0039	<0.0049	<0.0035	<0.0034	<0.0036	<0.0036	<0.0038	<0.0036
Perfluorooctane sulfonic acid (PFOS)	0.016 (A)	***0.042***	***0.027***	***0.033***	***0.026***	<0.0037	<0.0036	<0.0037	<0.0037	<0.0039	<0.0049	<0.0035	<0.0034	<0.0036	<0.0036	<0.0038	<0.0036
Perfluoropentanoic acid (PFPeA)	NCL	0.038	0.06	0.062	0.05	<0.0037	<0.0036	<0.0037	<0.0037	<0.0039	<0.0049	<0.0035	<0.0034	<0.0036	<0.0036	<0.0038	<0.0036
Perfluorotetradecanoic acid (PFTeDA)	NCL	<0.004	<0.0037	<0.0042	<0.0039	<0.0037	<0.0036	<0.0037	<0.0037	<0.0039	<0.0049	<0.0035	<0.0034	<0.0036	<0.0036	<0.0038	<0.0036
Perfluorotridecanoic acid (PFTrDA)	NCL	<0.004	<0.0037	<0.0042	<0.0039	<0.0037	<0.0036	<0.0037	<0.0037	<0.0039	<0.0049	<0.0035	<0.0034	<0.0036	<0.0036	<0.0038	<0.0036
Perfluoroundecanoic acid (PFUnDA)	NCL	<0.004	<0.0037	<0.0042	<0.0039	<0.0037	<0.0036	<0.0037	<0.0037	<0.0039	<0.0049	<0.0035	<0.0034	<0.0036	<0.0036	<0.0038	<0.0036
Tetrafluoro-2-(heptafluoropropoxy)propanoic acid (GenX)	0.37 (A)	<0.0081	<0.0074	<0.0083	<0.0078	<0.0074	<0.0073	<0.0074	<0.0075	<0.0077	<0.0099	<0.0069	<0.0068	<0.0072	<0.0071	<0.0076	<0.0072

TABLE 4A
SUMMARY OF MONITORING WELL GROUNDWATER SAMPLE ANALYSIS - PFAS
Perimeter
Algoma & Plainfield Townships, Kent County, Michigan

Sample Event	Part 201 Generic Residential Groundwater Cleanup Criteria - Drinking Water[2]	Perimeter - Q3 2023	Perimeter - Q4 2023	Perimeter - Q1 2024	Perimeter - Q2 2023	Perimeter - Q3 2023	Perimeter - Q4 2023	Perimeter - Q1 2024
Well		WV-PMW-RI-107	WV-PMW-RI-107	WV-PMW-RI-107	WV-PMW-RI-108	WV-PMW-RI-108	WV-PMW-RI-108	WV-PMW-RI-108
Sample Name		WV-PMW-RI-107	WV-PMW-RI-107	WV-PMW-RI-107	WV-PMW-RI-108	WV-PMW-RI-108	WV-PMW-RI-108	WV-PMW-RI-108
Screen Interval (feet below ground surface)		187-192	187-192	187-192	9.6-14.6	9.6-14.6	9.6-14.6	9.6-14.6
Laboratory Sample ID		YI01015-016	YK04005-002	ZB21017-015	YF22007-017	YH31008-007	YK04005-005	ZB21017-014
Sample Date		08/30/2023	11/01/2023	02/14/2024	06/21/2023	08/29/2023	11/02/2023	02/14/2024
Parameter (µg/L)								
9-chlorohexadecafluoro-3-oxanone-1-sulfonic acid (9Cl-PF3ONS)	NCL	<0.0074	<0.0072	<0.0078	<0.0076	<0.0069	<0.0072	<0.0078
11-chloroeicosafluoro-3-oxaundecane-1-sulfonic acid (11CL-PF3OUdS)	NCL	<0.0074	<0.0072	<0.0078	<0.0076	<0.0069	<0.0072	<0.0078
4,8-dioxa-3H-perfluorononanoic acid (ADONA)	NCL	<0.0074	<0.0072	<0.0078	<0.0076	<0.0069	<0.0072	<0.0078
1H,1H,2H,2H-perfluorohexane sulfonate (4:2FTS)	NCL	<0.0074	<0.0072	<0.0078	<0.0076	<0.0069	<0.0072	<0.0078
6:2 Fluorotelomer sulfonic acid (6:2 FTS)	NCL	<0.0074	<0.0072	<0.0078	<0.0076	<0.0069	<0.0072	<0.0078
8:2 Fluorotelomer sulfonic acid (8:2 FTS)	NCL	<0.0074	<0.0072	<0.0078	<0.0076	<0.0069	<0.0072	<0.0078
N-ethylperfluoro-1-octanesulfonamidoacetic acid (EtFOSAA)	NCL	<0.0074	<0.0072	<0.0078	<0.0076	<0.0069	<0.0072	<0.0078
N-methylperfluoro-1-octanesulfonamidoacetic acid (MeFOSAA)	NCL	<0.0074	<0.0072	<0.0078	<0.0076	<0.0069	<0.0072	<0.0078
Perfluorobutane sulfonic acid (PFBS)	0.42 (A)	<0.0037	<0.0036	<0.0039	0.009	0.007	0.0065	0.0066
Perfluorodecane sulfonic acid (PFDS)	NCL	<0.0037	<0.0036	<0.0039	<0.0038	<0.0035	<0.0036	<0.0039
Perfluoroheptane sulfonic acid (PFHpS)	NCL	<0.0037	<0.0036	<0.0039	<0.0038	<0.0035	<0.0036	<0.0039
Perfluorononane sulfonic acid (PFNS)	NCL	<0.0037	<0.0036	<0.0039	<0.0038	<0.0035	<0.0036	<0.0039
Perfluorooctane sulfonamide (FOSA)	NCL	<0.0037	<0.0036	<0.0039	<0.0038	<0.0035	<0.0036	<0.0039
Perfluoropentane sulfonic acid (PFPeS)	NCL	<0.0037	<0.0036	<0.0039	<0.0038	<0.0035	<0.0036	<0.0039
Perfluorohexane sulfonic acid (PFHxS)	0.051 (A)	<0.0037	<0.0036	<0.0039	0.01	0.0079	0.0083	0.0072
Perfluorobutanoic acid (PFBA)	NCL	<0.0037	<0.0036	<0.0039	<0.0038	<0.0035	<0.0036	<0.0039
Perfluorodecanoic acid (PFDA)	NCL	<0.0037	<0.0036	<0.0039	<0.0038	<0.0035	<0.0036	<0.0039
Perfluorododecanoic acid (PFDoDA)	NCL	<0.0037	<0.0036	<0.0039	<0.0038	<0.0035	<0.0036	<0.0039
Perfluoroheptanoic acid (PFHpA)	NCL	<0.0037	<0.0036	<0.0039	<0.0038	<0.0035	<0.0036	<0.0039
Perfluorohexanoic acid (PFHxA)	400 (A)	<0.0037	<0.0036	<0.0039	<0.0038	<0.0035	<0.0036	<0.0039
Perfluorononanoic acid (PFNA)	0.006 (A)	<0.0037	<0.0036	<0.0039	<0.0038	<0.0035	<0.0036	<0.0039
Perfluorooctanoic acid (PFOA)	0.008 (A)	<0.0037	<0.0036	<0.0039	0.006	0.0038	0.0052	0.0065
Perfluorooctane sulfonic acid (PFOS)	0.016 (A)	<0.0037	<0.0036	<0.0039	<0.0038	<0.0035	<0.0036	<0.0039
Perfluoropentanoic acid (PFPeA)	NCL	<0.0037	<0.0036	<0.0039	<0.0038	<0.0035	<0.0036	<0.0039
Perfluorotetradecanoic acid (PFTeDA)	NCL	<0.0037	<0.0036	<0.0039	<0.0038	<0.0035	<0.0036	<0.0039
Perfluorotridecanoic acid (PFTrDA)	NCL	<0.0037	<0.0036	<0.0039	<0.0038	<0.0035	<0.0036	<0.0039
Perfluoroundecanoic acid (PFUnDA)	NCL	<0.0037	<0.0036	<0.0039	<0.0038	<0.0035	<0.0036	<0.0039
Tetrafluoro-2-(heptafluoropropoxy)propanoic acid (GenX)	0.37 (A)	<0.0074	<0.0072	<0.0078	<0.0076	<0.0069	<0.0072	<0.0078

TABLE 4A NOTES
Perimeter
Algoma & Plainfield Townships, Kent County, Michigan

NOTES:

1. Concentration and criteria units are micrograms per Liter (µg/L) or approximately parts per billion (ppb).
2. Michigan Part 201 Groundwater Cleanup Criteria are based on "Table 1, Groundwater: Residential and Nonresidential Part 201 Generic Cleanup Criteria and Screening Levels/Part 213 Tier I Risk Based Screening Levels," Michigan Administrative Code, Cleanup Criteria Requirements for Response Activity, Rules 299.44 and 299.49, effective December 30, 2013; last updated October 12, 2023.
   Abbreviations Include:
   "NCL" indicates no criterion listed in EGLE Table 1.
   Footnotes Include:
   (A) - The criterion is the State of Michigan drinking water standard.
   Abbreviations Include:
   "NA" indicates not available.
3. Bold, italic number with thick line border or italic analyte name indicates that parameter was detected above the Michigan Part 201 Groundwater Cleanup Criteria listed.
4. Abbreviations include:
   "< LOQ" indicates the analyte was analyzed for but not detected above the limit of quantitation (LOQ).
   "H" indicates the parameter was analyzed out of hold time.
   "DUP" indicates a duplicate sample.
5. Screen interval presented is the top of the screen to the bottom of the screen in feet below ground surface.
6. Validated results are shown for Laboratory IDs beginning with YH02032 and YI01015. The remaining results shown were not included in the 5% validation of PFAS samples required by the Quality Assurance Project Plan.
7. Results shown on this table are from monitoring wells sampled during the Perimeter sampling events, including dual purpose wells. See Table 4B for dual purpose well results sampled prior to Perimeter well sampling events.

TABLE 4B
SUMMARY OF GROUNDWATER SAMPLE ANALYSIS - PFAS
Perimeter (Dual Purpose)
Algoma & Plainfield Townships, Kent County, Michigan

Sample Event	Part 201 Generic Residential Groundwater Cleanup Criteria - Drinking Water[2]	Area 6 - Q4 2022	Area 6 - Q1 2023	Area 6 - Q4 2022	Area 6 - Q1 2023	Area 6 - Q1 2023	Area 6 - Q4 2022	Area 6 - Q1 2023	Area 6 - Q1 2023	Area 6 - Q1 2023	Area 6 - Q1 2023	Area 5 - Initial Sampling	Area 5 - Initial Sampling	Area 5 - Q1 2023	Area 5 - Initial Sampling	Area 5 - Q1 2023	Area 5 - Initial Sampling
Well		HS-MW-13A	HS-MW-13A	HS-MW-13B	HS-MW-13B	HS-MW-13B	HS-MW-13C	HS-MW-13C	HS-PMW-16A	HS-PMW-16B	HS-PMW-16C	AREA5-RI-3A	AREA5-RI-3A	AREA5-RI-3A	AREA5-RI-3B	AREA5-RI-3B	AREA5-RI-8A
Sample Name		HS-MW-13A	HS-MW-13A	HS-MW-13B	HS-MW-13B	HS-MW-13B DUP	HS-MW-13C	HS-MW-13C	HS-PMW-16A	HS-PMW-16B	HS-PMW-16C	Area5-RI-3A	Area5-RI-3A DUP	Area5-RI-3A	Area5-RI-3B	Area5-RI-3B	Area5-RI-8A
Screen Interval (feet below ground surface)		79.2-84	79.2-84	148.8-153.6	148.8-153.6	148.8-153.6	199.4-204.2	199.4-204.2	89.3-94.3	118.7-123.7	161.6-166.6	59.4-64.4	59.4-64.4	59.4-64.4	106.7-111.7	106.7-111.7	85.6-90.6
Laboratory Sample ID		XJ19045-007	YC23005-003	XJ19045-008	YC23005-001	YC23005-002	XJ19045-009	YC23005-004	YC23005-005	YC23005-006	YC23005-007	XA24002-001	XA24002-002	YB17027-012	XA24002-003	YB17027-016	WI23023-005
Sample Date		10/14/2022	03/16/2023	10/14/2022	03/16/2023	03/16/2023	10/14/2022	03/16/2023	03/16/2023	03/16/2023	03/16/2023	01/17/2022	01/17/2022	02/13/2023	01/17/2022	02/13/2023	09/14/2021
Parameter (µg/L)																	
9-chlorohexadecafluoro-3-oxanone-1-sulfonic acid (9Cl-PF3ONS)	NCL	<0.0068	<0.007	<0.0073	<0.0076	<0.0075	<0.0072	<0.0068	<0.0075	<0.0067	<0.007	<0.0074	<0.0077	<0.0068	<0.007	<0.0074	<0.0081
11-chloroeicosafluoro-3-oxaundecane-1-sulfonic acid (11CL-PF3OUdS)	NCL	<0.0068	<0.007	<0.0073	<0.0076	<0.0075	<0.0072	<0.0068	<0.0075	<0.0067	<0.007	<0.0074	<0.0077	<0.0068	<0.007	<0.0074	<0.0081
4,8-dioxa-3H-perfluorononanoic acid (ADONA)	NCL	<0.0068	<0.007	<0.0073	<0.0076	<0.0075	<0.0072	<0.0068	<0.0075	<0.0067	<0.007	<0.0074	<0.0077	<0.0068	<0.007	<0.0074	<0.0081
1H,1H,2H,2H-perfluorohexane sulfonate (4:2FTS)	NCL	<0.0068	<0.007	<0.0073	<0.0076	<0.0075	<0.0072	<0.0068	<0.0075	<0.0067	<0.007	<0.0074	<0.0077	<0.0068	<0.007	<0.0074	<0.0081
6:2 Fluorotelomer sulfonic acid (6:2 FTS)	NCL	<0.0068	<0.007	<0.0073	<0.0076	<0.0075	<0.0072	<0.0068	<0.0075	<0.0067	<0.007	<0.0074	<0.0077	<0.0068	<0.007	<0.0074	<0.0081
8:2 Fluorotelomer sulfonic acid (8:2 FTS)	NCL	<0.0068	<0.007	<0.0073	<0.0076	<0.0075	<0.0072	<0.0068	<0.0075	<0.0067	<0.007	<0.0074	<0.0077	<0.0068	<0.007	<0.0074	<0.0081
N-ethylperfluoro-1-octanesulfonamidoacetic acid (EtFOSAA)	NCL	<0.0068	<0.007	<0.0073	<0.0076	<0.0075	<0.0072	<0.0068	<0.0075	<0.0067	<0.007	<0.0074	<0.0077	<0.0068	<0.007	<0.0074	<0.0081
N-methylperfluoro-1-octanesulfonamidoacetic acid (MeFOSAA)	NCL	<0.0068	<0.007	<0.0073	<0.0076	<0.0075	<0.0072	<0.0068	<0.0075	<0.0067	<0.007	<0.0074	<0.0077	<0.0068	<0.007	<0.0074	<0.0081
Perfluorobutane sulfonic acid (PFBS)	0.42 (A)	0.0089	0.0083	<0.0037	0.0042	0.0042	<0.0036	<0.0034	0.008	0.006	<0.0035	0.0039	0.0039	0.0054	<0.0035	<0.0037	0.0048
Perfluorodecane sulfonic acid (PFDS)	NCL	<0.0034	<0.0035	<0.0037	<0.0038	<0.0038	<0.0036	<0.0034	<0.0037	<0.0034	<0.0035	<0.0037	<0.0038	<0.0034	<0.0035	<0.0037	<0.0041
Perfluoroheptane sulfonic acid (PFHpS)	NCL	<0.0034	<0.0035	<0.0037	<0.0038	<0.0038	<0.0036	<0.0034	<0.0037	<0.0034	<0.0035	<0.0037	<0.0038	<0.0034	<0.0035	<0.0037	<0.0041
Perfluorononane sulfonic acid (PFNS)	NCL	<0.0034	<0.0035	<0.0037	<0.0038	<0.0038	<0.0036	<0.0034	<0.0037	<0.0034	<0.0035	<0.0037	<0.0038	<0.0034	<0.0035	<0.0037	<0.0041
Perfluorooctane sulfonamide (FOSA)	NCL	<0.0034	<0.0035	<0.0037	<0.0038	<0.0038	<0.0036	<0.0034	<0.0037	<0.0034	<0.0035	<0.0037	<0.0038	<0.0034	<0.0035	<0.0037	<0.0041
Perfluoropentane sulfonic acid (PFPeS)	NCL	<0.0034	<0.0035	<0.0037	<0.0038	<0.0038	<0.0036	<0.0034	<0.0037	<0.0034	<0.0035	<0.0037	<0.0038	<0.0034	<0.0035	<0.0037	<0.0041
Perfluorohexane sulfonic acid (PFHxS)	0.051 (A)	0.01	0.0098	<0.0037	<0.0038	<0.0038	<0.0036	<0.0034	0.0037	<0.0034	<0.0035	<0.0037	<0.0038	<0.0034	<0.0035	<0.0037	<0.0041
Perfluorobutanoic acid (PFBA)	NCL	<0.0034	<0.0035	<0.0037	<0.0038	<0.0038	<0.0036	<0.0034	<0.0037	<0.0034	<0.0035	<0.0037	<0.0038	<0.0034	<0.0035	<0.0037	<0.0041
Perfluorodecanoic acid (PFDA)	NCL	<0.0034	<0.0035	<0.0037	<0.0038	<0.0038	<0.0036	<0.0034	<0.0037	<0.0034	<0.0035	<0.0037	<0.0038	<0.0034	<0.0035	<0.0037	<0.0041
Perfluorododecanoic acid (PFDoDA)	NCL	<0.0034	<0.0035	<0.0037	<0.0038	<0.0038	<0.0036	<0.0034	<0.0037	<0.0034	<0.0035	<0.0037	<0.0038	<0.0034	<0.0035	<0.0037	<0.0041
Perfluoroheptanoic acid (PFHpA)	NCL	<0.0034	<0.0035	<0.0037	<0.0038	<0.0038	<0.0036	<0.0034	<0.0037	<0.0034	<0.0035	<0.0037	<0.0038	<0.0034	<0.0035	<0.0037	<0.0041
Perfluorohexanoic acid (PFHxA)	400 (A)	<0.0034	<0.0035	<0.0037	<0.0038	<0.0038	<0.0036	<0.0034	0.0048	0.0048	<0.0035	<0.0037	<0.0038	<0.0034	<0.0035	<0.0037	<0.0041
Perfluorononanoic acid (PFNA)	0.006 (A)	<0.0034	<0.0035	<0.0037	<0.0038	<0.0038	<0.0036	<0.0034	<0.0037	<0.0034	<0.0035	<0.0037	<0.0038	<0.0034	<0.0035	<0.0037	<0.0041
Perfluorooctanoic acid (PFOA)	0.008 (A)	<0.0034	<0.0035	<0.0037	<0.0038	<0.0038	<0.0036	<0.0034	0.0077	0.0048	<0.0035	<0.0037	<0.0038	<0.0034	<0.0035	<0.0037	<0.0041
Perfluorooctane sulfonic acid (PFOS)	0.016 (A)	<0.0034	<0.0035	<0.0037	<0.0038	<0.0038	<0.0036	<0.0034	0.0045	<0.0034	<0.0035	<0.0037	<0.0038	<0.0034	<0.0035	<0.0037	<0.0041
Perfluoropentanoic acid (PFPeA)	NCL	<0.0034	<0.0035	<0.0037	<0.0038	<0.0038	<0.0036	<0.0034	0.0042	0.0047	0.0046	<0.0037	<0.0038	<0.0034	<0.0035	<0.0037	<0.0041
Perfluorotetradecanoic acid (PFTeDA)	NCL	<0.0034	<0.0035	<0.0037	<0.0038	<0.0038	<0.0036	<0.0034	<0.0037	<0.0034	<0.0035	<0.0037	<0.0038	<0.0034	<0.0035	<0.0037	<0.0041
Perfluorotridecanoic acid (PFTrDA)	NCL	<0.0034	<0.0035	<0.0037	<0.0038	<0.0038	<0.0036	<0.0034	<0.0037	<0.0034	<0.0035	<0.0037	<0.0038	<0.0034	<0.0035	<0.0037	<0.0041
Perfluoroundecanoic acid (PFUnDA)	NCL	<0.0034	<0.0035	<0.0037	<0.0038	<0.0038	<0.0036	<0.0034	<0.0037	<0.0034	<0.0035	<0.0037	<0.0038	<0.0034	<0.0035	<0.0037	<0.0041
Tetrafluoro-2-(heptafluoropropoxy)propanoic acid (GenX)	0.37 (A)	<0.0068	<0.007	<0.0073	<0.0076	<0.0075	<0.0072	<0.0068	<0.0075	<0.0067	<0.007	<0.0074	<0.0077	<0.0068	<0.007	<0.0074	<0.0081

TABLE 4B
SUMMARY OF GROUNDWATER SAMPLE ANALYSIS - PFAS
Perimeter (Dual Purpose)
Algoma & Plainfield Townships, Kent County, Michigan

Sample Event	Part 201 Generic Residential Groundwater Cleanup Criteria - Drinking Water[2]	Area 5 - Initial Sampling	Area 5 - Q1 2023	Area 5 - Initial Sampling	Area 5 - Initial Sampling	Area 5 - Q1 2023	Area 5 - Initial Sampling	Area 5 - Initial Sampling	Area 5 - Q1 2023	Area 5 - Initial Sampling	Area 5 - Q1 2023	Area 5 - Initial Sampling	Area 5 - Q1 2023	Area 5 - Initial Sampling	Area 5 - Q1 2023	Area 5 - Initial Sampling	Area 5 - Q1 2023
Well		AREA5-RI-8A	AREA5-RI-8A	AREA5-RI-8B	AREA5-RI-8B	AREA5-RI-8B	AREA5-RI-8C	AREA5-RI-8C	AREA5-RI-8C	AREA5-RI-9A	AREA5-RI-9A	AREA5-RI-9B	AREA5-RI-9B	AREA5-RI-9C	AREA5-RI-9C	AREA5-RI-11A	AREA5-RI-11A
Sample Name		Area5-RI-8A	Area5-RI-8A	Area5-RI-8B	Area5-RI-8B	Area5-RI-8B	Area5-RI-8C	Area5-RI-8C	Area5-RI-8C	AREA5-RI-9A	Area5-RI-9A	AREA5-RI-9B	Area5-RI-9B	AREA5-RI-9C	Area5-RI-9C	Area5-RI-11A	Area5-RI-11A
Screen Interval (feet below ground surface)		85.6-90.6	85.6-90.6	156.7-161.7	156.7-161.7	156.7-161.7	174.7-179.7	174.7-179.7	174.7-179.7	96.4-101.4	96.4-101.4	149-154	149-154	218.9-223.9	218.9-223.9	106.8-111.8	106.8-111.8
Laboratory Sample ID		XL05030-014	YB21008-003	WI23023-009	XL05030-016	YB21008-001	WI23023-010	XL05030-015	YB21008-002	XE27024-011	YB21008-004	XE27024-012	YB21008-006	XE27024-013	YB21008-005	XA24002-008	YC03023-004
Sample Date		12/01/2022	02/17/2023	09/15/2021	12/01/2022	02/17/2023	09/15/2021	12/01/2022	02/17/2023	05/25/2022	02/16/2023	05/25/2022	02/16/2023	05/25/2022	02/16/2023	01/19/2022	02/24/2023
Parameter (µg/L)																	
9-chlorohexadecafluoro-3-oxanone-1-sulfonic acid (9Cl-PF3ONS)	NCL	<0.0069	<0.0069	<0.0082	<0.0071	<0.0071	<0.0072	<0.0079	<0.0072	<0.0072	<0.0069	<0.007	<0.0069	<0.007	<0.0074	<0.0074	<0.0071
11-chloroeicosafluoro-3-oxaundecane-1-sulfonic acid (11CL-PF3OUdS)	NCL	<0.0069	<0.0069	<0.0082	<0.0071	<0.0071	<0.0072	<0.0079	<0.0072	<0.0072	<0.0069	<0.007	<0.0069	<0.007	<0.0074	<0.0074	<0.0071
4,8-dioxa-3H-perfluorononanoic acid (ADONA)	NCL	<0.0069	<0.0069	<0.0082	<0.0071	<0.0071	<0.0072	<0.0079	<0.0072	<0.0072	<0.0069	<0.007	<0.0069	<0.007	<0.0074	<0.0074	<0.0071
1H,1H,2H,2H-perfluorohexane sulfonate (4:2FTS)	NCL	<0.0069	<0.0069	<0.0082	<0.0071	<0.0071	<0.0072	<0.0079	<0.0072	<0.0072	<0.0069	<0.007	<0.0069	<0.007	<0.0074	<0.0074	<0.0071
6:2 Fluorotelomer sulfonic acid (6:2 FTS)	NCL	<0.0069	<0.0069	<0.0082	<0.0071	<0.0071	<0.0072	<0.0079	<0.0072	0.0073	<0.0069	<0.007	<0.0069	<0.007	<0.0074	<0.0074	<0.0071
8:2 Fluorotelomer sulfonic acid (8:2 FTS)	NCL	<0.0069	<0.0069	<0.0082	<0.0071	<0.0071	<0.0072	<0.0079	<0.0072	<0.0072	<0.0069	<0.007	<0.0069	<0.007	<0.0074	<0.0074	<0.0071
N-ethylperfluoro-1-octanesulfonamidoacetic acid (EtFOSAA)	NCL	<0.0069	<0.0069	<0.0082	<0.0071	<0.0071	<0.0072	<0.0079	<0.0072	<0.0072	<0.0069	<0.007	<0.0069	<0.007	<0.0074	<0.0074	<0.0071
N-methylperfluoro-1-octanesulfonamidoacetic acid (MeFOSAA)	NCL	<0.0069	<0.0069	<0.0082	<0.0071	<0.0071	<0.0072	<0.0079	<0.0072	<0.0072	<0.0069	<0.007	<0.0069	<0.007	<0.0074	<0.0074	<0.0071
Perfluorobutane sulfonic acid (PFBS)	0.42 (A)	<0.0035	<0.0034	<0.0041	<0.0035	<0.0035	0.0039	0.0047	0.0042	<0.0036	<0.0035	<0.0035	<0.0035	<0.0035	<0.0037	<0.0037	<0.0035
Perfluorodecane sulfonic acid (PFDS)	NCL	<0.0035	<0.0034	<0.0041	<0.0035	<0.0035	<0.0036	<0.004	<0.0036	<0.0036	<0.0035	<0.0035	<0.0035	<0.0035	<0.0037	<0.0037	<0.0035
Perfluoroheptane sulfonic acid (PFHpS)	NCL	<0.0035	<0.0034	<0.0041	<0.0035	<0.0035	<0.0036	<0.004	<0.0036	<0.0036	<0.0035	<0.0035	<0.0035	<0.0035	<0.0037	<0.0037	<0.0035
Perfluorononane sulfonic acid (PFNS)	NCL	<0.0035	<0.0034	<0.0041	<0.0035	<0.0035	<0.0036	<0.004	<0.0036	<0.0036	<0.0035	<0.0035	<0.0035	<0.0035	<0.0037	<0.0037	<0.0035
Perfluorooctane sulfonamide (FOSA)	NCL	<0.0035	<0.0034	<0.0041	<0.0035	<0.0035	<0.0036	<0.004	<0.0036	<0.0036	<0.0035	<0.0035	<0.0035	<0.0035	<0.0037	<0.0037	<0.0035
Perfluoropentane sulfonic acid (PFPeS)	NCL	<0.0035	<0.0034	<0.0041	<0.0035	<0.0035	<0.0036	<0.004	<0.0036	<0.0036	<0.0035	<0.0035	<0.0035	<0.0035	<0.0037	<0.0037	<0.0035
Perfluorohexane sulfonic acid (PFHxS)	0.051 (A)	<0.0035	<0.0034	<0.0041	<0.0035	<0.0035	<0.0036	<0.004	<0.0036	<0.0036	<0.0035	<0.0035	<0.0035	<0.0035	<0.0037	<0.0037	<0.0035
Perfluorobutanoic acid (PFBA)	NCL	<0.0035	<0.0034	<0.0041	<0.0035	<0.0035	<0.0036	<0.004	<0.0036	<0.0036	<0.0035	<0.0035	<0.0035	<0.0035	<0.0037	<0.0037	<0.0035
Perfluorodecanoic acid (PFDA)	NCL	<0.0035	<0.0034	<0.0041	<0.0035	<0.0035	<0.0036	<0.004	<0.0036	<0.0036	<0.0035	<0.0035	<0.0035	<0.0035	<0.0037	<0.0037	<0.0035
Perfluorododecanoic acid (PFDoDA)	NCL	<0.0035	<0.0034	<0.0041	<0.0035	<0.0035	<0.0036	<0.004	<0.0036	<0.0036	<0.0035	<0.0035	<0.0035	<0.0035	<0.0037	<0.0037	<0.0035
Perfluoroheptanoic acid (PFHpA)	NCL	<0.0035	<0.0034	<0.0041	<0.0035	<0.0035	<0.0036	<0.004	<0.0036	<0.0036	<0.0035	<0.0035	<0.0035	<0.0035	<0.0037	<0.0037	<0.0035
Perfluorohexanoic acid (PFHxA)	400 (A)	<0.0035	<0.0034	<0.0041	<0.0035	<0.0035	<0.0036	<0.004	<0.0036	<0.0036	<0.0035	<0.0035	<0.0035	<0.0035	<0.0037	<0.0037	<0.0035
Perfluorononanoic acid (PFNA)	0.006 (A)	<0.0035	<0.0034	<0.0041	<0.0035	<0.0035	<0.0036	<0.004	<0.0036	<0.0036	<0.0035	<0.0035	<0.0035	<0.0035	<0.0037	<0.0037	<0.0035
Perfluorooctanoic acid (PFOA)	0.008 (A)	<0.0035	<0.0034	<0.0041	<0.0035	<0.0035	<0.0036	<0.004	<0.0036	<0.0036	<0.0035	<0.0035	<0.0035	<0.0035	<0.0037	<0.0037	<0.0035
Perfluorooctane sulfonic acid (PFOS)	0.016 (A)	<0.0035	<0.0034	<0.0041	<0.0035	<0.0035	<0.0036	<0.004	<0.0036	<0.0036	<0.0035	<0.0035	<0.0035	<0.0035	<0.0037	<0.0037	<0.0035
Perfluoropentanoic acid (PFPeA)	NCL	<0.0035	<0.0034	<0.0041	<0.0035	<0.0035	<0.0036	<0.004	<0.0036	<0.0036	<0.0035	<0.0035	<0.0035	<0.0035	<0.0037	<0.0037	<0.0035
Perfluorotetradecanoic acid (PFTeDA)	NCL	<0.0035	<0.0034	<0.0041	<0.0035	<0.0035	<0.0036	<0.004	<0.0036	<0.0036	<0.0035	<0.0035	<0.0035	<0.0035	<0.0037	<0.0037	<0.0035
Perfluorotridecanoic acid (PFTrDA)	NCL	<0.0035	<0.0034	<0.0041	<0.0035	<0.0035	<0.0036	<0.004	<0.0036	<0.0036	<0.0035	<0.0035	<0.0035	<0.0035	<0.0037	<0.0037	<0.0035
Perfluoroundecanoic acid (PFUnDA)	NCL	<0.0035	<0.0034	<0.0041	<0.0035	<0.0035	<0.0036	<0.004	<0.0036	<0.0036	<0.0035	<0.0035	<0.0035	<0.0035	<0.0037	<0.0037	<0.0035
Tetrafluoro-2-(heptafluoropropoxy)propanoic acid (GenX)	0.37 (A)	<0.0069	<0.0069	<0.0082	<0.0071	<0.0071	<0.0072	<0.0079	<0.0072	<0.0072	<0.0069	<0.007	<0.0069	<0.007	<0.0074	<0.0074	<0.0071

TABLE 4B
SUMMARY OF GROUNDWATER SAMPLE ANALYSIS - PFAS
Perimeter (Dual Purpose)
Algoma & Plainfield Townships, Kent County, Michigan

Sample Event	Part 201 Generic Residential Groundwater Cleanup Criteria - Drinking Water[2]	Area 5 - Initial Sampling	Area 5 - Q1 2023	Area 5 - Initial Sampling	Area 5 - Q1 2023	Area 5 - Initial Sampling	Area 5 - Q1 2023	Area 5 - Initial Sampling	Area 5 - Q1 2023	Area 5 - Initial Sampling	Area 5 - Q1 2023	Area 5 - Q1 2023	Area 5 - Initial Sampling	Area 5 - Q1 2023	Area 5 - Initial Sampling	Area 5 - Q1 2023	Area 5 - Initial Sampling
Well		AREA5-RI-11B	AREA5-RI-11B	AREA5-RI-11C	AREA5-RI-11C	AREA5-RI-11D	AREA5-RI-11D	HS-PMW-RI-103A	HS-PMW-RI-103A	HS-PMW-RI-103B	HS-PMW-RI-103B	HS-PMW-RI-103B	HS-PMW-RI-104A	HS-PMW-RI-104A	HS-PMW-RI-104B	HS-PMW-RI-104B	HS-PMW-RI-104C
Sample Name		Area5-RI-11B	Area5-RI-11B	Area5-RI-11C	Area5-RI-11C	Area5-RI-11D	Area5-RI-11D	HS-PMW-RI-103A	HS-PMW-103A	HS-PMW-RI-103B	HS-PMW-103B	HS-PMW-103B-DUP	HS-PMW-RI-104A	HS-PMW-RI-104A	HS-PMW-RI-104B	HS-PMW-RI-104B	HS-PMW-RI-104C
Screen Interval (feet below ground surface)		137-142	137-142	229.5-234.5	229.5-234.5	259-264	259-264	87.2-92.2	87.2-92.2	106-111	106-111	106-111	15.1-20.1	15.1-20.1	45.9-50.9	45.9-50.9	74.8-79.8
Laboratory Sample ID		XA24002-006	YC03023-003	XA24002-007	YC03023-002	XA24002-009	YC03023-001	XE28011-001	YB24013-001	XE28011-002	YB24013-002	YB24013-003	XE27024-001	YB17027-003	XE27024-002	YB17027-004	XE27024-003
Sample Date		01/18/2022	02/24/2023	01/18/2022	02/24/2023	01/19/2022	02/24/2023	05/26/2022	02/21/2023	05/26/2022	02/21/2023	02/21/2023	05/23/2022	02/15/2023	05/23/2022	02/15/2023	05/23/2022
Parameter (µg/L)																	
9-chlorohexadecafluoro-3-oxanone-1-sulfonic acid (9Cl-PF3ONS)	NCL	<0.0079	<0.0074	<0.0074	<0.04	<0.0076	<0.08	<0.0074	<0.0071	<0.0072	<0.0068	<0.0071	<0.0073	<0.008	<0.0075	<0.0072	<0.0071
11-chloroeicosafluoro-3-oxaundecane-1-sulfonic acid (11CL-PF3OUdS)	NCL	<0.0079	<0.0074	<0.0074	<0.04	<0.0076	<0.08	<0.0074	<0.0071	<0.0072	<0.0068	<0.0071	<0.0073	<0.008	<0.0075	<0.0072	<0.0071
4,8-dioxa-3H-perfluorononanoic acid (ADONA)	NCL	<0.0079	<0.0074	<0.0074	<0.04	<0.0076	<0.08	<0.0074	<0.0071	<0.0072	<0.0068	<0.0071	<0.0073	<0.008	<0.0075	<0.0072	<0.0071
1H,1H,2H,2H-perfluorohexane sulfonate (4:2FTS)	NCL	<0.0079	<0.0074	<0.0074	<0.04	<0.0076	<0.08	<0.0074	<0.0071	<0.0072	<0.0068	<0.0071	<0.0073	<0.008	<0.0075	<0.0072	<0.0071
6:2 Fluorotelomer sulfonic acid (6:2 FTS)	NCL	<0.0079	<0.0074	<0.0074	<0.04	<0.0076	<0.08	0.3	<0.0071	<0.0072	<0.0068	<0.0071	<0.0073	<0.008	<0.0075	<0.0072	<0.0071
8:2 Fluorotelomer sulfonic acid (8:2 FTS)	NCL	<0.0079	<0.0074	<0.0074	<0.04	<0.0076	<0.08	<0.0074	<0.0071	<0.0072	<0.0068	<0.0071	<0.0073	<0.008	<0.0075	<0.0072	<0.0071
N-ethylperfluoro-1-octanesulfonamidoacetic acid (EtFOSAA)	NCL	<0.0079	<0.0074	<0.0074	<0.04	<0.0076	<0.08	<0.0074	<0.0071	<0.0072	<0.0068	<0.0071	<0.0073	<0.008	<0.0075	<0.0072	<0.0071
N-methylperfluoro-1-octanesulfonamidoacetic acid (MeFOSAA)	NCL	<0.0079	<0.0074	<0.0074	<0.04	<0.0076	<0.08	<0.0074	<0.0071	<0.0072	<0.0068	<0.0071	<0.0073	<0.008	<0.0075	<0.0072	<0.0071
Perfluorobutane sulfonic acid (PFBS)	0.42 (A)	<0.004	<0.0037	0.0047	<0.02	<0.0038	<0.04	0.0058	0.014	0.0047	0.0042	0.0047	0.0043	0.012	0.0052	0.0066	0.18
Perfluorodecane sulfonic acid (PFDS)	NCL	<0.004	<0.0037	<0.0037	<0.02	<0.0038	<0.04	<0.0037	<0.0036	<0.0036	<0.0034	<0.0035	<0.0037	<0.004	<0.0038	<0.0036	<0.0036
Perfluoroheptane sulfonic acid (PFHpS)	NCL	<0.004	<0.0037	<0.0037	<0.02	<0.0038	<0.04	<0.0037	<0.0036	<0.0036	<0.0034	<0.0035	<0.0037	<0.004	<0.0038	<0.0036	<0.0036
Perfluorononane sulfonic acid (PFNS)	NCL	<0.004	<0.0037	<0.0037	<0.02	<0.0038	<0.04	<0.0037	<0.0036	<0.0036	<0.0034	<0.0035	<0.0037	<0.004	<0.0038	<0.0036	<0.0036
Perfluorooctane sulfonamide (FOSA)	NCL	<0.004	<0.0037	<0.0037	<0.02	<0.0038	<0.04	<0.0037	<0.0036	<0.0036	<0.0034	<0.0035	<0.0037	<0.004	<0.0038	<0.0036	<0.0036
Perfluoropentane sulfonic acid (PFPeS)	NCL	<0.004	<0.0037	<0.0037	<0.02	<0.0038	<0.04	0.0042	0.0091	0.0039	0.0043	0.0046	<0.0037	<0.004	<0.0038	<0.0036	0.12
Perfluorohexane sulfonic acid (PFHxS)	0.051 (A)	<0.004	<0.0037	<0.0037	<0.02	<0.0038	<0.04	0.0074	0.011	0.009	0.011	0.0098	<0.0037	0.0055	<0.0038	<0.0036	***0.08***
Perfluorobutanoic acid (PFBA)	NCL	<0.004	<0.0037	<0.0037	<0.02	<0.0038	<0.04	<0.0037	<0.0036	<0.0036	<0.0034	<0.0035	0.0039	0.0054	<0.0038	0.0054	0.063
Perfluorodecanoic acid (PFDA)	NCL	<0.004	<0.0037	<0.0037	<0.02	<0.0038	<0.04	<0.0037	<0.0036	<0.0036	<0.0034	<0.0035	<0.0037	<0.004	<0.0038	<0.0036	<0.0036
Perfluorododecanoic acid (PFDoDA)	NCL	<0.004	<0.0037	<0.0037	<0.02	<0.0038	<0.04	<0.0037	<0.0036	<0.0036	<0.0034	<0.0035	<0.0037	<0.004	<0.0038	<0.0036	<0.0036
Perfluoroheptanoic acid (PFHpA)	NCL	<0.004	<0.0037	<0.0037	<0.02	<0.0038	<0.04	<0.0037	<0.0036	<0.0036	<0.0034	<0.0035	<0.0037	0.0052	<0.0038	<0.0036	0.08
Perfluorohexanoic acid (PFHxA)	400 (A)	<0.004	<0.0037	<0.0037	<0.02	<0.0038	<0.04	<0.0037	<0.0036	<0.0036	<0.0034	<0.0035	<0.0037	0.0069	<0.0038	0.0036	0.12
Perfluorononanoic acid (PFNA)	0.006 (A)	<0.004	<0.0037	<0.0037	<0.02	<0.0038	<0.04	<0.0037	<0.0036	<0.0036	<0.0034	<0.0035	<0.0037	<0.004	<0.0038	<0.0036	<0.0036
Perfluorooctanoic acid (PFOA)	0.008 (A)	<0.004	<0.0037	<0.0037	<0.02	<0.0038	<0.04	<0.0037	0.0044	<0.0036	<0.0034	<0.0035	0.0048	***0.015***	<0.0038	<0.0036	***0.13***
Perfluorooctane sulfonic acid (PFOS)	0.016 (A)	<0.004	<0.0037	<0.0037	<0.02	<0.0038	<0.04	<0.0037	<0.0036	<0.0036	<0.0034	<0.0035	0.015	***0.026***	<0.0038	<0.0036	<0.0036
Perfluoropentanoic acid (PFPeA)	NCL	<0.004	<0.0037	<0.0037	<0.02	<0.0038	<0.04	<0.0037	<0.0036	<0.0036	<0.0034	<0.0035	<0.0037	<0.004	<0.0038	<0.0036	0.064
Perfluorotetradecanoic acid (PFTeDA)	NCL	<0.004	<0.0037	<0.0037	<0.02	<0.0038	<0.04	<0.0037	<0.0036	<0.0036	<0.0034	<0.0035	<0.0037	<0.004	<0.0038	<0.0036	<0.0036
Perfluorotridecanoic acid (PFTrDA)	NCL	<0.004	<0.0037	<0.0037	<0.02	<0.0038	<0.04	<0.0037	<0.0036	<0.0036	<0.0034	<0.0035	<0.0037	<0.004	<0.0038	<0.0036	<0.0036
Perfluoroundecanoic acid (PFUnDA)	NCL	<0.004	<0.0037	<0.0037	<0.02	<0.0038	<0.04	<0.0037	<0.0036	<0.0036	<0.0034	<0.0035	<0.0037	<0.004	<0.0038	<0.0036	<0.0036
Tetrafluoro-2-(heptafluoropropoxy)propanoic acid (GenX)	0.37 (A)	<0.0079	<0.0074	<0.0074	<0.04	<0.0076	<0.08	<0.0074	<0.0071	<0.0072	<0.0068	<0.0071	<0.0073	<0.008	<0.0075	<0.0072	<0.0071

TABLE 4B
SUMMARY OF GROUNDWATER SAMPLE ANALYSIS - PFAS
Perimeter (Dual Purpose)
Algoma & Plainfield Townships, Kent County, Michigan

Sample Event	Part 201 Generic Residential Groundwater Cleanup Criteria - Drinking Water[2]	Area 5 - Q1 2023	Area 5 - Initial Sampling	Area 5 - Q1 2023	Area 5 - Initial Sampling	Area 5 - Q1 2023	Area 5 - Initial Sampling	Area 5 - Q1 2023	Area 5 - Initial Sampling	Area 5 - Q1 2023	Area 5 - Initial Sampling	Area 5 - Initial Sampling	Area 5 - Q1 2023	Area 6 - Initial Sampling	Area 6 - Q4 2022	Area 6 - Q1 2023	Area 6 - Initial Sampling
Well		HS-PMW-RI-104C	HS-PMW-RI-104D	HS-PMW-RI-104D	HS-PMW-RI-107A	HS-PMW-RI-107A	HS-PMW-RI-107B	HS-PMW-RI-107B	HS-PMW-RI-107C	HS-PMW-RI-107C	HS-PMW-RI-107D	HS-PMW-RI-107D	HS-PMW-RI-107D	HS-PMW-RI-108A	HS-PMW-RI-108A	HS-PMW-RI-108A	HS-PMW-RI-108B
Sample Name		HS-PMW-RI-104C	HS-PMW-RI-104D	HS-PMW-RI-104D	HS-PMW-RI-107A	HS-PMW-RI-107A	HS-PMW-RI-107B	HS-PMW-RI-107B	HS-PMW-RI-107C	HS-PMW-RI-107C	HS-PMW-RI-107D	HS-PMW-RI-107D (DUP)	HS-PMW-RI-107D	HS-PMW-RI-108A	HS-PMW-RI-108A	HS-PMW-RI-108A	HS-PMW-RI-108B
Screen Interval (feet below ground surface)		74.8-79.8	112.1-117.1	112.1-117.1	76.5-81.5	76.5-81.5	172.7-177.7	172.7-177.7	182.8-187.8	182.8-187.8	197.8-202.8	197.8-202.8	197.8-202.8	65.8-70.8	65.8-70.8	65.8-70.8	132.1-137.1
Laboratory Sample ID		YB17027-002	XE27024-004	YB17027-001	XE27024-005	YC03024-004	XE27024-006	YC03024-005	XE27024-007	YC03024-003	XE27024-008	XE27024-009	YC03024-002	WI23023-015	XJ11042-004	YC16017-001	WI23023-016
Sample Date		02/15/2023	05/23/2022	02/15/2023	05/24/2022	03/01/2023	05/24/2022	03/01/2023	05/24/2022	03/01/2023	05/24/2022	05/24/2022	03/01/2023	09/16/2021	10/05/2022	03/14/2023	09/16/2021
Parameter (µg/L)																	
9-chlorohexadecafluoro-3-oxanone-1-sulfonic acid (9Cl-PF3ONS)	NCL	<0.007	<0.0072	<0.0074	<0.0071	<0.007	<0.0074	<0.08	<0.0078	<0.0072	<0.0071	<0.007	<0.017	<0.0076	<0.0079	<0.0079	<0.0073
11-chloroeicosafluoro-3-oxaundecane-1-sulfonic acid (11CL-PF3OUdS)	NCL	<0.007	<0.0072	<0.0074	<0.0071	<0.007	<0.0074	<0.08	<0.0078	<0.0072	<0.0071	<0.007	<0.017	<0.0076	<0.0079	<0.0079	<0.0073
4,8-dioxa-3H-perfluorononanoic acid (ADONA)	NCL	<0.007	<0.0072	<0.0074	<0.0071	<0.007	<0.0074	<0.08	<0.0078	<0.0072	<0.0071	<0.007	<0.017	<0.0076	<0.0079	<0.0079	<0.0073
1H,1H,2H,2H-perfluorohexane sulfonate (4:2FTS)	NCL	<0.007	<0.0072	<0.0074	<0.0071	<0.007	<0.0074	<0.08	<0.0078	<0.0072	<0.0071	<0.007	<0.017	<0.0076 [UJ]	<0.0079	<0.0079	<0.0073
6:2 Fluorotelomer sulfonic acid (6:2 FTS)	NCL	<0.007	<0.0072	<0.0074	<0.0071	<0.007	<0.0074	<0.08	<0.0078	<0.0072	<0.0071	<0.007	<0.017	<0.0076	<0.0079	<0.0079	<0.0073
8:2 Fluorotelomer sulfonic acid (8:2 FTS)	NCL	<0.007	<0.0072	<0.0074	<0.0071	<0.007	<0.0074	<0.08	<0.0078	<0.0072	<0.0071	<0.007	<0.017	<0.0076	<0.0079	<0.0079	<0.0073
N-ethylperfluoro-1-octanesulfonamidoacetic acid (EtFOSAA)	NCL	<0.007	<0.0072	<0.0074	<0.0071	<0.007	<0.0074	<0.08	<0.0078	<0.0072	<0.0071	<0.007	<0.017	<0.0076	<0.0079	<0.0079	<0.0073
N-methylperfluoro-1-octanesulfonamidoacetic acid (MeFOSAA)	NCL	<0.007	<0.0072	<0.0074	<0.0071	<0.007	<0.0074	<0.08	<0.0078	<0.0072	<0.0071	<0.007	<0.017	<0.0076	<0.0079	<0.0079	<0.0073
Perfluorobutane sulfonic acid (PFBS)	0.42 (A)	0.13	<0.0036	<0.0037	<0.0036	<0.0035	0.0037	<0.04	<0.0039	0.004	<0.0036	<0.0035	<0.0085	<0.0038	<0.004	<0.004	<0.0036
Perfluorodecane sulfonic acid (PFDS)	NCL	<0.0035	<0.0036	<0.0037	<0.0036	<0.0035	<0.0037	<0.04	<0.0039	<0.0036	<0.0036	<0.0035	<0.0085	<0.0038	<0.004	<0.004	<0.0036
Perfluoroheptane sulfonic acid (PFHpS)	NCL	<0.0035	<0.0036	<0.0037	<0.0036	<0.0035	<0.0037	<0.04	<0.0039	<0.0036	<0.0036	<0.0035	<0.0085	<0.0038	<0.004	<0.004	<0.0036
Perfluorononane sulfonic acid (PFNS)	NCL	<0.0035	<0.0036	<0.0037	<0.0036	<0.0035	<0.0037	<0.04	<0.0039	<0.0036	<0.0036	<0.0035	<0.0085	<0.0038	<0.004	<0.004	<0.0036
Perfluorooctane sulfonamide (FOSA)	NCL	<0.0035	<0.0036	<0.0037	<0.0036	<0.0035	<0.0037	<0.04	<0.0039	<0.0036	<0.0036	<0.0035	<0.0085	<0.0038	<0.004	<0.004	<0.0036
Perfluoropentane sulfonic acid (PFPeS)	NCL	0.11	<0.0036	<0.0037	<0.0036	<0.0035	<0.0037	<0.04	<0.0039	<0.0036	<0.0036	<0.0035	<0.0085	<0.0038	<0.004	<0.004	<0.0036
Perfluorohexane sulfonic acid (PFHxS)	0.051 (A)	***0.072***	<0.0036	<0.0037	<0.0036	<0.0035	<0.0037	<0.04	<0.0039	<0.0036	<0.0036	<0.0035	<0.0085	<0.0038	<0.004	<0.004	<0.0036
Perfluorobutanoic acid (PFBA)	NCL	0.042	<0.0036	<0.0037	<0.0036	<0.0035	<0.0037	<0.04	<0.0039	<0.0036	<0.0036	<0.0035	<0.0085	<0.0038	<0.004	<0.004	<0.0036
Perfluorodecanoic acid (PFDA)	NCL	<0.0035	<0.0036	<0.0037	<0.0036	<0.0035	<0.0037	<0.04	<0.0039	<0.0036	<0.0036	<0.0035	<0.0085	<0.0038	<0.004	<0.004	<0.0036
Perfluorododecanoic acid (PFDoDA)	NCL	<0.0035	<0.0036	<0.0037	<0.0036	<0.0035	<0.0037	<0.04	<0.0039	<0.0036	<0.0036	<0.0035	<0.0085	<0.0038	<0.004	<0.004	<0.0036
Perfluoroheptanoic acid (PFHpA)	NCL	0.059	<0.0036	<0.0037	<0.0036	<0.0035	<0.0037	<0.04	<0.0039	<0.0036	<0.0036	<0.0035	<0.0085	<0.0038	<0.004	<0.004	<0.0036
Perfluorohexanoic acid (PFHxA)	400 (A)	0.095	<0.0036	<0.0037	<0.0036	<0.0035	<0.0037	<0.04	<0.0039	<0.0036	<0.0036	<0.0035	<0.0085	<0.0038	<0.004	<0.004	<0.0036
Perfluorononanoic acid (PFNA)	0.006 (A)	<0.0035	<0.0036	<0.0037	<0.0036	<0.0035	<0.0037	<0.04	<0.0039	<0.0036	<0.0036	<0.0035	<0.0085	<0.0038	<0.004	<0.004	<0.0036
Perfluorooctanoic acid (PFOA)	0.008 (A)	***0.12***	<0.0036	<0.0037	<0.0036	<0.0035	<0.0037	<0.04	<0.0039	<0.0036	<0.0036	<0.0035	<0.0085	<0.0038	<0.004	<0.004	<0.0036
Perfluorooctane sulfonic acid (PFOS)	0.016 (A)	<0.0035	<0.0036	<0.0037	<0.0036	<0.0035	<0.0037	<0.04	<0.0039	<0.0036	<0.0036	<0.0035	0.0094	<0.0038	<0.004	<0.004	<0.0036
Perfluoropentanoic acid (PFPeA)	NCL	0.05	<0.0036	<0.0037	<0.0036	<0.0035	<0.0037	<0.04	<0.0039	<0.0036	<0.0036	<0.0035	<0.0085	<0.0038	<0.004	<0.004	<0.0036
Perfluorotetradecanoic acid (PFTeDA)	NCL	<0.0035	<0.0036	<0.0037	<0.0036	<0.0035	<0.0037	<0.04	<0.0039	<0.0036	<0.0036	<0.0035	<0.0085	<0.0038	<0.004	<0.004	<0.0036
Perfluorotridecanoic acid (PFTrDA)	NCL	<0.0035	<0.0036	<0.0037	<0.0036	<0.0035	<0.0037	<0.04	<0.0039	<0.0036	<0.0036	<0.0035	<0.0085	<0.0038	<0.004	<0.004	<0.0036
Perfluoroundecanoic acid (PFUnDA)	NCL	<0.0035	<0.0036	<0.0037	<0.0036	<0.0035	<0.0037	<0.04	<0.0039	<0.0036	<0.0036	<0.0035	<0.0085	<0.0038	<0.004	<0.004	<0.0036
Tetrafluoro-2-(heptafluoropropoxy)propanoic acid (GenX)	0.37 (A)	<0.007	<0.0072	<0.0074	<0.0071	<0.007	<0.0074	<0.08	<0.0078	<0.0072	<0.0071	<0.007	<0.017	<0.0076	<0.0079	<0.0079	<0.0073

TABLE 4B
SUMMARY OF GROUNDWATER SAMPLE ANALYSIS - PFAS
Perimeter (Dual Purpose)
Algoma & Plainfield Townships, Kent County, Michigan

Sample Event	Part 201 Generic Residential Groundwater Cleanup Criteria - Drinking Water[2]	Area 6 - Q4 2022	Area 6 - Q1 2023	Area 6 - Initial Sampling	Area 6 - Q4 2022	Area 6 - Q1 2023	Area 6 - Q4 2022	Area 6 - Q1 2023	Area 6 - Q4 2022	Area 6 - Q1 2023	Area 6 - Q4 2022	Area 6 - Q1 2023	Area 11 12 - Q4 2022	Area 11 12 - Q1 2023	Area 11 12 - Q4 2022	Area 11 12 - Q1 2023	Area 11 12 - Initial Sampling
Well		HS-PMW-RI-108B	HS-PMW-RI-108B	HS-PMW-RI-108D	HS-PMW-RI-108D	HS-PMW-RI-108D	HS-PMW-RI-109A	HS-PMW-RI-109A	HS-PMW-RI-109B	HS-PMW-RI-109B	HS-PMW-RI-109C	HS-PMW-RI-109C	HS-PMW-RI-111A	HS-PMW-RI-111A	HS-PMW-RI-111B	HS-PMW-RI-111B	HS-PMW-RI-112A
Sample Name		HS-PMW-RI-108B	HS-PMW-RI-108B	HS-PMW-RI-108D	HS-PMW-RI-108D	HS-PMW-RI-108D	HS-PMW-RI-109A	HS-PMW-RI-109A	HS-PMW-RI-109B	HS-PMW-RI-109B	HS-PMW-RI-109C	HS-PMW-RI-109C	HS-PMW-RI-111A	HS-PMW-RI-111A	HS-PMW-RI-111B	HS-PMW-RI-111B	HS-PMW-RI-112A
Screen Interval (feet below ground surface)		132.1-137.1	132.1-137.1	223.3-228.3	223.3-228.3	223.3-228.3	14-19	14-19	125-130	125-130	144.1-149.1	144.1-149.1	10.2-15.2	10.2-15.2	45-50	45-50	24.7-29.7
Laboratory Sample ID		XJ11042-005	YC16017-002	WI23023-017	XJ11042-006	YC16017-005	XJ11042-001	YC16017-003	XJ11042-002	YC16017-006	XJ11042-003	YC16017-004	XJ11041-006	YB08035-002	XJ11041-007	YB08035-001	XE27022-001
Sample Date		10/05/2022	03/14/2023	09/17/2021	10/05/2022	03/14/2023	10/07/2022	03/14/2023	10/04/2022	03/14/2023	10/04/2022	03/14/2023	10/07/2022	02/01/2023	10/07/2022	02/01/2023	05/23/2022
Parameter (µg/L)																	
9-chlorohexadecafluoro-3-oxanone-1-sulfonic acid (9Cl-PF3ONS)	NCL	<0.007	<0.0068	<0.0071	<0.0073	<0.008	<0.0078	<0.0072	<0.0073	<0.0071	<0.0074	<0.007	<0.0072	<0.0071	<0.0069	<0.0084	<0.0072
11-chloroeicosafluoro-3-oxaundecane-1-sulfonic acid (11CL-PF3OUdS)	NCL	<0.007	<0.0068	<0.0071	<0.0073	<0.008	<0.0078	<0.0072	<0.0073	<0.0071	<0.0074	<0.007	<0.0072	<0.0071	<0.0069	<0.0084	<0.0072
4,8-dioxa-3H-perfluorononanoic acid (ADONA)	NCL	<0.007	<0.0068	<0.0071	<0.0073	<0.008	<0.0078	<0.0072	<0.0073	<0.0071	<0.0074	<0.007	<0.0072	<0.0071	<0.0069	<0.0084	<0.0072
1H,1H,2H,2H-perfluorohexane sulfonate (4:2FTS)	NCL	<0.007	<0.0068	<0.0071	<0.0073	<0.008	<0.0078	<0.0072	<0.0073	<0.0071	<0.0074	<0.007	<0.0072	<0.0071	<0.0069	<0.0084	<0.0072
6:2 Fluorotelomer sulfonic acid (6:2 FTS)	NCL	<0.007	<0.0068	<0.0071	<0.0073	<0.008	<0.0078	<0.0072	0.018	<0.0071	<0.0074	<0.007	<0.0072	<0.0071	<0.0069	<0.0084	<0.0072
8:2 Fluorotelomer sulfonic acid (8:2 FTS)	NCL	<0.007	<0.0068	<0.0071	<0.0073	<0.008	<0.0078	<0.0072	<0.0073	<0.0071	<0.0074	<0.007	<0.0072	<0.0071	<0.0069	<0.0084	<0.0072
N-ethylperfluoro-1-octanesulfonamidoacetic acid (EtFOSAA)	NCL	<0.007	<0.0068	<0.0071	<0.0073	<0.008	<0.0078	<0.0072	<0.0073	<0.0071	<0.0074	<0.007	<0.0072	<0.0071	<0.0069	<0.0084	<0.0072
N-methylperfluoro-1-octanesulfonamidoacetic acid (MeFOSAA)	NCL	<0.007	<0.0068	<0.0071	<0.0073	<0.008	<0.0078	<0.0072	<0.0073	<0.0071	<0.0074	<0.007	<0.0072	<0.0071	<0.0069	<0.0084	<0.0072
Perfluorobutane sulfonic acid (PFBS)	0.42 (A)	<0.0035	<0.0034	<0.0035	<0.0036	<0.004	<0.0039	<0.0036	0.012	0.013	<0.0037	<0.0035	0.0067	0.009	0.011	0.0091	0.0062
Perfluorodecane sulfonic acid (PFDS)	NCL	<0.0035	<0.0034	<0.0035	<0.0036	<0.004	<0.0039	<0.0036	<0.0036	<0.0035	<0.0037	<0.0035	<0.0036	<0.0036	<0.0035	<0.0042	<0.0036
Perfluoroheptane sulfonic acid (PFHpS)	NCL	<0.0035	<0.0034	<0.0035	<0.0036	<0.004	<0.0039	<0.0036	<0.0036	<0.0035	<0.0037	<0.0035	0.0039	0.0042	<0.0035	<0.0042	<0.0036
Perfluorononane sulfonic acid (PFNS)	NCL	<0.0035	<0.0034	<0.0035	<0.0036	<0.004	<0.0039	<0.0036	<0.0036	<0.0035	<0.0037	<0.0035	<0.0036	<0.0036	<0.0035	<0.0042	<0.0036
Perfluorooctane sulfonamide (FOSA)	NCL	<0.0035	<0.0034	<0.0035	<0.0036	<0.004	<0.0039	<0.0036	<0.0036	<0.0035	<0.0037	<0.0035	<0.0036	<0.0036	<0.0035	<0.0042	<0.0036
Perfluoropentane sulfonic acid (PFPeS)	NCL	<0.0035	<0.0034	<0.0035	<0.0036	<0.004	<0.0039	<0.0036	<0.0036	<0.0035	<0.0037	<0.0035	<0.0036	<0.0036	<0.0035	<0.0042	<0.0036
Perfluorohexane sulfonic acid (PFHxS)	0.051 (A)	<0.0035	<0.0034	<0.0035	<0.0036	<0.004	<0.0039	<0.0036	<0.0036	<0.0035	<0.0037	<0.0035	0.0096	0.007	0.0061	0.0049	0.011
Perfluorobutanoic acid (PFBA)	NCL	<0.0035	<0.0034	<0.0035	<0.0036	<0.004	<0.0039	<0.0036	<0.0036	<0.0035	<0.0037	<0.0035	0.0043	<0.0036	<0.0035	<0.0042	0.0041
Perfluorodecanoic acid (PFDA)	NCL	<0.0035	<0.0034	<0.0035	<0.0036	<0.004	<0.0039	<0.0036	<0.0036	<0.0035	<0.0037	<0.0035	<0.0036	<0.0036	<0.0035	<0.0042	<0.0036
Perfluorododecanoic acid (PFDoDA)	NCL	<0.0035	<0.0034	<0.0035	<0.0036	<0.004	<0.0039	<0.0036	<0.0036	<0.0035	<0.0037	<0.0035	<0.0036	<0.0036	<0.0035	<0.0042	<0.0036
Perfluoroheptanoic acid (PFHpA)	NCL	<0.0035	<0.0034	<0.0035	<0.0036	<0.004	<0.0039	<0.0036	<0.0036	<0.0035	<0.0037	<0.0035	<0.0036	<0.0036	<0.0035	<0.0042	<0.0036
Perfluorohexanoic acid (PFHxA)	400 (A)	<0.0035	<0.0034	<0.0035	<0.0036	<0.004	<0.0039	<0.0036	<0.0036	<0.0035	<0.0037	<0.0035	0.0061	0.0051	0.0076	<0.0042	0.0078
Perfluorononanoic acid (PFNA)	0.006 (A)	<0.0035	<0.0034	<0.0035	<0.0036	<0.004	<0.0039	<0.0036	<0.0036	<0.0035	<0.0037	<0.0035	<0.0036	<0.0036	<0.0035	<0.0042	<0.0036
Perfluorooctanoic acid (PFOA)	0.008 (A)	<0.0035	<0.0034	<0.0035	<0.0036	<0.004	<0.0039	<0.0036	<0.0036	<0.0035	<0.0037	<0.0035	***0.018***	***0.019***	0.0068	0.0047	***0.014***
Perfluorooctane sulfonic acid (PFOS)	0.016 (A)	<0.0035	<0.0034	<0.0035	<0.0036	<0.004	0.0056	0.0045	<0.0036	<0.0035	<0.0037	<0.0035	***0.035***	***0.043***	0.0068	0.0068	***0.019***
Perfluoropentanoic acid (PFPeA)	NCL	<0.0035	<0.0034	<0.0035	<0.0036	<0.004	<0.0039	<0.0036	<0.0036	<0.0035	<0.0037	<0.0035	<0.0036	<0.0036	0.0057	<0.0042	0.0048
Perfluorotetradecanoic acid (PFTeDA)	NCL	<0.0035	<0.0034	<0.0035	<0.0036	<0.004	<0.0039	<0.0036	<0.0036	<0.0035	<0.0037	<0.0035	<0.0036	<0.0036	<0.0035	<0.0042	<0.0036
Perfluorotridecanoic acid (PFTrDA)	NCL	<0.0035	<0.0034	<0.0035	<0.0036	<0.004	<0.0039	<0.0036	<0.0036	<0.0035	<0.0037	<0.0035	<0.0036	<0.0036	<0.0035	<0.0042	<0.0036
Perfluoroundecanoic acid (PFUnDA)	NCL	<0.0035	<0.0034	<0.0035	<0.0036	<0.004	<0.0039	<0.0036	<0.0036	<0.0035	<0.0037	<0.0035	<0.0036	<0.0036	<0.0035	<0.0042	<0.0036
Tetrafluoro-2-(heptafluoropropoxy)propanoic acid (GenX)	0.37 (A)	<0.007	<0.0068	<0.0071	<0.0073	<0.008	<0.0078	<0.0072	<0.0073	<0.0071	<0.0074	<0.007	<0.0072	<0.0071	<0.0069	<0.0084	<0.0072

TABLE 4B
SUMMARY OF GROUNDWATER SAMPLE ANALYSIS - PFAS
Perimeter (Dual Purpose)
Algoma & Plainfield Townships, Kent County, Michigan

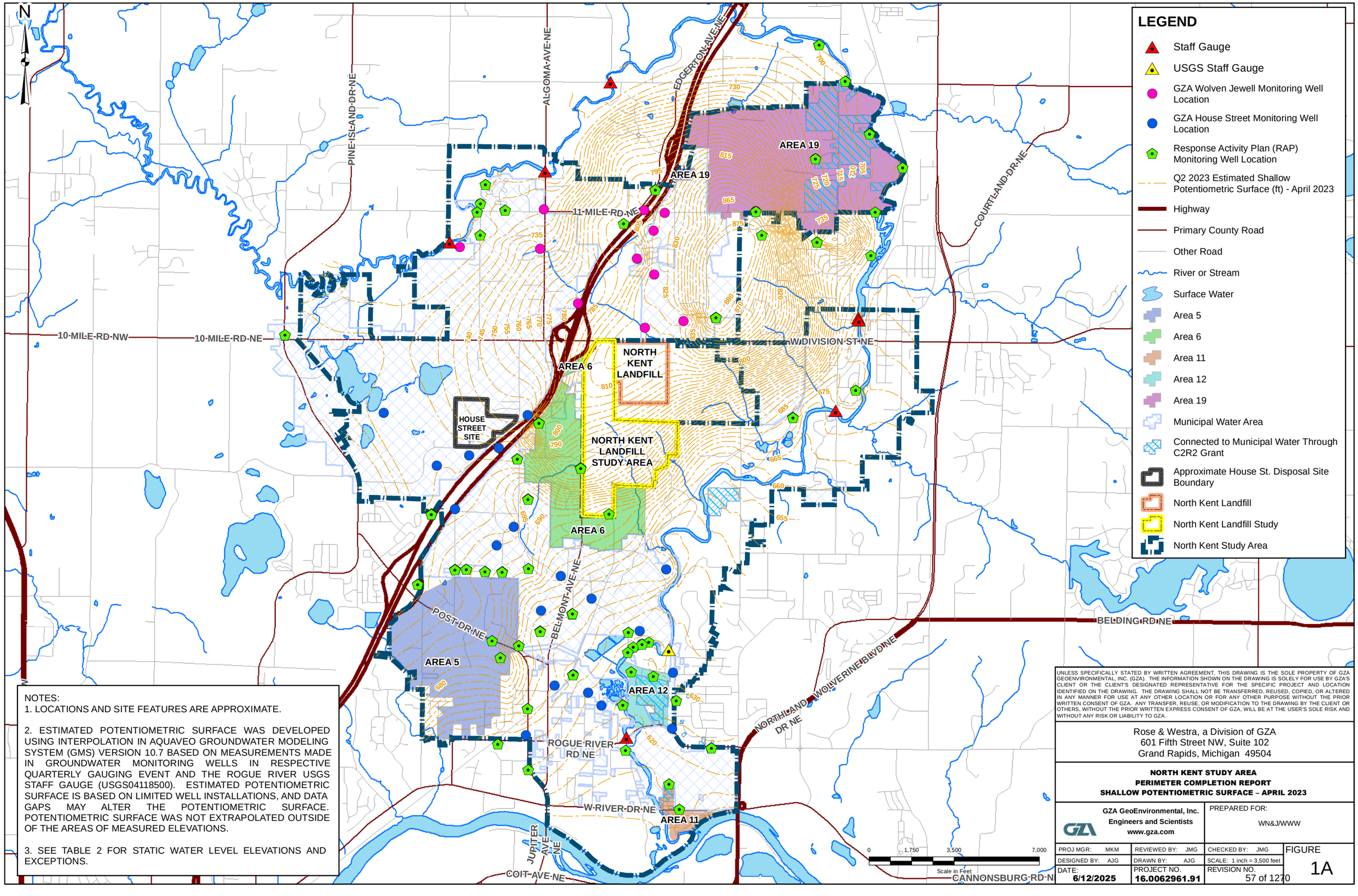
Sample Event	Part 201 Generic Residential Groundwater Cleanup Criteria - Drinking Water[2]	Area 11 12 - Q4 2022	Area 11 12 - Q1 2023	Area 11 12 - Initial Sampling	Area 11 12 - Q4 2022	Area 11 12 - Q1 2023
Well		HS-PMW-RI-112A	HS-PMW-RI-112A	HS-PMW-RI-112B	HS-PMW-RI-112B	HS-PMW-RI-112B
Sample Name		HS-PMW-RI-112A	HS-PMW-RI-112A	HS-PMW-RI-112B	HS-PMW-RI-112B	HS-PMW-RI-112B
Screen Interval (feet below ground surface)		24.7-29.7	24.7-29.7	69.8-74.8	69.8-74.8	69.8-74.8
Laboratory Sample ID		XJ11041-001	YB08035-004	XE27022-002	XJ11041-002	YB08035-003
Sample Date		10/05/2022	02/01/2023	05/23/2022	10/05/2022	02/01/2023
Parameter (µg/L)						
9-chlorohexadecafluoro-3-oxanone-1-sulfonic acid (9Cl-PF3ONS)	NCL	<0.0075	<0.0073	<0.0072	<0.0075	<0.0075
11-chloroeicosafluoro-3-oxaundecane-1-sulfonic acid (11CL-PF3OUdS)	NCL	<0.0075	<0.0073	<0.0072	<0.0075	<0.0075
4,8-dioxa-3H-perfluorononanoic acid (ADONA)	NCL	<0.0075	<0.0073	<0.0072	<0.0075	<0.0075
1H,1H,2H,2H-perfluorohexane sulfonate (4:2FTS)	NCL	<0.0075	<0.0073	<0.0072	<0.0075	<0.0075
6:2 Fluorotelomer sulfonic acid (6:2 FTS)	NCL	<0.0075	<0.0073	<0.0072	<0.0075	<0.0075
8:2 Fluorotelomer sulfonic acid (8:2 FTS)	NCL	<0.0075	<0.0073	<0.0072	<0.0075	<0.0075
N-ethylperfluoro-1-octanesulfonamidoacetic acid (EtFOSAA)	NCL	<0.0075	<0.0073	<0.0072	<0.0075	<0.0075
N-methylperfluoro-1-octanesulfonamidoacetic acid (MeFOSAA)	NCL	<0.0075	<0.0073	<0.0072	<0.0075	<0.0075
Perfluorobutane sulfonic acid (PFBS)	0.42 (A)	0.0062	0.0064	<0.0036	<0.0037	<0.0038
Perfluorodecane sulfonic acid (PFDS)	NCL	<0.0038	<0.0036	<0.0036	<0.0037	<0.0038
Perfluoroheptane sulfonic acid (PFHpS)	NCL	<0.0038	<0.0036	<0.0036	<0.0037	<0.0038
Perfluorononane sulfonic acid (PFNS)	NCL	<0.0038	<0.0036	<0.0036	<0.0037	<0.0038
Perfluorooctane sulfonamide (FOSA)	NCL	<0.0038	<0.0036	<0.0036	<0.0037	<0.0038
Perfluoropentane sulfonic acid (PFPeS)	NCL	<0.0038	<0.0036	<0.0036	<0.0037	<0.0038
Perfluorohexane sulfonic acid (PFHxS)	0.051 (A)	0.0092	0.0086	<0.0036	<0.0037	<0.0038
Perfluorobutanoic acid (PFBA)	NCL	<0.0038	<0.0036	<0.0036	<0.0037	<0.0038
Perfluorodecanoic acid (PFDA)	NCL	<0.0038	<0.0036	<0.0036	<0.0037	<0.0038
Perfluorododecanoic acid (PFDoDA)	NCL	<0.0038	<0.0036	<0.0036	<0.0037	<0.0038
Perfluoroheptanoic acid (PFHpA)	NCL	<0.0038	<0.0036	<0.0036	<0.0037	<0.0038
Perfluorohexanoic acid (PFHxA)	400 (A)	0.0061	0.0058	<0.0036	<0.0037	<0.0038
Perfluorononanoic acid (PFNA)	0.006 (A)	<0.0038	<0.0036	<0.0036	<0.0037	<0.0038
Perfluorooctanoic acid (PFOA)	0.008 (A)	***0.014***	***0.013***	<0.0036	<0.0037	<0.0038
Perfluorooctane sulfonic acid (PFOS)	0.016 (A)	***0.02***	***0.021***	<0.0036	<0.0037	<0.0038
Perfluoropentanoic acid (PFPeA)	NCL	0.0039	<0.0036	<0.0036	<0.0037	<0.0038
Perfluorotetradecanoic acid (PFTeDA)	NCL	<0.0038	<0.0036	<0.0036	<0.0037	<0.0038
Perfluorotridecanoic acid (PFTrDA)	NCL	<0.0038	<0.0036	<0.0036	<0.0037	<0.0038
Perfluoroundecanoic acid (PFUnDA)	NCL	<0.0038	<0.0036	<0.0036	<0.0037	<0.0038
Tetrafluoro-2-(heptafluoropropoxy)propanoic acid (GenX)	0.37 (A)	<0.0075	<0.0073	<0.0072	<0.0075	<0.0075

TABLE 4B NOTES
Perimeter (Dual Purpose)
Algoma & Plainfield Townships, Kent County, Michigan

NOTES:

1. Concentration and criteria units are micrograms per Liter (µg/L) or approximately parts per billion (ppb).
2. Michigan Part 201 Groundwater Cleanup Criteria are based on "Table 1, Groundwater: Residential and Nonresidential Part 201 Generic Cleanup Criteria and Screening Levels/Part 213 Tier I Risk Based Screening Levels," Michigan Administrative Code, Cleanup Criteria Requirements for Response Activity, Rules 299.44 and 299.49, effective December 30, 2013; last updated October 12, 2023.
   Abbreviations Include:
   "NCL" indicates no criterion listed in EGLE Table 1.
   Footnotes Include:
   (A) - The criterion is the State of Michigan drinking water standard.
   Abbreviations Include:
   "NA" indicates not available.
3. Bold, italic number with thick line border or italic analyte name indicates that parameter was detected above the Michigan Part 201 Groundwater Cleanup Criteria listed.
4. Abbreviations include:
   "< LOQ" indicates the analyte was analyzed for but not detected above the limit of quantitation (LOQ).
   "UJ" indicates, for validated results, the analyte was analyzed for but was not detected. The reported LOQ is approximate and may be inaccurate or imprecise.
   "DUP" indicates a duplicate sample.
5. Screen interval presented is the top of the screen to the bottom of the screen in feet below ground surface.
6. Validated results are shown for Laboratory IDs beginning with WI23023. The remaining results shown were not included in the 5% validation of PFAS samples required by the Quality Assurance Project Plan.
7. Results shown on this table are from dual purpose wells sampled prior to Perimeter sampling events. See Table 4A for monitoring well results sampled during Perimeter sampling events.

FIGURES



LEGEND

- Staff Gauge
- USGS Staff Gauge
- GZA Wolven Jewell Monitoring Well Location
- GZA House Street Monitoring Well Location
- Response Activity Plan (RAP) Monitoring Well Location
- Q2 2023 Estimated Shallow Potentiometric Surface (ft) - April 2023
- Highway
- Primary County Road
- Other Road
- River or Stream
- Surface Water
- Area 5
- Area 6
- Area 11
- Area 12
- Area 19
- Municipal Water Area
- Connected to Municipal Water Through C2R2 Grant
- Approximate House St. Disposal Site Boundary
- North Kent Landfill
- North Kent Landfill Study
- North Kent Study Area

NOTES:
1. LOCATIONS AND SITE FEATURES ARE APPROXIMATE.

2. ESTIMATED POTENTIOMETRIC SURFACE WAS DEVELOPED USING INTERPOLATION IN AQUAVEO GROUNDWATER MODELING SYSTEM (GMS) VERSION 10.7 BASED ON MEASUREMENTS MADE IN GROUNDWATER MONITORING WELLS IN RESPECTIVE QUARTERLY GAUGING EVENT AND THE ROGUE RIVER USGS STAFF GAUGE (USGS04118500). ESTIMATED POTENTIOMETRIC SURFACE IS BASED ON LIMITED WELL INSTALLATIONS, AND DATA GAPS MAY ALTER THE POTENTIOMETRIC SURFACE. POTENTIOMETRIC SURFACE WAS NOT EXTRAPOLATED OUTSIDE OF THE AREAS OF MEASURED ELEVATIONS.

3. SEE TABLE 2 FOR STATIC WATER LEVEL ELEVATIONS AND EXCEPTIONS.

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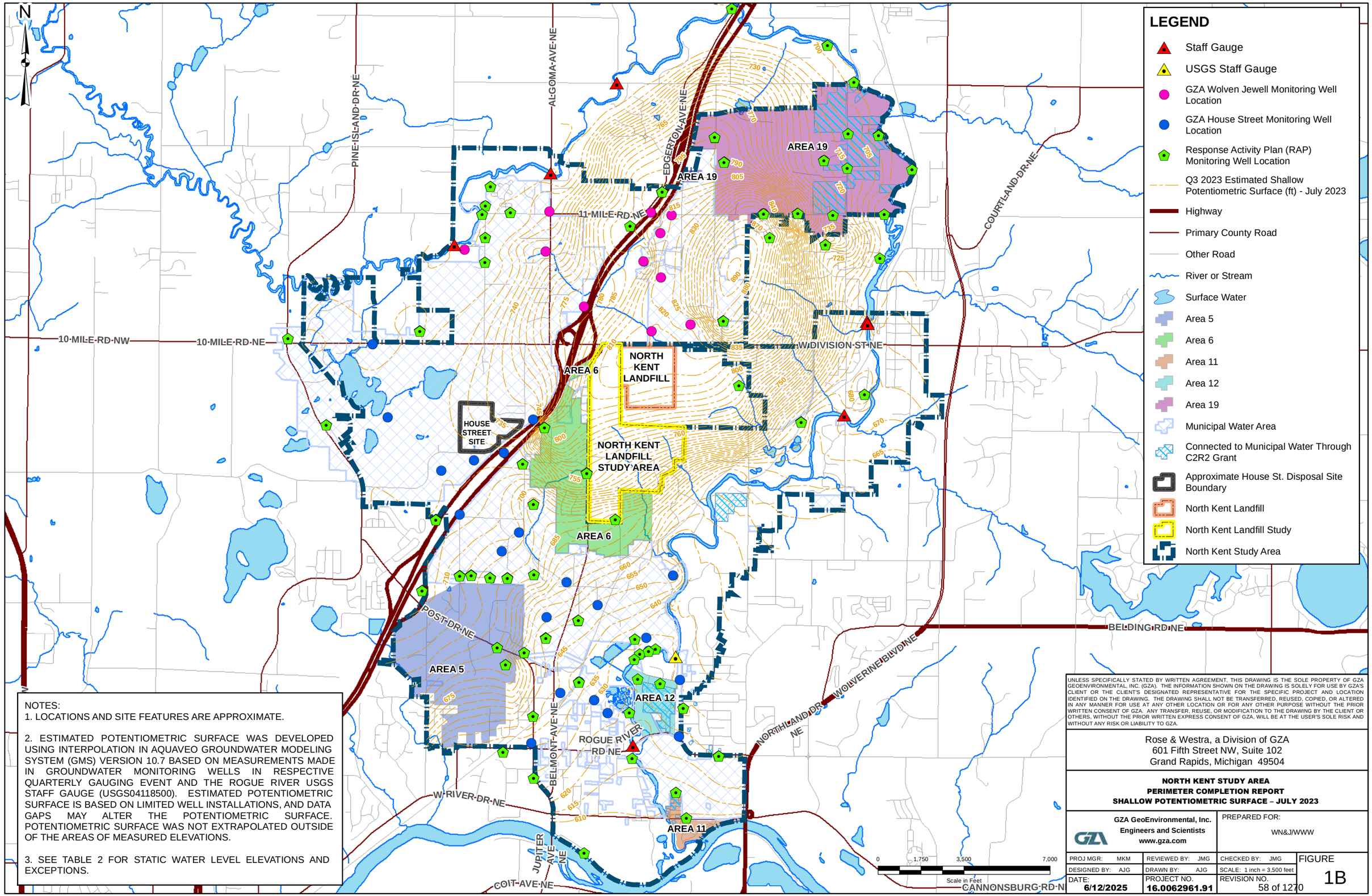
Rose & Westra, a Division of GZA
601 Fifth Street NW, Suite 102
Grand Rapids, Michigan 49504

NORTH KENT STUDY AREA
PERIMETER COMPLETION REPORT
SHALLOW POTENTIOMETRIC SURFACE – APRIL 2023

GZA GeoEnvironmental, Inc.
Engineers and Scientists
www.gza.com

PREPARED FOR: WN&J/WWW

PROJ MGR: MKM	REVIEWED BY: JMG	CHECKED BY: JMG	FIGURE 1A
DESIGNED BY: AJG	DRAWN BY: AJG	SCALE: 1 inch = 3,500 feet	
DATE: 6/12/2025	PROJECT NO. 16.0062961.91	REVISION NO.	



LEGEND

- Staff Gauge
- USGS Staff Gauge
- GZA Wolven Jewell Monitoring Well Location
- GZA House Street Monitoring Well Location
- Response Activity Plan (RAP) Monitoring Well Location
- Q3 2023 Estimated Shallow Potentiometric Surface (ft) - July 2023
- Highway
- Primary County Road
- Other Road
- River or Stream
- Surface Water
- Area 5
- Area 6
- Area 11
- Area 12
- Area 19
- Municipal Water Area
- Connected to Municipal Water Through C2R2 Grant
- Approximate House St. Disposal Site Boundary
- North Kent Landfill
- North Kent Landfill Study
- North Kent Study Area

NOTES:
1. LOCATIONS AND SITE FEATURES ARE APPROXIMATE.

2. ESTIMATED POTENTIOMETRIC SURFACE WAS DEVELOPED USING INTERPOLATION IN AQUAVEO GROUNDWATER MODELING SYSTEM (GMS) VERSION 10.7 BASED ON MEASUREMENTS MADE IN GROUNDWATER MONITORING WELLS IN RESPECTIVE QUARTERLY GAUGING EVENT AND THE ROGUE RIVER USGS STAFF GAUGE (USGS04118500). ESTIMATED POTENTIOMETRIC SURFACE IS BASED ON LIMITED WELL INSTALLATIONS, AND DATA GAPS MAY ALTER THE POTENTIOMETRIC SURFACE. POTENTIOMETRIC SURFACE WAS NOT EXTRAPOLATED OUTSIDE OF THE AREAS OF MEASURED ELEVATIONS.

3. SEE TABLE 2 FOR STATIC WATER LEVEL ELEVATIONS AND EXCEPTIONS.

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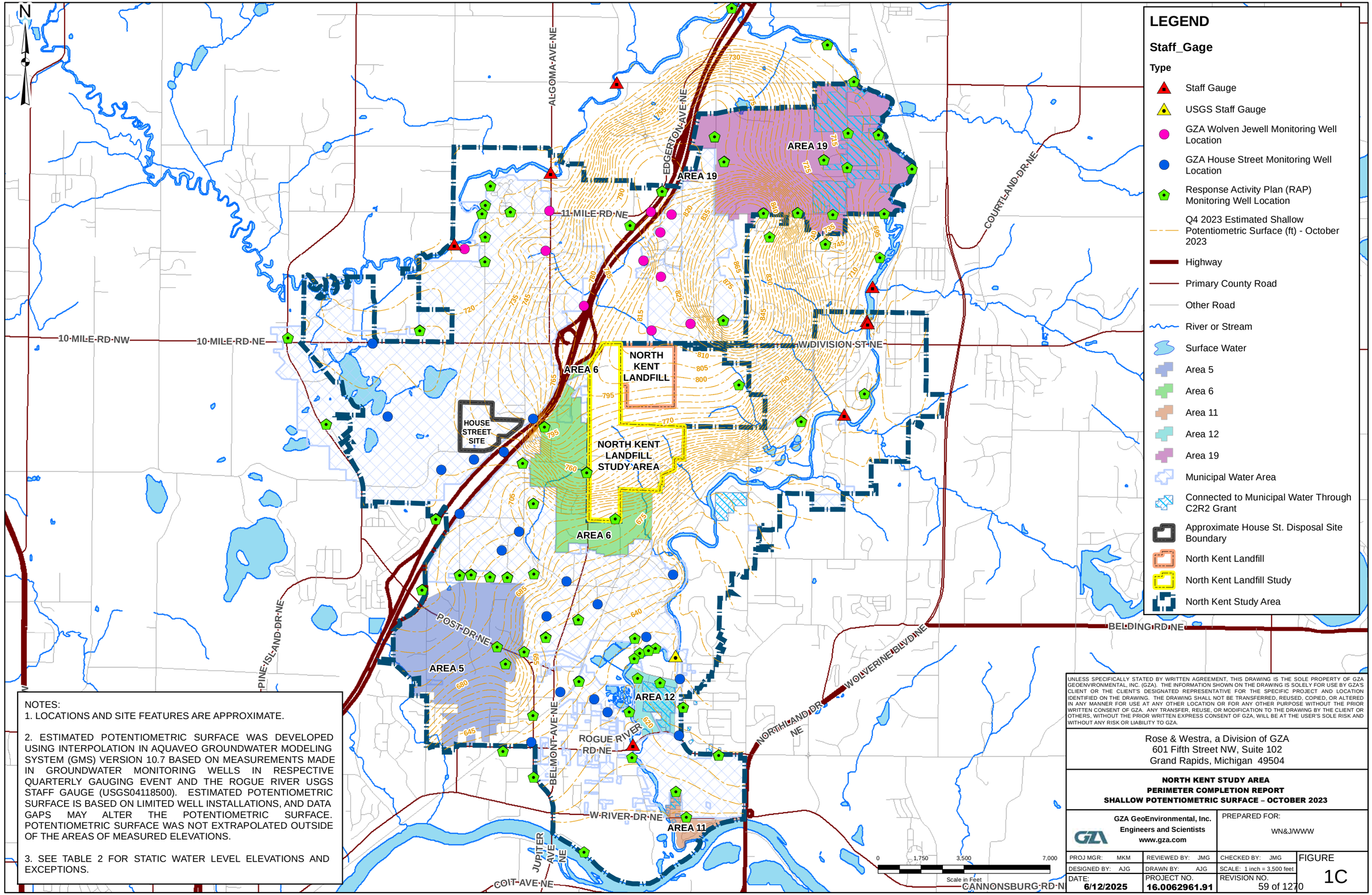
Rose & Westra, a Division of GZA
601 Fifth Street NW, Suite 102
Grand Rapids, Michigan 49504

NORTH KENT STUDY AREA
PERIMETER COMPLETION REPORT
SHALLOW POTENTIOMETRIC SURFACE – JULY 2023

GZA GeoEnvironmental, Inc.
Engineers and Scientists
www.gza.com

PREPARED FOR: WN&J/WWW

PROJ MGR: MKM	REVIEWED BY: JMG	CHECKED BY: JMG	FIGURE 1B
DESIGNED BY: AJG	DRAWN BY: AJG	SCALE: 1 inch = 3,500 feet	
DATE: 6/12/2025	PROJECT NO. 16.0062961.91	REVISION NO.	



LEGEND

Staff_Gage

Type

- Staff Gauge
- USGS Staff Gauge
- GZA Wolven Jewell Monitoring Well Location
- GZA House Street Monitoring Well Location
- Response Activity Plan (RAP) Monitoring Well Location
- Q4 2023 Estimated Shallow Potentiometric Surface (ft) - October 2023
- Highway
- Primary County Road
- Other Road
- River or Stream
- Surface Water
- Area 5
- Area 6
- Area 11
- Area 12
- Area 19
- Municipal Water Area
- Connected to Municipal Water Through C2R2 Grant
- Approximate House St. Disposal Site Boundary
- North Kent Landfill
- North Kent Landfill Study
- North Kent Study Area

NOTES:
1. LOCATIONS AND SITE FEATURES ARE APPROXIMATE.

2. ESTIMATED POTENTIOMETRIC SURFACE WAS DEVELOPED USING INTERPOLATION IN AQUAVEO GROUNDWATER MODELING SYSTEM (GMS) VERSION 10.7 BASED ON MEASUREMENTS MADE IN GROUNDWATER MONITORING WELLS IN RESPECTIVE QUARTERLY GAUGING EVENT AND THE ROGUE RIVER USGS STAFF GAUGE (USGS04118500). ESTIMATED POTENTIOMETRIC SURFACE IS BASED ON LIMITED WELL INSTALLATIONS, AND DATA GAPS MAY ALTER THE POTENTIOMETRIC SURFACE. POTENTIOMETRIC SURFACE WAS NOT EXTRAPOLATED OUTSIDE OF THE AREAS OF MEASURED ELEVATIONS.

3. SEE TABLE 2 FOR STATIC WATER LEVEL ELEVATIONS AND EXCEPTIONS.

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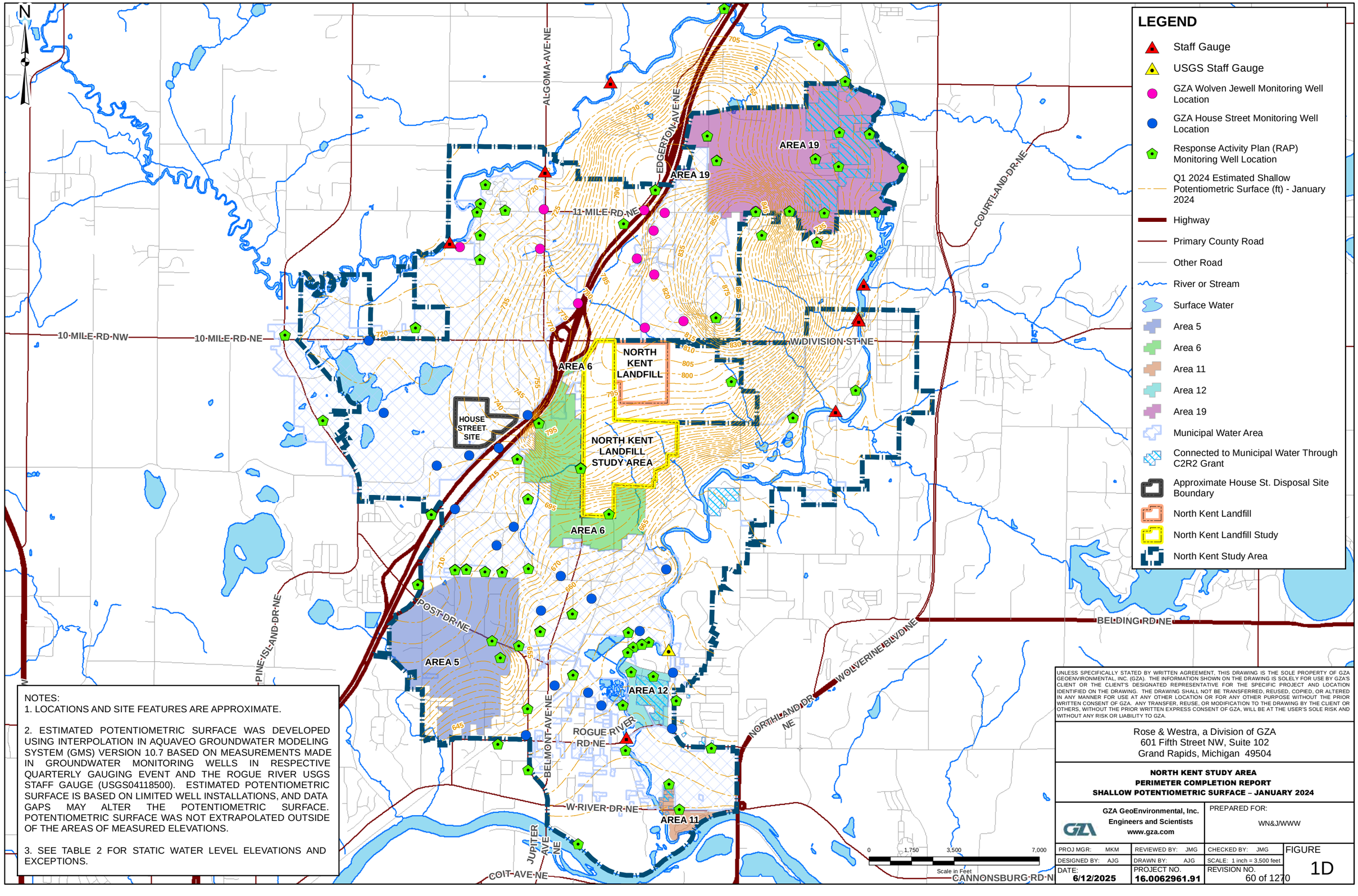
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NORTH KENT STUDY AREA
PERIMETER COMPLETION REPORT
SHALLOW POTENTIOMETRIC SURFACE – OCTOBER 2023

GZA GeoEnvironmental, Inc.
Engineers and Scientists
www.gza.com

PREPARED FOR: WN&J/WWW

PROJ MGR: MKM	REVIEWED BY: JMG	CHECKED BY: JMG	FIGURE 1C
DESIGNED BY: AJG	DRAWN BY: AJG	SCALE: 1 inch = 3,500 feet	
DATE: 6/12/2025	PROJECT NO. 16.0062961.91	REVISION NO. 59 of 1270	



LEGEND

- Staff Gauge
- USGS Staff Gauge
- GZA Wolven Jewell Monitoring Well Location
- GZA House Street Monitoring Well Location
- Response Activity Plan (RAP) Monitoring Well Location
- Q1 2024 Estimated Shallow Potentiometric Surface (ft) - January 2024
- Highway
- Primary County Road
- Other Road
- River or Stream
- Surface Water
- Area 5
- Area 6
- Area 11
- Area 12
- Area 19
- Municipal Water Area
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- Approximate House St. Disposal Site Boundary
- North Kent Landfill
- North Kent Landfill Study
- North Kent Study Area

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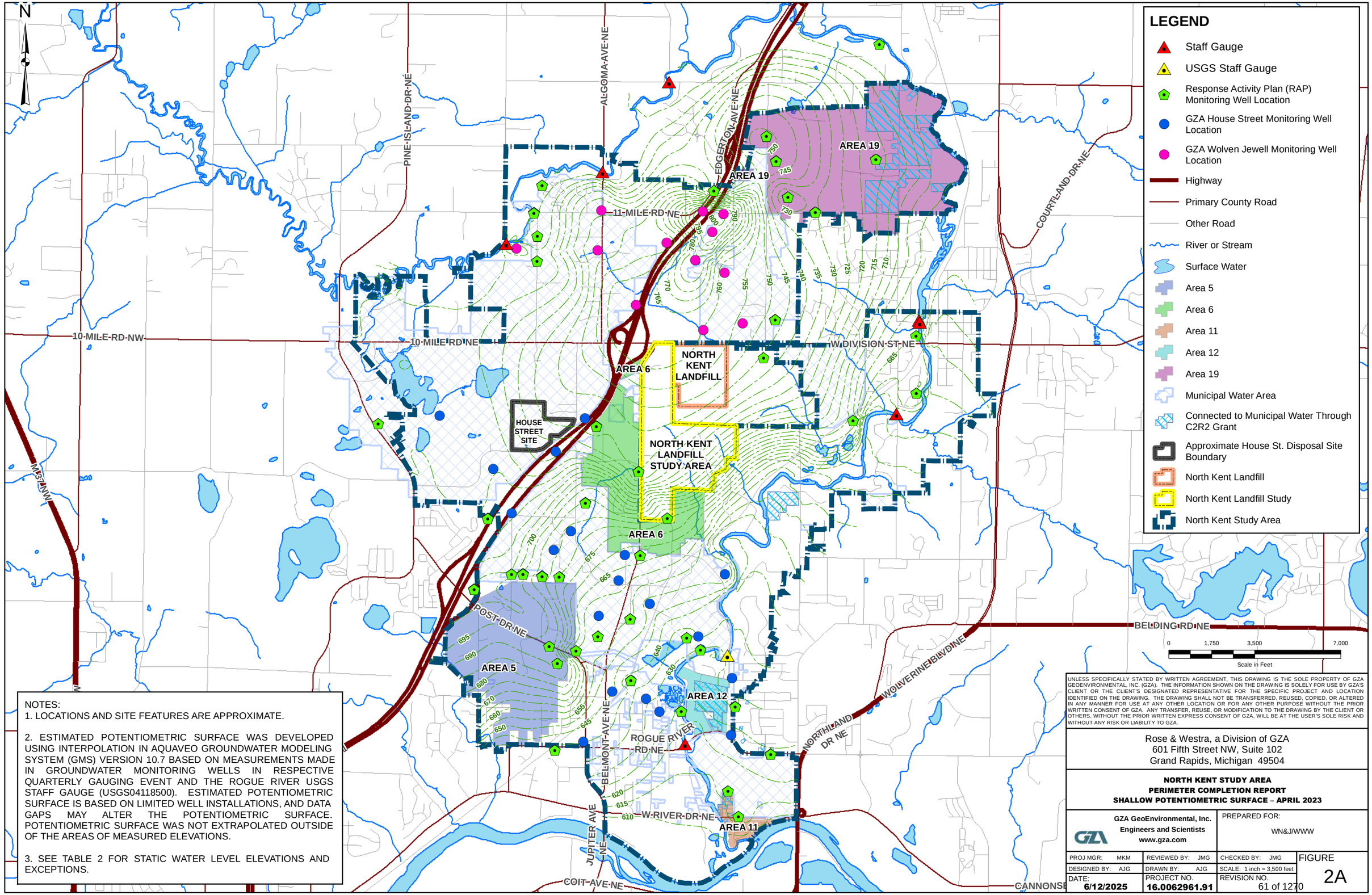
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NORTH KENT STUDY AREA
PERIMETER COMPLETION REPORT
SHALLOW POTENTIOMETRIC SURFACE – JANUARY 2024

GZA GeoEnvironmental, Inc. Engineers and Scientists www.gza.com		PREPARED FOR: WN&J/WWW	
PROJ MGR: MKM	REVIEWED BY: JMG	CHECKED BY: JMG	FIGURE 1D
DESIGNED BY: AJG	DRAWN BY: AJG	SCALE: 1 inch = 3,500 feet	
DATE: 6/12/2025	PROJECT NO. 16.0062961.91	REVISION NO.	



LEGEND

- Staff Gauge
- USGS Staff Gauge
- Response Activity Plan (RAP) Monitoring Well Location
- GZA House Street Monitoring Well Location
- GZA Wolven Jewell Monitoring Well Location
- Highway
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- Area 12
- Area 19
- Municipal Water Area
- Connected to Municipal Water Through C2R2 Grant
- Approximate House St. Disposal Site Boundary
- North Kent Landfill
- North Kent Landfill Study
- North Kent Study Area

NOTES:
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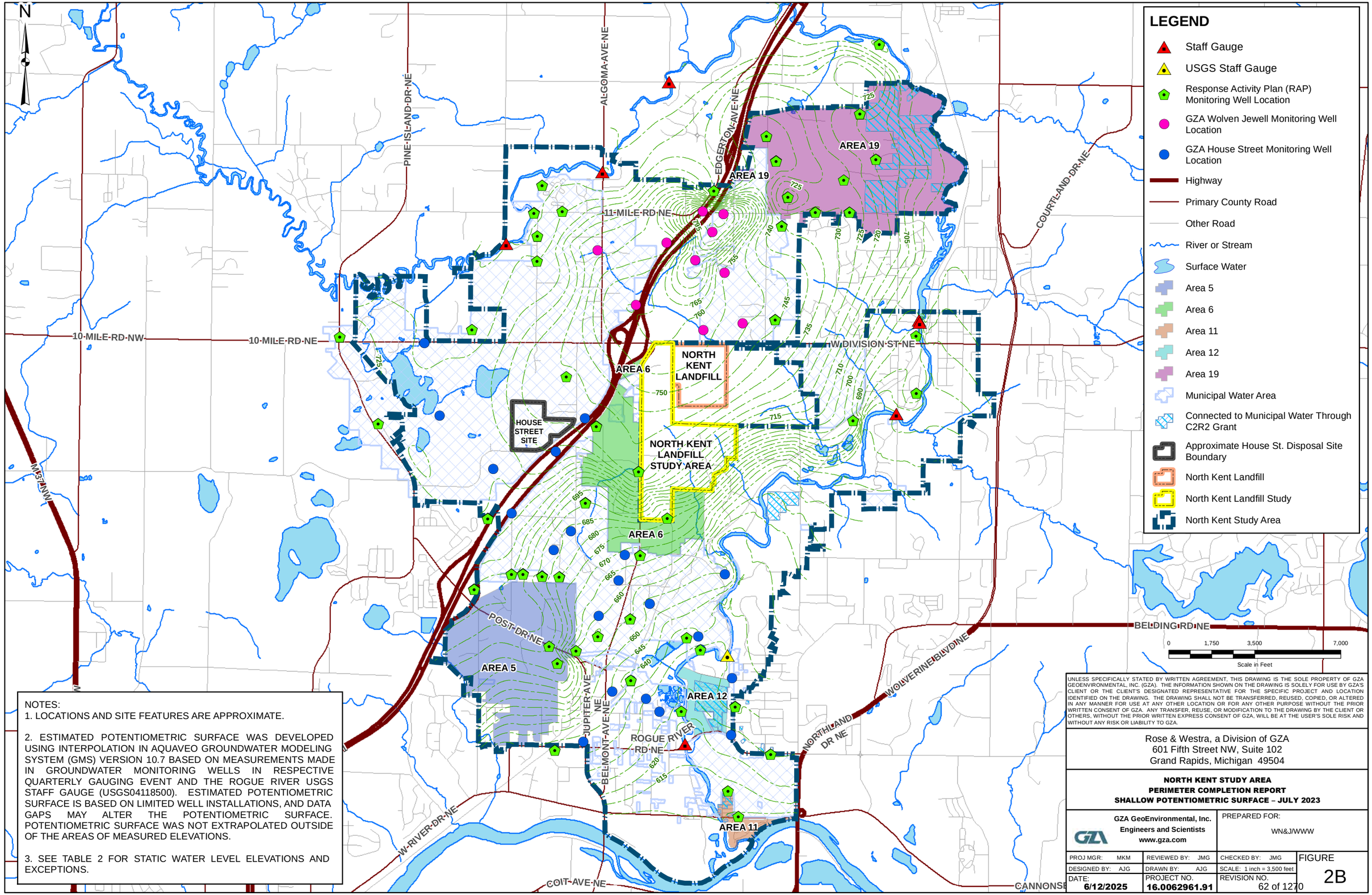
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NORTH KENT STUDY AREA
PERIMETER COMPLETION REPORT
SHALLOW POTENTIOMETRIC SURFACE – APRIL 2023

GZA GeoEnvironmental, Inc. Engineers and Scientists www.gza.com		PREPARED FOR: WN&J/WWW	
PROJ MGR: MKM	REVIEWED BY: JMG	CHECKED BY: JMG	FIGURE 2A
DESIGNED BY: AJG	DRAWN BY: AJG	SCALE: 1 inch = 3,500 feet	
DATE: **6/12/2025**	PROJECT NO. **16.0062961.91**	REVISION NO. 61 of 1270	



LEGEND

- Staff Gauge
- USGS Staff Gauge
- Response Activity Plan (RAP) Monitoring Well Location
- GZA Wolven Jewell Monitoring Well Location
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- Highway
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0 1,750 3,500 7,000

Scale in Feet

NOTES:
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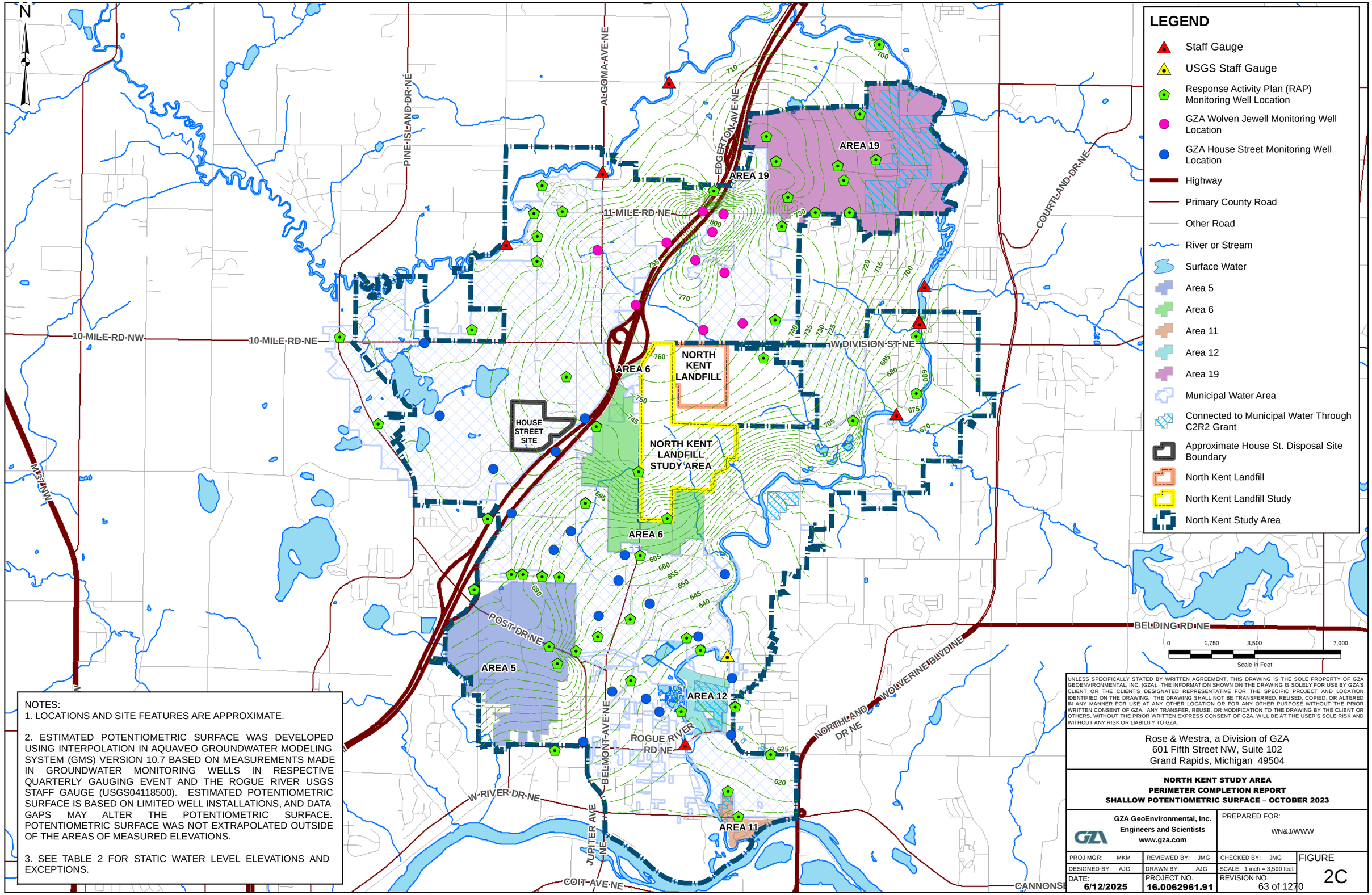
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NORTH KENT STUDY AREA
PERIMETER COMPLETION REPORT
SHALLOW POTENTIOMETRIC SURFACE – JULY 2023

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PROJ MGR: MKM	REVIEWED BY: JMG	CHECKED BY: JMG	FIGURE 2B
DESIGNED BY: AJG	DRAWN BY: AJG	SCALE: 1 inch = 3,500 feet	
DATE: 6/12/2025	PROJECT NO. 16.0062961.91	REVISION NO. 62 of 1270	



LEGEND

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NORTH KENT STUDY AREA
PERIMETER COMPLETION REPORT
SHALLOW POTENTIOMETRIC SURFACE – OCTOBER 2023

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DESIGNED BY: AJG	DRAWN BY: AJG	SCALE: 1 inch = 3,500 feet	
DATE: 6/12/2025	PROJECT NO. 16.0062961.91	REVISION NO. 63 of 1270	

N

LEGEND

- Staff Gauge
- USGS Staff Gauge
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PINE ISLAND DR NE · ALGOMA AVE NE · EDGERTON AVE NE · COURTLAND DR NE · 11 MILE RD NE · 10 MILE RD NW · 10 MILE RD NE · W DIVISION ST NE · M-37 NW · POST DR NE · JUPITER AVE NE · BELMONT AVE NE · ROGUE RIVER RD NE · NORTHLAND DR NE · WOLVERINE BLVD NE · W RIVER DR NE · COIT AVE NE · BELDING RD NE · CANNONSB

AREA 19 · AREA 6 · AREA 5 · AREA 12 · AREA 11

NORTH KENT LANDFILL · NORTH KENT LANDFILL STUDY AREA · HOUSE STREET SITE

0 1,750 3,500 7,000
Scale in Feet

NOTES:
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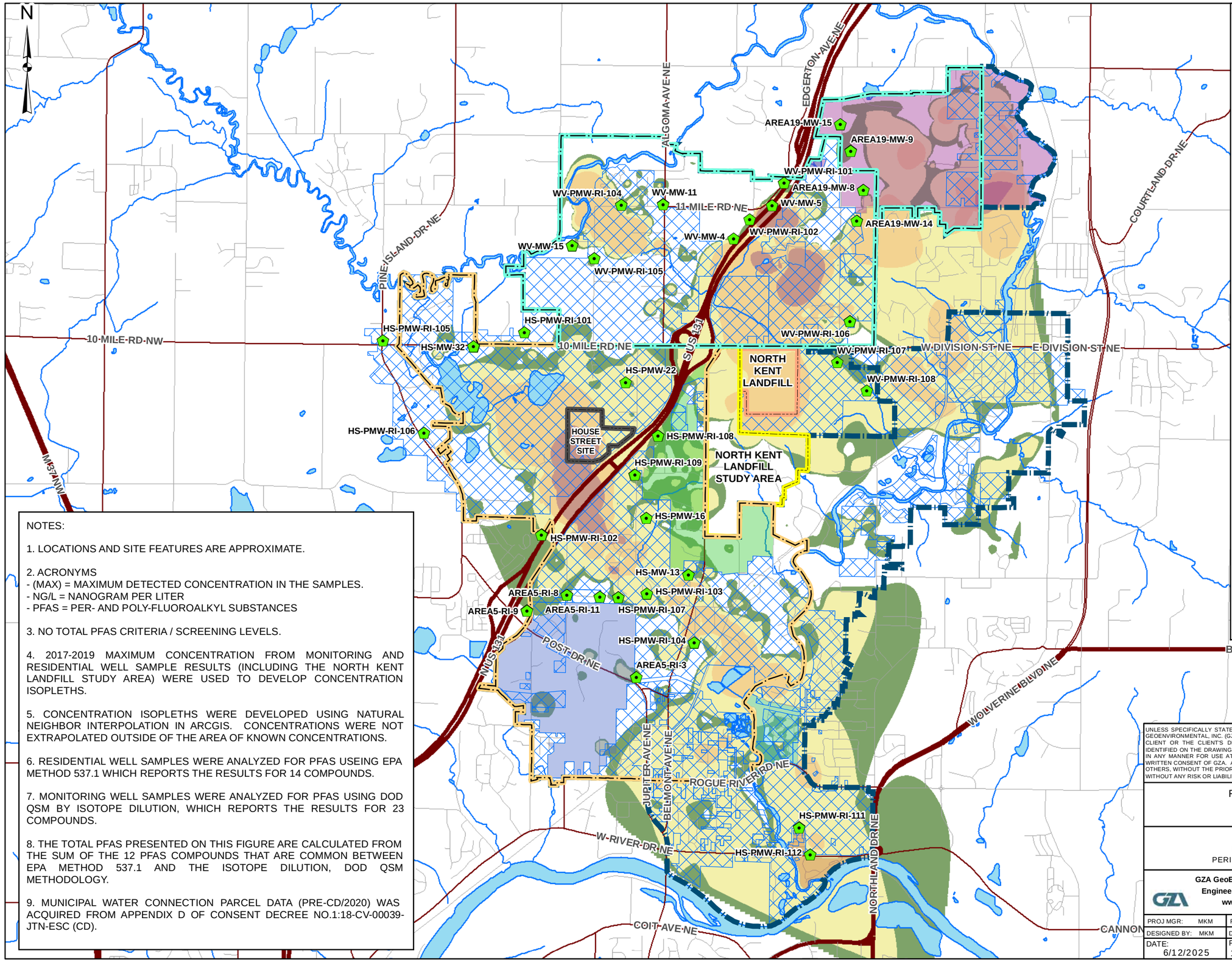
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DESIGNED BY: AJG	DRAWN BY: AJG	SCALE: 1 inch = 3,500 feet	
DATE: 6/12/2025	PROJECT NO. 16.0062961.91	REVISION NO.	



LEGEND

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- Area 19
- Municipal Water Area Pre and Post
- Approximate House St. Disposal Site Boundary
- North Kent Landfill
- North Kent Landfill Study
- North Kent Study Area

Total PFAS (12 compounds, ppt)

<VALUE>

- < 4 ng/L
- 4 - 10 ng/L
- 11 - 70 ng/L
- 71 - 1,000 ng/L
- 1,001 - 127,000 ng/L (MAX)

NOTES:

1. LOCATIONS AND SITE FEATURES ARE APPROXIMATE.

2. ACRONYMS
- (MAX) = MAXIMUM DETECTED CONCENTRATION IN THE SAMPLES.
- NG/L = NANOGRAM PER LITER
- PFAS = PER- AND POLY-FLUOROALKYL SUBSTANCES

3. NO TOTAL PFAS CRITERIA / SCREENING LEVELS.

4. 2017-2019 MAXIMUM CONCENTRATION FROM MONITORING AND RESIDENTIAL WELL SAMPLE RESULTS (INCLUDING THE NORTH KENT LANDFILL STUDY AREA) WERE USED TO DEVELOP CONCENTRATION ISOPLETHS.

5. CONCENTRATION ISOPLETHS WERE DEVELOPED USING NATURAL NEIGHBOR INTERPOLATION IN ARCGIS. CONCENTRATIONS WERE NOT EXTRAPOLATED OUTSIDE OF THE AREA OF KNOWN CONCENTRATIONS.

6. RESIDENTIAL WELL SAMPLES WERE ANALYZED FOR PFAS USEING EPA METHOD 537.1 WHICH REPORTS THE RESULTS FOR 14 COMPOUNDS.

7. MONITORING WELL SAMPLES WERE ANALYZED FOR PFAS USING DOD QSM BY ISOTOPE DILUTION, WHICH REPORTS THE RESULTS FOR 23 COMPOUNDS.

8. THE TOTAL PFAS PRESENTED ON THIS FIGURE ARE CALCULATED FROM THE SUM OF THE 12 PFAS COMPOUNDS THAT ARE COMMON BETWEEN EPA METHOD 537.1 AND THE ISOTOPE DILUTION, DOD QSM METHODOLOGY.

9. MUNICIPAL WATER CONNECTION PARCEL DATA (PRE-CD/2020) WAS ACQUIRED FROM APPENDIX D OF CONSENT DECREE NO.1:18-CV-00039-JTN-ESC (CD).

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NORTH KENT STUDY AREA
PERIMETER COMPLETION REPORT
PERIMETER MONITORING WELL LOCATIONS

GZA GeoEnvironmental, Inc.
Engineers and Scientists
www.gza.com

PREPARED FOR: WN&J/WWW

PROJ MGR: MKM	REVIEWED BY: JMG	CHECKED BY: JMG	FIGURE 3
DESIGNED BY: MKM	DRAWN BY: MKM	SCALE: 1 inch = 3,500 feet	
DATE: 6/12/2025	PROJECT NO. 16.0062961.91	REVISION NO. 65 of 1270	

LEGEND

- Response Activity Plan (RAP) Monitoring Well Location
- Estimated Shallow Potentiometric Surface (ft) - January 2024
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N

0 1,500 3,000 6,000

Scale in Feet

NOTES:
1. LOCATIONS AND SITE FEATURES ARE APPROXIMATE.

Compound	Units	DWC
PFHxS	µg/L	0.051
PFOA	µg/L	0.008
PFOS	µg/L	0.016

NOTES:
- = Not Sampled
DWC = Drinking Water Criteria
ND = Not Detected
µg/L = Micrograms per Liter
Gray Shading Indicates that sample result is greater than DWC
PFHxS = Perfluorohexane Sulfonate
PFOA = Perfluorooctanoic Acid
PFOS = Perfluorooctanesulfonic Acid

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Rose & Westra, a Division of GZA
601 Fifth Street NW, Suite 102
Grand Rapids, Michigan 49504

NORTH KENT STUDY AREA
SHALLOW AND PERCHED GROUNDWATER RESULTS
FOURTH QUARTER 2022 THROUGH FIRST QUARTER 2024

GZA GeoEnvironmental, Inc.
Engineers and Scientists
www.gza.com

PREPARED FOR: WN&J/WWW

PROJ MGR: MKM	REVIEWED BY: JMG	CHECKED BY: JMG	FIGURE 4A
DESIGNED BY: AJG	DRAWN BY: AJG	SCALE: 1 inch = 3,000 feet	
DATE: 6/12/2025	PROJECT NO. 16.0062961.91	REVISION NO. 66 of 1270	

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NOTES:
1. LOCATIONS AND SITE FEATURES ARE APPROXIMATE.

Compound	Units	DWC
PFHxS	µg/L	0.051
PFOA	µg/L	0.008
PFOS	µg/L	0.016

NOTES:
- = Not Sampled
DWC = Drinking Water Criteria
ND = Not Detected
µg/L = Micrograms per Liter
Gray Shading Indicates that sample result is greater than DWC
PFHxS = Perfluorohexane Sulfonate
PFOA = Perfluorooctanoic Acid
PFOS = Perfluorooctanesulfonic Acid

HOUSE STREET SITE

LEGEND

- Response Activity Plan (RAP) Monitoring Well Location
- Estimated Deep Potentiometric Surface (ft) - January 2024
- Highway
- Primary County Road
- Other Road
- River or Stream
- Surface Water
- Area 5
- Area 6
- Area 11
- Area 12
- Area 19
- Municipal Water
- Connected to Municipal Water Through C2R2 Grant
- Approximate House St. Disposal Site Boundary
- North Kent Landfill
- North Kent Landfill Study
- North Kent Study Area

N

0 1,500 3,000 6,000
Scale in Feet

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Grand Rapids, Michigan 49504

NORTH KENT STUDY AREA
DEEP GROUNDWATER RESULTS
FOURTH QUARTER 2022 THROUGH FIRST QUARTER 2024

GZA GeoEnvironmental, Inc.
Engineers and Scientists
www.gza.com

PREPARED FOR: WN&J/WWW

PROJ MGR: MKM	REVIEWED BY: JMG	CHECKED BY: JMG	FIGURE 4B
DESIGNED BY: AJG	DRAWN BY: AJG	SCALE: 1 inch = 3,000 feet	
DATE: 6/12/2025	PROJECT NO. 16.0062961.91	REVISION NO. 67 of 1270	

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LEGEND

- Residential Water Well
- Monitoring Well
- CROSS SECTION LINE
- HIGHWAY
- PRIMARY COUNTY ROAD
- OTHER ROAD
- RIVER OR STREAM
- SURFACE WATER
- Area 5
- Area 6
- Area 11
- Area 12
- Area 19
- APPROXIMATE HOUSE ST. DISPOSAL SITE BOUNDARY
- NORTH KENT LANDFILL
- NORTH KENT STUDY AREA OUTLINE

Approximate Total PFAS Extent (nanograms per liter [ng/L])

- < 4 ng/L
- 4 - 10 ng/L
- 11 - 70 ng/L
- 71 - 1,000 ng/L
- 1,001 - 127,000 ng/L (MAX)

NOTES:
1. LOCATIONS AND SITE FEATURES ARE APPROXIMATE.

2. ACRONYMS
- (MAX) = MAXIMUM DETECTED CONCENTRATION IN THE SAMPLES.
- NG/L = NANOGRAM PER LITER
- PFAS = PER- AND POLY-FLUOROALKYL SUBSTANCES

3. NO TOTAL PFAS CRITERIA / SCREENING LEVELS.

4. 2017-2019 MAXIMUM CONCENTRATION FROM MONITORING AND RESIDENTIAL WELL SAMPLE RESULTS (INCLUDING THE NORTH KENT LANDFILL STUDY AREA) WERE USED TO DEVELOP CONCENTRATION ISOPLETHS.

5. CONCENTRATION ISOPLETHS WERE DEVELOPED USING NATURAL NEIGHBOR INTERPOLATION IN ARCGIS. CONCENTRATIONS WERE NOT EXTRAPOLATED OUTSIDE OF THE AREA OF KNOWN CONCENTRATIONS.

6. RESIDENTIAL WELL SAMPLES WERE ANALYZED FOR PFAS USEING EPA METHOD 537.1 WHICH REPORTS THE RESULTS FOR 14 COMPOUNDS.

7. MONITORING WELL SAMPLES WERE ANALYZED FOR PFAS USING DOD QSM BY ISOTOPE DILUTION, WHICH REPORTS THE RESULTS FOR 23 COMPOUNDS.

8. THE TOTAL PFAS PRESENTED ON THIS FIGURE ARE CALCULATED FROM THE SUM OF THE 12 PFAS COMPOUNDS THAT ARE COMMON BETWEEN EPA METHOD 537.1 AND THE ISOTOPE DILUTION, DOD QSM METHODOLOGY.

N

0 1,750 3,500 7,000
Scale in Feet

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NORTH KENT STUDY AREA
CROSS SECTION PLAN
PERIMETER RAP COMPLETION REPORT

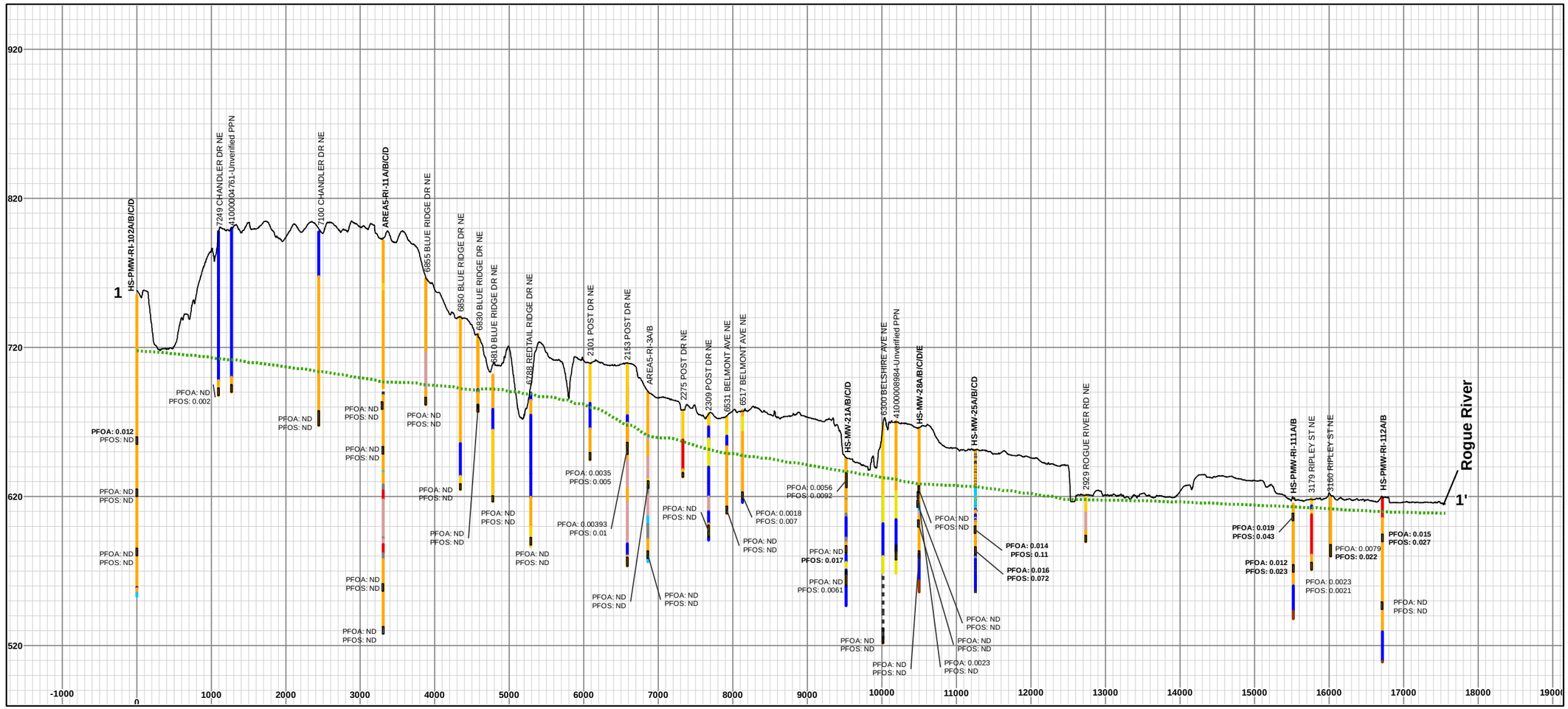
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Engineers and Scientists
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PREPARED FOR:
WN&J/WWW

PROJ MGR: MKM	REVIEWED BY: JMG	CHECKED BY: JMG	FIGURE 5
DESIGNED BY: MKM	DRAWN BY: MKM	SCALE: 1 inch = 3,500 feet	
DATE: 6/16/2025	PROJECT NO. 16.0062961.91	REVISION NO.	

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NORTHWEST

SOUTHEAST

CROSS SECTION LEGEND

- ESTIMATED POTENTIOMETRIC SURFACE (1/2024)
- GROUND SURFACE
- WELL SCREEN

BOREHOLE LITHOLOGY

- GRAVEL
- SAND AND GRAVEL
- SAND
- SAND/GRAVEL WITH CLAY/SILT
- CLAY/SILT WITH SAND/GRAVEL
- SILT
- CLAY AND SILT
- CLAY
- BEDROCK
- NOT AVAILABLE

OVERVIEW MAP LEGEND

- PORE-WATER SAMPLE LOCATION
- GSI PIEZOMETER LOCATION
- VERTICAL AQUIFER PROFILING BORING
- RESIDENTIAL WATER WELL
- MONITORING WELL
- CROSS SECTION LINE
- HIGHWAY
- PRIMARY COUNTY ROAD
- OTHER ROAD
- RIVER OR STREAM
- SURFACE WATER
- NORTH KENT STUDY AREA OUTLINE

NOTES:
1. LOCATIONS AND SITE FEATURES ARE APPROXIMATE.

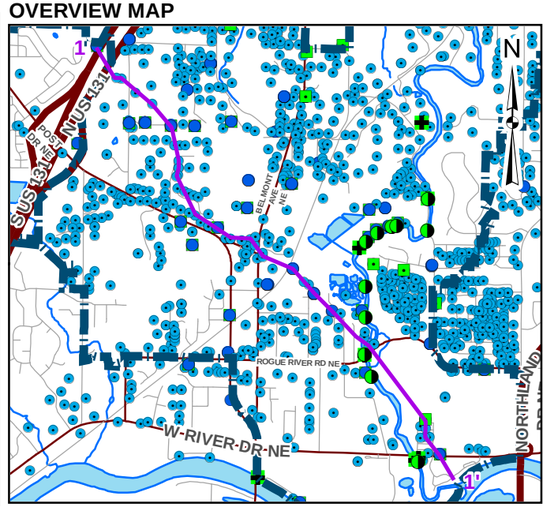
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OVERVIEW MAP



0 2,000 4,000
OVERVIEW MAP SCALE IN FEET

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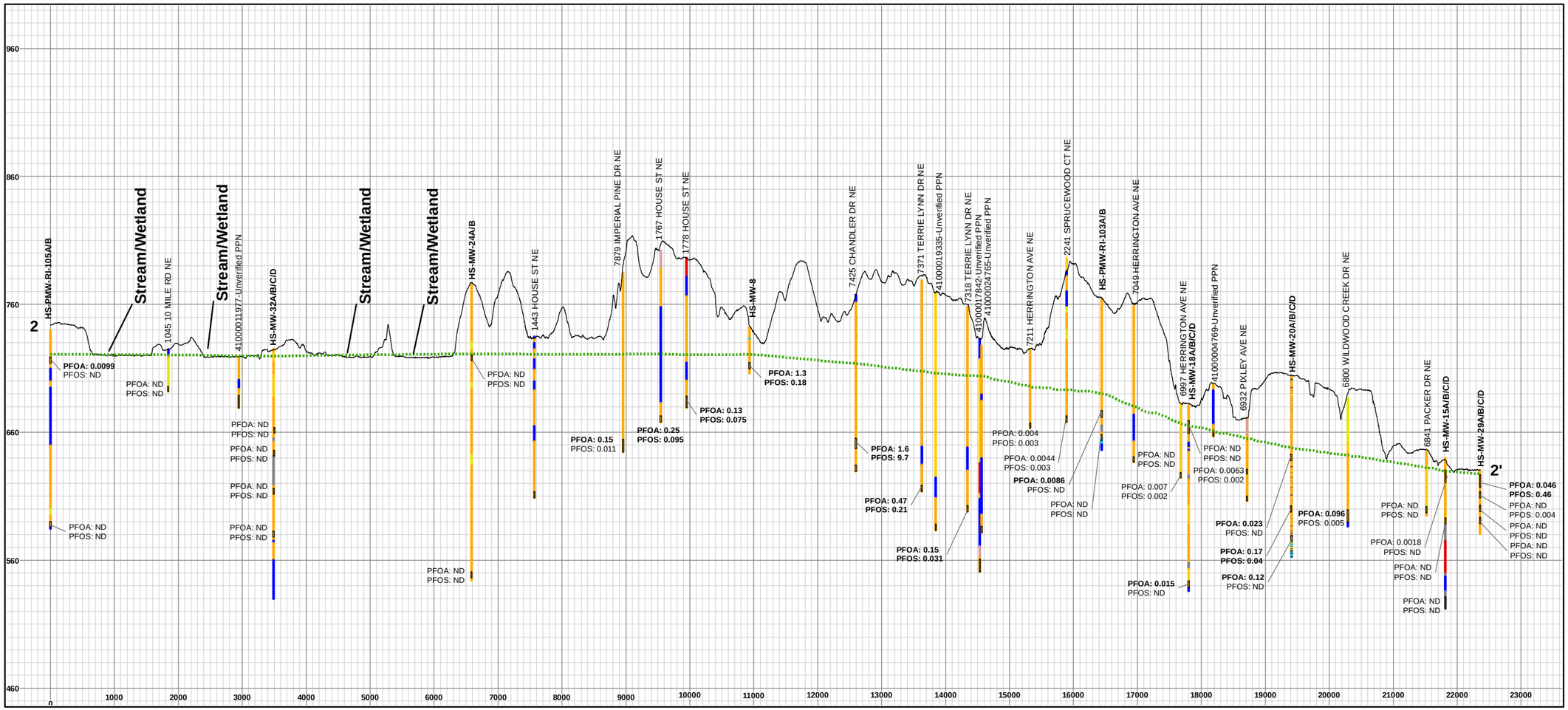
NORTH KENT STUDY AREA
GEOLOGICAL CROSS SECTION 1-1'
PERIMETER RAP COMPLETION REPORT

PREPARED BY: GZA GeoEnvironmental, Inc. Engineers and Scientists www.gza.com

PREPARED FOR: WN&J/WWW

PROJ MGR:	MKM	REVIEWED BY:	JMG	CHECKED BY:	JMG
DESIGNED BY:	MKM	DRAWN BY:	EAF	SCALE:	1 in = 4,500 ft
DATE:	06/12/2025	PROJECT NO:	16.0062961.91	REVISION NO:	

FIGURE 6A



NORTHWEST

SOUTHEAST

CROSS SECTION LEGEND

- ESTIMATED POTENTIOMETRIC SURFACE (1/2024)
- GROUND SURFACE
- WELL SCREEN

BOREHOLE LITHOLOGY

- GRAVEL
- SAND AND GRAVEL
- SAND
- SAND/GRAVEL WITH CLAY/SILT
- CLAY/SILT WITH SAND/GRAVEL
- SILT
- CLAY AND SILT
- CLAY
- NOT AVAILABLE

OVERVIEW MAP LEGEND

- PORE-WATER SAMPLE LOCATION
- GSI PIEZOMETER LOCATION
- VERTICAL AQUIFER PROFILING BORING
- RESIDENTIAL WATER WELL
- MONITORING WELL
- CROSS SECTION LINE
- HIGHWAY
- PRIMARY COUNTY ROAD
- OTHER ROAD
- RIVER OR STREAM
- SURFACE WATER
- APPROXIMATE HOUSE STREET PROPERTY (HSP)
- NORTH KENT LANDFILL
- NORTH KENT STUDY AREA OUTLINE

NOTES:
1. LOCATIONS AND SITE FEATURES ARE APPROXIMATE.

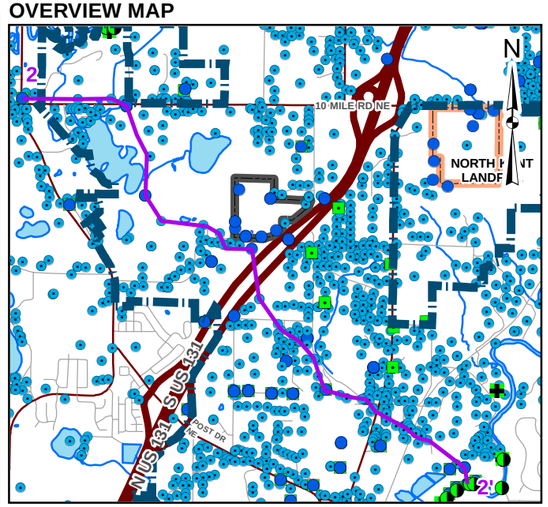
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OVERVIEW MAP



0 5,000 10,000

OVERVIEW MAP SCALE IN FEET

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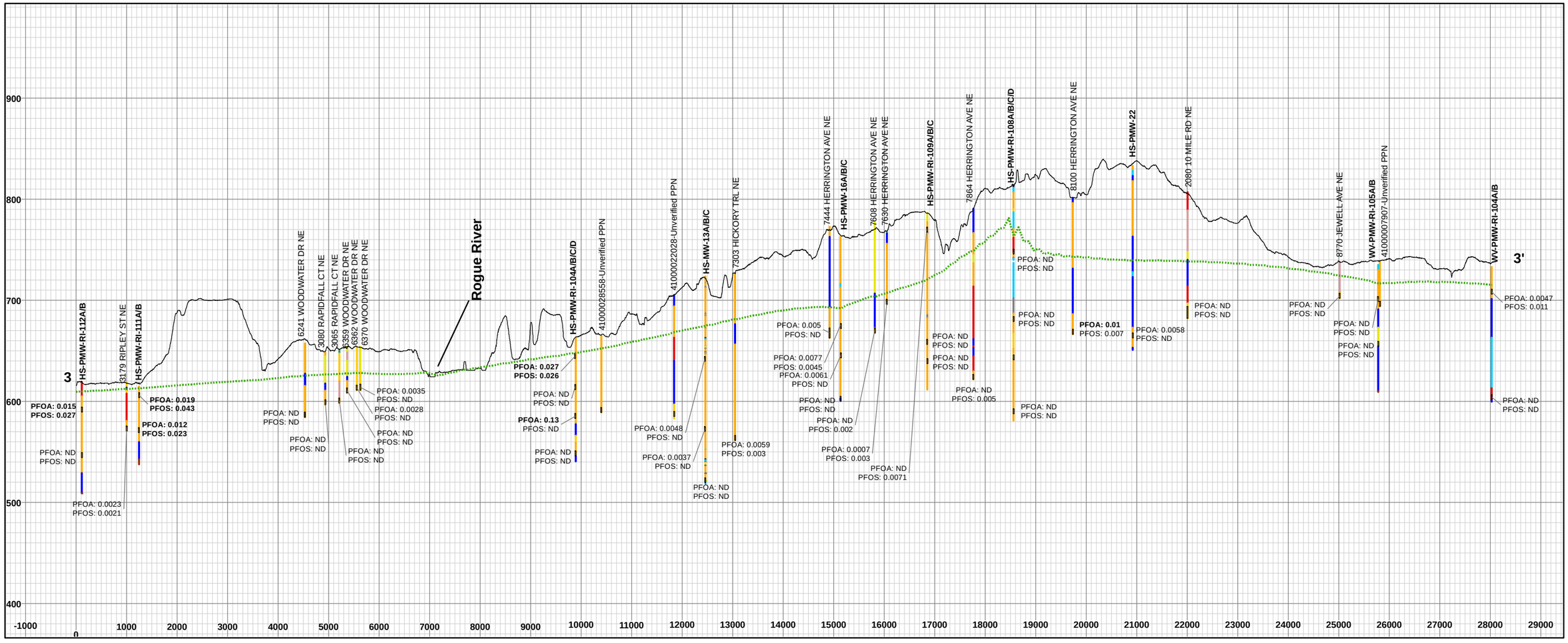
NORTH KENT STUDY AREA
GEOLOGICAL CROSS SECTION 2-2'
PERIMETER RAP COMPLETION REPORT

PREPARED BY: GZA GeoEnvironmental, Inc. Engineers and Scientists www.gza.com

PREPARED FOR: WN&J/WWW

PROJ MGR: MKM	REVIEWED BY: JMG	CHECKED BY: JMG	FIGURE
DESIGNED BY: MKM	DRAWN BY: EAF	SCALE: 1 in = 5,000 ft	
DATE: 06/16/2025	PROJECT NO: 16.0062961.91	REVISION NO:	70 of 1270	6B

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SOUTHEAST

NORTHEAST

CROSS SECTION LEGEND

- ESTIMATED POTENTIOMETRIC SURFACE (1/2024)
- GROUND SURFACE
- WELL SCREEN

BOREHOLE LITHOLOGY

- GRAVEL
- SAND AND GRAVEL
- SAND
- SAND/GRAVEL WITH CLAY/SILT
- CLAY/SILT WITH SAND/GRAVEL
- SILT
- CLAY AND SILT
- CLAY
- TOP SOIL
- BEDROCK
- NOT AVAILABLE

OVERVIEW MAP LEGEND

- PORE-WATER SAMPLE LOCATION
- GSI PIEZOMETER LOCATION
- VERTICAL AQUIFER PROFILING BORING
- RESIDENTIAL WATER WELL
- MONITORING WELL
- CROSS SECTION LINE
- HIGHWAY
- PRIMARY COUNTY ROAD
- OTHER ROAD
- RIVER OR STREAM
- SURFACE WATER
- APPROXIMATE HOUSE STREET PROPERTY (HSP)
- NORTH KENT LANDFILL
- NORTH KENT STUDY AREA OUTLINE

NOTES:
1. LOCATIONS AND SITE FEATURES ARE APPROXIMATE.

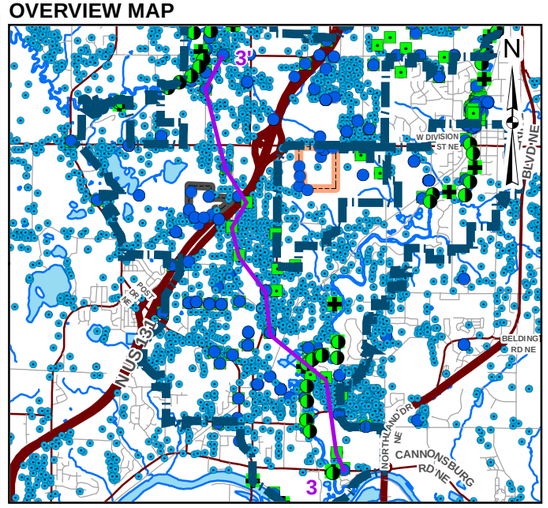
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OVERVIEW MAP



0 9,000 18,000

OVERVIEW MAP SCALE IN FEET

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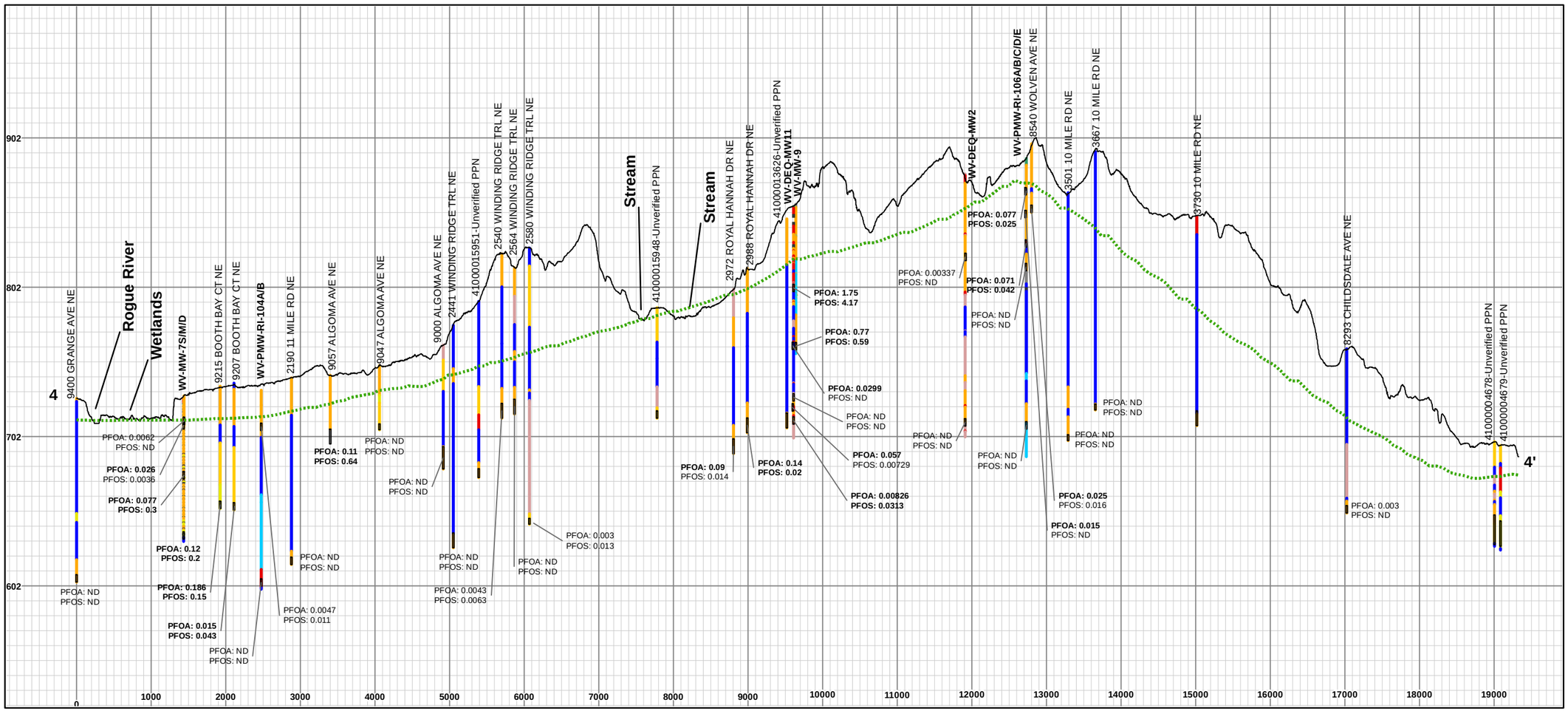
NORTH KENT STUDY AREA
GEOLOGICAL CROSS SECTION 3-3'
PERIMETER RAP COMPLETION REPORT

PREPARED BY: GZA GeoEnvironmental, Inc. Engineers and Scientists www.gza.com

PREPARED FOR: WN&J/WWW

PROJ MGR: BAB	REVIEWED BY: LJP	CHECKED BY: BAB	FIGURE
DESIGNED BY: JC/MKM	DRAWN BY: EAF	SCALE: 1 in = 9,000 ft	6C
DATE: 06/12/2025	PROJECT NO: 16.0062961.91	REVISION NO:	71 of 1270

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NORTHWEST

SOUTHEAST

CROSS SECTION LEGEND

- ESTIMATED POTENTIOMETRIC SURFACE (1/2024)
- GROUND SURFACE
- WELL SCREEN

BOREHOLE LITHOLOGY

- GRAVEL
- SAND AND
- SAND
- SAND/GRAVEL WITH CLAY/SILT
- CLAY/SILT WITH SAND/GRAVEL
- SILT
- CLAY AND
- CLAY
- TOP SOIL
- NOT AVAILABLE

OVERVIEW MAP LEGEND

- PORE-WATER SAMPLE LOCATION
- GSI PIEZOMETER LOCATION
- VERTICAL AQUIFER PROFILING BORING
- RESIDENTIAL WATER WELL
- MONITORING WELL
- CROSS SECTION LINE
- HIGHWAY
- PRIMARY COUNTY ROAD
- OTHER ROAD
- RIVER OR STREAM
- SURFACE WATER
- APPROXIMATE HOUSE STREET PROPERTY (HSP)
- NORTH KENT LANDFILL
- NORTH KENT STUDY AREA OUTLINE

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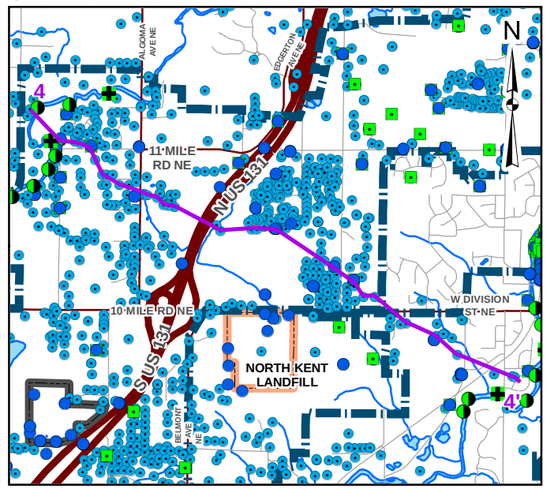
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OVERVIEW MAP



0 5,000 10,000

OVERVIEW MAP SCALE IN FEET

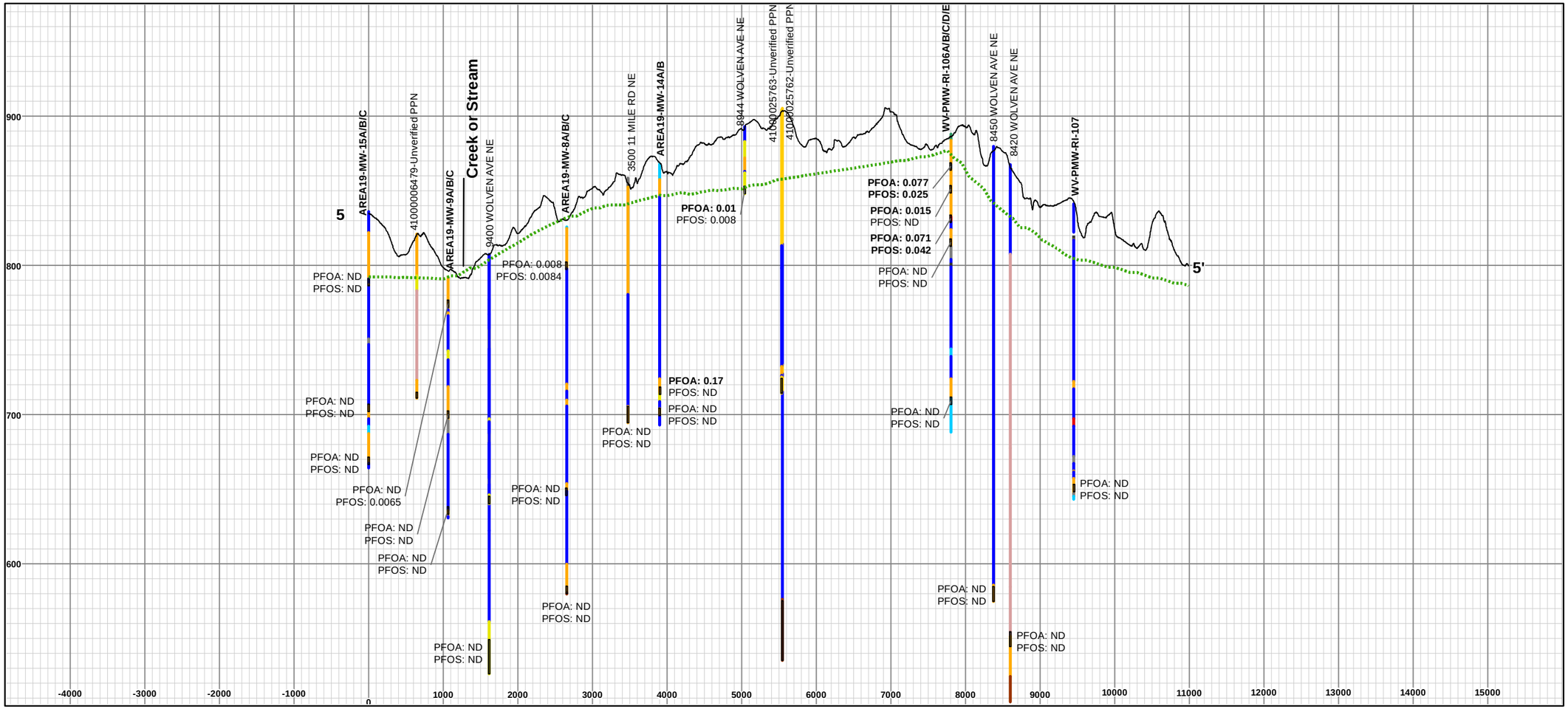
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NORTH KENT STUDY AREA
GEOLOGICAL CROSS SECTION 4-4'
PERIMETER RAP COMPLETION REPORT

PREPARED BY: GZA GeoEnvironmental, Inc. Engineers and Scientists www.gza.com		PREPARED FOR: WN&J/WWW	
PROJ MGR: MKM	REVIEWED BY: JMG	CHECKED BY: JMG	FIGURE 6D
DESIGNED BY: MKM	DRAWN BY: EAF	SCALE: 1 in = 5,000 ft	
DATE: 06/16/2025	PROJECT NO: 16.0062961.91	REVISION NO:	

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NORTH

SOUTH

CROSS SECTION LEGEND

- ESTIMATED POTENTIOMETRIC SURFACE (1/2024)
- GROUND SURFACE
- WELL SCREEN

BOREHOLE LITHOLOGY

- OTHER
- GRAVEL
- SAND AND
- SAND
- SAND/GRAVEL WITH CLAY/SILT
- CLAY/SILT WITH SAND/GRAVEL
- SILT
- CLAY AND
- CLAY
- TOP SOIL
- BEDROCK
- NOT AVAILABLE

OVERVIEW MAP LEGEND

- PORE-WATER SAMPLE LOCATION
- VERTICAL AQUIFER PROFILING BORING
- RESIDENTIAL WATER WELL
- MONITORING WELL
- CROSS SECTION LINE
- HIGHWAY
- PRIMARY COUNTY ROAD
- OTHER ROAD
- RIVER OR STREAM
- SURFACE WATER
- NORTH KENT LANDFILL
- NORTH KENT STUDY AREA OUTLINE

NOTES:
1. LOCATIONS AND SITE FEATURES ARE APPROXIMATE.

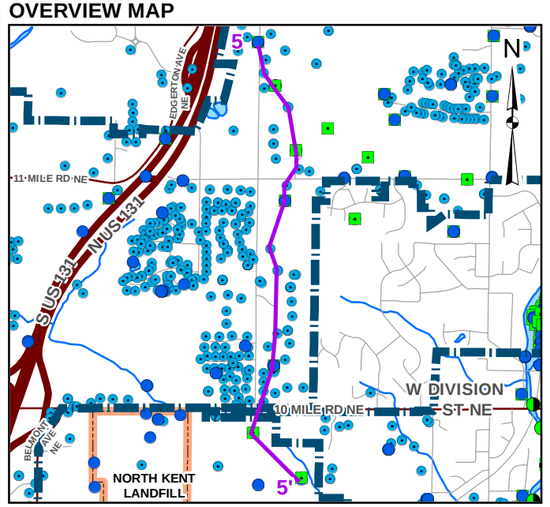
2. GROUND SURFACE ELEVATIONS ARE BASED ON DIGITAL RASTER FILES OF BARE EARTH DIGITAL ELEVATION MODELS (DEMS), GENERATED FROM LIDAR DATA WITH 1-METER HORIZONTAL ACCURACY AND 18.5-CENTIMETER VERTICAL ACCURACY. DIGITAL FILES OF DEMS AND LIDAR DATA WERE PROVIDED BY KENT COUNTY.

3. ESTIMATED POTENTIOMETRIC SURFACE WAS DEVELOPED BASED ON MEASUREMENTS MADE IN GROUNDWATER MONITORING WELLS IN JANUARY 2024. GROUNDWATER ELEVATIONS WERE NOT MEASURED FROM RESIDENTIAL WATER SUPPLY WELLS.

4. WELL SCREEN ELEVATIONS PROVIDED IN FEET ABOVE MEAN SEA LEVEL, NORTH AMERICAN VERTICAL DATUM OF 1988 (NAVD 88). RESIDENTIAL WELL SCREEN ELEVATIONS AND BOREHOLE LITHOLOGY ELEVATIONS WERE CALCULATED USING WELL INFORMATION PROVIDED BY THE STATE OF MICHIGAN'S WELLOGIC DATABASE AND GROUND SURFACE ELEVATIONS OF THE CENTER OF THE PPN GENERATED FROM LIDAR DATA PROVIDED BY KENT COUNTY. ELEVATIONS ARE ROUNDED TO THE NEAREST FOOT.

5. ONLY RESULTS FROM PERMANENT WELLS ARE SHOWN. RESULTS SHOWN ARE MAXIMUM DETECTIONS OF SAMPLES COLLECTED AT THE INDICATED LOCATION; THEREFORE, PFOA AND PFOS RESULTS SHOWN MAY BE FROM DIFFERENT SAMPLES. RESULTS IN BOLD TEXT ARE GREATER THAN PART 201 GENERIC GROUNDWATER CLEANUP CRITERIA - GROUNDWATER SURFACE WATER INTERFACE.

OVERVIEW MAP



0 3,500 7,000

OVERVIEW MAP SCALE IN FEET

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NORTH KENT STUDY AREA
GEOLOGICAL CROSS SECTION 5-5'
PERIMETER RAP COMPLETION REPORT

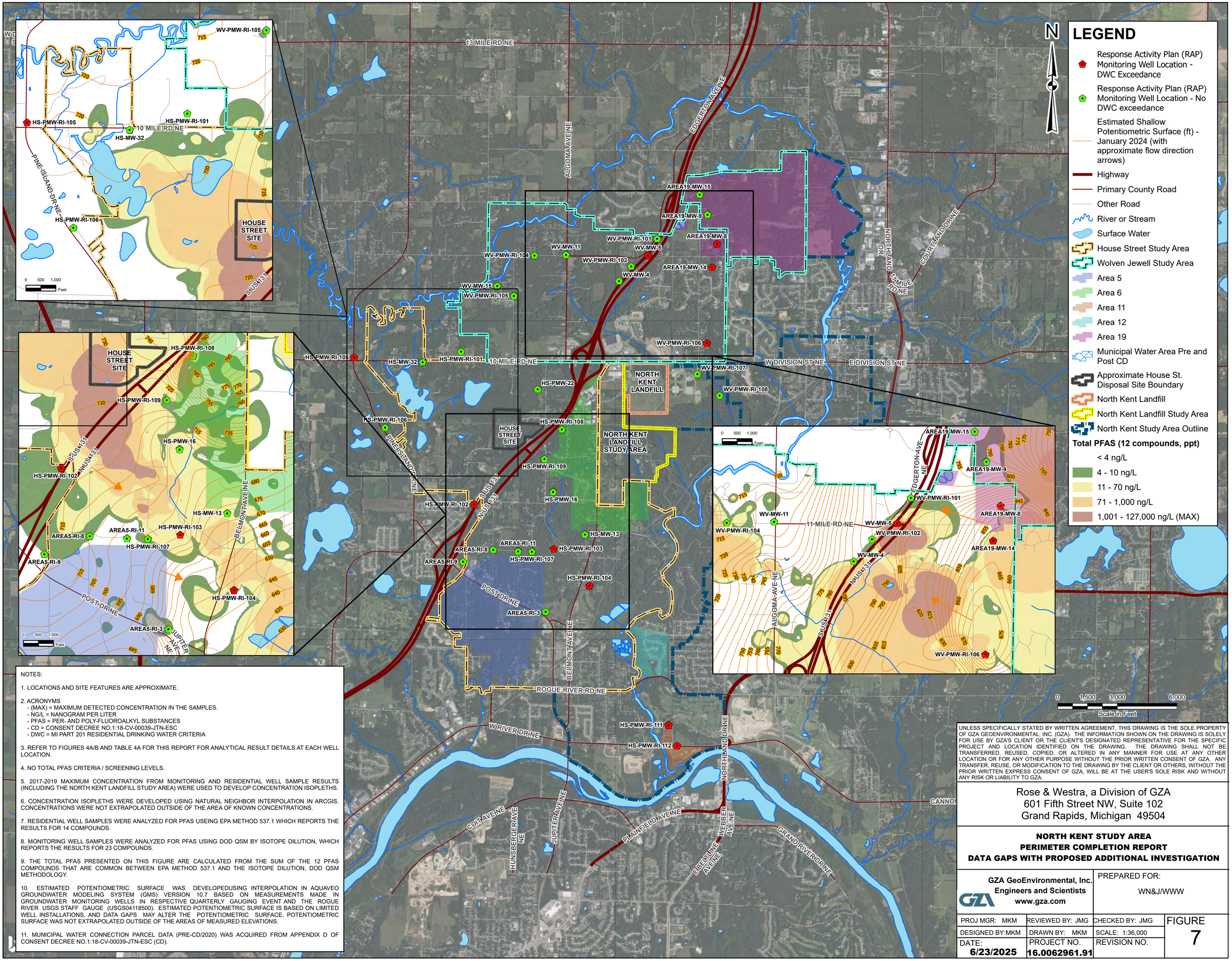
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PROJ MGR:	MKM	REVIEWED BY:	JMG	CHECKED BY:	JMG
DESIGNED BY:	MKM	DRAWN BY:	EAF	SCALE:	1 in = 3,500 ft
DATE:	06/12/2025	PROJECT NO:	16.0062961.91	REVISION NO:	73 of 1270

FIGURE 6E

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NOTES:

1. LOCATIONS AND SITE FEATURES ARE APPROXIMATE.

2. ACRONYMS
   - (MAX) = MAXIMUM DETECTED CONCENTRATION IN THE SAMPLES.
   - NG/L = NANOGRAM PER LITER
   - PFAS = PER- AND POLY-FLUOROALKYL SUBSTANCES
   - CD = CONSENT DECREE NO.1:18-CV-00039-JTN-ESC
   - DWC = MI PART 201 RESIDENTIAL DRINKING WATER CRITERIA

3. REFER TO FIGURES 4A/B AND TABLE 4A FOR THIS REPORT FOR ANALYTICAL RESULT DETAILS AT EACH WELL LOCATION.

4. NO TOTAL PFAS CRITERIA / SCREENING LEVELS.

5. 2017-2019 MAXIMUM CONCENTRATION FROM MONITORING AND RESIDENTIAL WELL SAMPLE RESULTS (INCLUDING THE NORTH KENT LANDFILL STUDY AREA) WERE USED TO DEVELOP CONCENTRATION ISOPLETHS.

6. CONCENTRATION ISOPLETHS WERE DEVELOPED USING NATURAL NEIGHBOR INTERPOLATION IN ARCGIS. CONCENTRATIONS WERE NOT EXTRAPOLATED OUTSIDE OF THE AREA OF KNOWN CONCENTRATIONS.

7. RESIDENTIAL WELL SAMPLES WERE ANALYZED FOR PFAS USEING EPA METHOD 537.1 WHICH REPORTS THE RESULTS FOR 14 COMPOUNDS.

8. MONITORING WELL SAMPLES WERE ANALYZED FOR PFAS USING DOD QSM BY ISOTOPE DILUTION, WHICH REPORTS THE RESULTS FOR 23 COMPOUNDS.

9. THE TOTAL PFAS PRESENTED ON THIS FIGURE ARE CALCULATED FROM THE SUM OF THE 12 PFAS COMPOUNDS THAT ARE COMMON BETWEEN EPA METHOD 537.1 AND THE ISOTOPE DILUTION, DOD QSM METHODOLOGY.

10. ESTIMATED POTENTIOMETRIC SURFACE WAS DEVELOPEDUSING INTERPOLATION IN AQUAVEO GROUNDWATER MODELING SYSTEM (GMS) VERSION 10.7 BASED ON MEASUREMENTS MADE IN GROUNDWATER MONITORING WELLS IN RESPECTIVE QUARTERLY GAUGING EVENT AND THE ROGUE RIVER USGS STAFF GAUGE (USGS04118500). ESTIMATED POTENTIOMETRIC SURFACE IS BASED ON LIMITED WELL INSTALLATIONS, AND DATA GAPS MAY ALTER THE POTENTIOMETRIC SURFACE. POTENTIOMETRIC SURFACE WAS NOT EXTRAPOLATED OUTSIDE OF THE AREAS OF MEASURED ELEVATIONS.

11. MUNICIPAL WATER CONNECTION PARCEL DATA (PRE-CD/2020) WAS ACQUIRED FROM APPENDIX D OF CONSENT DECREE NO.1:18-CV-00039-JTN-ESC (CD).

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NORTH KENT STUDY AREA
PERIMETER COMPLETION REPORT
DATA GAPS WITH PROPOSED ADDITIONAL INVESTIGATION

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PROJ MGR: MKM	REVIEWED BY: JMG	CHECKED BY: JMG	FIGURE 7
DESIGNED BY:MKM	DRAWN BY: MKM	SCALE: 1:36,000	
DATE: 6/23/2025	PROJECT NO. 16.0062961.91	REVISION NO.	

APPENDIX A

PERIMETER RESPONSE ACTIVITY PLAN

Rose & Westra
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ECOLOGICAL
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PERIMETER MONITORING RESPONSE ACTIVITY PLAN

North Kent Study Area

August 17, 2020, Revised December 31, 2020
File No. 16.0062961.90

PREPARED FOR:
Wolverine World Wide, Inc.
Rockford, Michigan

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ABBREVIATIONS AND ACRONYMS

AMSL	Above Mean Sea Level
CD	Consent Decree
cfs	Cubic feet per second
COVID-19	Coronavirus Disease 2019
CSM	Conceptual Site Model
DoD	United States Department of Defense
DWC	Part 201 Generic Groundwater Cleanup Criteria Protective of Drinking Water for Residential Land Uses
EGLE	Michigan Department of Environmental, Great Lakes and Energy
EPA	United States Environmental Protection Agency
GIS	Geographic Information Systems
GSI	Groundwater-Surface Water Interface
HFPO-DA	Hexafluoropropylene oxide dimer acid
HSDS	House Street Disposal Site
HUC	Hydrologic Unit Code
ID	Identification
MCL	Maximum Contaminant Level
MDEQ	Michigan Department of Environmental Quality
MDOT	Michigan Department of Transportation
MGDL	Michigan GIS Data Library
MS/MSD	Matrix Spike/Matrix Spike Duplicate
NE	Northeast
ng/L	Nanogram per Liter
NKLF	North Kent Landfill
NKSA	North Kent Study Area
PDF	Portable Document Format
PFAS	Per- and Polyfluoroalkyl Substances
PFBS	Perfluorobutane Sulfonic Acid
PFHxA	Perfluorohexanoic Acid
PFHxS	Perfluorohexane Sulfonic Acid
PFNA	Perfluorononanoic Acid
PFOA	Perfluorooctanoic Acid
PFOS	Perfluorooctane Sulfonate
ppt	Parts per Trillion
QAPP	Quality Assurance Project Plan [*Former Wolverine Tannery, House Street Disposal Area, and Wolven/Jewell Area, Per- and Polyfluoroalkyl Substances Investigation Program]*
QA/QC	Quality Assurance/Quality Control
QSM	Quality Systems Manual
R&W/GZA	Rose & Westra, a Division of GZA GeoEnvironmental, Inc.
RAP	Response Activity Plan
SAP	Sampling and Analysis Plan
SOP	Standard Operating Procedures
TCRA	Time Critical Removal Action
µg/L	Micrograms per Liter
USGS	United States Geological Survey
VAP	Vertical Aquifer Profiling
WJSA	Wolven Jewell Study Area
Wolverine	Wolverine World Wide, Inc.

1.0 INTRODUCTION

On behalf of Wolverine, R&W/GZA prepared this RAP for the Perimeter Monitoring investigation in the NKSA. The objective of this RAP is monitor for potential migration outside of the municipal water areas by further evaluating the vertical and horizontal extent of PFAS at the perimeter of the municipal water areas.

The municipal water areas are shown on **Figure 1**. In areas of the NKSA where municipal water is not being installed, most residential well PFAS concentrations are less than the new Michigan Part 201 drinking water criteria.

This RAP is prepared pursuant to CD No. 1:18-cv-00039-JTN-SJB, effective February 19, 2020. Specifically, this scope of work is established in Sections 7.4, 7.9(a), and Appendix N of the CD. This RAP is organized into the following sections:

- Introduction
- CSM
- Proposed Statement of Work
- Investigation Methodologies
- Sampling and Analysis Methods and Procedures
- Data Quality Objectives
- Data Quality Control and Assurance
- Project Schedule for Field Sampling and Analysis
- Project Schedule for Data Evaluation and Report Submittals

2.0 CONCEPTUAL SITE MODEL

The CSM (as defined in Section 4.4 of the CD) was based on interpretation of the HSDS Study Area and WJSA investigation data, regional geology and hydrogeology, residential water well sampling data in the NKSA, and groundwater investigations performed associated with the former HSDS and WJSA.

The CSM is focused on the groundwater flow from the EGLE-presumed source areas in both the HSDS Study Area and WJSA to outside the municipal water areas, PFAS distribution in groundwater, and the fate and transport of PFAS in groundwater. See **Figure 1** for a layout of the NKSA, WJSA, and HSDS Study Area.

For the purpose of this RAP, the CSM is focused on PFAS distribution in groundwater, and the fate and transport of PFAS in groundwater likely to migrate outside the municipal water areas within the NKSA. The following sections provide discussions of source areas, hydrology, geology, and hydrogeology, PFAS distribution in groundwater, groundwater flow, and PFAS transport.

2.01 SOURCE AREAS

The HSDS, located at 1855 House Street NE, Plainfield Township, Kent County, Michigan comprises approximately 76 acres (included on **Figure 1**). The HSDS is currently undeveloped and according to available information, no

buildings were previously present. An electric utility right-of-way and associated high-voltage transmission lines cross the northern portion of the HSDS, and an access road from House Street runs south to north across the HSDS.

The properties surrounding the HSDS are primarily undeveloped or residential. Properties to the northwest are undeveloped, extending to Clear Bottom Lake and Freska Lake. Properties to the west, southwest, and northeast are primarily residential. House Street NE abuts the HSDS to the south and southeast. Portions of the eastern HSDS boundary are formed by Herrington Avenue NE. Land owned by MDOT is present south and southeast of the HSDS (US 131 right-of-way), and additional residential properties are located westward along House Street.

PFAS were in Scotchgard™, a waterproofing material manufactured by 3M Company, that was applied to some leather goods manufactured at the former Wolverine Tannery site in Rockford, Michigan, over a period of time. Some tanning byproducts contained PFOS, PFOA, and their precursors which are part of a larger group of PFAS.

The HSDS was a State of Michigan licensed and regulated disposal facility from the mid-1960s through 1978. Until 1970, the HSDS received leather tanning byproducts over a period of time. EGLE Remediation and Redevelopment Division files indicated that HSDS's waste disposal license expired in 1978, but it appears no waste was disposed by Wolverine at HSDS after 1970. Prior to Wolverine acquiring the HSDS in 1964 and Michigan's first disposal area licensing statute (PA 87 of 1965), Wolverine and other entities disposed of materials on the HSDS (perhaps as early as the 1940s). Further investigation would be necessary to confirm the exact dates of disposal and the entities responsible for disposal. Based on past investigation data at Wolverine's tannery site (R&W/GZA, 2019), the byproducts also contained other substances which were addressed in the USEPA TCRA removal action. However, the data indicates that only PFAS appear to be materially migrating off-Site from the HSDS.

EGLE has alleged that there is a potential source area in the Wellington Ridge neighborhood where historic disposal of PFAS took place. GZA's investigations and review of available information have not revealed evidence of waste material. Historical aerial photographs suggest a portion of a former gravel pit was previously located in the area of the Lady Lauren cul-de-sac of the Wellington Ridge Development. The Wellington Ridge neighborhood is a high point within the WJSA (approximately 860 feet AMSL) resulting in groundwater flow in multiple directions.

Although the presence of other sources does not impact the obligations of the parties under the CD, in addition to the HSDS Study Area and WJSA, analytical data and groundwater flow information indicates the North Kent Landfill, which is owned and operated by Kent County, is likely also a source area of PFAS in some parts of both HSDS Study Area and WJSA. Lastly, while not specifically investigated, there are other possible sources of PFAS at residential properties, including septic systems, rain deposition, and the use of domestic products that contain PFAS (Schaider et al, 2016; EGLE, 2019a; ITRC, 2020).

Figure 1 includes an outlined boundary showing the HSDS Study Area and WJSA.

2.02 TOPOGRAPHY

As shown in **Figure 1**, the terrain is generally hilly in the region. The ground surface elevation at HSDS ranges from 740 feet to 800 feet. The HSDS is flanked by higher ground to the northeast and southwest, but ground surface generally dips to the northwest toward Clear Bottom Lake and Freska Lake, and to the southeast toward the Rogue River. Ground surface elevations for the area east of the HSDS range from 800 to more than 900 feet AMSL; ground surface elevations for the west to southwest of the HSDS range from 800 to 820 feet AMSL, with lower terrains to the northwest and southeast.

The ground surface elevations in the central portion of WJSA (where the Wellington Ridge neighborhood development is located) range from approximately 780 feet AMSL to greater than 930 feet AMSL. Most of the neighborhoods in the eastern portion of the WJSA are situated on topographically elevated areas sloping along surface water drainageways toward lowland areas. The terrain is sloped in various directions, to the west and northwest toward the Rogue River, and northeast toward the Rogue River. The portion of the WJSA located west of US 131 has ground surface elevations ranging from approximately 724 to 850 feet AMSL. The lowest elevations occur along the Rogue River ranging from approximately 723 feet AMSL on the western boundary to 700 feet AMSL on the eastern boundary.

Ground surface elevations in the NKSA range from approximately 650 feet AMSL at the Rogue River to more than 900 feet AMSL near the North Kent Landfill. Ground surface generally dips southeast toward the Rogue River.

2.03 HYDROLOGY

The NKSA is situated within the Rogue River Basin (Basin No. 14F), which is part of the Lower Grand River watershed (HUC 04050006). Based on *Michigan's Major Watersheds – Sub-basins GIS data (*EGLE, 2019b*)* downloaded from MGDL, the HSDS is situated within the Rogue River Basin (Basin No. 14F), which is part of the Lower Grand River watershed (HUC 04050006). The Rogue River Basin consists of 12 sub-basins. The HSDS is situated on the water divide of two sub-basins: HUC 04050006040080 and HUC 04050006040120. The WJSA is also situated on a water divide of two sub-basins: HUC 04050006040110 and HUC 0405006040080. These sub-basins drain to the Rogue River, which discharges to the Grand River.

The 2016 National Oceanic and Atmospheric Administration climate data report[1] for Grand Rapids, Michigan, indicates that the mean annual precipitation for the 80-year record period is approximately 36 inches. Based on the state-wide GIS data, the estimated annual groundwater recharge from precipitation (Michigan State University, 2005) at the NKSA ranged from 9 to 15 inches.

From 1989 to 2016, the average annual streamflow rate at USGS Gaging Station No. 04118500 in Rockford, Michigan, is approximately 260 cfs, and the average baseflow rate approximately 210 cfs. The gaging station measures the flow for the sub-basin, HUC 04050006040110, and all the upstream sub-basins, representing a drainage area of approximately 234 square miles, according to the USGS record.

2.04 GEOLOGY

Overburden in Kent County is a thick sequence of Pleistocene glacial deposits. The thickness of glacial deposits ranges from 11 to 800 feet in Kent County; however, the majority of glacial deposits range from 200 to 400 feet in thickness (Western Michigan University, 1981; Farrand, 1982). The glacial deposits in the County include till, outwash, and lacustrine deposits. Till occurs in end moraines and ground moraines (till plains), interspersed on the surface throughout the County (Stramel, Wisler, & Laird, 1954). For the area near the City of Rockford and Plainfield Township, the Michigan Glacial Land systems (Michigan State University, 2015) indicates that proglacial outwash plain is present along the Rogue River, and end moraines are present either side of the Rogue River extending to the "wide" near the Grand River. End moraines of medium-textured till are present at the NKSA and its vicinity. The ground moraine (till plain) and end moraine belong to the unstratified group of deposits, composed of fine- to coarse-grained material, including silt, sand, gravel, and boulders.

Based upon bedrock maps for the area (MDEQ, 1987), the bedrock beneath the NKSA includes the Michigan basin series. Based on GIS data from EGLE (MDEQ, 1987), Jurassic "red beds" are present in most of the site area and its vicinity, with small areas of Saginaw formation outcrops. The Jurassic "red beds" are often poorly consolidated

[1] https://www.ncdc.noaa.gov/cdo-web/search

or unconsolidated and consist primarily of clay, mudstone, siltstone, sandstone, shale, and gypsum. The "red beds" are of low permeability and are considered a confining unit. However, locally in the county, the "red beds" have been documented to supply small quantities of water (Apple & Reeves, 2007). Beneath the "red beds," bedrock in the region consists of the Mississippian-aged sandstone (Marshall formation), shale (Michigan formation), and the Bayport limestone as well as the Pennsylvanian-aged Saginaw formation. The regional dip is northeasterly toward the center of the Michigan basin.

Based on the *Hydrogeologic Atlas of Michigan* (Western Michigan University, 1981), the top of bedrock elevation ranges from 500 to 550 feet near the City of Rockford and within the WJSA. The top of bedrock elevations at the HSDS Study Area were estimated to range from 540 to 580 feet (R&W/GZA, 2018).

NKSA Geology

This summary of the geology in the NKSA is based on borehole data collected during the subsurface exploration, groundwater monitoring well installation described in the previously submitted GSI RAP**,** and the residential water well construction information and lithology data downloaded from the online Wellogic System[2]. The Wellogic System made available individual well logs in PDF, GIS shapefiles of county-wide well locations and construction information, and database files of lithology data for some of the wells. R&W/GZA has attempted to verify the well locations by comparing the well addresses to the Kent County Parcel GIS shapefiles and found that some of the well locations in the Wellogic GIS shapefiles are incorrect. To rectify, the Kent County parcel center coordinates are used for the residential well locations if the well addresses are verified with the Kent County Parcel GIS shapefiles. The majority of the well addresses in the Wellogic System GIS shapefiles were verified, and the parcel center locations were used as their coordinates. For some well locations, the addresses of which were not verifiable, the locations in the Wellogic System GIS files were kept and qualified with a note. In addition, lithology data for some of the wells in the Wellogic System GIS shapefiles were not available; therefore, R&W/GZA downloaded the PDF well logs and compiled the available lithology data into the well lithology database.

The monitoring well locations and the residential water wells are shown in **Figures 2** and **3.** Geologic cross-sections A-A' through G-G' (see **Figure 4** for transect locations) were created to show the general spatial variability of the depositional environment beneath the NKSA. See **Figures 5** through **11** for geological cross-sections A-A' through G-G', respectively.

HSDS Study Area

In the HSDS study area, cross-section A-A' is constructed along the primary plume center line, extending northwest to the Freska Lake area and southeast to the Rogue River. Cross-section F-F' runs perpendicular to the primary plume, upgradient of the Rogue River and extends from the south side of the HSDS municipal water area northeast to 10 Mile Road and the North Childsdale municipal water area (see **Figure 1**). Cross-section G-G' is located southeast of cross-section A-A' and extends from U.S. Route 131 southeast to the Grand River, parallel to the primary HSDS plume.

The area depicted in cross-section A-A' is predominantly coarse-grained soils. Fine-grained soils are present in some boreholes in thickness ranging from less than 10 feet to approximately 140 feet. However, water-bearing units were encountered in all of these wells.

Cross-section F-F' depicts an area that is predominantly coarse-grained material to the southwest with increasingly thick fine-grained layers moving to the northeast. Fine-grained soils are present in some boreholes

[2] https://secure1.state.mi.us/wellogic/Login.aspx?ReturnUrl=%2fwellogic%2fdefault.aspx

in thickness ranging from less than 10 feet to approximately 70 feet. Water-bearing units are either between clay strata or below the deepest clay strata encountered.

Cross-section G-G' is predominantly coarse-grained material, with a few exceptions where there are clay layers up to 100 feet thick. Toward the southeast end of the cross-section there are more interbedded layers of fine- and coarse-grained material. Water-bearing units are beneath the clay or between clay layers in most boreholes, though water is encountered above the shallowest clay layer in several boreholes approaching the Rogue River.

In general, coarse-grained soil is dominant in most of the soil borings and water well logs in the HSDS Study Area. The presence and thickness of clay and silt deposits varies horizontally and vertically without stratified correlation between borings. The lithologies shown on the cross-sections in the HSDS Study Area are characteristic of glacial outwash, and end moraines, to a lesser extent, as documented in regional geology.

Wolven/Jewell Study Areas

Cross-section B-B' is constructed from the Freska Lake area northeast to Algoma Avenue. The southwest portion is primarily sand and gravel until approximately Jewell Road and 11 Mile Road, where thicker clay layers are present.

Cross-section C-C' extends from the Rogue River northwest of the intersection of 11 Mile Road and Jewell Road southeast to the Rogue River south of 10 Mile Road. Fine-grained soils are predominant across this area with the exception of the homes nearest the Rogue River, that were predominantly sand. The thickness of fine-grained soil varies from approximately 20 feet to more than 100 feet across the area. Water-bearing units were encountered below the clay stratum or between clay strata.

Cross-section D-D' extends from U.S. Route 131 north of 11 Mile Road to the southeast, ending southeast of the intersection of 11 Mile Road and Wolven. This cross-section is northeast of the Wellington Ridge municipal water area. Soils are predominantly fine-grained through this area. In most of the boreholes on cross-section D-D', the top of the clay stratum was shallow, except the well at 3616 11 Mile Road, where more than 100 feet of sand were present above the top of the clay stratum, presenting a potential pathway for surface/shallow contamination to migrate to deeper zones.

Cross-section E-E' extends from the Wellington Ridge neighborhood to the northeast, along one of the WJSA plumes. This area is also dominated by fine-grained soil. Water bearing units were encountered below the clay stratum or between clay strata.

In general, fine-grained soil predominates in most of the soil borings and water well logs in the WJSA. In the soil borings located west of US 131 or closer to the Rogue River, coarse-grained soils are present in greater thickness and are even dominant in some locations. In addition, individual borings containing only coarse-grained soil exist even in the areas where fine-grained soils are predominant. These locations provide potential migration pathways from the surface/shallow to the deeper zone. The presence and thickness of clay and slit deposits varies horizontally and vertically. They appear to be unstratified and discontinuous in the area. In the soil borings where fine-grained soils are predominant, water-bearing units were encountered below the clay stratum or between clay strata. In rare cases, water wells were screened in the bedrock. The lithologies shown on the cross-sections in the WJSA are characteristic of end moraines as documented in regional geology. The presence of a relatively large volume of fine-grained soil limits the hydraulically conductive saturated zone, and therefore affects groundwater flow and contaminant transport pathway.

The moraine and ablation till deposits are characterized by sandy till that includes varying amounts of silt and clay and can vary from loose to medium density. West of US 131 closer to the Rogue River, coarse-grained sand and sand with some gravel are present in stratigraphically greater thickness and are dominant in some locations. Individual borings containing only coarse-grained sand exist even in the areas where fine-grained soils are predominant. Where continuous, these more permeable strata may provide preferential migration pathways to the deeper water-bearing zone. The presence and thickness of clay and silt till deposits varies horizontally and vertically, are unstratified and appear discontinuous in the WJSA. The lithologies shown on the cross-sections are characteristic of end moraines and complex depositional mechanisms vertically and horizontally in the hillier portions of the WJSA and are characteristic of glacial outwash sand and gravel and post-glacial alluvium deposition in low-lying areas approaching the Rogue River. The complex depositional environment and variability horizontally and vertically affects the transmissivity of the water-bearing deposits, and therefore influences groundwater flow and contaminant transport.

2.05 HYDROGEOLOGY

The direction of regional groundwater flow is influenced by the primary surface water features of the Rogue River and the Grand River. Streamflow data from the USGS Gaging Station indicates that the Rogue River is a gaining stream, acting as a groundwater discharge zone. R&W/GZA interpolated regional groundwater flows based on the static groundwater level in *Wellogic - Statewide Wells GIS Data for Kent County* (Michigan State University, 2005a through 2005d). The regional groundwater contours also indicate regional groundwater flow pattern generally follows the topography, discharging to the Rogue River and the Grand River.

Static water levels were collected from the monitoring wells and the staff gages. Groundwater and surface water elevations were calculated from the surveyed elevations of the top of casing for the monitoring wells or reference points for the staff gages. In addition, surface water elevations recorded at USGS Gaging Station No. 04118500 were also downloaded and converted to the same datum as the monitoring well survey. See **Table 3** of the GSI RAP for the well installation information in the NKSA and **Table 4** of the GSI RAP for a summary of the static groundwater level measurements.

In addition to the R&W/GZA-installed groundwater monitoring wells, EGLE also collected static water level data from the monitoring wells installed by EGLE during the November 2019 monitoring event and requested that NKLF collect and provide static water level data in November 2019. In combination, the November 2019 static water level data provided the most complete set of static water levels and elevations for the NKSA.

For the locations where multiple wells were installed at different intervals, R&W/GZA grouped the wells into the shallow zone and deep zone by borehole lithologies, screen intervals, and static water elevations. See **Table 3** of the GSI RAP for the well grouping designations.

Based on the November 2019 data set, groundwater elevation contours were interpolated from the static water level data. See **Figure 12** for the groundwater elevation contours in the shallow zone and **Figure 13** for the deep zone. As shown on **Figures 12** and **13**, groundwater in both the deep and shallow zones of the NKSA flows to the Rogue River.

HSDS Groundwater Flow

The HSDS is situated at or near a groundwater divide. Groundwater predominantly flows from the HSDS to the southeast to the Rogue River, but a portion of the flow appears to be to the northwest. Because of groundwater discharge to Freska Lake and Clear Bottom Lake, the hydraulic gradient to the northwest appears to be flat as compared to the southeast.

Wolven/Jewell Study Area Groundwater Flow

The shallow groundwater flow regime in the WJSA is characterized by a radial pattern from topographic highs toward the Rogue River. There appears to be a groundwater divide that corresponds to a topographically elevated moraine in the Wellington Ridge neighborhood. The divide is likely a primary recharge zone and appears oriented northeast to southwest. Groundwater flow is predominantly to the northwest from the Wellington Ridge area across the WJSA. However, components of flow toward the northeast and east are evident in the Wolven Northeast area. Deep zone groundwater contours are similar to the shallow zone although the groundwater divide appears within the approximate north-central portion of the WJSA.

2.06 PFAS DISTRIBUTION IN GROUNDWATER

Distribution of PFAS in the House Street Study Area

Groundwater and residential well sampling completed since 2017 has identified one primary PFAS plume within the HSDS Study Area ("House Street Primary Plume"). Groundwater samples collected from the monitoring wells across the HSDS Study Area in 2019 identified PFOA and PFOS as the primary PFAS compounds (approximately 11 percent and 60 percent of the total PFAS in monitoring well samples respectively). Note total PFAS analyte lists have varied between 14 and 23 (i.e., the EPA Method 537.1 14-analyte list and the 23 analytes included in the isotope dilution methodology under the most recent DoD QSM revision in effect at the time of sampling). However, given that the percent of the total PFAS mass that is comprised of PFOA+PFOS is relatively high, the slight variations in the total PFAS due to the varied number of analytes is negligible. Specifically, the analytes included on the 23 list that are not on the 14 list (i.e., nine different compounds) comprise approximately 8 percent of the total PFAS in the monitoring well samples. For consistency in the mapping, the total PFAS presented on **Figure 14** are calculated from the sum of the 12 PFAS compounds that are common between EPA Method 537.1 and the isotope dilution, DoD QSM methodology. However, the total PFAS values used throughout the remainder of this RAP and associated documents are reported as full totals of either the 14 or 23 analytes.

PFAS analytical data from the groundwater monitoring wells, and residential water well samples collected until December 2019 were combined and used for the interpolation of isoconcentration maps for total PFAS (**Figure 14**), and PFOA+PFOS **(Figure 15**). Where data from multiple sampling depths or sampling events are available at one location, the maximum concentrations were used during interpolation. It is important to note that the isoconcentration maps were geostatistically interpolated from spatially distributed point data, therefore they may overestimate the concentrations or extents in areas where data points were relatively sparse. As implied by the method, the isoconcentration maps are estimations only and are not intended to represent measured or true conditions.

Given the mobility of PFAS in groundwater, the migration and distribution in the HSDS Study Area is expected to correlate strongly to the groundwater flow pattern. Based on available data, it appears that there are two potential PFAS source areas in the primary HSDS plume:

1. The HSDS where PFAS contamination was identified.
2. The NKLF, where PFAS contamination was identified. Groundwater underlying the NKLF could migrate southwest into the HSDS Study Area and contribute to PFAS in residential wells.

The total PFAS isoconcentration map (**Figure 14**) suggests the primary PFAS plume migrated from the HSDS toward the Rogue River, primarily in the southeast direction, along the plume centerline. The PFOA+PFOS isoconcentration map (**Figure 15**) indicates a similar distribution to the total PFAS isoconcentration map, but their

extents and the concentration ranges are less than that of total PFAS because the total PFAS isoconcentration map included other compounds, such as PFBS, PFHxA, PFHxS, and PFNA. Figures 16 through 21 provide isoconcentration maps for the individual compounds that have been detected on site and have Part 201 criteria (PFOS, PFOA, PFBS, PFHxS, PFHxA and PFNA respectively). So-called secondary plumes, i.e. fingers or branches to the primary plume may also be present in HSDS Study Area.

Distribution of PFAS in the Wolven/Jewell Study Area

Based on the groundwater and residential well sampling data collected since 2017, it is GZA's opinion that there are two primary PFAS plumes within the WJSA. Groundwater samples collected from the monitoring wells across the WJSA in 2019 identified PFOA and PFOS as the primary PFAS compounds (approximately 26 percent and 57 percent of the total PFAS in monitoring well samples, respectively). Note total PFAS analyte lists have varied between 14 and 23 (i.e., the EPA Method 537.1 14-analyte list and the 23 analytes included in the isotope dilution methodology under the most recent DoD QSM revision in effect at the time of sampling). However, given that the percent of the total PFAS mass that is comprised of PFOA+PFOS is relatively high, the slight variations in the total PFAS due to the varied number of analytes is negligible. Specifically, the analytes included on the 23 list that are not on the 14 list (i.e., nine different compounds) comprise approximately 8 percent of the total PFAS in the monitoring well samples. For consistency in the mapping, the total PFAS presented on **Figure 14** are calculated from the sum of the 12 PFAS compounds that are common between EPA Method 537.1 and the isotope dilution, DoD QSM methodology. However, the total PFAS values used throughout the remainder of this RAP and associated documents are reported as full totals of either the 14 or 23 analytes.

PFAS analytical data from the groundwater monitoring wells and residential water well samples collected until December 2019 were combined and used for the interpolation of isoconcentration maps for total PFAS (**Figure 14**), and PFOA+PFOS **(Figure 15**). Where data from multiple sampling depths or sampling events are available at one location, the maximum concentrations were used during interpolation. It is important to note that the isoconcentration maps were geostatistically interpolated from spatially distributed point data, therefore they may overestimate the concentrations or extents in areas where data points were relatively sparse. As implied by the method, the isoconcentration maps are estimations only and are not intended to represent measured or true conditions.

Given the mobility of PFAS in groundwater, the migration and distribution in the WJSA is expected to correlate strongly to the groundwater flow pattern. Based on available data, it appears that there are two potential PFAS source areas in the primary WJSA:

1. The Wellington Ridge neighborhood. Note that GZA's investigation of this area and review of available data did not yield evidence of waste material.
2. The NKLF, where PFAS contamination was previously identified. A reported landfill underdrain system previously discharged to the northwest trending drainage feature that discharges under 10 Mile Road then northwest toward US 131. Both the underdrain discharge and groundwater impacted by a reported liner leak underlying the NKLF could migrate into the WJSA and contribute to PFAS in residential wells.

The PFOA+PFOS isoconcentration map (**Figure 15**) suggests radial migration from the groundwater divide, east-northeast toward Wolven Northeast, 12 Mile Road and Summit Avenue areas, northwest across US 131 toward the Rogue River, and to the south-southeast into the North Childsdale area. Based on the groundwater flow evaluation; the PFOA+PFOS-impacted groundwater is expected to continue migrating along preferential flow paths primarily controlled by a complex depositional environment, established surface drainage and surface water features as well as topography toward the Rogue River.

2.07 EXPOSURE PATHWAYS – APPLICABLE PART 201 CLEANUP CRITERIA, MI MCLS, AND CD ACTION LEVELS

Based on EGLE's Part 201 administrative rules, the applicable Part 201 groundwater cleanup criterion for the perimeter monitoring is the DWC, which is protective of human health from being exposed to groundwater via ingestion.

For PFAS compounds, Michigan has Part 201 cleanup criteria for PFOS, PFOA, PFNA, PFHxS, PFHxA, PFBS and HFPO-DA as listed below[3]. Section 7.1 of the CD requires preventing exposure to PFOA+PFOS concentration in excess of 10 ng/L as one of the performance objectives.

Compound	Threshold Value (µg/L)	Basis for Value
PFOA	12	GSI
PFOS	0.012	GSI
PFOA	0.008	DWC
PFOS	0.016	DWC
PFNA	0.006	DWC
PFHxS	0.051	DWC
PFHxA	400	DWC
PFBS	0.420	DWC
HFPO-DA	0.370	DWC

The GSI pathway for PFAS is addressed in a separate RAP submitted to EGLE in August 2020 (R&W/GZA, 2020).

Based on the Part 201 cleanup criteria, the project action levels are set to be 8 ng/L for PFOA and 16 ng/L for PFOS. The project objectives are to monitor possible migration of PFAS/PFOA+PFOS from the municipal areas and evaluate if downgradient receptors are potentially exposed to PFOA above 8 ng/L or PFOS above 16 ng/L via groundwater ingestion.

2.08 DATA GAPS

Based on the current understanding of the CSM and the above discussions, the following data gaps are identified and intended to be addressed with this RAP:

- Potential for PFAS/PFOA+PFOS-impacted groundwater in the shallow and deep zones migrating from the municipal water areas.

[3] EGLE promulgated state drinking water standards for seven per- and polyfluoroalkyl substances (PFAS) that are effective August 3, 2020. State drinking water standards are also commonly referenced as maximum contaminant levels and developed under section 5 of the State Drinking Water Act, 1976 PA 299 [MCL 325.1005]. EGLE previously developed generic cleanup criteria for groundwater used as drinking water for PFOA and PFOS that were effective January 10, 2018. As established under Part 201, Environmental Remediation, of the Natural Resources and Environmental Protection Act, 1994 PA 451, as amended [MCL 324.20120a(5)], the state drinking water standards become the PFOA and PFOS generic cleanup criteria for groundwater used as drinking water. The state drinking water standards 0.008 µg/L (parts per billion) and 0.016 µg/L, respectively for PFOA and PFOS, are effective August 3, 2020 and replace the previously established residential and nonresidential drinking water criteria of 0.07 µg/L for the combined concentrations of PFOA and PFOS. Additionally, EGLE established new generic drinking water criteria for PFNA, PFHxS, PFHxA, PFBS, and HFPO-DA (also known as GenX) effective December 21, 2020.

R&W/GZA has identified the following areas where additional data is needed to further characterize the plume and meet the project objectives and address the data gaps:

- West, northwest and south of the HSDS primary plume (west of US 131);
- North and south of the northwest portion of the WJSA plume, near the Rogue River;
- North of the WJSA plume north of Wellington Ridge, along US 131);
- Southeast of the WJSA plume, north of 10 Mile Road; and
- West of the North Childsdale municipal water area.

3.0 PROPOSED STATEMENT OF WORK

The following provides a summary of the proposed investigation, based on the identified data gaps. The proposed sampling locations are shown on **Figure 22**. Actual monitoring well locations may vary slightly from the proposed locations of **Figure 22** during installation. While the target locations for the well clusters are shown, limitations for access on private properties, site conditions, and utilities may require moving monitoring well locations.

- Two monitoring well locations, HS-PMW-16 and HS-PMW-22, were previously proposed. These well locations were proposed to assist with delineating the east-northeast boundary of the House Street plume[4]. Well location HS-PMW-16 will be utilized as a perimeter monitoring well cluster to evaluate potential PFAS migration to the east. A third monitoring well, HS-MW-13, was installed and will be included as a perimeter well.
- Three perimeter well locations, HS-PMW-RI-105, HS-PMW-RI-106, and HS-PMW-RI-101, located northwest, and hydraulically downgradient of the House Street site, are proposed to evaluate potential PFAS migration at the edge of the Freska Lake area toward the edge of the NKSA. In addition, the existing well cluster, HS-MW-32A/B/C/D, will be included as perimeter monitoring wells to evaluate potential PFAS migration to this area.
- Well location HS-PMW-RI-102, located hydraulically downgradient of the House Street Site to the southwest, is proposed to monitor for PFAS migration from the municipal water areas to the southeast.
- For the Wolven West and Wolven Northwest Study Areas, perimeter well locations WV-PMW-RI-101 and WV-PMW-RI-102 are proposed immediately west of the US 131 right-of-way, hydraulically downgradient of the PFAS plume in Wellington Ridge. These wells are proposed to evaluate potential migration of PFAS from Wellington Ridge municipal water area to the west. Well locations WV-PMW-RI-104 and WV-PMW-RI-105 are proposed to delineate the southwest and northeast boundary of the PFAS plume within the Wolven Northwest municipal water area. In addition, existing monitoring well clusters, WV-MW-5, WV-MW-4, WV-MW-11, and WV-MW-15 will be included as part of the perimeter monitoring for the Wolven West and Wolven Northwest areas.
- Well locations WV-PMW-RI-106 and WV-PMW-RI-107 are located in the southeastern portion of the Wolven/Jewell area municipal water area. These wells are proposed to evaluate the potential migration of PFAS plume from Wolven Southeast municipal water area to the southeast.

[4] For the sake of this Work Plan, the edge of the PFAS plume is defined as PFOA+PFOS = 10 ppt or PFOA = 8 ppt. If the applicable PFAS criteria change during the life of this Work Plan and subsequent monitoring, the Work Plan will be reassessed for its adequacy and modified as needed.

- Well location WV-PMW-RI-108 is located southwest of the North Childsdale municipal water area and is proposed to evaluate flow from that area to the west and south.

The combination of groundwater monitoring, institutional controls (groundwater use ordinance), and filters (as required) are designed to protect downgradient receptors from unacceptable exposure to PFAS in drinking water. In addition to groundwater monitoring proposed in this RAP, additional residential well resampling is proposed (see separate Residential Well Resampling RAP submitted September 2020).

4.0 INVESTIGATION METHODOLOGY

Relevant tasks included in this RAP will be completed in accordance with the most recent revision of the EGLE-approved QAPP prepared for Wolverine by R&W/GZA.

The proposed well cluster locations will be drilled using either hollow-stem auger or rotosonic methods in accordance with SOPs A03 through A06 of the QAPP. When possible, the initial boring at each location will be drilled to the top of bedrock or upon refusal. The borehole terminal depth will also be evaluated based on the depths of adjacent water wells and the presence of confining strata.

As the original borings are drilled at each location, vertical aquifer profiling samples will be collected for PFAS analysis from water-bearing and permeable formation(s) at intervals of 10 feet. Vertical Aquifer Profiling will be completed in accordance with *SOP A25, Vertical Aquifer Profiling* included in the QAPP. The turn-around time for laboratory samples will be approximately three weeks.

Based on the profiling data, encountered geology, and nearby drinking water well elevations, R&W/GZA will determine the depth(s) of wells installed at each location. The monitoring wells will be developed in accordance with *SOP A13, Well Development* in the QAPP. Upon completion, the wells will also be surveyed by a licensed surveyor.

5.0 SAMPLING AND ANALYTICAL PROCEDURES

This section provides a generalized SAP for the perimeter monitoring well sampling. Specific information regarding sampling procedures and analytical methods is provided in the site-specific QAPP.

Wells will be sampled as follows:

- Initial sampling post installation/development;
- Annual sampling until substantial completion of the perimeter well network; and
- Once the perimeter well network is substantially complete, all newly installed wells will be sampled quarterly for one year. (Substantial Completion will be agreed upon by R&W/GZA and EGLE.)

Following the full year of quarterly sampling of the well network, R&W/GZA, in consultation with EGLE, will evaluate the data and determine appropriate next steps.

5.01 SAMPLING LOCATIONS

As discussed in **Section 3.0**, the following monitoring wells will be sampled:

Grouping/Area	Well Nomenclature
Existing	HS-MW-32A/B/C/D, WV-MW-5S/D, WV-MW-4S/D, WV-MW-11S/D, and WV-MW-15A/B/C/D
Delineation of the northeastern boundary of the House Street plume	HS-MW-13, HS-PMW-16, and HS-PMW-22
Evaluate potential migration at the edge of Freska Lake toward the eastern edge of NKSA	HS-PMW-RI-105, HS-PMW-RI-106, and PMW-RI-101
Evaluate potential migration from municipal areas within HSDS to the southeast	HS-PMW-RI-102
Evaluate potential migration to the northwest in WJSA	WV-PMW-RI-101 and WV-PMW-RI-102
Delineate the southwest and northeast boundary of the PFAS plume with in the Wolven Northwest municipal area	WV-PMW-RI-104 and WV-PMW-RI-105
Evaluate potential migration from the Wolven Southeast municipal water area to the southeast	WV-PMW-RI-106 and WV-PMW-RI-107
Evaluate potential migration southwest of North Childsdale municipal water area	WV-PMW-RI-108

In addition to the wells listed above, the following monitoring well clusters being installed as part of the Areas 5, 6, 11/12, and 19 RAPs will be added to sampling for this RAP after the first year:

- Area19-MW-8
- Area19-MW-9
- Area19-MW-14
- Area19-MW-15
- Area5-RI-3
- Area5-RI-8
- Area5-RI-9
- HS-PMW-RI-103
- HS-PMW-RI-107
- HS-PMW-RI-103
- HS-PMW-RI-104
- HS-PMW-RI-111
- HS-PMW-RI-112

Figure 23 includes all of the wells to be included in the perimeter monitoring program.

5.02 SAMPLE COLLECTION AND LABELING

Samples will be collected for PFAS analysis following the methods summarized in **Section 4.0** and detailed in the sampling SOPs for Groundwater Monitoring Wells (SOP A16; Low Flow Sampling). Detailed field and laboratory requirements are provided in the project specific QAPP.

Sample identification will consist of nomenclature that includes the sample's unique location identification (see reference table above). If applicable, sample identification for each sample will be repeated for each sampling event with consistent spelling.

To prevent misidentification of samples, legible labels will be affixed to each sample container. The labels will be sufficiently durable to remain legible even when wet. At a minimum, the labels will contain the following information:

- Location ID;
- Name or initials of collector; and
- Date and time of collection.

5.03 SAMPLE SHIPPING

Sample bottles will be placed into the cooler and packed with double-bagged wet ice immediately following collection. Packing material will be used as necessary. A temperature blank will be placed in the cooler prior to shipment. The cooler shall be addressed to the appropriate laboratory and dispatched as soon as practical to ensure timely arrival.

5.04 ANALYTICAL METHOD AND PARAMETERS

PFAS will be analyzed using DoD QSM 5.3 guidelines for PFAS by isotope dilution methodology. The analyte list will include the 28 PFAS compounds specified by EGLE, and reporting limits are provided in Table A.7.7 of the project specific QAPP.

6.0 DATA QUALITY ASSURANCE AND CONTROL

The following field quality control samples will be collected at a rate of one per 20 samples in accordance with the project specific QAPP: *Field blanks, field duplicates, and MS/MSDs*.

- Field blanks will be collected by pouring laboratory-supplied, certified PFAS-free water into a sample container at the point of sample collection. The purpose of field blanks is to assess potential contamination at the sample point.
- Field duplicates will be collected by filling one additional sample container with water from the sample point. The purpose of field duplicates is to assess variability in sample composition. Field duplicates are not intended to be blind duplicates.
- MS/MSD will be collected by filling two additional sets of sample bottles with water from the sample point. MS/MSD analyses are conducted by the analytical laboratory after samples have been collected and submitted. Analysis of known concentrations of analytes spiked in the MS/MSD samples indicate if matrix interference effects are occurring.
- QA/QC samples will be collected using the methods described in **Section 5.0** and the SOPs in the site-specific QAPP. Samples will be labeled as described in **Section 5.0.** The location of QA/QC samples will be entered into the Monitoring Checklist. QA/QC samples will be analyzed using the same analytical methods used for the primary sample.

7.0 INVESTIGATION-DERIVED WASTE

Soil cuttings will be containerized and transported to the HSDS property for staging/storage until off-site treatment/disposal or other approved handling can be arranged. The monitoring well development and purge water will be managed as follows:

- For locations where PFAS concentrations are below Part 201 GRCC, the water can be discharged to the ground surface in accordance with EGLE interoffice communication regarding purge-water disposal from well sampling and development (EGLE, 1999).

- For locations where PFAS concentrations are unknown or known to exceed Part 201 GRCC, the water will be disposed of appropriately in accordance with the EGLE interoffice communication regarding purge water disposal from well sampling and development (EGLE, 1999), and not discharged to the ground surface.

8.0 ANTICIPATED SCHEDULE

The schedule for monitoring well installation will depend greatly on R&W/GZA's ability to procure access to the desired or proximate alternate locations and the potential impact of coronavirus disease 2019 (COVID-19). The following table outlines R&W/GZA's current estimates of the steps and approximate timeframes for the tasks in this RAP (upon EGLE approval).

Task	Estimated Timeframe per Location
Access	1 to 3 months
Initial Drilling	2 to 3 weeks
VAP analysis	3 weeks
Monitoring Wells Installation	1 to 2 weeks
Development Wait Time	2 weeks
First Groundwater Sampling	1 week
First Laboratory Analysis	3 weeks

Assuming one month per location, R&W/GZA estimates this SOW will require eleven months to complete drilling, vertical aquifer profiling, and monitoring well installation. This will be completed in conjunction with the other RAPs submitted under the CD. R&W/GZA will coordinate with EGLE to prioritize drilling locations if access is obtained for multiple locations throughout the RAPs simultaneously. Because access will likely be obtained piecemeal, the actual well installation schedule may exceed eleven months.

Following the full year of quarterly sampling of the well network, R&W/GZA will evaluate the data in consultation with EGLE and determine appropriate next steps. A long-term monitoring schedule will be documented and included within the Completion Report discussed in Section 7.12(v) of the CD.

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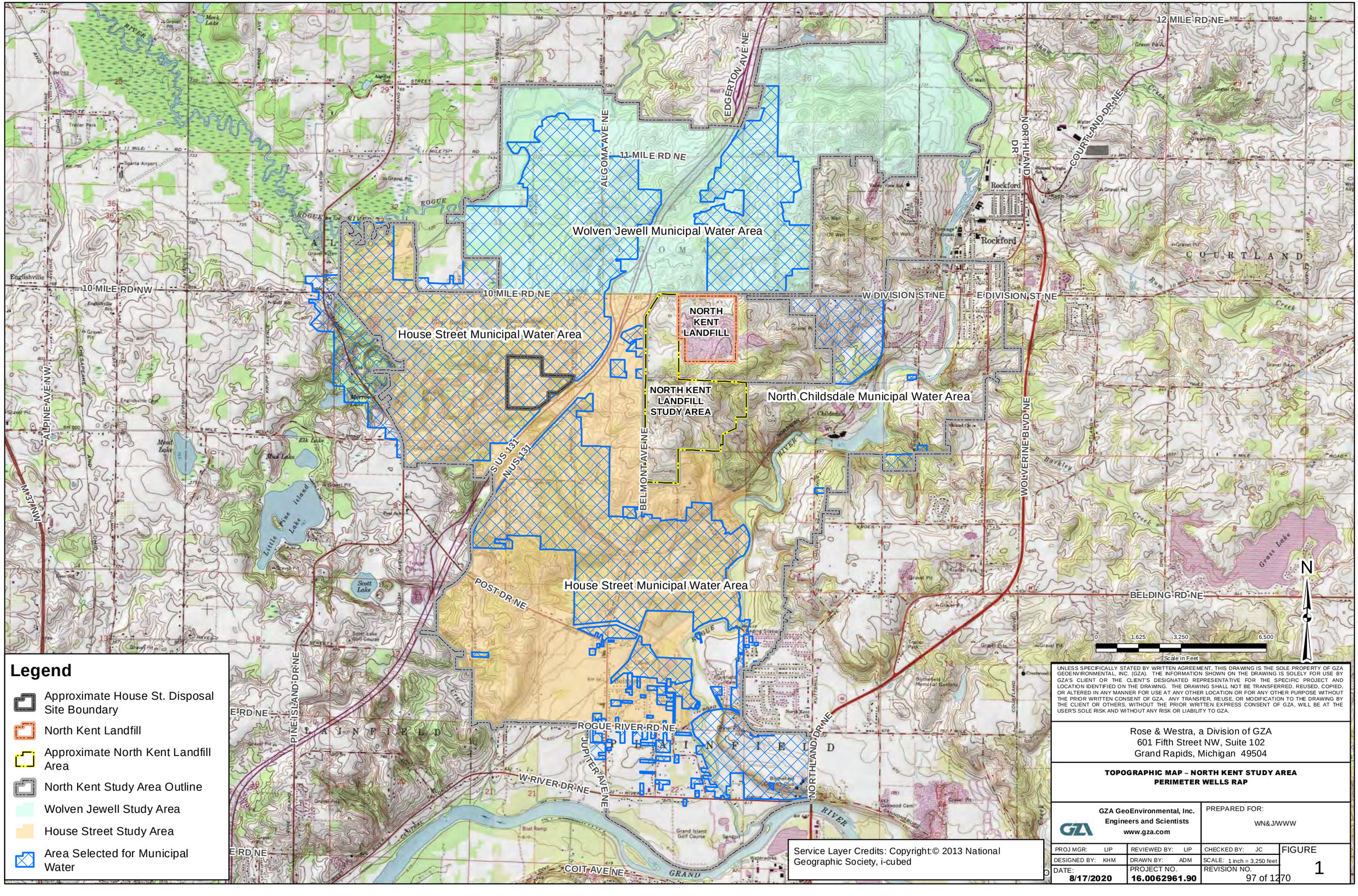
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FIGURES



Legend

- Approximate House St. Disposal Site Boundary
- North Kent Landfill
- Approximate North Kent Landfill Area
- North Kent Study Area Outline
- Wolven Jewell Study Area
- House Street Study Area
- Area Selected for Municipal Water

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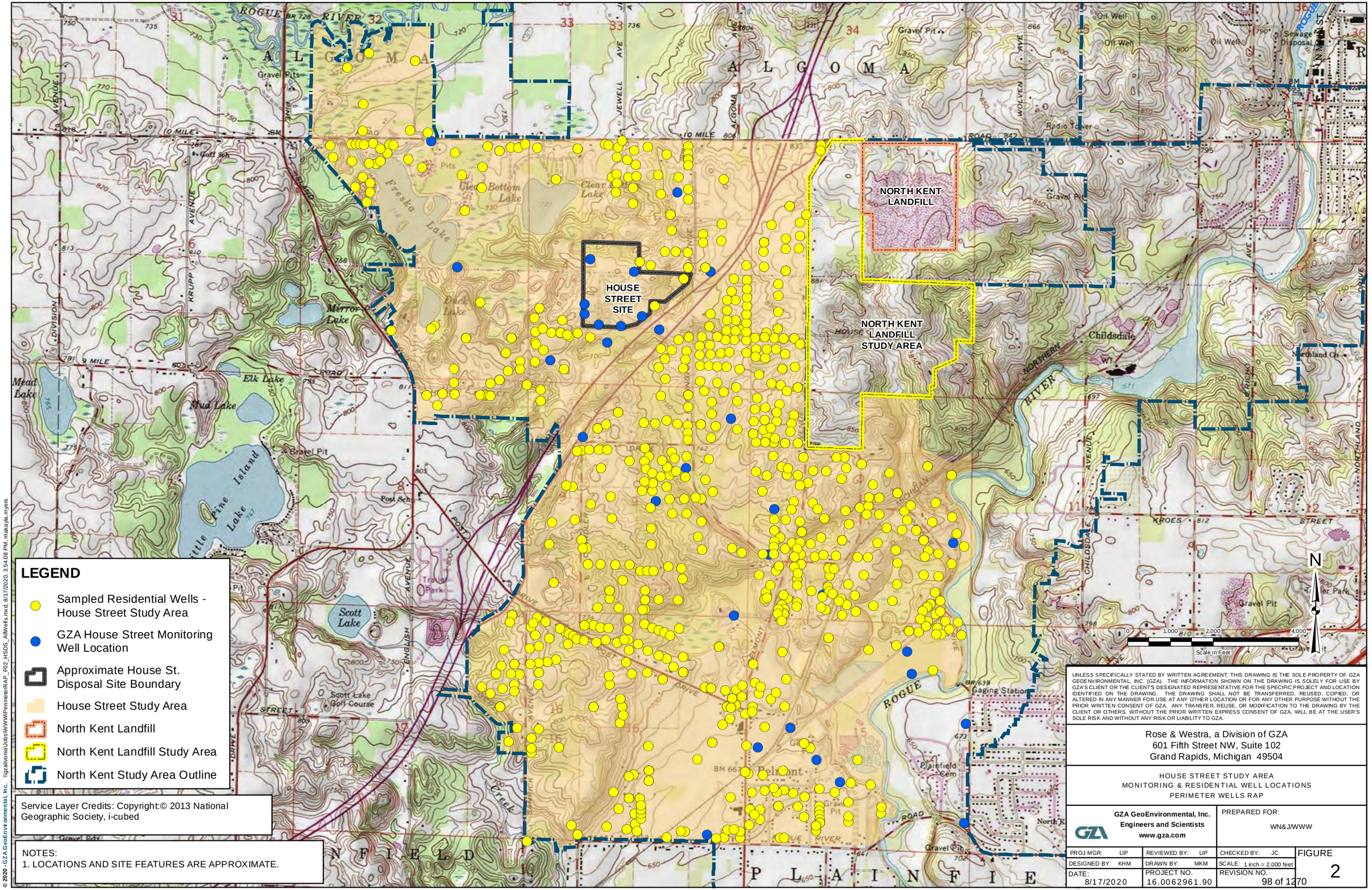
TOPOGRAPHIC MAP – NORTH KENT STUDY AREA
PERIMETER WELLS RAP

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Engineers and Scientists
www.gza.com

PREPARED FOR: WN&J/WWW

PROJ MGR: LIP	REVIEWED BY: LIP	CHECKED BY: JC	FIGURE 1
DESIGNED BY: KHM	DRAWN BY: ADM	SCALE: 1 inch = 3,250 feet	
DATE: 8/17/2020	PROJECT NO. 16.0062961.90	REVISION NO.	

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LEGEND

- Sampled Residential Wells - House Street Study Area
- GZA House Street Monitoring Well Location
- Approximate House St. Disposal Site Boundary
- House Street Study Area
- North Kent Landfill
- North Kent Landfill Study Area
- North Kent Study Area Outline

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NOTES:
1. LOCATIONS AND SITE FEATURES ARE APPROXIMATE.

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HOUSE STREET STUDY AREA
MONITORING & RESIDENTIAL WELL LOCATIONS
PERIMETER WELLS RAP

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PREPARED FOR: WN&J/WWW

PROJ MGR: LIP	REVIEWED BY: LIP	CHECKED BY: JC	FIGURE 2
DESIGNED BY: KHM	DRAWN BY: MKM	SCALE: 1 inch = 2,000 feet	
DATE: 8/17/2020	PROJECT NO. 16.0062961.90	REVISION NO.	

Legend

- EGLE Monitoring Well
- GZA Monitoring Well - Wolven Jewell Study Area
- Sampled Residential Well
- North Kent Landfill
- North Kent Landfill Study Area
- North Kent Study Area Outline
- Wolven Jewell Study Area
- Approximate House St. Disposal Site Boundary

NORTH KENT LANDFILL

NORTH KENT LANDFILL STUDY AREA

HOUSE STREET SITE

N

0 1,000 2,000 4,000

Scale in Feet

NOTES:
1. LOCATIONS AND SITE FEATURES ARE APPROXIMATE.

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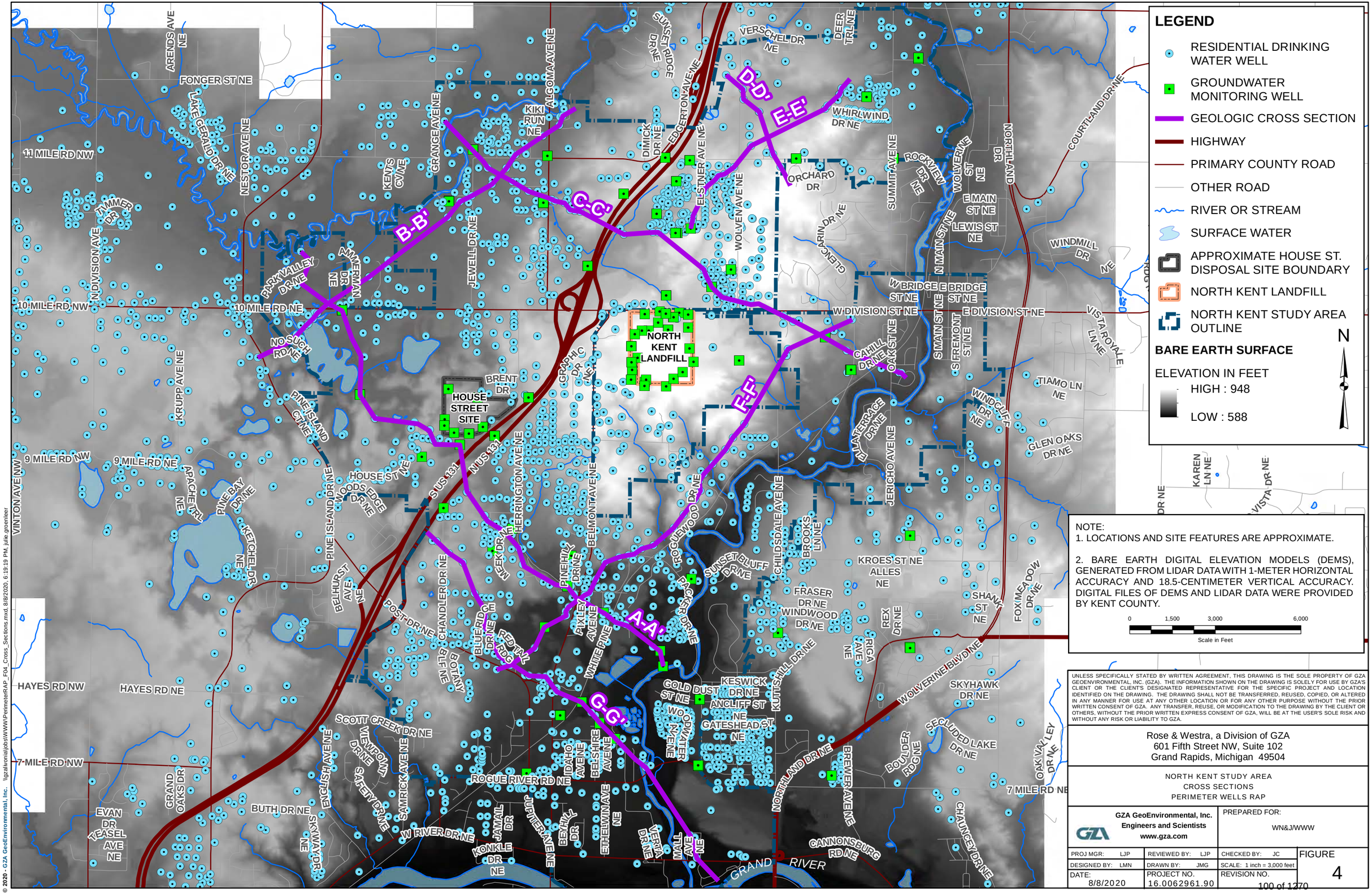
WOLVEN JEWELL STUDY AREA
MONITORING & RESIDENTIAL WELL LOCATIONS
PERIMETER WELLS RAP

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PREPARED FOR: WN&JWWW

PROJ MGR: LJP	REVIEWED BY: LJP	CHECKED BY: JC	FIGURE 3
DESIGNED BY: KHM	DRAWN BY: MKM	SCALE: 1 inch = 2,000 feet	
DATE: 8/17/2020	PROJECT NO. 16.0062961.90	REVISION NO.	

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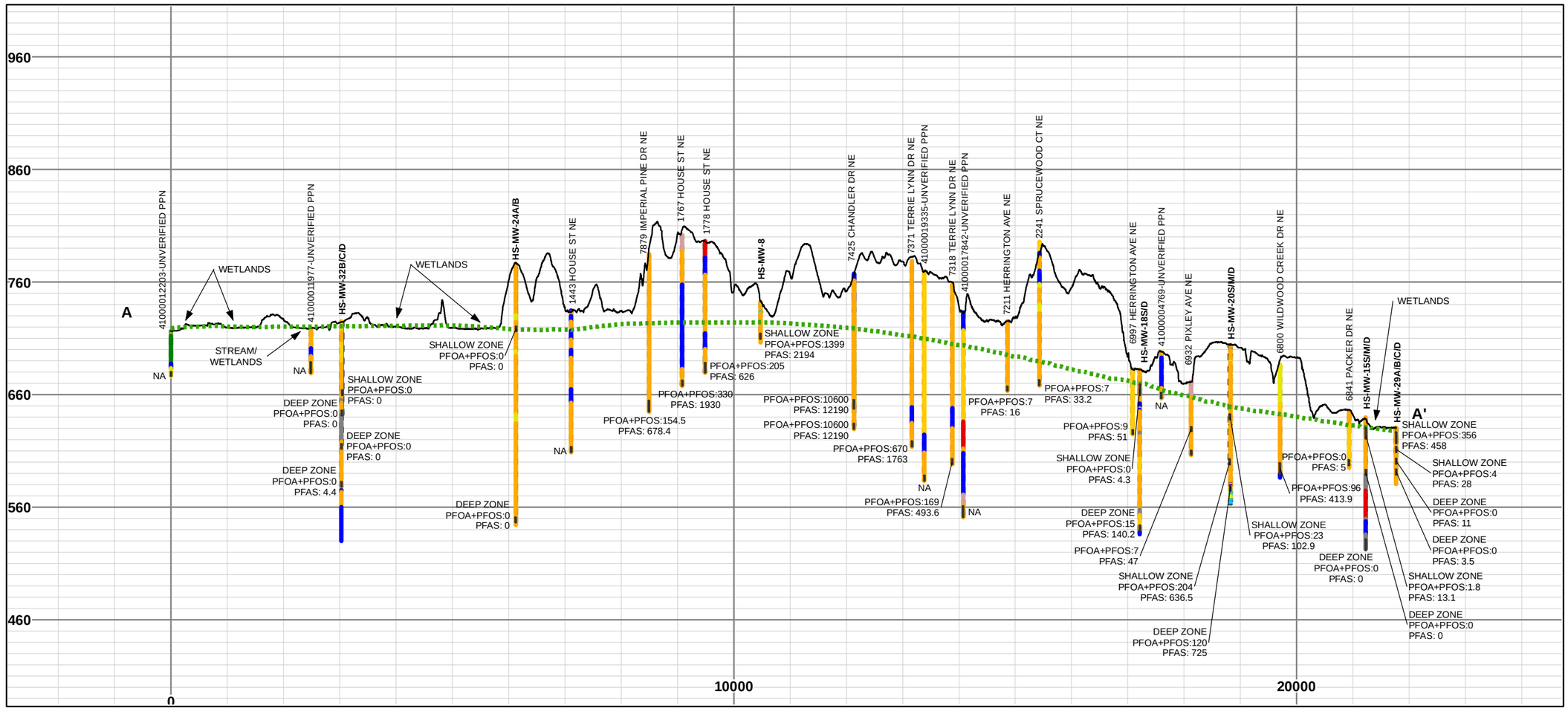
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NORTH KENT STUDY AREA
CROSS SECTIONS
PERIMETER WELLS RAP

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PREPARED FOR:
WN&J/WWW

PROJ MGR: LJP	REVIEWED BY: LJP	CHECKED BY: JC	FIGURE 4
DESIGNED BY: LMN	DRAWN BY: JMG	SCALE: 1 inch = 3,000 feet	
DATE: 8/8/2020	PROJECT NO. 16.0062961.90	REVISION NO.	



CROSS SECTION LEGEND

WELL SCREEN

PFOA+PFOS (ng/L)
PFAS (ng/L)
0 = NOT DETECTED
NA = NOT AVAILABLE

ESTIMATED POTENTIOMETRIC SURFACE (11/2019)

GROUND SURFACE

BOREHOLE LITHOLOGY

- GRAVEL
- SAND AND
- SAND
- SAND/GRAVEL WITH CLAY/SILT
- CLAY/SILT WITH SAND/GRAVEL
- SILT
- CLAY AND
- CLAY
- TOP SOIL
- ORGANIC SOIL
- NOT

OVERVIEW MAP LEGEND

- PROPOSED INVESTIGATION/ PERIMETER MONITORING WELL
- PROPOSED PERIMETER MONITORING WELL
- RESIDENTIAL WATER WELL
- MONITORING WELL
- CROSS SECTION LINE
- HIGHWAY
- PRIMARY COUNTY ROAD
- OTHER ROAD
- RIVER OR STREAM
- SURFACE WATER
- APPROXIMATE HOUSE ST. DISPOSAL SITE BOUNDARY
- NORTH KENT LANDFILL

NOTES:
1. LOCATIONS AND SITE FEATURES ARE APPROXIMATE.

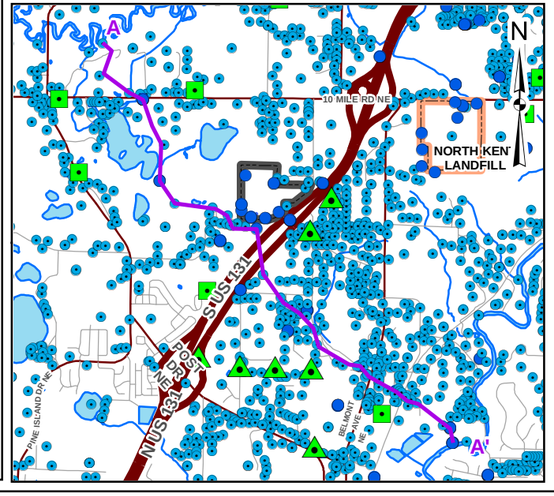
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4. WELL SCREEN ELEVATIONS PROVIDED IN FEET ABOVE MEAN SEA LEVEL, NORTH AMERICAN VERTICAL DATUM OF 1988 (NAVD 88). RESIDENTIAL WELL SCREEN ELEVATIONS AND BOREHOLE LITHOLOGY ELEVATIONS WERE CALCULATED USING WELL INFORMATION PROVIDED BY THE STATE OF MICHIGAN'S WELLOGIC DATABASE AND GROUND SURFACE ELEVATIONS OF THE CENTER OF THE PPN GENERATED FROM LIDAR DATA PROVIDED BY KENT COUNTY. ELEVATIONS ARE ROUNDED TO THE NEAREST FOOT.

5. MONITORING WELL SCREEN AQUIFER ZONES ARE DESIGNATED AS PERCHED, SHALLOW, OR DEEP. CONCENTRATIONS OF TOTAL PFAS AND PFOA+PFOS DEPICTED ARE MAXIMUM CONCENTRATIONS DETECTED AT THE SPECIFIED LOCATION.

OVERVIEW MAP



0 2,750 5,500 11,000
SCALE IN FEET

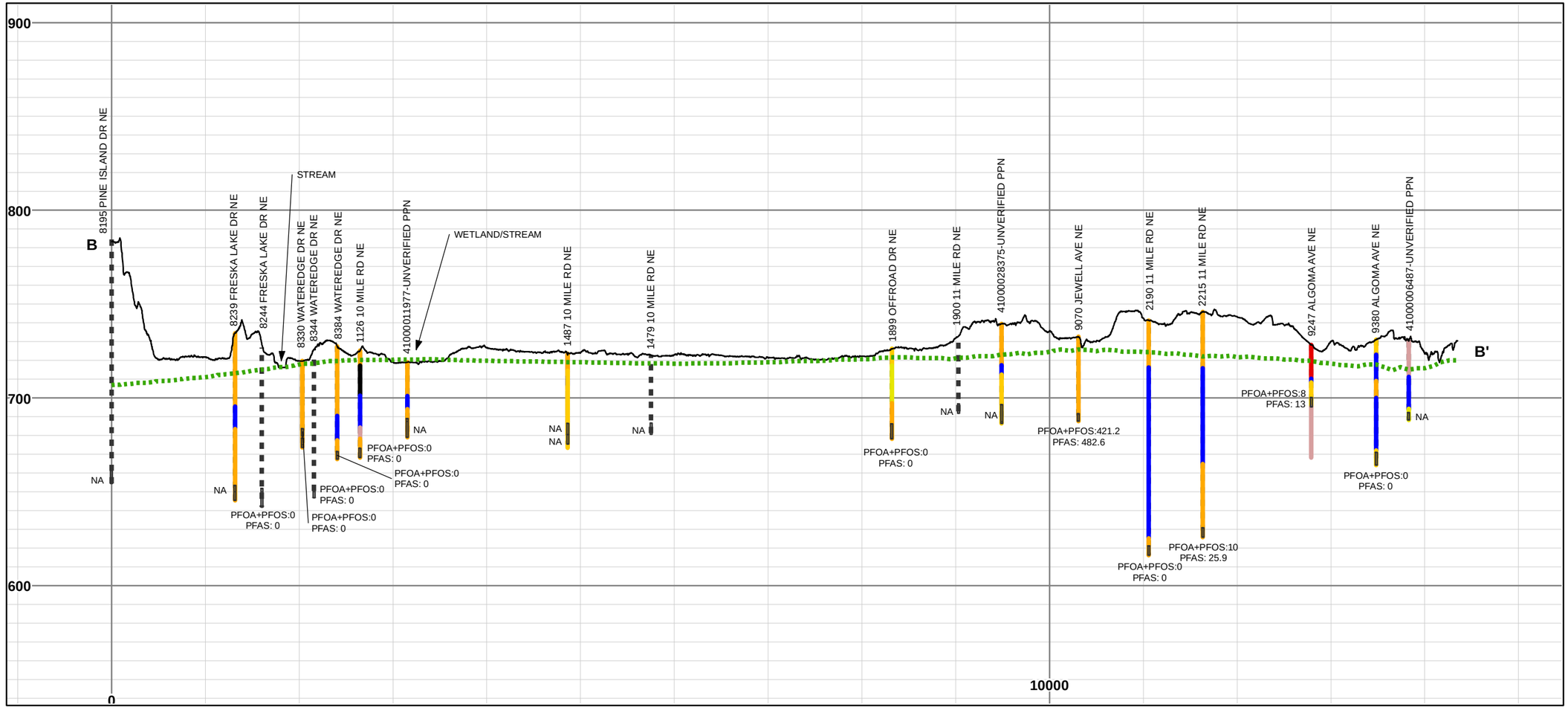
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NORTH KENT STUDY AREA
CROSS SECTION A-A'
PERIMETER WELLS RAP

PREPARED BY: GZA GeoEnvironmental, Inc. Engineers and Scientists www.gza.com		PREPARED FOR: WN&J/WWW	
PROJ MGR: LJP	REVIEWED BY: MW	CHECKED BY: LMN	FIGURE 5
DESIGNED BY: JC	DRAWN BY: JMG	SCALE: 1 in = 5,500 ft	
DATE: 12/16/2020	PROJECT NO: 16.0062961.90	REVISION NO:	

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CROSS SECTION LEGEND

WELL SCREEN

PFOA+PFOS (ng/L)
PFAS (ng/L)
0 = NOT DETECTED
NA = NOT AVAILABLE

ESTIMATED POTENTIOMETRIC SURFACE (11/2019)

GROUND SURFACE

BOREHOLE LITHOLOGY

- GRAVEL
- SAND AND GRAVEL
- SAND
- SAND/GRAVEL WITH CLAY/SILT
- CLAY/SILT WITH SAND/GRAVEL
- CLAY
- MARL
- NOT AVAILABLE

OVERVIEW MAP LEGEND

- PROPOSED INVESTIGATION/ PERIMETER MONITORING WELL
- PROPOSED PERIMETER MONITORING WELL
- RESIDENTIAL WATER WELL
- MONITORING WELL
- CROSS SECTION LINE
- HIGHWAY
- PRIMARY COUNTY ROAD
- OTHER ROAD
- RIVER OR STREAM
- SURFACE WATER
- APPROXIMATE HOUSE ST. DISPOSAL SITE BOUNDARY
- NORTH KENT LANDFILL

NOTES:
1. LOCATIONS AND SITE FEATURES ARE APPROXIMATE.

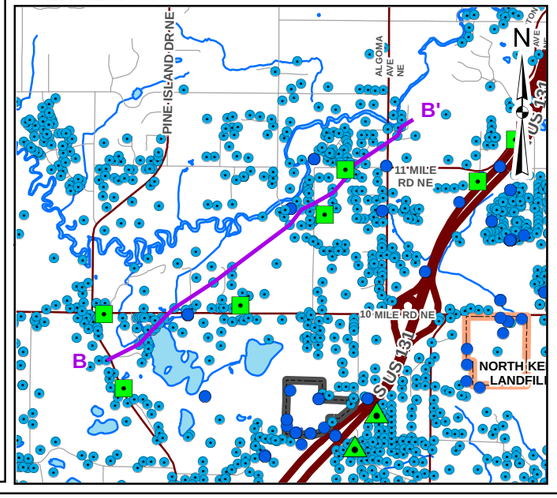
2. GROUND SURFACE ELEVATIONS ARE BASED ON DIGITAL RASTER FILES OF BARE EARTH DIGITAL ELEVATION MODELS (DEMS), GENERATED FROM LIDAR DATA WITH 1-METER HORIZONTAL ACCURACY AND 18.5-CENTIMETER VERTICAL ACCURACY. DIGITAL FILES OF DEMS AND LIDAR DATA WERE PROVIDED BY KENT COUNTY.

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OVERVIEW MAP



0 2,750 5,500 11,000
SCALE IN FEET

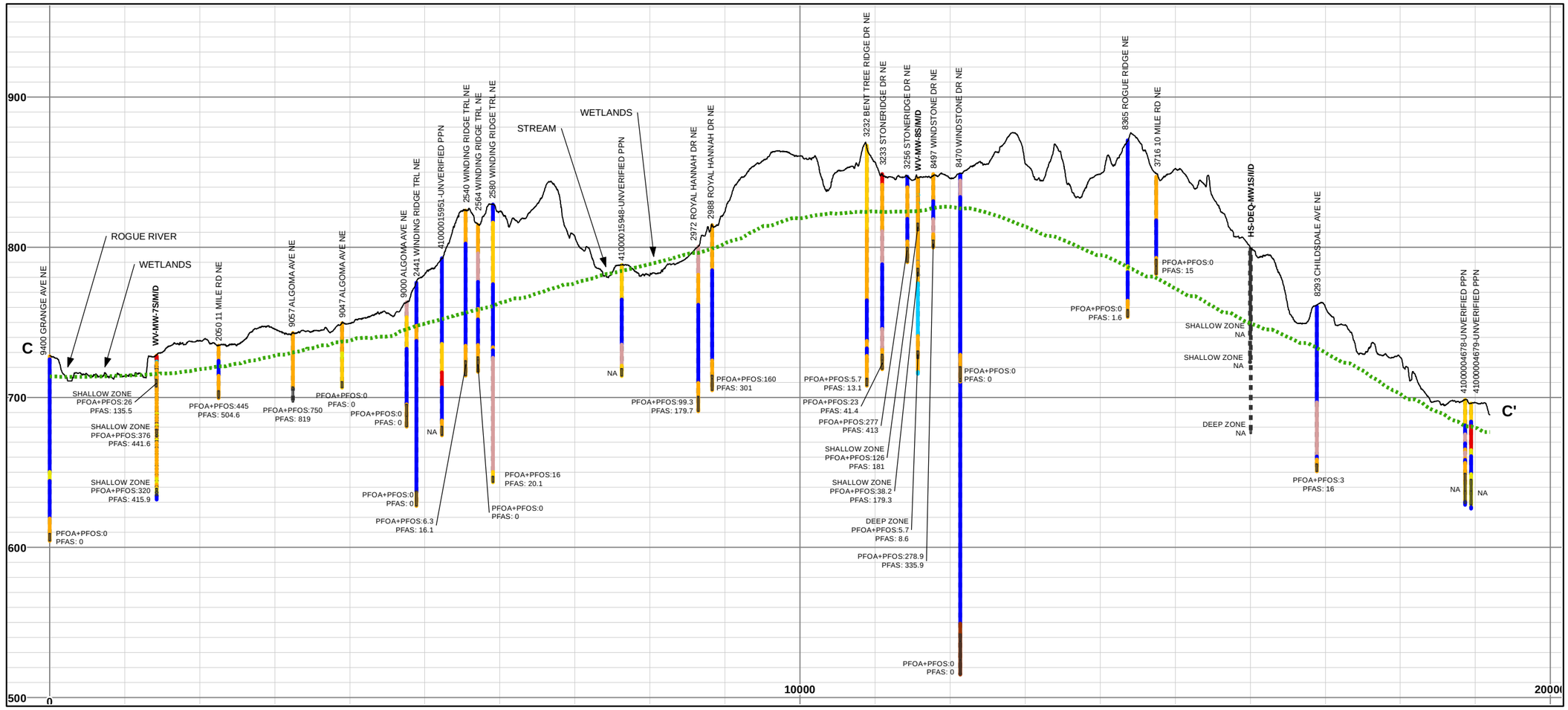
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NORTH KENT STUDY AREA
CROSS SECTION B-B'
PERIMETER WELLS RAP

PREPARED BY:		PREPARED FOR:	
GZA GeoEnvironmental, Inc. Engineers and Scientists www.gza.com		WN&J/WWW	
PROJ MGR: LJP	REVIEWED BY: MW	CHECKED BY: LMN	FIGURE
DESIGNED BY: JC	DRAWN BY: JMG	SCALE: 1 in = 5,500 ft	6
DATE: 12/16/2020	PROJECT NO: 16.0062961.90	REVISION NO:	

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CROSS SECTION LEGEND

WELL SCREEN

PFOA+PFOS (ng/L)
PFAS (ng/L)
0 = NOT DETECTED
NA = NOT AVAILABLE

ESTIMATED POTENTIOMETRIC SURFACE (11/2019)

GROUND SURFACE

BOREHOLE LITHOLOGY

- GRAVEL
- SAND AND GRAVEL
- SAND
- SAND/GRAVEL WITH CLAY/SILT
- CLAY/SILT WITH SAND/GRAVEL
- SILT
- CLAY AND SILT
- CLAY
- BEDROCK
- NOT AVAILABLE

OVERVIEW MAP LEGEND

- PROPOSED INVESTIGATION/ PERIMETER MONITORING WELL
- PROPOSED PERIMETER MONITORING WELL
- RESIDENTIAL WATER WELL
- MONITORING WELL
- CROSS SECTION LINE
- HIGHWAY
- PRIMARY COUNTY ROAD
- OTHER ROAD
- RIVER OR STREAM
- SURFACE WATER
- APPROXIMATE HOUSE ST. DISPOSAL SITE BOUNDARY
- NORTH KENT LANDFILL

NOTES:
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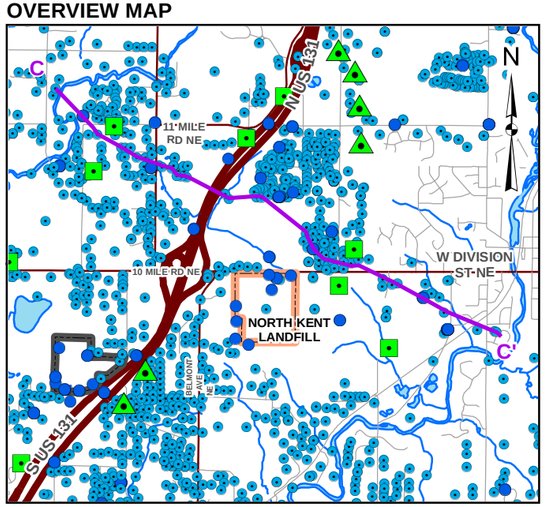
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OVERVIEW MAP



0 2,750 5,500 11,000
SCALE IN FEET

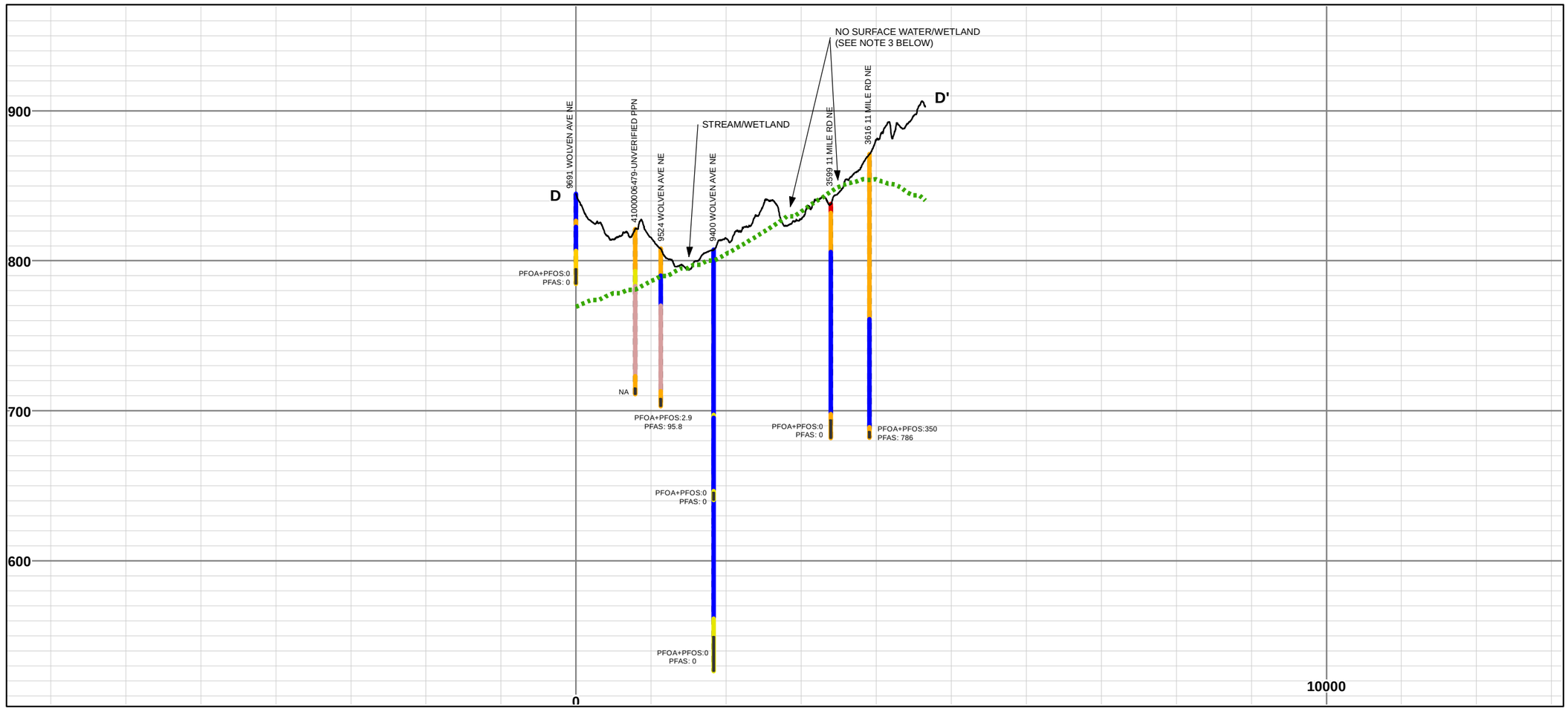
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NORTH KENT STUDY AREA
CROSS SECTION C-C'
PERIMETER WELLS RAP

PREPARED BY: GZA GeoEnvironmental, Inc. Engineers and Scientists www.gza.com		PREPARED FOR: WN&J/WWW	
PROJ MGR: LJP	REVIEWED BY: MW	CHECKED BY: LMN	FIGURE 7
DESIGNED BY: JC	DRAWN BY: JMG	SCALE: 1 in = 5,500 ft	
DATE: 12/16/2020	PROJECT NO: 16.0062961.90	REVISION NO:	

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CROSS SECTION LEGEND

WELL SCREEN

PFOA+PFOS (ng/L)
PFAS (ng/L)
0 = NOT DETECTED
NA = NOT AVAILABLE

ESTIMATED POTENTIOMETRIC SURFACE (11/2019)

GROUND SURFACE

BOREHOLE LITHOLOGY

GRAVEL
SAND AND GRAVEL
SAND
SAND/GRAVEL WITH CLAY/SILT
CLAY/SILT WITH SAND/GRAVEL
CLAY

OVERVIEW MAP LEGEND

PROPOSED INVESTIGATION/ PERIMETER MONITORING WELL
PROPOSED PERIMETER MONITORING WELL
RESIDENTIAL WATER WELL
MONITORING WELL

CROSS SECTION LINE
HIGHWAY
PRIMARY COUNTY ROAD
OTHER ROAD
RIVER OR STREAM
SURFACE WATER

NOTES:
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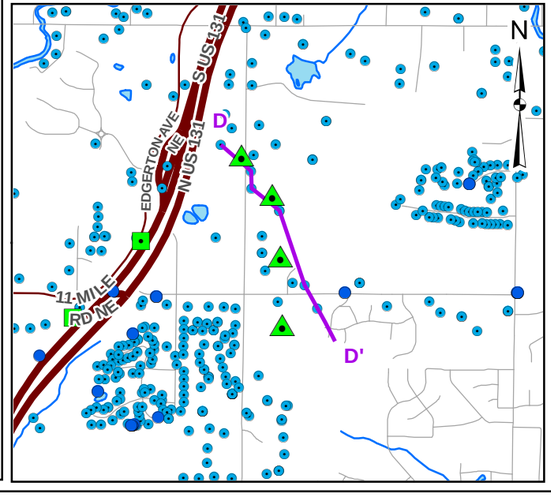
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5. MONITORING WELL SCREEN AQUIFER ZONES ARE DESIGNATED AS PERCHED, SHALLOW, OR DEEP. CONCENTRATIONS OF TOTAL PFAS AND PFOA+PFOS DEPICTED ARE MAXIMUM CONCENTRATIONS DETECTED AT THE SPECIFIED LOCATION.

OVERVIEW MAP



0 1,500 3,000 6,000
SCALE IN FEET

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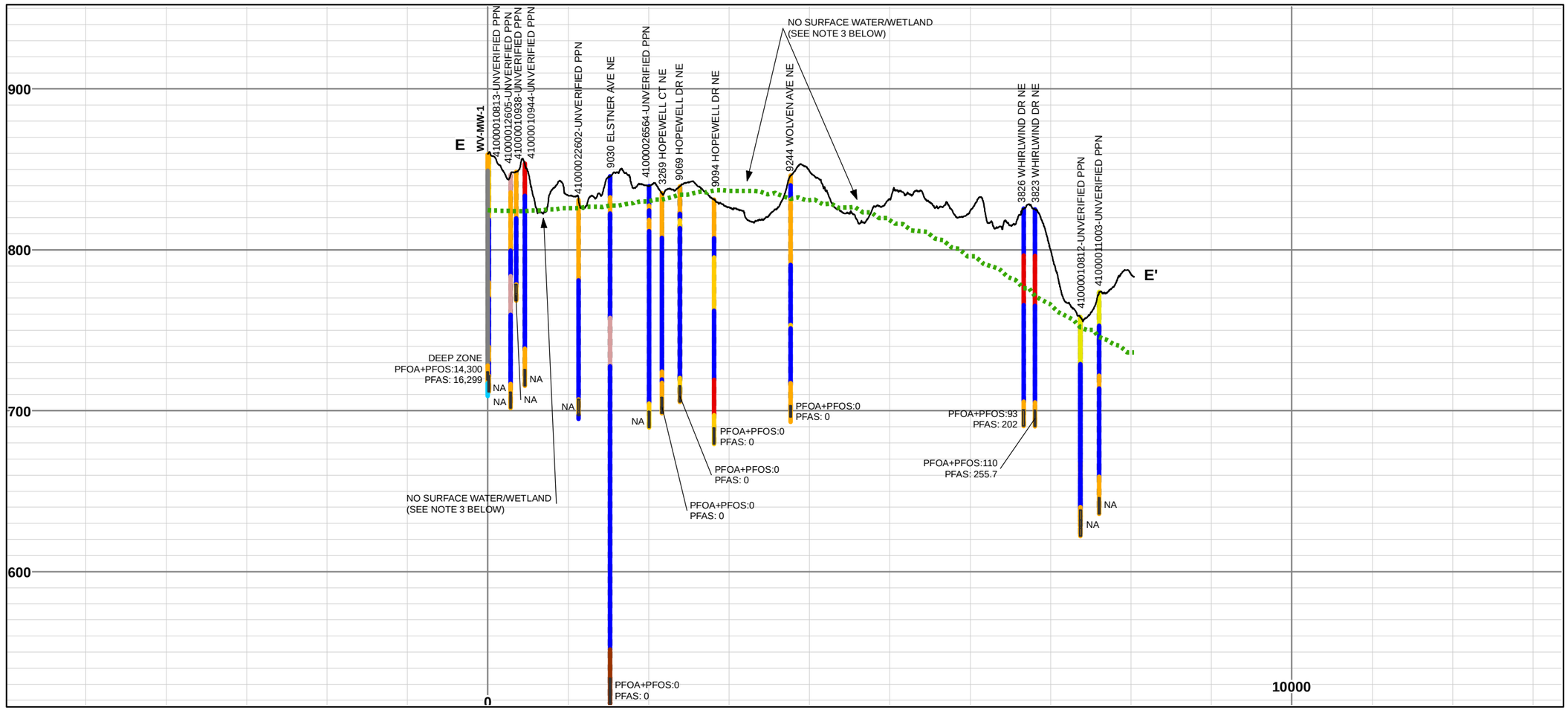
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Grand Rapids, Michigan 49504

NORTH KENT STUDY AREA
CROSS SECTION D-D'
PERIMETER WELLS RAP

PREPARED BY: GZA GeoEnvironmental, Inc. Engineers and Scientists www.gza.com
PREPARED FOR: WN&J/WWW

PROJ MGR: LJP	REVIEWED BY: MW	CHECKED BY: LMN	FIGURE
DESIGNED BY: JC	DRAWN BY: JMG	SCALE: 1 in = 3,000 ft	8
DATE: 12/16/2020	PROJECT NO: 16.0062961.90	REVISION NO:	

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CROSS SECTION LEGEND

WELL SCREEN

- PFOA+PFOS (ng/L)
  PFAS (ng/L)
  0 = NOT DETECTED
  NA = NOT AVAILABLE
- ESTIMATED POTENTIOMETRIC SURFACE (11/2019)
- GROUND SURFACE

BOREHOLE LITHOLOGY

- GRAVEL
- SAND AND GRAVEL
- SAND
- SAND/GRAVEL WITH CLAY/SILT
- CLAY/SILT WITH SAND/GRAVEL
- SILT
- CLAY AND SILT
- CLAY
- BEDROCK

OVERVIEW MAP LEGEND

- PROPOSED INVESTIGATION/ PERIMETER MONITORING WELL
- PROPOSED PERIMETER MONITORING WELL
- RESIDENTIAL WATER WELL
- MONITORING WELL
- CROSS SECTION LINE
- HIGHWAY
- PRIMARY COUNTY ROAD
- OTHER ROAD
- RIVER OR STREAM
- SURFACE WATER

NOTES:
1. LOCATIONS AND SITE FEATURES ARE APPROXIMATE.

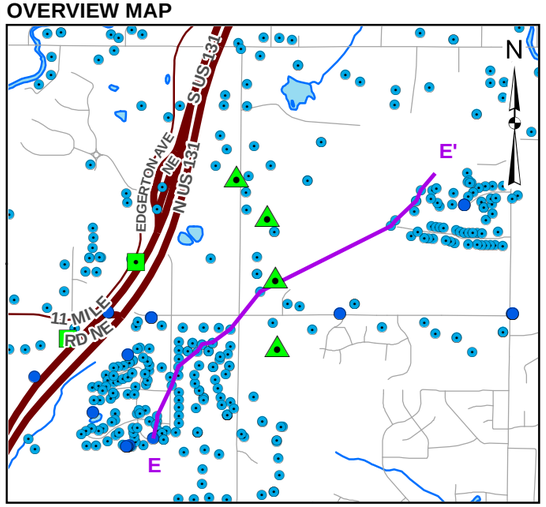
2. GROUND SURFACE ELEVATIONS ARE BASED ON DIGITAL RASTER FILES OF BARE EARTH DIGITAL ELEVATION MODELS (DEMS), GENERATED FROM LIDAR DATA WITH 1-METER HORIZONTAL ACCURACY AND 18.5-CENTIMETER VERTICAL ACCURACY. DIGITAL FILES OF DEMS AND LIDAR DATA WERE PROVIDED BY KENT COUNTY.

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5. MONITORING WELL SCREEN AQUIFER ZONES ARE DESIGNATED AS PERCHED, SHALLOW, OR DEEP. CONCENTRATIONS OF TOTAL PFAS AND PFOA+PFOS DEPICTED ARE MAXIMUM CONCENTRATIONS DETECTED AT THE SPECIFIED LOCATION.

OVERVIEW MAP



0 1,500 3,000 6,000
SCALE IN FEET

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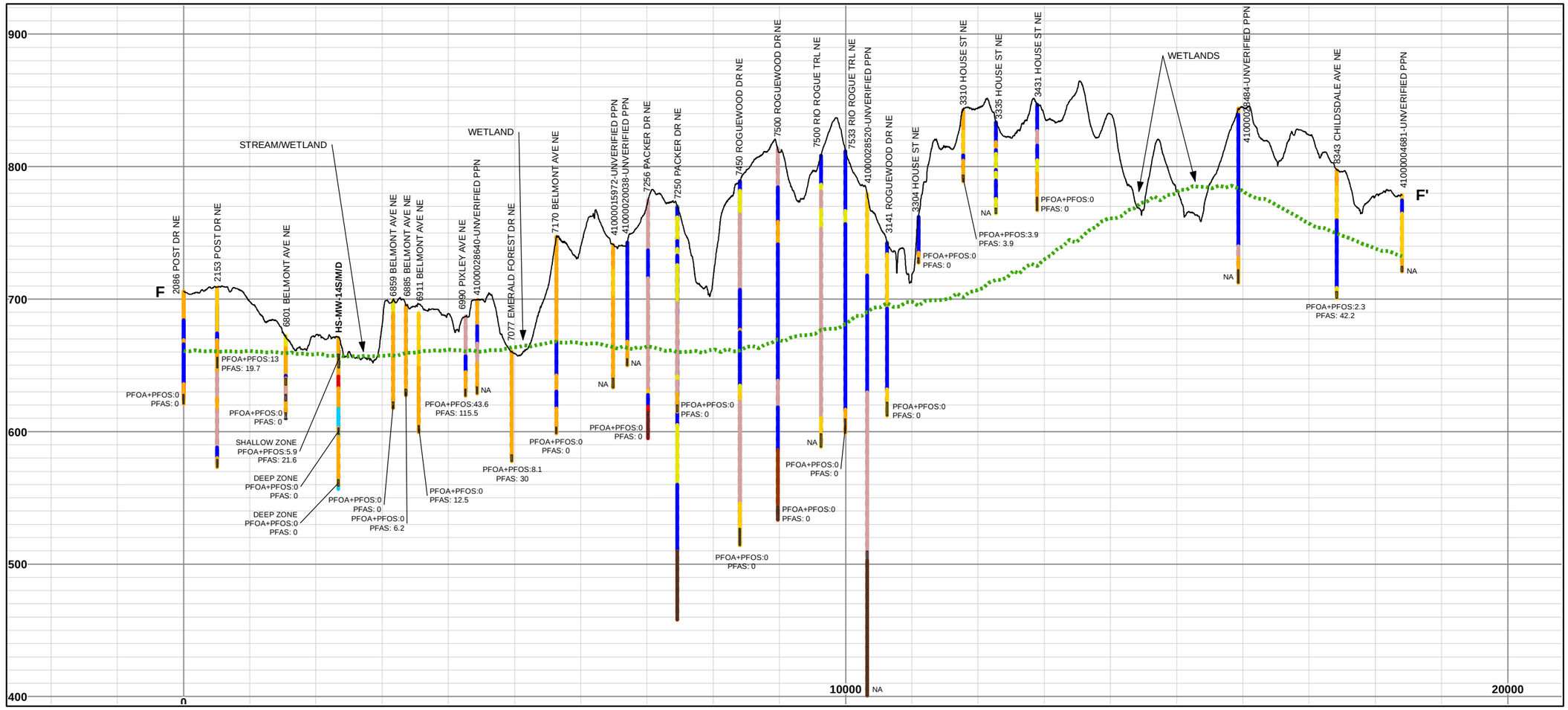
NORTH KENT STUDY AREA
CROSS SECTION E-E'
PERIMETER WELLS RAP

PREPARED BY:
GZA GeoEnvironmental, Inc.
Engineers and Scientists
www.gza.com

PREPARED FOR:
WN&J/WWW

PROJ MGR: LJP	REVIEWED BY: MW	CHECKED BY: LMN	FIGURE
DESIGNED BY: JC	DRAWN BY: JMG	SCALE: 1 in = 3,000 ft	9
DATE: 12/16/2020	PROJECT NO: 16.0062961.90	REVISION NO:	

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SOUTHWEST NORTHEAST

CROSS SECTION LEGEND

WELL SCREEN

ESTIMATED POTENTIOMETRIC SURFACE (11/2019)

GROUND SURFACE

BOREHOLE LITHOLOGY

- GRAVEL
- SAND AND GRAVEL
- SAND
- SAND/GRAVEL WITH CLAY/SILT
- CLAY/SILT WITH SAND/GRAVEL
- CLAY AND SILT
- CLAY
- TOP SOIL
- BEDROCK

OVERVIEW MAP LEGEND

- PROPOSED INVESTIGATION/ PERIMETER MONITORING WELL
- PROPOSED PERIMETER MONITORING WELL
- RESIDENTIAL WATER WELL
- MONITORING WELL
- CROSS SECTION LINE
- HIGHWAY
- PRIMARY COUNTY ROAD
- OTHER ROAD
- RIVER OR STREAM
- SURFACE WATER
- APPROXIMATE HOUSE ST. DISPOSAL SITE BOUNDARY
- NORTH KENT LANDFILL

NOTES:
1. LOCATIONS AND SITE FEATURES ARE APPROXIMATE.

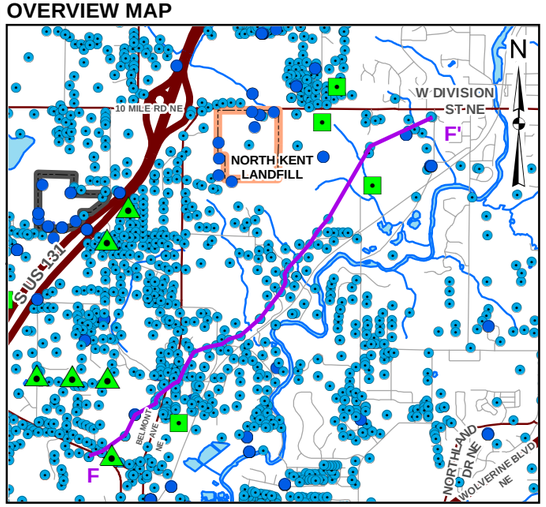
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OVERVIEW MAP



0 2,750 5,500 11,000
SCALE IN FEET

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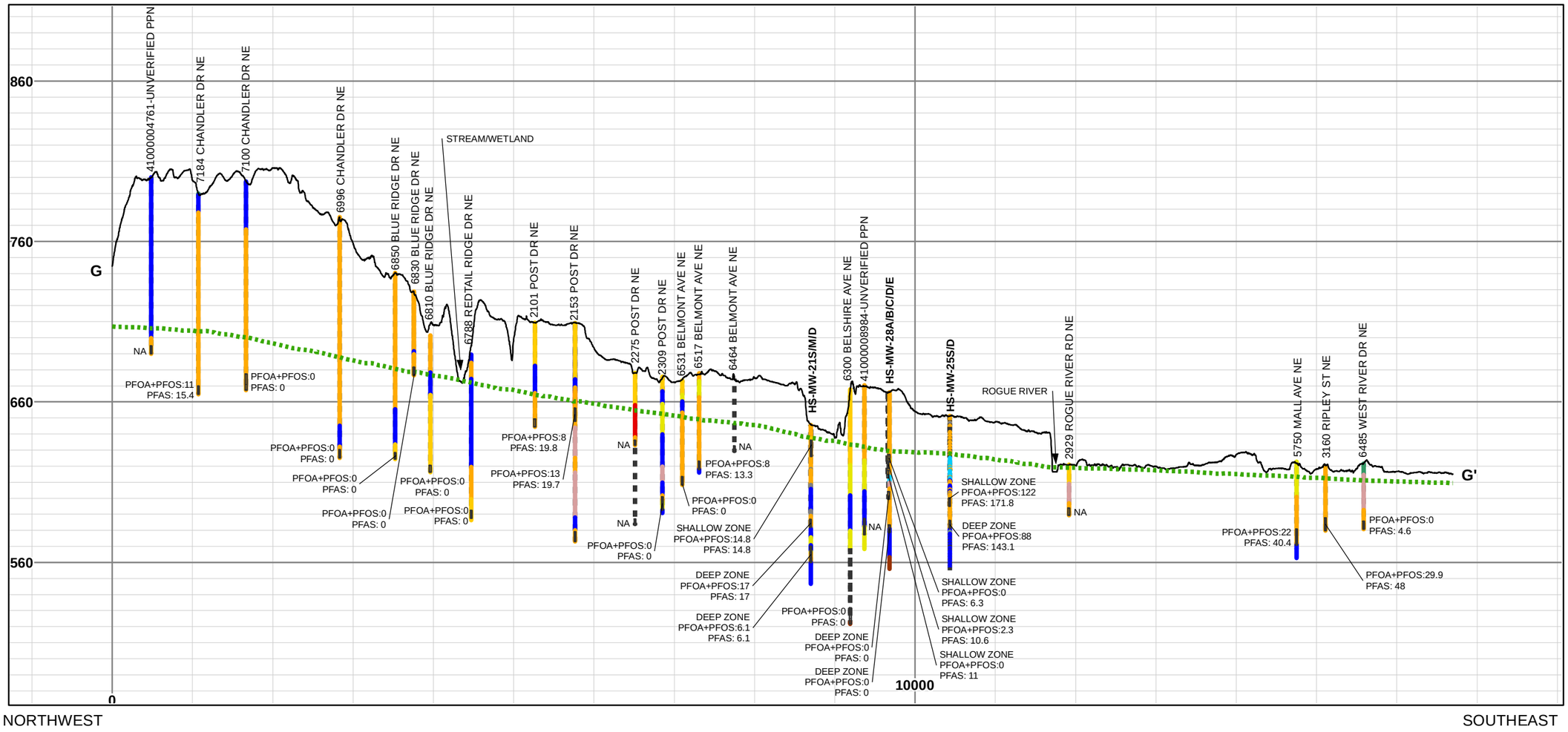
NORTH KENT STUDY AREA
CROSS SECTION F-F'
PERIMETER WELLS RAP

PREPARED BY:
GZA GeoEnvironmental, Inc.
Engineers and Scientists
www.gza.com

PREPARED FOR:
WN&J/WWW

PROJ MGR: LJP	REVIEWED BY: MW	CHECKED BY: LMN	FIGURE 10
DESIGNED BY: JC	DRAWN BY: JMG	SCALE: 1 in = 5,500 ft	
DATE: 12/16/2020	PROJECT NO: 16.0062961.90	REVISION NO:	

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CROSS SECTION LEGEND

WELL SCREEN

ESTIMATED POTENTIOMETRIC SURFACE (11/2019)

GROUND SURFACE

BOREHOLE LITHOLOGY

- GRAVEL
- SAND AND GRAVEL
- SAND
- SAND/GRAVEL WITH CLAY/SILT
- CLAY/SILT WITH SAND/GRAVEL
- SILT
- CLAY AND SILT
- CLAY
- TOP SOIL
- BEDROCK
- NOT AVAILABLE

OVERVIEW MAP LEGEND

- PROPOSED INVESTIGATION/ PERIMETER MONITORING WELL
- PROPOSED PERIMETER MONITORING WELL
- RESIDENTIAL WATER WELL
- MONITORING WELL
- CROSS SECTION LINE
- HIGHWAY
- PRIMARY COUNTY ROAD
- OTHER ROAD
- RIVER OR STREAM
- SURFACE WATER

NOTES:
1. LOCATIONS AND SITE FEATURES ARE APPROXIMATE.

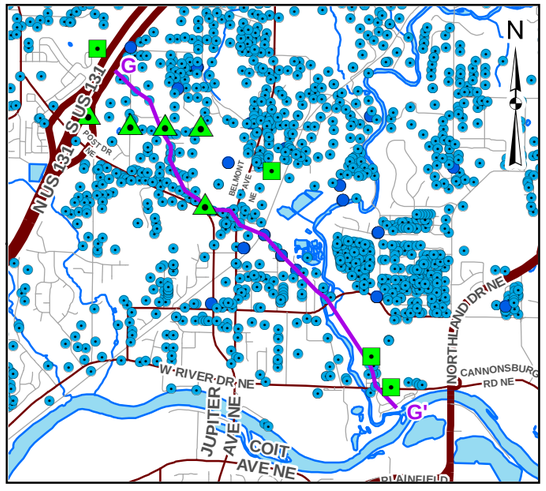
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OVERVIEW MAP



0 2,750 5,500 11,000
SCALE IN FEET

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NORTH KENT STUDY AREA
CROSS SECTION G-G'
PERIMETER WELLS RAP

PREPARED BY: GZA GeoEnvironmental, Inc. Engineers and Scientists www.gza.com

PREPARED FOR: WN&J/WWW

PROJ MGR: LJP	REVIEWED BY: MW	CHECKED BY: LMN	FIGURE
DESIGNED BY: JC	DRAWN BY: JMG	SCALE: 1 in = 5,500 ft	11
DATE: 12/16/2020	PROJECT NO: 16.0062961.90	REVISION NO:	

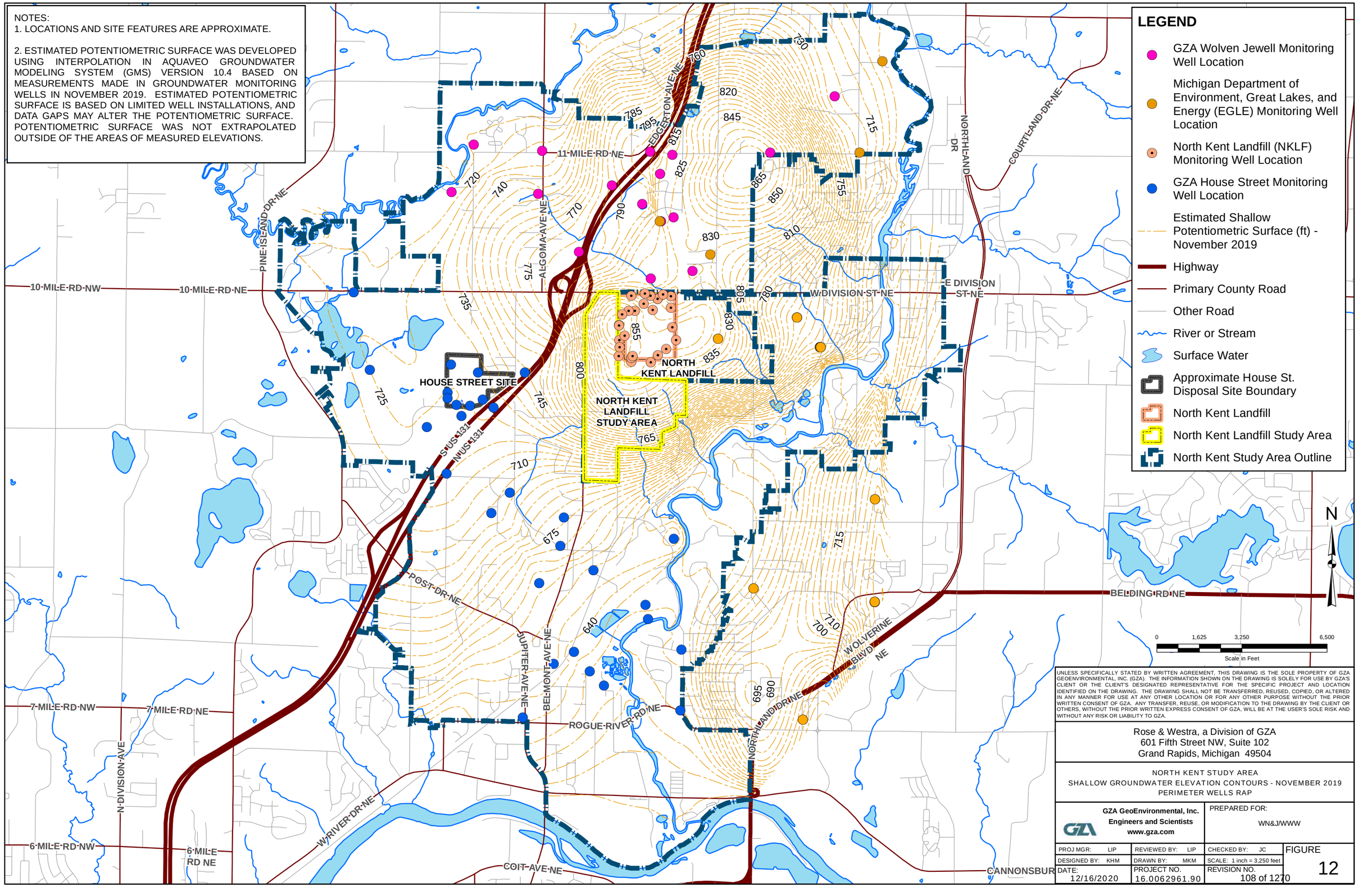
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NOTES:
1. LOCATIONS AND SITE FEATURES ARE APPROXIMATE.

2. ESTIMATED POTENTIOMETRIC SURFACE WAS DEVELOPED USING INTERPOLATION IN AQUAVEO GROUNDWATER MODELING SYSTEM (GMS) VERSION 10.4 BASED ON MEASUREMENTS MADE IN GROUNDWATER MONITORING WELLS IN NOVEMBER 2019. ESTIMATED POTENTIOMETRIC SURFACE IS BASED ON LIMITED WELL INSTALLATIONS, AND DATA GAPS MAY ALTER THE POTENTIOMETRIC SURFACE. POTENTIOMETRIC SURFACE WAS NOT EXTRAPOLATED OUTSIDE OF THE AREAS OF MEASURED ELEVATIONS.

LEGEND

- GZA Wolven Jewell Monitoring Well Location
- Michigan Department of Environment, Great Lakes, and Energy (EGLE) Monitoring Well Location
- North Kent Landfill (NKLF) Monitoring Well Location
- GZA House Street Monitoring Well Location
- Estimated Shallow Potentiometric Surface (ft) - November 2019
- Highway
- Primary County Road
- Other Road
- River or Stream
- Surface Water
- Approximate House St. Disposal Site Boundary
- North Kent Landfill
- North Kent Landfill Study Area
- North Kent Study Area Outline



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NORTH KENT STUDY AREA
SHALLOW GROUNDWATER ELEVATION CONTOURS - NOVEMBER 2019
PERIMETER WELLS RAP

GZA GeoEnvironmental, Inc.
Engineers and Scientists
www.gza.com

PREPARED FOR: WN&J/WWW

PROJ MGR: LIP	REVIEWED BY: LIP	CHECKED BY: JC	FIGURE 12
DESIGNED BY: KHM	DRAWN BY: MKM	SCALE: 1 inch = 3,250 feet	
DATE: 12/16/2020	PROJECT NO. 16.0062961.90	REVISION NO. 108 of 1270	

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NOTES:
1. LOCATIONS AND SITE FEATURES ARE APPROXIMATE.

2. ESTIMATED POTENTIOMETRIC SURFACE WAS DEVELOPED USING INTERPOLATION IN AQUAVEO GROUNDWATER MODELING SYSTEM (GMS) VERSION 10.4 BASED ON MEASUREMENTS MADE IN GROUNDWATER MONITORING WELLS IN NOVEMBER 2019. ESTIMATED POTENTIOMETRIC SURFACE IS BASED ON LIMITED WELL INSTALLATIONS, AND DATA GAPS MAY ALTER THE POTENTIOMETRIC SURFACE. POTENTIOMETRIC SURFACE WAS NOT EXTRAPOLATED OUTSIDE OF THE AREAS OF MEASURED ELEVATIONS.

LEGEND

- GZA Wolven Jewell Monitoring Well Location
- Michigan Department of Environment, Great Lakes, and Energy (EGLE) Monitoring Well Location
- North Kent Landfill (NKLF) Monitoring Well Location
- GZA House Street Monitoring Well Location
- Deep Potentiometric Surface (ft) - November 2019
- Highway
- Primary County Road
- Other Road
- River or Stream
- Surface Water
- Approximate House St. Disposal Site Boundary
- North Kent Landfill
- North Kent Landfill Study Area
- North Kent Study Area Outline

HOUSE STREET SITE
NORTH KENT LANDFILL
NORTH KENT LANDFILL STUDY AREA

11 MILE RD NE
10 MILE RD NW
10 MILE RD NE
7 MILE RD NW
7 MILE RD NE
6 MILE RD NW
6 MILE RD NE
BELDING RD NE
W DIVISION ST NE
E DIVISION ST NE
POST DR NE
ROGUE RIVER RD NE
W RIVER DR NE
COIT AVE NE
PINE ISLAND DR NE
ALGOMA AVE NE
LEDGERTON AVE NE
BELMONT AVE NE
JUPITER AVE NE
NORTHLAND DR NE
COURTLAND DR NE
WOLVERINE BLVD NE
ALPINE AVE NW
N DIVISION AVE
M37 NW
US 131
710 765 795 800 805 760 755 750 745 740 735 730 725 720 715 710 705 700 695

N

0 1,625 3,250 6,500
Scale in Feet

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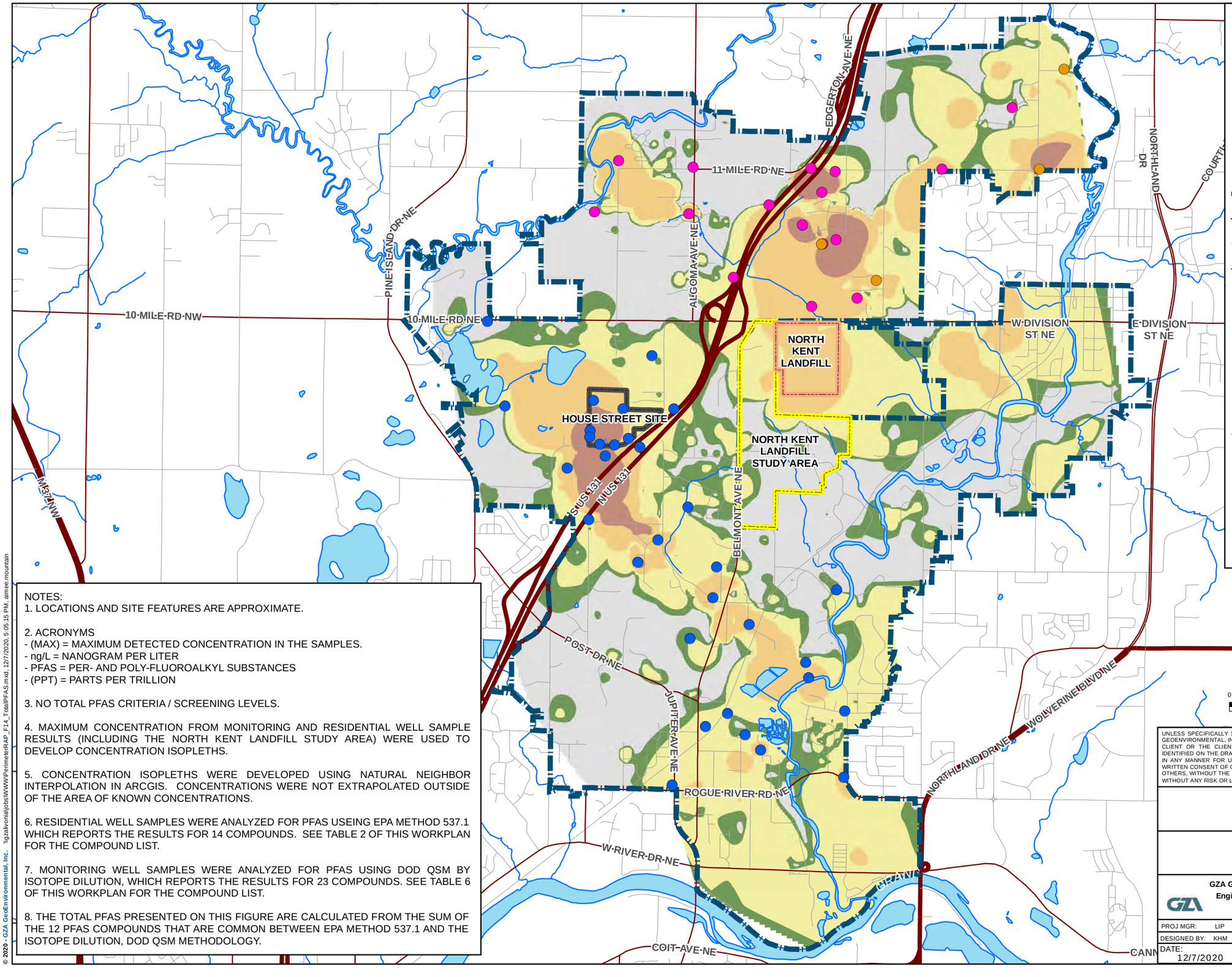
NORTH KENT STUDY AREA
DEEP GROUNDWATER ELEVATION CONTOURS - NOVEMBER 2019
PERIMETER WELL RAP

GZA GeoEnvironmental, Inc.
Engineers and Scientists
www.gza.com

PREPARED FOR: WN&J/WWW

PROJ MGR: LIP	REVIEWED BY: LIP	CHECKED BY: JC	FIGURE 13
DESIGNED BY: KHM	DRAWN BY: MKM	SCALE: 1 inch = 3,250 feet	
DATE: 12/16/2020	PROJECT NO. 16.0062961.90	REVISION NO.	

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LEGEND

- GZA House Street Monitoring Well Location
- GZA Wolven Jewell Monitoring Well Location
- Michigan Department of Environment, Great Lakes, and Energy (EGLE) Wolven Jewell Monitoring Well Location
- Highway
- Primary County Road
- Other Road
- River or Stream
- Surface Water
- Approximate House St. Disposal Site Boundary
- North Kent Landfill
- North Kent Landfill Study Area
- North Kent Study Area Outline

Approximate Total PFAS Extent (ppt)

- < 4 ng/L
- 4 - 10 ng/L
- 11 - 70 ng/L
- 71 - 1,000 ng/L
- 1,001 - 127,000 ng/L (MAX)

NOTES:
1. LOCATIONS AND SITE FEATURES ARE APPROXIMATE.

2. ACRONYMS
- (MAX) = MAXIMUM DETECTED CONCENTRATION IN THE SAMPLES.
- ng/L = NANOGRAM PER LITER
- PFAS = PER- AND POLY-FLUOROALKYL SUBSTANCES
- (PPT) = PARTS PER TRILLION

3. NO TOTAL PFAS CRITERIA / SCREENING LEVELS.

4. MAXIMUM CONCENTRATION FROM MONITORING AND RESIDENTIAL WELL SAMPLE RESULTS (INCLUDING THE NORTH KENT LANDFILL STUDY AREA) WERE USED TO DEVELOP CONCENTRATION ISOPLETHS.

5. CONCENTRATION ISOPLETHS WERE DEVELOPED USING NATURAL NEIGHBOR INTERPOLATION IN ARCGIS. CONCENTRATIONS WERE NOT EXTRAPOLATED OUTSIDE OF THE AREA OF KNOWN CONCENTRATIONS.

6. RESIDENTIAL WELL SAMPLES WERE ANALYZED FOR PFAS USEING EPA METHOD 537.1 WHICH REPORTS THE RESULTS FOR 14 COMPOUNDS. SEE TABLE 2 OF THIS WORKPLAN FOR THE COMPOUND LIST.

7. MONITORING WELL SAMPLES WERE ANALYZED FOR PFAS USING DOD QSM BY ISOTOPE DILUTION, WHICH REPORTS THE RESULTS FOR 23 COMPOUNDS. SEE TABLE 6 OF THIS WORKPLAN FOR THE COMPOUND LIST.

8. THE TOTAL PFAS PRESENTED ON THIS FIGURE ARE CALCULATED FROM THE SUM OF THE 12 PFAS COMPOUNDS THAT ARE COMMON BETWEEN EPA METHOD 537.1 AND THE ISOTOPE DILUTION, DOD QSM METHODOLOGY.

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NORTH KENT STUDY AREA
TOTAL PFAS ISOCONCENTRATION MAP
PERIMETER WELL RAP

GZA GeoEnvironmental, Inc.
Engineers and Scientists
www.gza.com

PREPARED FOR: WN&J/WWW

PROJ MGR: LIP	REVIEWED BY: LIP	CHECKED BY: JC	FIGURE 14
DESIGNED BY: KHM	DRAWN BY: MKM	SCALE: 1 inch = 3,250 feet	
DATE: 12/7/2020	PROJECT NO. 16.0062961.90	REVISION NO.	

LEGEND

- GZA WOLVEN JEWELL MONITORING WELL LOCATION
- NORTH KENT LANDFILL (NKLF) MONITORING WELL LOCATION
- GZA HOUSE STREET MONITORING WELL LOCATION
- GZA HOUSE STREET PROPOSED MONITORING WELL LOCATION
- HIGHWAY
- PRIMARY COUNTY ROAD
- OTHER ROAD
- RIVER OR STREAM
- SURFACE WATER
- APPROXIMATE HOUSE ST. DISPOSAL SITE BOUNDARY
- NORTH KENT LANDFILL
- NORTH KENT LANDFILL STUDY AREA
- NORTH KENT STUDY AREA OUTLINE

Approximate PFOS + PFOA Extent (ppt)

- < 4 ng/L
- 4 - 10 ng/L (CD VALUE)
- 11 - 70 ng/L
- 71 - 1,000 ng/L
- 1,001 - 111,000 ng/L (MAX)

NOTES:
1. LOCATIONS AND SITE FEATURES ARE APPROXIMATE.

2. ACRONYMS
- (CD VALUE) = CONSENT DECREE VALUE
- (MAX) = MAXIMUM DETECTED CONCENTRATION IN THE SAMPLES.
- ng/L = NANOGRAM PER LITER
- PFOA = PERFLUORO-N-OCTANOIC ACID
- PFOS = PERFLUOROOCTANE SULFONATE
- (PPT) = PARTS PER TRILLION

3. MAXIMUM CONCENTRATION FROM MONITORING AND RESIDENTIAL WELL SAMPLE RESULTS (INCLUDING THE NORTH KENT LANDFILL STUDY AREA) WERE USED TO DEVELOP CONCENTRATION ISOPLETHS.

4. CONCENTRATION ISOPLETHS WERE DEVELOPED USING NATURAL NEIGHBOR INTERPOLATION IN ARCGIS. CONCENTRATIONS WERE NOT EXTRAPOLATED OUTSIDE OF THE AREA OF KNOWN CONCENTRATIONS.

12-MILE-RD-NE
11-MILE-RD-NE
10-MILE-RD-NE
BELDING-RD-NE
ROGUE-RIVER-RD-NE
POST-DR-NE
COIT-AVE-NE
W-RIVER-DR-NE
PINE-ISLAND-DR-NE
ALGOMA-AVE-NE
EDGERTON-AVE-NE
BELMONT-AVE-NE
JUPITER-AVE-NE
NORTHLAND DR
COURTLAND-DR-NE
NORTHLAND-DR-NE
WOLVERINE-BLVD-NE
W-DIVISION ST NE
E-DIVISION ST NE
S-US 131
N-US 131
HOUSE STREET SITE
NORTH KENT LANDFILL
NORTH KENT LANDFILL STUDY AREA
GRAND

N

0 1,625 3,250 6,500
Scale in Feet

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NORTH KENT STUDY AREA
PFOS + PFOA ISOCONCENTRATION MAP
PERIMETER WELLS RAP

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PREPARED FOR: WN&J/WWW

PROJ MGR: LIP	REVIEWED BY: LIP	CHECKED BY: JC	FIGURE 15
DESIGNED BY: KHM	DRAWN BY: MKM	SCALE: 1 inch = 3,250 feet	
DATE: 12/7/2020	PROJECT NO. 16.0062961.90	REVISION NO.	

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LEGEND

- GZA WOLVEN JEWELL MONITORING WELL LOCATION
- NORTH KENT LANDFILL (NKLF) MONITORING WELL LOCATION
- GZA HOUSE STREET MONITORING WELL LOCATION
- GZA HOUSE STREET PROPOSED MONITORING WELL LOCATION
- HIGHWAY
- PRIMARY COUNTY ROAD
- OTHER ROAD
- RIVER OR STREAM
- SURFACE WATER
- APPROXIMATE HOUSE ST. DISPOSAL SITE BOUNDARY
- NORTH KENT LANDFILL
- NORTH KENT LANDFILL STUDY AREA
- NORTH KENT STUDY AREA OUTLINE

APPROXIMATE PFOS EXTENT (PPT)

- ≤ 12 ng/L (GSI)
- > 12 - 16 ng/L (DWC)
- > 16 - 70 ng/L
- > 70 - 1,000 ng/L
- > 1,000 - 92,000 ng/L (MAX)

NOTES:
1. LOCATIONS AND SITE FEATURES ARE APPROXIMATE.

2. ACRONYMS
- (GSI) = GROUNDWATER - SURFACE WATER INTERFACE CRITERIA
- (DWC) = DRINKING WATER CRITERIA
- (MAX) = MAXIMUM DETECTED CONCENTRATION IN THE SAMPLES
- ng/L = NANOGRAM PER LITER
- PFOS = PERFLUOROOCTANE SULFONATE
- (PPT) = PARTS PER TRILLION

3. MAXIMUM CONCENTRATION FROM MONITORING AND RESIDENTIAL WELL SAMPLE RESULTS (INCLUDING THE NORTH KENT LANDFILL STUDY AREA) WERE USED TO DEVELOP CONCENTRATION ISOPLETHS.

4. CONCENTRATION ISOPLETHS WERE DEVELOPED USING NATURAL NEIGHBOR INTERPOLATION IN ARCGIS. CONCENTRATIONS WERE NOT EXTRAPOLATED OUTSIDE OF THE AREA OF KNOWN CONCENTRATIONS.

12-MILE-RD-NE
11-MILE-RD-NE
10-MILE-RD-NE
EDGERTON-AVE-NE
ALGOMA-AVE-NE
PINE-ISLAND-DR-NE
NORTHLAND DR
COURTLAND-DR-NE
W-DIVISION ST NE
E-DIVISION ST NE
HOUSE STREET SITE
NORTH KENT LANDFILL
NORTH KENT LANDFILL STUDY AREA
S-US 131
N-US 131
BELMONT-AVE-NE
POST-DR-NE
JUPITER-AVE-NE
ROGUE-RIVER-RD-NE
W-RIVER-DR-NE
COIT-AVE-NE
NORTHLAND DR NE
WOLVERINE BLVD NE
BELDING-RD-NE
CANN

N

0 1,625 3,250 6,500
Scale in Feet

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NORTH KENT STUDY AREA
PFOS ISOCONCENTRATION MAP
PERIMETER WELLS RAP

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PREPARED FOR: WN&J/WWW

PROJ MGR: LIP	REVIEWED BY: LIP	CHECKED BY: JC	FIGURE 16
DESIGNED BY: KHM	DRAWN BY: MKM	SCALE: 1 inch = 3,250 feet	
DATE: 12/21/2020	PROJECT NO. 16.0062961.90	REVISION NO.	

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LEGEND

- GZA WOLVEN JEWELL MONITORING WELL LOCATION
- NORTH KENT LANDFILL (NKLF) MONITORING WELL LOCATION
- GZA HOUSE STREET MONITORING WELL LOCATION
- GZA HOUSE STREET PROPOSED MONITORING WELL LOCATION
- HIGHWAY
- PRIMARY COUNTY ROAD
- OTHER ROAD
- RIVER OR STREAM
- SURFACE WATER
- APPROXIMATE HOUSE ST. DISPOSAL SITE BOUNDARY
- NORTH KENT LANDFILL
- NORTH KENT LANDFILL STUDY AREA
- NORTH KENT STUDY AREA OUTLINE

APPROXIMATE PFOA EXTENT (PPT)

- ≤ 8 ng/L (DWC)
- > 8 - 70 ng/L
- > 70 - 1,000 ng/L
- > 1,000 - 12,000 ng/L (GSI)
- > 12,000 - 15,300 ng/L (MAX)

NOTES:
1. LOCATIONS AND SITE FEATURES ARE APPROXIMATE.

2. ACRONYMS
- (GSI) = GROUNDWATER - SURFACE WATER INTERFACE CRITERIA
- (DWC) = DRINKING WATER CRITERIA
- (MAX) = MAXIMUM DETECTED CONCENTRATION IN THE SAMPLES
- ng/L = NANOGRAM PER LITER
- PFOA = PERFLUORO-N-OCTANOIC ACID
- (PPT) = PARTS PER TRILLION

3. MAXIMUM CONCENTRATION FROM MONITORING AND RESIDENTIAL WELL SAMPLE RESULTS (INCLUDING THE NORTH KENT LANDFILL STUDY AREA) WERE USED TO DEVELOP CONCENTRATION ISOPLETHS.

4. CONCENTRATION ISOPLETHS WERE DEVELOPED USING NATURAL NEIGHBOR INTERPOLATION IN ARCGIS. CONCENTRATIONS WERE NOT EXTRAPOLATED OUTSIDE OF THE AREA OF KNOWN CONCENTRATIONS.

12-MILE-RD-NE
11-MILE-RD-NE
10-MILE-RD-NE
EDGERTON-AVE-NE
ALGOMA-AVE-NE
PINE-ISLAND-DR-NE
NORTHLAND DR
COURTLAND-DR-NE
W DIVISION ST NE
E DIVISION ST NE
HOUSE STREET SITE
NORTH KENT LANDFILL
NORTH KENT LANDFILL STUDY AREA
BELMONT-AVE-NE
US-131
POST-DR-NE
JUPITER-AVE-NE
ROGUE-RIVER-RD-NE
W-RIVER-DR-NE
COIT-AVE-NE
NORTHLAND-DR-NE
WOLVERINE-BLVD-NE
BELDING-RD-NE
CANN

N

0 1,625 3,250 6,500
Scale in Feet

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NORTH KENT STUDY AREA
PFOA ISOCONCENTRATION MAP
PERIMETER WELLS RAP

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PREPARED FOR: WN&J/WWW

PROJ MGR: LIP	REVIEWED BY: LIP	CHECKED BY: JC	FIGURE 17
DESIGNED BY: KHM	DRAWN BY: MKM	SCALE: 1 inch = 3,250 feet	
DATE: 12/21/2020	PROJECT NO. 16.0062961.90	REVISION NO.	

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LEGEND

- GZA WOLVEN JEWELL MONITORING WELL LOCATION
- NORTH KENT LANDFILL (NKLF) MONITORING WELL LOCATION
- GZA HOUSE STREET MONITORING WELL LOCATION
- GZA HOUSE STREET PROPOSED MONITORING WELL LOCATION
- HIGHWAY
- PRIMARY COUNTY ROAD
- OTHER ROAD
- RIVER OR STREAM
- SURFACE WATER
- APPROXIMATE HOUSE ST. DISPOSAL SITE BOUNDARY
- NORTH KENT LANDFILL
- NORTH KENT LANDFILL STUDY AREA
- NORTH KENT STUDY AREA OUTLINE

APPROXIMATE PFBS EXTENT (PPT)

- ≤ 10 ng/L
- > 10 - 100 ng/L
- > 100 - 420 ng/L (DWC)
- > 420 - 1,000 ng/L
- > 1,000 - 2,800 (MAX)

NOTES:
1. LOCATIONS AND SITE FEATURES ARE APPROXIMATE.

2. ACRONYMS
- (DWC) = DRINKING WATER CRITERIA
- (MAX) = MAXIMUM DETECTED CONCENTRATION IN THE SAMPLES
- ng/L = NANOGRAM PER LITER
- PFBS = PERFLUOROBUTANE SULFONIC ACID
- (PPT) = PARTS PER TRILLION

3. MAXIMUM CONCENTRATION FROM MONITORING AND RESIDENTIAL WELL SAMPLE RESULTS (INCLUDING THE NORTH KENT LANDFILL STUDY AREA) WERE USED TO DEVELOP CONCENTRATION ISOPLETHS.

4. CONCENTRATION ISOPLETHS WERE DEVELOPED USING NATURAL NEIGHBOR INTERPOLATION IN ARCGIS. CONCENTRATIONS WERE NOT EXTRAPOLATED OUTSIDE OF THE AREA OF KNOWN CONCENTRATIONS.

12-MILE-RD-NE
11-MILE-RD-NE
10-MILE-RD-NE
BELDING-RD-NE
PINE-ISLAND-DR-NE
ALGOMA-AVE-NE
EDGERTON-AVE-NE
NORTHLAND DR
COURTLAND-DR-NE
W DIVISION ST NE
E DIVISION ST NE
HOUSE STREET SITE
NORTH KENT LANDFILL
NORTH KENT LANDFILL STUDY AREA
BELMONT-AVE-NE
S US-131
N US-131
POST-DR-NE
JUPITER-AVE-NE
ROGUE-RIVER-RD-NE
W-RIVER-DR-NE
COIT-AVE-NE
WOLVERINE-BLVD-NE
NORTHLAND-DR-NE
GRAND
CANN

N

0 1,625 3,250 6,500
Scale in Feet

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NORTH KENT STUDY AREA
PFBS ISOCONCENTRATION MAP
PERIMETER WELLS RAP

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PREPARED FOR: WN&J/WWW

PROJ MGR: LIP	REVIEWED BY: LIP	CHECKED BY: JC	FIGURE 18
DESIGNED BY: KHM	DRAWN BY: MKM	SCALE: 1 inch = 3,250 feet	
DATE: 12/21/2020	PROJECT NO. 16.0062961.90	REVISION NO.	

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LEGEND

- GZA WOLVEN JEWELL MONITORING WELL LOCATION
- NORTH KENT LANDFILL (NKLF) MONITORING WELL LOCATION
- GZA HOUSE STREET MONITORING WELL LOCATION
- GZA HOUSE STREET PROPOSED MONITORING WELL LOCATION
- HIGHWAY
- PRIMARY COUNTY ROAD
- OTHER ROAD
- RIVER OR STREAM
- SURFACE WATER
- APPROXIMATE HOUSE ST. DISPOSAL SITE BOUNDARY
- NORTH KENT LANDFILL
- NORTH KENT LANDFILL STUDY AREA
- NORTH KENT STUDY AREA OUTLINE

APPROXIMATE PFHXS EXTENT (PPT)

- ≤ 10 ng/L
- > 10 - 51 ng/L (DWC)
- > 51 - 500 ng/L
- > 500 - 1,000 ng/L
- > 1,000 - 21,000 ng/L (MAX)

NOTES:
1. LOCATIONS AND SITE FEATURES ARE APPROXIMATE.

2. ACRONYMS
- (DWC) = DRINKING WATER CRITERIA
- (MAX) = MAXIMUM DETECTED CONCENTRATION IN THE SAMPLES
- ng/L = NANOGRAM PER LITER
- PFHxS = PERFLUOROHEXANE SULFONIC ACID
- (PPT) = PARTS PER TRILLION

3. MAXIMUM CONCENTRATION FROM MONITORING AND RESIDENTIAL WELL SAMPLE RESULTS (INCLUDING THE NORTH KENT LANDFILL STUDY AREA) WERE USED TO DEVELOP CONCENTRATION ISOPLETHS.

4. CONCENTRATION ISOPLETHS WERE DEVELOPED USING NATURAL NEIGHBOR INTERPOLATION IN ARCGIS. CONCENTRATIONS WERE NOT EXTRAPOLATED OUTSIDE OF THE AREA OF KNOWN CONCENTRATIONS.

12-MILE-RD-NE
11-MILE-RD-NE
10-MILE-RD-NE
EDGERTON-AVE-NE
PINE-ISLAND-DR-NE
ALGOMA-AVE-NE
NORTHLAND DR
COURTLAND-DR-NE
W DIVISION ST NE
E DIVISION ST NE
HOUSE STREET SITE
NORTH KENT LANDFILL
NORTH KENT LANDFILL STUDY AREA
S US 131
N US 131
BELMONT-AVE-NE
POST-DR-NE
JUPITER-AVE-NE
ROGUE-RIVER-RD-NE
W-RIVER-DR-NE
COIT-AVE-NE
GRANDV
CANN
NORTHLAND-DR-NE
WOLVERINE-BLVD-NE
BELDING-RD-NE

N

0 1,625 3,250 6,500
Scale in Feet

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NORTH KENT STUDY AREA
PFHXS ISOCONCENTRATION MAP
PERIMETER WELLS RAP

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PREPARED FOR: WN&J/WWW

PROJ MGR: LIP	REVIEWED BY: LIP	CHECKED BY: JC	FIGURE 19
DESIGNED BY: KHM	DRAWN BY: MKM	SCALE: 1 inch = 3,250 feet	
DATE: 12/21/2020	PROJECT NO. 16.0062961.90	REVISION NO.	

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LEGEND

- GZA WOLVEN JEWELL MONITORING WELL LOCATION
- NORTH KENT LANDFILL (NKLF) MONITORING WELL LOCATION
- GZA HOUSE STREET MONITORING WELL LOCATION
- GZA HOUSE STREET PROPOSED MONITORING WELL LOCATION
- HIGHWAY
- PRIMARY COUNTY ROAD
- OTHER ROAD
- RIVER OR STREAM
- SURFACE WATER
- APPROXIMATE HOUSE ST. DISPOSAL SITE BOUNDARY
- NORTH KENT LANDFILL
- NORTH KENT LANDFILL STUDY AREA
- NORTH KENT STUDY AREA OUTLINE

APPROXIMATE PFHXA EXTENT (PPT)

- ≤ 10 ng/L
- > 10 - 100 ng/L
- > 100 - 1,000 ng/L
- > 1,000 - 2,000 ng/L
- > 2,000 - 3,000 ng/L (MAX)

NOTES:
1. LOCATIONS AND SITE FEATURES ARE APPROXIMATE.

2. ACRONYMS
- (DWC) = DRINKING WATER CRITERIA (400,000 ng/L)
- (MAX) = MAXIMUM DETECTED CONCENTRATION IN THE SAMPLES
- ng/L = NANOGRAM PER LITER
- PFHxA = PERFLUOROHEXANOIC ACID
- (PPT) = PARTS PER TRILLION

3. MAXIMUM CONCENTRATION FROM MONITORING AND RESIDENTIAL WELL SAMPLE RESULTS (INCLUDING THE NORTH KENT LANDFILL STUDY AREA) WERE USED TO DEVELOP CONCENTRATION ISOPLETHS.

4. CONCENTRATION ISOPLETHS WERE DEVELOPED USING NATURAL NEIGHBOR INTERPOLATION IN ARCGIS. CONCENTRATIONS WERE NOT EXTRAPOLATED OUTSIDE OF THE AREA OF KNOWN CONCENTRATIONS.

12-MILE-RD-NE
11-MILE-RD-NE
10-MILE-RD-NE
EDGERTON-AVE-NE
PINE-ISLAND-DR-NE
ALGOMA-AVE-NE
NORTHLAND DR
COURTLAND-DR-NE
W DIVISION ST NE
E DIVISION ST NE
HOUSE STREET SITE
NORTH KENT LANDFILL
NORTH KENT LANDFILL STUDY AREA
BELMONT-AVE-NE
US 131
POST-DR-NE
JUPITER-AVE-NE
ROGUE-RIVER-RD-NE
W-RIVER-DR-NE
COIT-AVE-NE
BELDING-RD-NE
WOLVERINE-BLVD-NE
NORTHLAND-DR-NE

N

0 1,625 3,250 6,500
Scale in Feet

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NORTH KENT STUDY AREA
PFHXA ISOCONCENTRATION MAP
PERIMETER WELLS RAP

GZA GeoEnvironmental, Inc.
Engineers and Scientists
www.gza.com

PREPARED FOR: WN&J/WWW

PROJ MGR: LIP	REVIEWED BY: LIP	CHECKED BY: JC	FIGURE 20
DESIGNED BY: KHM	DRAWN BY: MKM	SCALE: 1 inch = 3,250 feet	
DATE: 12/21/2020	PROJECT NO. 16.0062961.90	REVISION NO.	

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LEGEND

- GZA WOLVEN JEWELL MONITORING WELL LOCATION
- NORTH KENT LANDFILL (NKLF) MONITORING WELL LOCATION
- GZA HOUSE STREET MONITORING WELL LOCATION
- GZA HOUSE STREET PROPOSED MONITORING WELL LOCATION
- HIGHWAY
- PRIMARY COUNTY ROAD
- OTHER ROAD
- RIVER OR STREAM
- SURFACE WATER
- APPROXIMATE HOUSE ST. DISPOSAL SITE BOUNDARY
- NORTH KENT LANDFILL
- NORTH KENT LANDFILL STUDY AREA
- NORTH KENT STUDY AREA OUTLINE

APPROXIMATE PFNA EXTENT (PPT)

- ≤ 6 ng/L (DWC)
- > 6 - 10 ng/L
- > 10 - 20 ng/L
- > 20 - 80 ng/L
- > 80 - 120 (MAX)

NOTES:
1. LOCATIONS AND SITE FEATURES ARE APPROXIMATE.

2. ACRONYMS
- (DWC) = DRINKING WATER CRITERIA
- (MAX) = MAXIMUM DETECTED CONCENTRATION IN THE SAMPLES
- ng/L = NANOGRAM PER LITER
- PFNA = PERFLURONONANOIC ACID
- (PPT) = PARTS PER TRILLION

3. MAXIMUM CONCENTRATION FROM MONITORING AND RESIDENTIAL WELL SAMPLE RESULTS (INCLUDING THE NORTH KENT LANDFILL STUDY AREA) WERE USED TO DEVELOP CONCENTRATION ISOPLETHS.

4. CONCENTRATION ISOPLETHS WERE DEVELOPED USING NATURAL NEIGHBOR INTERPOLATION IN ARCGIS. CONCENTRATIONS WERE NOT EXTRAPOLATED OUTSIDE OF THE AREA OF KNOWN CONCENTRATIONS.

HOUSE STREET SITE
NORTH KENT LANDFILL
NORTH KENT LANDFILL STUDY AREA
12-MILE-RD-NE
11-MILE-RD-NE
10-MILE-RD-NE
EDGERTON-AVE-NE
ALGOMA-AVE-NE
PINE-ISLAND-DR-NE
NORTHLAND DR
COURTLAND-DR-NE
W-DIVISION ST NE
E-DIVISION ST NE
BELMONT-AVE-NE
POST-DR-NE
JUPITER-AVE-NE
ROGUE-RIVER-RD-NE
W-RIVER-DR-NE
NORTHLAND-DR-NE
WOLVERINE-BLVD-NE
BELDING-RD-NE
COIT-AVE-NE
GRANDV
CANN
M-57
M-44
US-131
NUS-131

N

0 1,625 3,250 6,500
Scale in Feet

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Grand Rapids, Michigan 49504

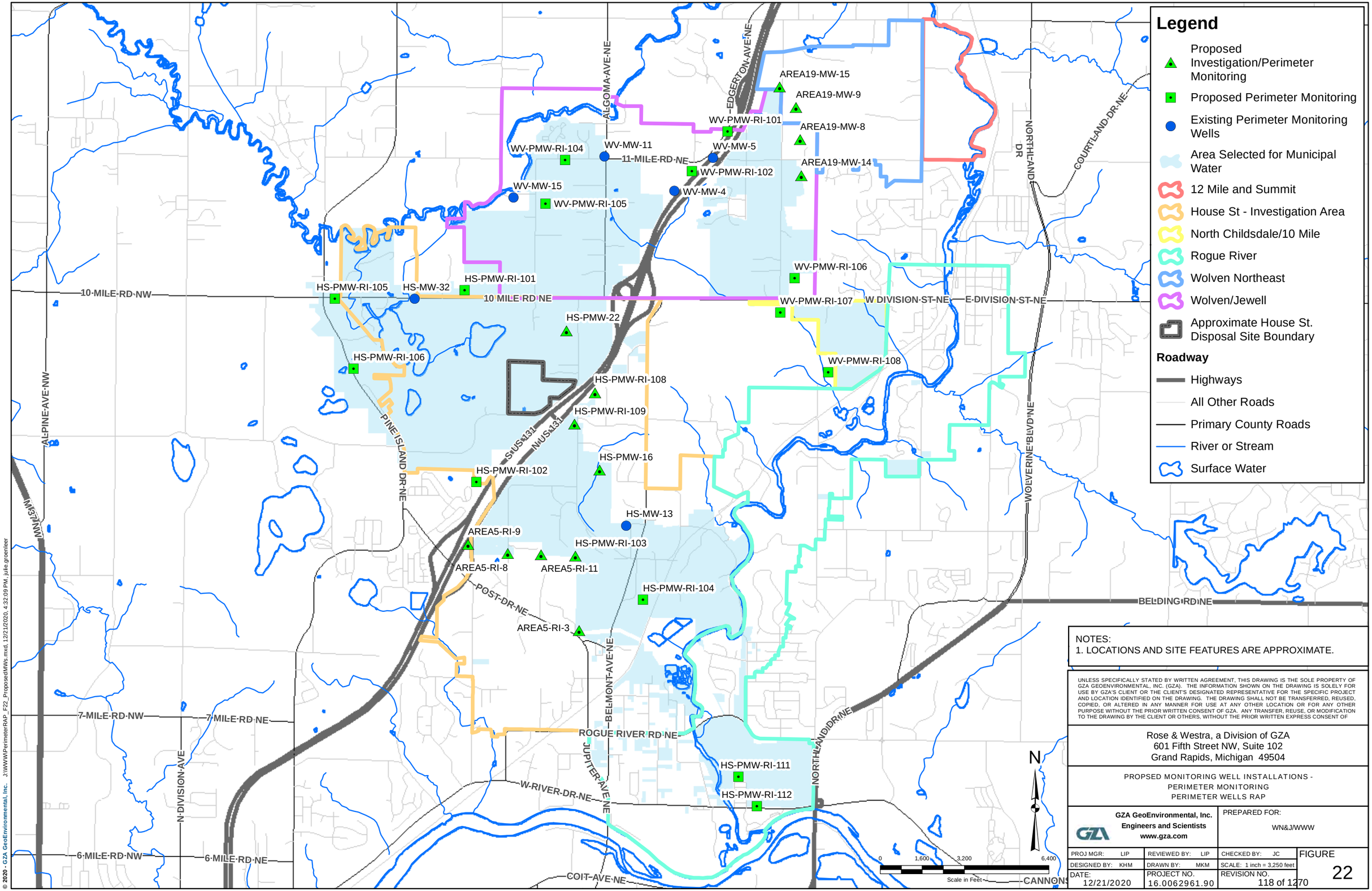
NORTH KENT STUDY AREA
PFNA ISOCONCENTRATION MAP
PERIMETER WELLS RAP

GZA GeoEnvironmental, Inc.
Engineers and Scientists
www.gza.com

PREPARED FOR: WN&J/WWW

PROJ MGR: LIP	REVIEWED BY: LIP	CHECKED BY: JC	FIGURE 21
DESIGNED BY: KHM	DRAWN BY: MKM	SCALE: 1 inch = 3,250 feet	
DATE: 12/21/2020	PROJECT NO. 16.0062961.90	REVISION NO.	

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NOTES:
1. LOCATIONS AND SITE FEATURES ARE APPROXIMATE.

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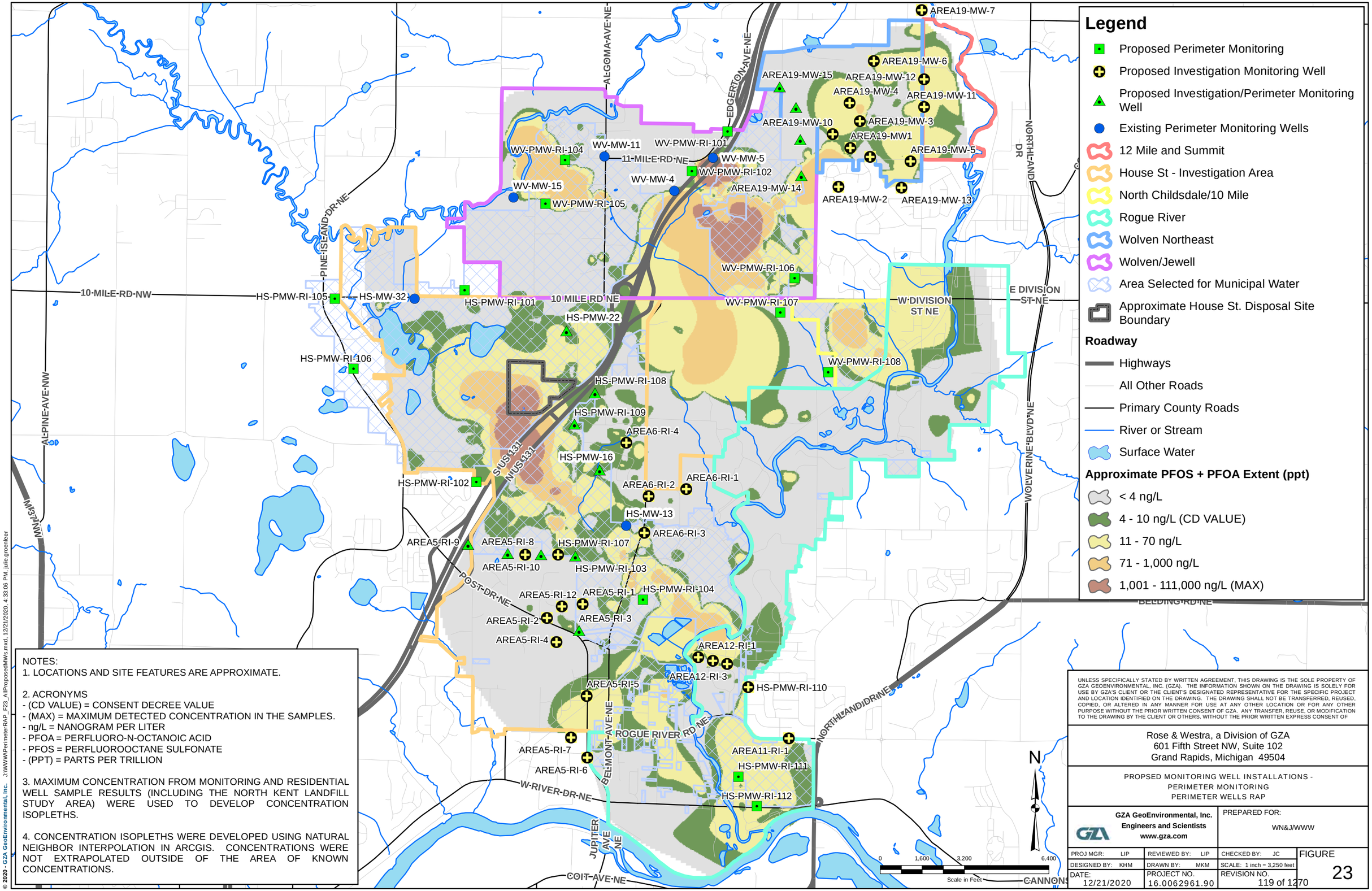
PROPSED MONITORING WELL INSTALLATIONS -
PERIMETER MONITORING
PERIMETER WELLS RAP

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Engineers and Scientists
www.gza.com

PREPARED FOR: WN&JWWW

PROJ MGR: LIP	REVIEWED BY: LIP	CHECKED BY: JC	FIGURE 22
DESIGNED BY: KHM	DRAWN BY: MKM	SCALE: 1 inch = 3,250 feet	
DATE: 12/21/2020	PROJECT NO. 16.0062961.90	REVISION NO.	

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Legend

- Proposed Perimeter Monitoring
- Proposed Investigation Monitoring Well
- Proposed Investigation/Perimeter Monitoring Well
- Existing Perimeter Monitoring Wells
- 12 Mile and Summit
- House St - Investigation Area
- North Childsdale/10 Mile
- Rogue River
- Wolven Northeast
- Wolven/Jewell
- Area Selected for Municipal Water
- Approximate House St. Disposal Site Boundary

Roadway

- Highways
- All Other Roads
- Primary County Roads
- River or Stream
- Surface Water

Approximate PFOS + PFOA Extent (ppt)

- < 4 ng/L
- 4 - 10 ng/L (CD VALUE)
- 11 - 70 ng/L
- 71 - 1,000 ng/L
- 1,001 - 111,000 ng/L (MAX)

NOTES:
1. LOCATIONS AND SITE FEATURES ARE APPROXIMATE.

2. ACRONYMS
- (CD VALUE) = CONSENT DECREE VALUE
- (MAX) = MAXIMUM DETECTED CONCENTRATION IN THE SAMPLES.
- ng/L = NANOGRAM PER LITER
- PFOA = PERFLUORO-N-OCTANOIC ACID
- PFOS = PERFLUOROOCTANE SULFONATE
- (PPT) = PARTS PER TRILLION

3. MAXIMUM CONCENTRATION FROM MONITORING AND RESIDENTIAL WELL SAMPLE RESULTS (INCLUDING THE NORTH KENT LANDFILL STUDY AREA) WERE USED TO DEVELOP CONCENTRATION ISOPLETHS.

4. CONCENTRATION ISOPLETHS WERE DEVELOPED USING NATURAL NEIGHBOR INTERPOLATION IN ARCGIS. CONCENTRATIONS WERE NOT EXTRAPOLATED OUTSIDE OF THE AREA OF KNOWN CONCENTRATIONS.

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PROPSED MONITORING WELL INSTALLATIONS -
PERIMETER MONITORING
PERIMETER WELLS RAP

GZA GeoEnvironmental, Inc.
Engineers and Scientists
www.gza.com

PREPARED FOR: WN&JWWW

PROJ MGR: LIP	REVIEWED BY: LIP	CHECKED BY: JC	FIGURE 23
DESIGNED BY: KHM	DRAWN BY: MKM	SCALE: 1 inch = 3,250 feet	
DATE: 12/21/2020	PROJECT NO. 16.0062961.90	REVISION NO.	


GEOTECHNICAL
ENVIRONMENTAL
ECOLOGICAL
WATER
CONSTRUCTION MANAGEMENT

APPENDIX B

PERIMETER STATEMENT OF WORK

Rose & Westra
A Division of GZA

GEOTECHNICAL
ENVIRONMENTAL
ECOLOGICAL
WATER
CONSTRUCTION MANAGEMENT

The Widdicomb Building
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F: 616.288.3327
www.rosewestra.com
www.gza.com



PERIMETER WELLS STATEMENT OF WORK
North Kent Study Area

January 31, 2020
File No. 16.0062335.60

PREPARED FOR:
Wolverine World Wide, Inc.
Rockford, Michigan

Rose & Westra, a Division of GZA GeoEnvironmental, Inc.
601 Fifth Street NW | Suite 102 | Grand Rapids, MI 49504
616.956.6123

31 Offices Nationwide
www.gza.com

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TABLE OF CONTENTS

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3.0 BACKGROUND 1

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NORTH OF 10 MILE ROAD 2

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5.0 METHODOLOGY 3

6.0 WELL INSTALLATION PROCEDURES 3

7.0 SAMPLING 3

8.0 INVESTIGATION DERIVED WASTE 4

9.0 ANTICIPATED SCHEDULE 4

APPENDED FIGURES

FIGURE 1 PROPOSED PERIMETER WELL LOCATIONS NOT INCLUDED IN OTHER SOWs
FIGURE 2 PROPOSED NEW PERIMETER WELL LOCATIONS – ALL SOWS
FIGURE 3 EXISTING AND PROPOSED PERIMETER AND INVESTIGATION WELLS – ALL SOWS

1.0 INTRODUCTION

On behalf of Wolverine Worldwide, Inc. (Wolverine), Rose & Westra, a Division of GZA GeoEnvironmental, Inc. (R&W/GZA), prepared this Statement of Work (SOW) summarizing the approach and rationale for proposed perimeter monitoring wells set forth in the Consent Decree (CD) around the municipal water areas in Plainfield and Algoma Townships, Kent County, Michigan. The purpose of this SOW is to propose the locations of groundwater monitoring wells to monitor for per- and polyfluoroalkyl substances (PFAS) at the perimeter of the municipal water areas. Following completion of the tasks in this SOW, R&W/GZA will evaluate the data in consultation with EGLE and determine appropriate next steps. Where appropriate, the related scopes of work are referenced throughout this document.

2.0 GENERAL APPROACH

The monitoring wells were proposed after evaluating the known extent of PFAS and evaluating their potential transport in groundwater. The following data was compiled and evaluated:

- The estimated extent of perfluorooctane sulfonic acid (PFOS) and perfluorooctanoic acid (PFOA) exceeding 70 nanograms per liter (ng/L) and the extent of total PFAS, based on the test results for the residential drinking water wells, the vertical aquifer profiling samples, and the groundwater monitoring well samples.

- The estimated extent of PFOA+PFOS exceeding 10 ng/L and the estimated extent of seven PFAS compounds greater than the proposed maximum contaminant levels (MCLs) for those seven compounds, based on the test results for the residential drinking water wells, the vertical aquifer profiling samples, and the groundwater monitoring well samples.

- Isoconcentration maps for total PFAS interpolated from the residential water well and the groundwater monitoring data.

- Soil boring logs for the vertical aquifer profiling locations and available residential water well logs.

- Groundwater contours and interpreted groundwater flow direction based on the November 2019 static water levels measured at groundwater monitoring wells and at the staff gages installed in the Rogue River.

3.0 BACKGROUND

This SOW addresses perimeter wells (i.e. near the boundaries of municipal water areas in two investigation areas in the North Kent Study Area. Figure 1 illustrates the municipal water areas. The purpose of the activities in this SOW is to monitor PFAS at the perimeter of the municipal water areas.

<u>SOUTH OF 10 MILE ROAD</u>

PFAS have migrated with the predominant groundwater flow to the southeast toward the Rogue River. As the plume crosses Belmont Avenue, a portion of the plume appears to migrate southerly toward the confluence of the Rogue River and Grand River while the main plume continues southeasterly. While groundwater predominantly flows to the southeast, the groundwater contours indicate that a small fraction of groundwater flow passing through the House Street Site flows to the northwest toward the Freska Lake area, which may explain

the relatively low level PFOA+PFOS concentrations at a few individual locations in that area. Groundwater contours suggest some PFAS migrating toward Area 6 may originate at the North Kent Landfill Area.

NORTH OF 10 MILE ROAD

PFAS were found in the Wellington Ridge neighborhood, located between 10 Mile and 11 Mile Roads, west of Wolven Avenue. In addition, PFAS concentrations were also measured in groundwater monitoring wells near the North Kent Landfill area and in several surface-water samples collected from the unnamed creek to which the North Kent Landfill used to discharge water extracted from the landfill underdrain system. The unnamed creek appears to be a migration pathway for PFAS containing surface water from the North Kent Landfill to the northwest north of 10 Mile Road.

Based on the groundwater contours, there appears to be a groundwater mound in the Wellington Ridge area. Groundwater appears to flow radially outward from the mound. With the presence of fine-grained soil in this area, the transport of the PFAS plume was generally limited to the formations where relatively permeable soils are present. The groundwater monitoring data and residential well data suggest flow to the following areas: northeast (Area 19), the northwest (Wolven Northwest), and southeast (Wolven-Childsdale Area).

4.0 PROPOSED MONITORING WELLS

The following provides a summary of proposed remedial investigation wells for the purpose of plume perimeter delineation and monitoring. See Figure 1 for a well location plan for the proposed perimeter monitoring well network along with the areas selected for municipal water and the areas that will not receive municipal water. Figure 2 presents a well location plan of the proposed perimeter well locations along with the proposed remedial investigation wells and GSI piezometer/pore water sampling locations under other SOWs.

- Three previously proposed monitor well locations, HS-PMW-13, HS-PMW-16, and HS-PMW-22 are previously proposed with access efforts on-going. These well locations were proposed to assist with delineating the east-northeastern boundary of the House Street plume[1]. Well location HS-PMW-16 will be utilized as a perimeter monitoring well cluster to evaluate potential PFAS migration to the east.

- Three perimeter well locations, HS-PMW-RI-105, HS-PMW-RI-106, and HS-PMW-RI-101, located northwest, and hydraulically downgradient of the House Street site, are proposed to evaluate potential PFAS migration at the edge of the Freska Lake area toward the edge of the North Kent Study area. In addition, the existing well cluster, HS-MW-32A/B/C/D, will be included as perimeter monitoring wells to evaluate potential PFAS migration to this area.

- Well location HS-PMW-RI-102, located hydraulically downgradient of the House Street Site to the southwest, is proposed to monitor for PFAS migration from the municipal water areas to the southeast.

- For the Wolven West and Wolven Northwest Study Areas, perimeter well locations WV-PMW-RI-101 and WV-PMW-RI-102 are proposed immediately west of the US-131 right-of-way, hydraulically downgradient of the PFAS plume in Wellington Ridge. These wells are proposed to evaluate potential migration of PFAS from Wellington Ridge municipal water area to the west. Well locations WV-PMW-RI-104 and WV-PMW-RI-105 are proposed to delineate the southwest and northeast boundary of the PFAS plume

[1] For the sake of this Work Plan, the edge of the PFAS plume is defined as PFOA+PFOS = 10 ppt. If the applicable PFAS criteria change during the life of this Work Plan and subsequent monitoring, the Work Plan will be reassessed for its adequacy and modified as needed.

within the Wolven Northwest municipal water area. In addition, existing monitoring well clusters, WV-MW-5, WV-MW-4, WV-MW-11, and WV-MW-15 will be included as part of the perimeter monitoring for the Wolven West and Wolven Northwest areas.

- Well locations WV-PMW-RI-106 and WV-PMW-RI-107 are located in the southeastern portion of the Wolven/Jewell area municipal water area. These wells are proposed to evaluate the potential migration of PFAS plume from Wolven Southeast municipal water area to the southeast.

- Well location WV-PMW-RI-108 is located southwest of the North Childsdale municipal water area and is proposed to evaluate flow from that area to the west and south.

5.0 METHODOLOGY

The tasks completed under this abbreviated SOW will be completed in accordance with the *Quality Assurance Project Plan, Former Wolverine Tannery, House Street Disposal Area, and Wolven/Jewell Area, Per- and Polyfluoroalkyl Substances Investigation Program, Revision 2* (QAPP) prepared for Wolverine World Wide, Inc. by R&W/GZA and dated November 1, 2018. A Conceptual Site Model including additional background and methodology will be provided in a Response Activity Plan that will be prepared following the Effective Date of the CD (see Section 9.0 below).

6.0 WELL INSTALLATION PROCEDURES

The proposed well nest locations will be drilled using either hollow-stem auger or rotosonic methods in accordance with SOPs A03 through A06 of the QAPP. When possible, the initial boring at each location will be drilled to the top of bedrock or refusal. The borehole terminal depth will also be evaluated based on the depths of adjacent water wells and the presence of confining strata.

As the original borings are drilled at each location, vertical aquifer profiling samples will be collected from water-bearing and permeable formation(s) at an interval of 10 feet for PFAS analysis. Vertical Aquifer Profiling will be completed in accordance with *SOP A25, Vertical Aquifer Profiling* included in the QAPP. The turn-around time for laboratory samples will be approximately 3 weeks.

Based on the profiling data and the encountered geology, R&W/GZA will determine the depth(s) of wells installed at each nest location. The monitoring wells will be developed in accordance with *SOP A13, Well Development* in the QAPP and surveyed by a licensed surveyor.

7.0 SAMPLING

Wells installed as part of this SOW (Figure 1) will be sampled as follows:

- Initial sampling post installation/development;
- Annual sampling until substantial completion of the perimeter well network;
- Once the perimeter well network outlined in this SOW is substantially complete, the wells will be sampled quarterly for one year.

Substantial completion will be agreed upon by R&W/GZA and EGLE.

The sampling will be conducted using methods established in SOPs A14, A15, A16, and B01 of the QAPP. The samples will be analyzed using method EPA Method 537.1, modified isotope dilution.

8.0 INVESTIGATION DERIVED WASTE

Soil cuttings and development/purge water from the well installations and sampling will be containerized and transported to the former Wolverine House Street property for staging/storage until off-site treatment/disposal can be arranged.

9.0 ANTICIPATED SCHEDULE

A formal Work Plan will be prepared for this work and submitted to EGLE no later than 180 days following the Effective Date of the CD between EGLE and Wolverine.

The schedule for installation of the well nest locations will depend on R&W/GZA's ability to obtain access to the desired locations or proximate alternate locations. The following table outlines R&W/GZA's current estimates of the steps and approximate timeframes for the work in this SOW.

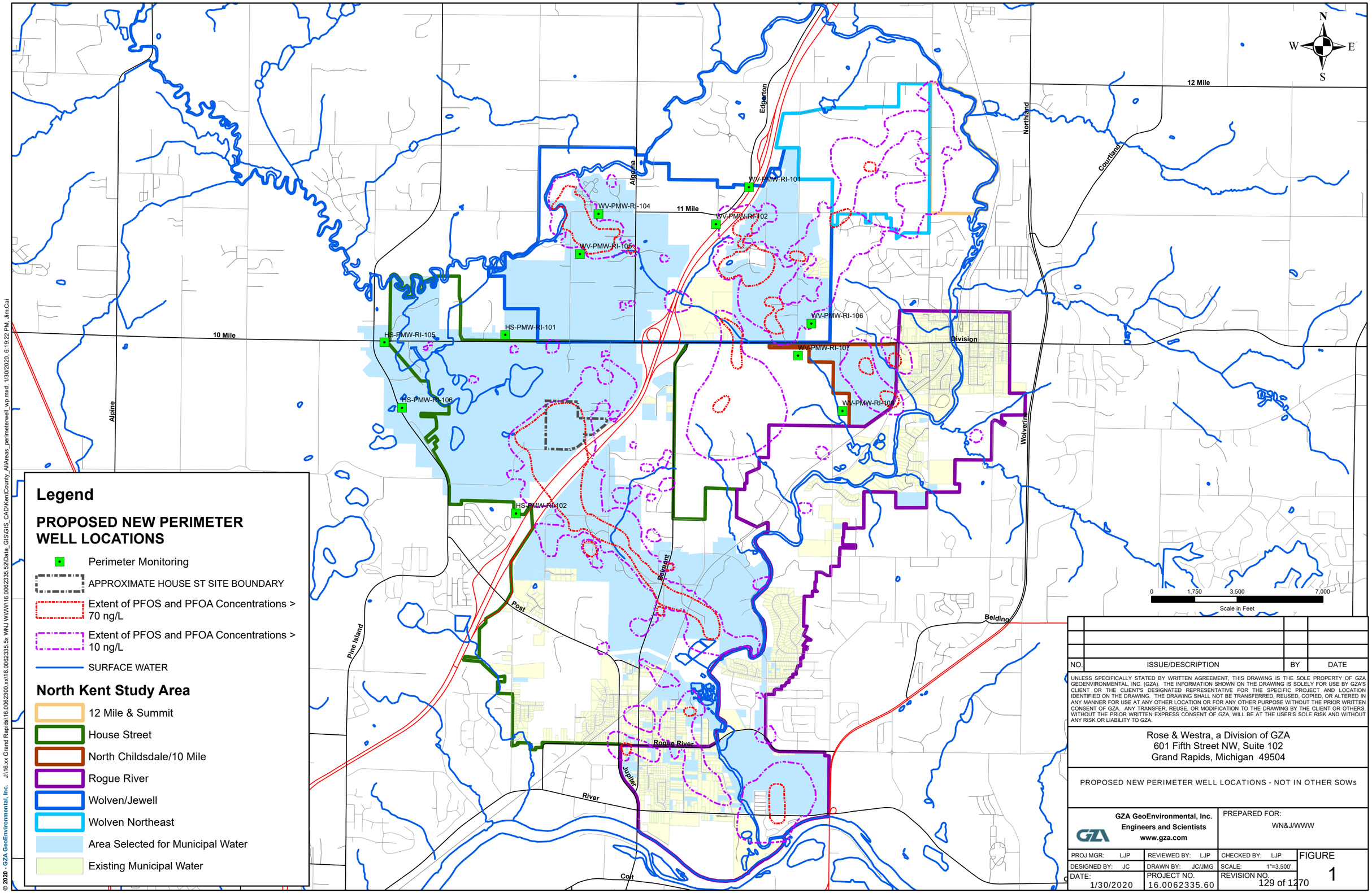
Task	Estimated Timeframe per Location
Access	1 to 3 months
Drilling	2 to 3 weeks
VAP analysis	3 weeks
Monitoring Well Installation	1 to 2 weeks
Development wait time	2 weeks
First Groundwater Sampling	1 week
First Laboratory Analysis	3 weeks

Assuming one month per location, R&W/GZA estimates this SOW will require 11 months to complete drilling, vertical aquifer profiling and monitoring well installation. This work will be completed in conjunction with the other SOWs submitted under the CD. R&W/GZA will coordinate with EGLE to prioritize drilling locations if access is obtained for multiple locations throughout the SOWs simultaneously. Because access will likely be obtained piecemeal, the actual well installation schedule will likely exceed 11 months.

Following the full year of quarterly sampling of the well network, R&W/GZA will evaluate the data in consultation with EGLE and determine appropriate next steps.

J:\62000\623xx\62335.60-PR and Litigation\WWW-Budget_Related\Settlement Assistance\MuniWater-Perimeter WP\PerimeterWells_SOW-F 01302020.docx

FIGURES



Legend

PROPOSED NEW PERIMETER WELL LOCATIONS

- Perimeter Monitoring
- APPROXIMATE HOUSE ST SITE BOUNDARY
- Extent of PFOS and PFOA Concentrations > 70 ng/L
- Extent of PFOS and PFOA Concentrations > 10 ng/L
- SURFACE WATER

North Kent Study Area

- 12 Mile & Summit
- House Street
- North Childsdale/10 Mile
- Rogue River
- Wolven/Jewell
- Wolven Northeast
- Area Selected for Municipal Water
- Existing Municipal Water

NO.	ISSUE/DESCRIPTION	BY	DATE

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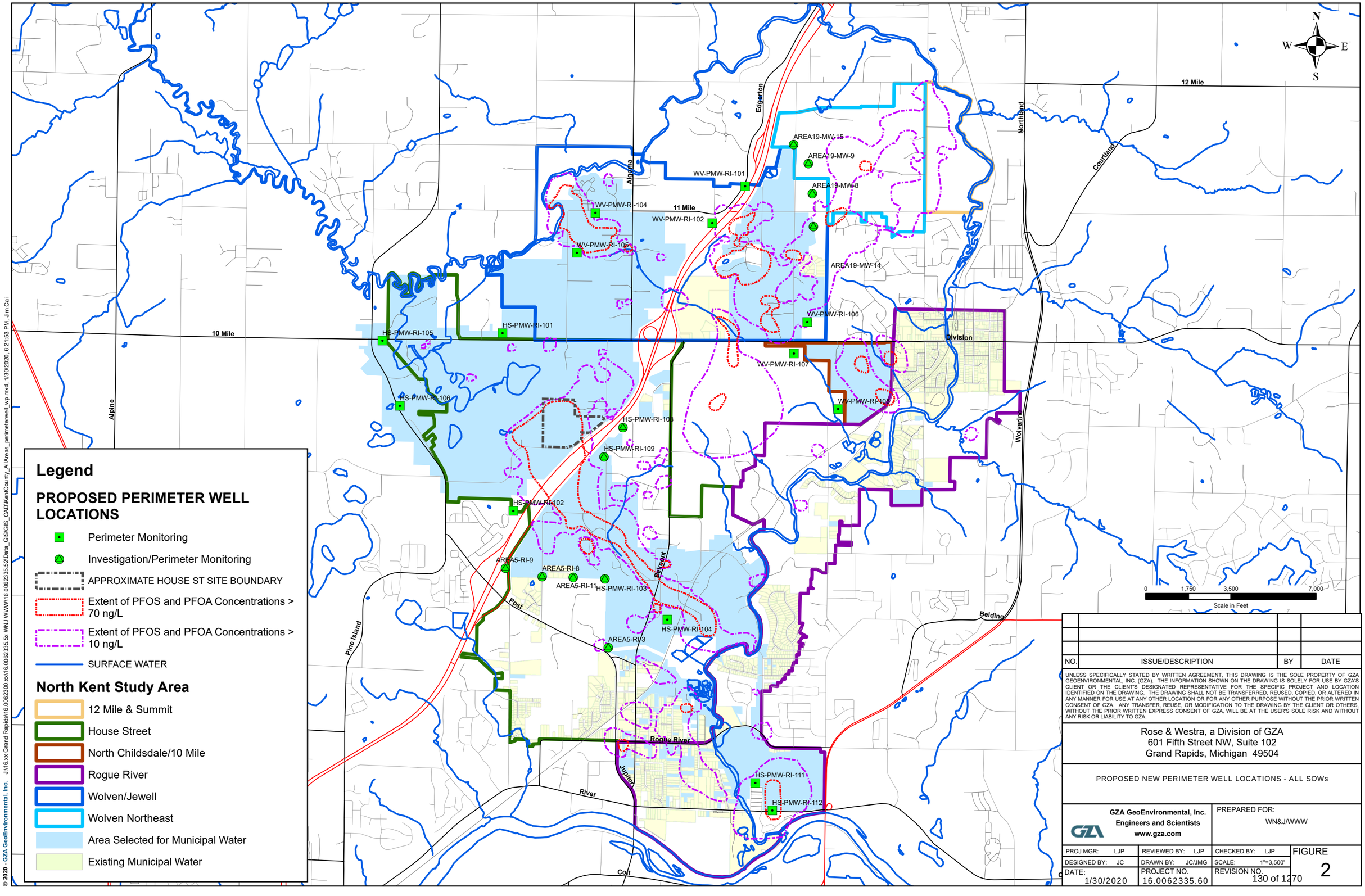
PROPOSED NEW PERIMETER WELL LOCATIONS - NOT IN OTHER SOWs

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Engineers and Scientists
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PREPARED FOR: WN&J/WWW

PROJ MGR: LJP	REVIEWED BY: LJP	CHECKED BY: LJP	FIGURE 1
DESIGNED BY: JC	DRAWN BY: JC/JMG	SCALE: 1"=3,500'	
DATE: 1/30/2020	PROJECT NO. 16.0062335.60	REVISION NO.	

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Legend

PROPOSED PERIMETER WELL LOCATIONS

- Perimeter Monitoring
- Investigation/Perimeter Monitoring
- APPROXIMATE HOUSE ST SITE BOUNDARY
- Extent of PFOS and PFOA Concentrations > 70 ng/L
- Extent of PFOS and PFOA Concentrations > 10 ng/L
- SURFACE WATER

North Kent Study Area

- 12 Mile & Summit
- House Street
- North Childsdale/10 Mile
- Rogue River
- Wolven/Jewell
- Wolven Northeast
- Area Selected for Municipal Water
- Existing Municipal Water

NO.	ISSUE/DESCRIPTION	BY	DATE

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PROPOSED NEW PERIMETER WELL LOCATIONS - ALL SOWs

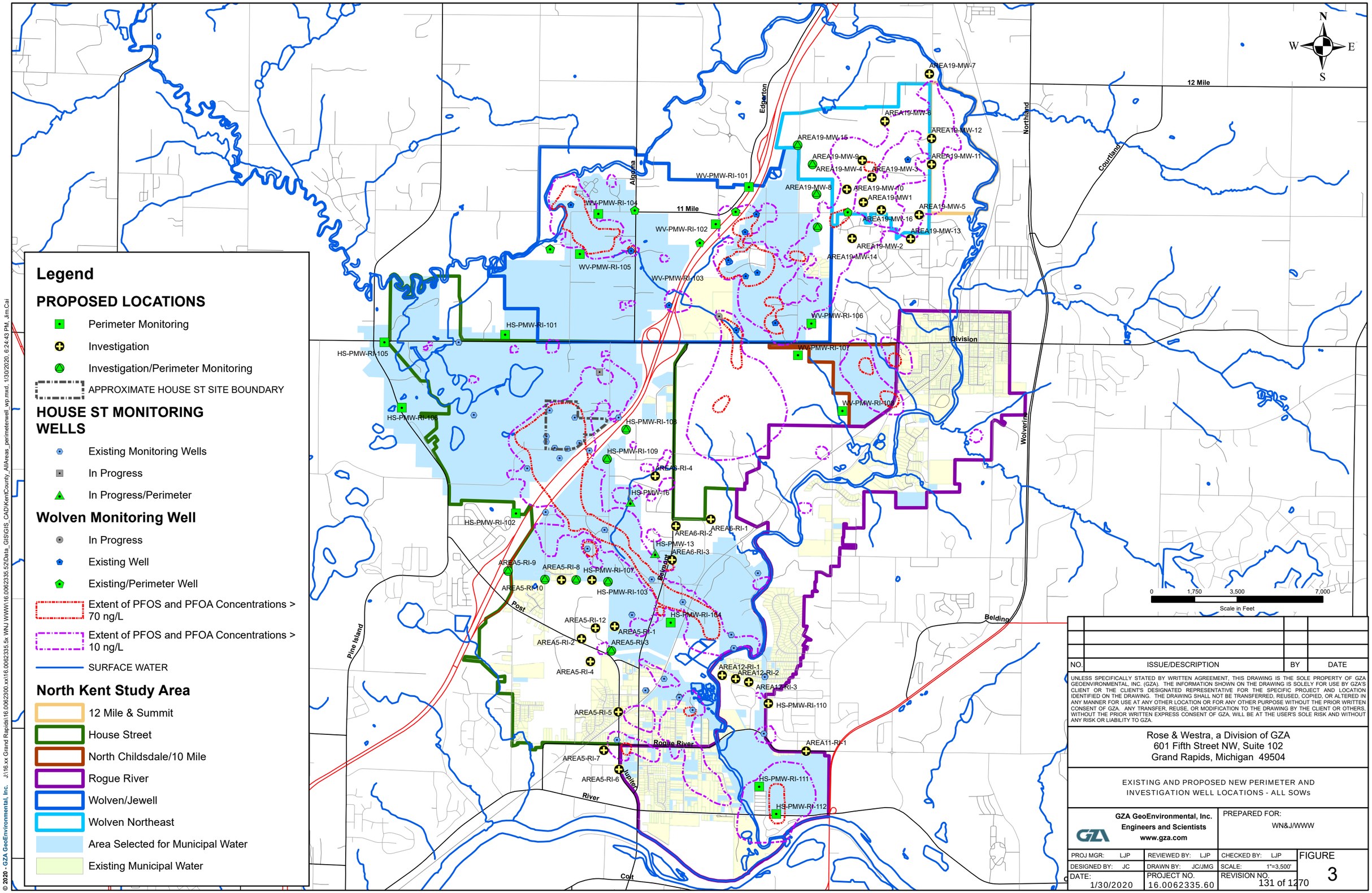
GZA GeoEnvironmental, Inc.
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PREPARED FOR: WN&J/WWW

PROJ MGR: LJP	REVIEWED BY: LJP	CHECKED BY: LJP	FIGURE 2
DESIGNED BY: JC	DRAWN BY: JC/JMG	SCALE: 1"=3,500'	
DATE: 1/30/2020	PROJECT NO. 16.0062335.60	REVISION NO.	

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Legend

PROPOSED LOCATIONS

- Perimeter Monitoring
- Investigation
- Investigation/Perimeter Monitoring
- APPROXIMATE HOUSE ST SITE BOUNDARY

HOUSE ST MONITORING WELLS

- Existing Monitoring Wells
- In Progress
- In Progress/Perimeter

Wolven Monitoring Well

- In Progress
- Existing Well
- Existing/Perimeter Well
- Extent of PFOS and PFOA Concentrations > 70 ng/L
- Extent of PFOS and PFOA Concentrations > 10 ng/L
- SURFACE WATER

North Kent Study Area

- 12 Mile & Summit
- House Street
- North Childsdale/10 Mile
- Rogue River
- Wolven/Jewell
- Wolven Northeast
- Area Selected for Municipal Water
- Existing Municipal Water

NO.	ISSUE/DESCRIPTION	BY	DATE

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Grand Rapids, Michigan 49504

EXISTING AND PROPOSED NEW PERIMETER AND INVESTIGATION WELL LOCATIONS - ALL SOWs

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PREPARED FOR: WN&J/WWW

PROJ MGR: LJP	REVIEWED BY: LJP	CHECKED BY: LJP	FIGURE 3
DESIGNED BY: JC	DRAWN BY: JC/JMG	SCALE: 1"=3,500'	
DATE: 1/30/2020	PROJECT NO. 16.0062335.60	REVISION NO.	

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GEOTECHNICAL
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WATER
CONSTRUCTION MANAGEMENT

APPENDIX C

SOIL BORING AND MONITORING WELL INSTALLATION LOGS

GZA
GeoEnvironmental, Inc.
Engineers and Scientists

Wolverine World Wide, Inc.
Area 19 - RAP Implementation
Rockford, Michigan

Boring No.: AREA19-MW-8A
Page: 1 **of** 1
File No.: 16.0062961.11
Check: J. Groenleer

Contractor: Stearns Drilling Company
Foreman: J. Huntoon
Logged by: C. Melby
Date Start/Finish: 4-21-23 / 4-21-23
Boring Location: 597,632.8496 N; 12,798,795.1698 E
GS Elev.: 829.67' **Datum:** NAD83/NAVD88

	Auger/ Casing	Sampler
Type:	Hollow Stem Auger	Split Spoon
O.D. / I.D.:	8.0" / 4.25"	2.0" / 1 3/8"
Hammer Wt.:	140lbs	NA
Hammer Fall:	30.0"	NA
TOC Elev.:	831.75'	NA

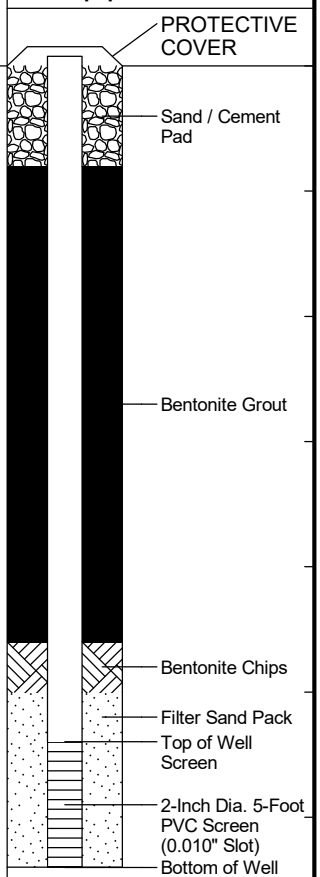
GROUNDWATER READINGS

Date	Time	Depth	Casing	Stab

Surveyed By: EXXEL **Survey Date:** 8/3/2023

Depth	Sample Information: No.	Pen./ Rec. (in.)	Depth (Ft.)	Blows (/6")	Test Data	Sample Description & Classification	Stratum Desc.	Remarks
1–31						See AREA19-MW-8C for soil and stratum descriptions.		
32						Bottom of Borehole at 32.0 Feet		1
33–45								

Equipment Installed



REMARKS

1. Monitoring well was installed in borehole upon completion. Well screen was set from approximately 27.0 to 32.0 feet below ground surface.

Stratification lines represent approximate boundary between soil types, transitions may be gradual. Water level readings have been made at times and under conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the time measurements were made.

Boring No.: AREA19-MW-8A

BORING_WELL 62961.11 AREA19.GPJ GZA_CORP.GDT 8/30/23

GZA
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Engineers and Scientists

Wolverine World Wide, Inc.
Area 19 - RAP Implementation
Rockford, Michigan

Boring No.: AREA19-MW-8B
Page: 1 **of** 3
File No.: 16.0062961.11
Check: J. Groenleer

Contractor: Stearns Drilling Company
Foreman: J. Huntoon
Logged by: C. Melby
Date Start/Finish: 4-17-23 / 4-24-23
Boring Location: 597,633.0385 N; 12,798,790.0530 E
GS Elev.: 829.64' **Datum:** NAD83/NAVD88

	Auger/ Casing	Sampler
Type:	Hollow Stem Auger	Split Spoon
O.D. / I.D.:	8.0" / 4.25"	2.0" / 1 3/8"
Hammer Wt.:	140lbs	NA
Hammer Fall:	30.0"	NA
TOC Elev.:	831.76'	NA

GROUNDWATER READINGS

Date	Time	Depth	Casing	Stab

Surveyed By: EXXEL **Survey Date:** 8/3/2023

Depth	Sample Information: No.	Pen./ Rec. (in.)	Depth (Ft.)	Blows (/6")	Test Data	Sample Description & Classification	Stratum Desc.	Remarks	Equipment Installed
1–57						See AREA19-MW-8C for soil and stratum descriptions.			PROTECTIVE COVER; Sand / Cement Pad

REMARKS

Stratification lines represent approximate boundary between soil types, transitions may be gradual. Water level readings have been made at times and under conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the time measurements were made.

Boring No.: AREA19-MW-8B

BORING_WELL 62961.11 AREA19.GPJ GZA_CORP.GDT 8/28/23

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Rockford, Michigan

Boring No.: AREA19-MW-8B
Page: 2 **of** 3
File No.: 16.0062961.11
Check: J. Groenleer

Depth	Sample Information					Sample Description & Classification	Stratum Desc.	Remarks	Equipment Installed
	No.	Pen./ Rec. (in.)	Depth (Ft.)	Blows (/6")	Test Data				
59–125									Bentonite Grout

REMARKS

Stratification lines represent approximate boundary between soil types, transitions may be gradual. Water level readings have been made at times and under conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the time measurements were made.

Boring No.: AREA19-MW-8B

BORING_WELL 62961.11 AREA19.GPJ GZA_CORP.GDT 8/28/23

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Rockford, Michigan

Boring No.: AREA19-MW-8B
Page: 3 **of** 3
File No.: 16.0062961.11
Check: J. Groenleer

Depth	Sample Information: No.	Pen./ Rec. (in.)	Depth (Ft.)	Blows (/6")	Test Data	Sample Description & Classification	Stratum Desc.	Remarks	Equipment Installed
127–192	1	24/20	174-176	1-1 4-6		Loose, gray, fine SAND, little Silt, wet.			Filter Sand Pack Top of Well Screen 2-Inch Dia. 5-Foot PVC Screen (0.010" Slot) Bottom of Well Screen
181						Bottom of Borehole at 181.0 Feet		1	

REMARKS

1. Monitoring well was installed in borehole upon completion. Well screen was set from approximately 176.0 to 181.0 feet below ground surface.

Stratification lines represent approximate boundary between soil types, transitions may be gradual. Water level readings have been made at times and under conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the time measurements were made.

Boring No.: AREA19-MW-8B

BORING_WELL 62961.11 AREA19.GPJ GZA_CORP.GDT 8/28/23

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Area 19 - RAP Implementation
Rockford, Michigan

Boring No.: AREA19-MW-8C
Page: 1 **of** 6
File No.: 16.0062961.11
Check: J. Groenleer

Contractor: Stearns Drilling Company
Foreman: J. Huntoon
Logged by: C. Melby/D. Watt
Date Start/Finish: 5-20-22 / 6-6-22
Boring Location: 597,627.6442 N; 12,798,790.5476 E
GS Elev.: 829.71' **Datum:** NAD83/NAVD88

	Auger/ Casing	Sampler
Type:	Hollow Stem Auger	Split Spoon
O.D. / I.D.:	8.0" / 4.25"	2.0" / 1 3/8"
Hammer Wt.:	140lbs	NA
Hammer Fall:	30.0"	NA
TOC Elev.:	832.09'	NA

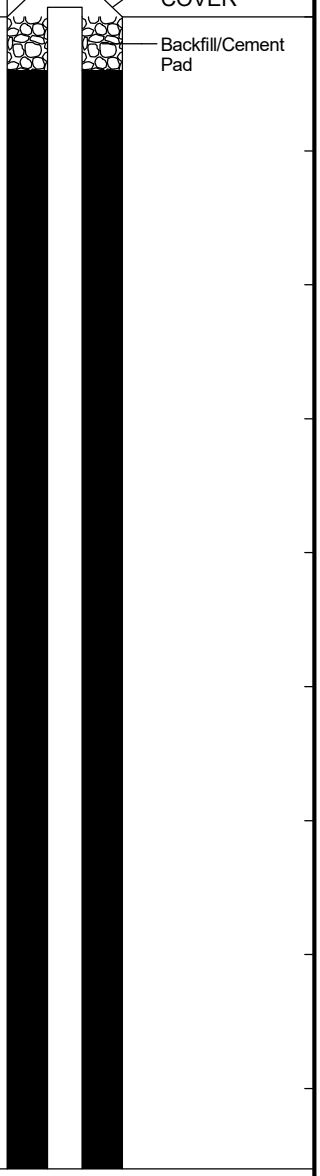
GROUNDWATER READINGS

Date	Time	Depth	Casing	Stab

Surveyed By: EXXEL **Survey Date:** 8/3/2023

Depth	Sample Information No.	Pen./ Rec. (in.)	Depth (Ft.)	Blows (/6")	Test Data	Sample Description & Classification	Stratum Desc.	Remarks
1–4								
4–5	1	24/24	4-6	3-5 4-4		Stiff, brown, SILT & CLAY, dry. Changing at 5.0 feet to: Loose, brown, fine SAND, some Silt, dry.	5' SILT & CLAY SAND	
5–9	2	24/20	9-11	2-3 2-3		Loose, brown, fine to medium SAND, little Silt, moist to wet.		1
9–14	3	24/15	14-16	WOH/6"-4 5-6		Loose, brown, fine to medium SAND, little Silt, moist to wet. Changing at 14.9 feet to: Loose, brown, fine to medium SAND, little Silt, dry.		
14–19	4	24/16	19-21	4-7 7-10		Medium dense, brown, fine to medium SAND, little Silt, dry.		
19–24	5	24/20	24-26	5-5 7-6		Medium dense, brown, fine to medium SAND, little Silt, dry.		2
24–29	6	24/24	29-31	3-3 4-4		Loose, brown, fine to medium SAND, little Silt, wet.		3
29–32	7	24/24	32-34	6-15 22-27		Hard, brown, Silty CLAY, some fine to medium Sand embedded, moist.	32' Silty CLAY	
32–34	8	24/24	34-36	9-14 21-29		Hard, brown, Silty CLAY, little fine to medium Sand, embedded, moist.		4
34–39								
39–42	9	24/24	39-41	9-17 33-50		Hard, brown, Silty CLAY, little fine to medium SAND embedded, moist.		

Equipment Installed



REMARKS

1. A temporary well was set from approximately 9.0 to 14.0 feet below ground surface but did not produce enough volume to collect samples for analytical laboratory testing.
2. VAP groundwater sample was collected from approximately 27.0 to 32.0 feet below ground surface and submitted for analytical laboratory testing.
3. Perched groundwater was encountered at approximately 29.0 feet below ground surface.
4. 10-inch casing installed from ground surface to approximately 33.0 feet below ground surface and grouted in place.

Stratification lines represent approximate boundary between soil types, transitions may be gradual. Water level readings have been made at times and under conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the time measurements were made.

Boring No.: AREA19-MW-8C

BORING_WELL 62961.11 AREA19.GPJ GZA_CORP.GDT 8/30/23

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Rockford, Michigan

Boring No.: AREA19-MW-8C
Page: 2 **of** 6
File No.: 16.0062961.11
Check: J. Groenleer

Depth	Sample Information					Sample Description & Classification	Stratum Desc.	Remarks	Equipment Installed
	No.	Pen./ Rec. (in.)	Depth (Ft.)	Blows (/6")	Test Data				
44	10	24/24	44-46	13-27 37-39		Hard, brown and gray, Silty CLAY, trace fine to medium Sand embedded, moist to dry.	Silty CLAY		
49	11	24/24	49-51	9-17 30-47		Hard, gray, Silty CLAY, trace fine to medium Sand embedded, moist to dry.			
54	12	24/24	54-56	4-11 18-33		Very stiff, gray, Silty CLAY, trace fine Sand embedded, moist to dry.			
59	13	24/24	59-61	9-15 21-30		Hard, gray and brown, Silty CLAY, trace fine Sand embedded, moist.			
64	14	24/24	64-66	7-14 23-26		Hard, gray and brown, Silty CLAY, trace fine to medium Sand embedded, moist.			
69	15	24/24	69-71	10-23 35-45		Hard, gray, Silty CLAY, trace fine to medium Sand embedded, moist.			
74	16	24/24	74-76	12-18 26-35		Hard, gray, Silty CLAY, little fine to coarse Sand lenses and embedded, moist.			
79	17	24/24	79-81	13-26 40-50		Hard, gray, Silty CLAY, little fine to coarse Sand embedded, moist.			
84	18	18/18	84-85.5	9-27-50/6"		Hard, gray, Silty CLAY, little fine to coarse Sand embedded, moist.			
89	19	18/18	89-90.5	22-33-50/6"		Hard, gray, Silty CLAY, trace fine to coarse Sand, embedded, moist.			

REMARKS

Stratification lines represent approximate boundary between soil types, transitions may be gradual. Water level readings have been made at times and under conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the time measurements were made.

Boring No.: AREA19-MW-8C

BORING_WELL 62961.11 AREA19.GPJ GZA_CORP.GDT 8/30/23

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Rockford, Michigan

Boring No.: AREA19-MW-8C
Page: 3 **of** 6
File No.: 16.0062961.11
Check: J. Groenleer

Depth	Sample Information: No.	Pen./ Rec. (in.)	Depth (Ft.)	Blows (/6")	Test Data	Sample Description & Classification	Stratum Desc.	Remarks	Equipment Installed
94–97	20	24/24	94-96	20-31 40-42		Hard, gray, Silty CLAY, little fine to coarse Sand embedded, occasional fine Sand lenses, moist.	Silty CLAY		
99–103	21	17/17	99-100.4	31-48-50/5"		Hard, gray, Silty CLAY, little fine to coarse Sand embedded, occasional fine Sand lenses, moist.			
104–108	22	17/17	104-105.4	27-36-50/5"		Hard, gray, Silty CLAY, trace fine to medium Sand embedded, moist.			
109–113	23	23/23	109-110.9	21-37 55-50/5"		Hard, gray, Silty CLAY, moist. Changing at 109.4 feet to: Very dense, gray, fine SAND and Silt, moist.	109.4' SAND		
114–118	24	24/24	114-116	15-25 31-40		Hard, gray, Silty CLAY, trace fine Sand seams and lenses, moist to dry.	114' Silty CLAY		
119–123	25	17/17	119-120.4	9-34-50/5"		Hard, gray, Silty CLAY, moist. Changing at 120.0 feet to: Very dense, gray, fine SAND and Silt, wet.	120' SAND		Bentonite Grout
124–128	26	6/6	124-124.5	100/6"		Hard, gray, Silty CLAY, trace fine Sand lenses, moist to dry.	124' Silty CLAY		
129–133	27	5/5	129-129.4	100/5"		Hard, gray, Silty CLAY, trace fine Sand lenses, trace fine to coarse Sand embedded, dry to moist.			
134–138	28	5/5	134-134.4	100/5"		Hard, gray, Silty CLAY, trace fine to medium Sand embedded, dry to moist.			
139–143	29	4/4	139-139.3	100/4"		Hard, gray, Silty CLAY, trace fine to medium Sand embedded, dry to moist.			

REMARKS

Stratification lines represent approximate boundary between soil types, transitions may be gradual. Water level readings have been made at times and under conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the time measurements were made.

Boring No.: AREA19-MW-8C

BORING_WELL 62961.11 AREA19.GPJ GZA_CORP.GDT 8/30/23

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Rockford, Michigan

Boring No.: AREA19-MW-8C
Page: 4 **of** 6
File No.: 16.0062961.11
Check: J. Groenleer

Depth	Sample Information					Sample Description & Classification	Stratum Desc.	Remarks	Equipment Installed
	No.	Pen./ Rec. (in.)	Depth (Ft.)	Blows (/6")	Test Data				
144	30	5/0	144-144.4	100/3"		NO RECOVERY.	Silty CLAY		
149	31	6/6	149-149.5	100/6"		Hard, gray, Silty CLAY, trace fine to medium Sand embedded, dry to moist.			
154	32	9/8	154-154.8	64-100/3"		Hard, gray, Silty CLAY, trace fine to medium Sand embedded, dry to moist.			
159	33	9/9	159-159.8	42-50/3"		Hard, gray, Silty CLAY, trace fine to medium Sand embedded, dry to moist.			
164	34	9/9	164-164.8	40-50/3"		Hard, gray, Silty CLAY, trace fine Sand, dry to moist.			
169	35	6/6	169-169.5	60/6"		Hard, gray, Silty CLAY, trace fine Sand, dry to moist.			
174	36	9/9	174-174.8	41-50/3"		Hard, gray, Silty CLAY, trace fine Sand, dry to moist.	176' SAND	5 6	
179	37	17/12	179-180.4	8-28-50/5"		Very dense, gray, fine to medium SAND, trace Silt, wet.	181' Silty CLAY	7	
184	38	9/9	184-184.8	48-50/3"		Hard, gray, Silty CLAY, trace fine Sand, dry to moist.			
189	39	9/9	189-189.8	48-50/3"		Hard, gray, Silty CLAY, trace fine to medium Sand embedded, dry to moist.			

REMARKS

5. VAP groundwater sample was collected from approximately 176.0 to 181.0 feet below ground surface and submitted for analytical laboratory testing.
6. Driller noted a change in auger advancement at approximately 176.0 feet below ground surface. Possible strata change.
7. Driller noted a change in auger advancement at approximately 181.0 feet below ground surface. Possible strata change.

Stratification lines represent approximate boundary between soil types, transitions may be gradual. Water level readings have been made at times and under conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the time measurements were made.

Boring No.: AREA19-MW-8C

BORING_WELL 62961.11 AREA19.GPJ GZA_CORP.GDT 8/30/23

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Wolverine World Wide, Inc.
Area 19 - RAP Implementation
Rockford, Michigan

Boring No.: AREA19-MW-8C
Page: 5 **of** 6
File No.: 16.0062961.11
Check: J. Groenleer

Depth	Sample Information: No.	Pen./ Rec. (in.)	Depth (Ft.)	Blows (/6")	Test Data	Sample Description & Classification	Stratum Desc.	Remarks	Equipment Installed
194	40	9/9	194-194.8	48-50/3"		Hard, gray, Silty CLAY, occasional interbedded Silt lenses and seams, moist.	Silty CLAY		
199	41	21/21	199-200.8	21-40 49-50/3"		Hard, gray, Silty CLAY, occasional interbedded Silt lenses and seams, moist.			
204	42	12/12	204-205	21-50/6"		Hard, gray, Silty CLAY, occasional interbedded Silt lenses, moist.			
209	43	10/10	209-209.8	39-50/4"		Hard, gray, Silty CLAY, trace fine Sand embedded, moist.			
214	44	12/12	214-215	33-50/6"		Hard, gray, Silty CLAY, trace fine to medium Sand embedded, moist.			
219	45	11/11	219-219.9	46-50/5"		Hard, gray, Silty CLAY, trace fine to coarse Sand embedded, moist.			
224	46	11/11	224-224.9	22-50/5"		Hard, gray, Silty CLAY, trace fine Sand embedded, moist.			
229	47	17/17	229-230.4	7-13-50/5"		Hard, gray, Silty CLAY, trace fine Sand embedded, moist. Changing at 230.2 feet to: Very dense, gray, fine to medium SAND, little Silt, wet.	230.2' SAND		
234	48	10/10	234-234.8	41-50/4"		Very dense, gray, fine to medium SAND, little Silt, trace Clay, Silt in lenses and seams, wet.		6	
239	49	24/24	239-241	10-10 12-18		Medium dense, gray, fine to coarse SAND, little Gravel, trace Silt, wet.			Filter Sand Pack

REMARKS

6. VAP groundwater sample was collected from approximately 234.0 to 239.0 feet below ground surface and submitted for analytical laboratory testing.

Stratification lines represent approximate boundary between soil types, transitions may be gradual. Water level readings have been made at times and under conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the time measurements were made.

Boring No.: AREA19-MW-8C

BORING_WELL 62961.11 AREA19.GPJ GZA_CORP.GDT 8/30/23

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Rockford, Michigan

Boring No.: AREA19-MW-8C
Page: 6 **of** 6
File No.: 16.0062961.11
Check: J. Groenleer

Depth	Sample Information: No.	Pen./ Rec. (in.)	Depth (Ft.)	Blows (/6")	Test Data	Sample Description & Classification	Stratum Desc.	Remarks	Equipment Installed
244	50	12/12	244-245	30-50/6"		Very dense, gray, fine to medium SAND, little Silt, wet.	SAND	7	Top of Well Screen
245									2-Inch Dia. 5-Foot PVC Screen (0.010" Slot)
246									
247									
248									
249	51	5/5	249-249.4	50/5"		Very dense, red, SANDSTONE.	249' SANDSTONE		
250						Bottom of Borehole at 250.0 Feet	250'	8	Bottom of Well screen
251									
252									
253									
254									
255									
256									
257									
258									
259									
260									
261									
262									
263									
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293									

REMARKS

7. VAP groundwater sample was collected from approximately 245.0 to 250.0 feet below ground surface and submitted for analytical laboratory testing.
8. Monitoring well was installed in borehole upon completion. Well screen was set from approximately 245.0 to 250.0 feet below ground surface.

Stratification lines represent approximate boundary between soil types, transitions may be gradual. Water level readings have been made at times and under conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the time measurements were made.

Boring No.: AREA19-MW-8C

BORING_WELL 62961.11 AREA19.GPJ GZA_CORP.GDT 8/30/23

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Area 19 - RAP Implementation
Rockford, Michigan

Boring No.: AREA19-MW-9A
Page: 1 **of** 1
File No.: 16.0062961.11
Check: J. Groenleer

Contractor: Stearns Drilling Company
Foreman: J. Huntoon
Logged by: N. Kampfschulte
Date Start/Finish: 5-1-23 / 5-2-23
Boring Location: 599,116.2478 N; 12,798,320.3076 E
GS Elev.: 796.04' **Datum:** NAD83/NAVD88

	Auger/ Casing	Sampler
Type:	Hollow Stem Auger	Split Spoon
O.D. / I.D.:	8.0" / 4.25"	2.0" / 1 3/8"
Hammer Wt.:	140lbs	NA
Hammer Fall:	30.0"	NA
TOC Elev.:	795.61'	NA

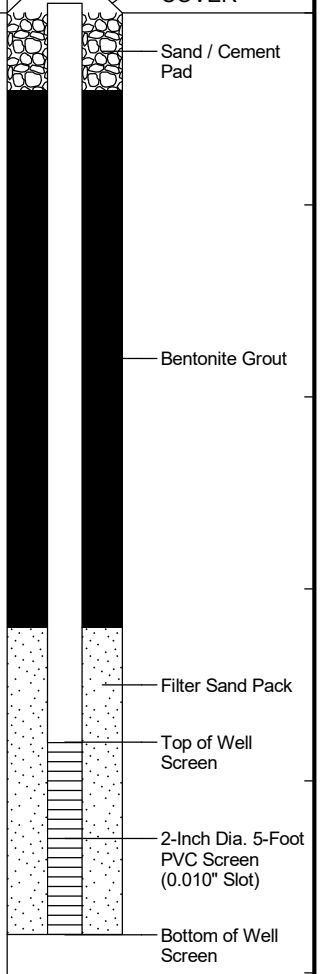
GROUNDWATER READINGS

Date	Time	Depth	Casing	Stab

Surveyed By: EXXEL **Survey Date:** 8/3/2023

Depth	Sample Information: No.	Pen./ Rec. (in.)	Depth (Ft.)	Blows (/6")	Test Data	Sample Description & Classification	Stratum Desc.	Remarks
1–24						See AREA19-MW-9C for soil and stratum descriptions.		
24						Bottom of Borehole at 24.0 Feet		1

Equipment Installed



REMARKS

1. Monitoring well was installed in borehole upon completion. Well screen was set from approximately 19.0 to 24.0 feet below ground surface.

Stratification lines represent approximate boundary between soil types, transitions may be gradual. Water level readings have been made at times and under conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the time measurements were made.

Boring No.: AREA19-MW-9A

BORING_WELL 62961.11 AREA19.GPJ GZA_CORP.GDT 8/28/23

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Boring No.: AREA19-MW-9B
Page: 1 **of** 3
File No.: 16.0062961.11
Check: J. Groenleer

Contractor: Stearns Drilling Company
Foreman: J. Huntoon
Logged by: C. Melby
Date Start/Finish: 4-21-23 / 5-1-23
Boring Location: 599,111.5652 N; 12,798,316.7925 E
GS Elev.: 795.83' **Datum:** NAD83/NAVD88

	Auger/ Casing	Sampler
Type:	Hollow Stem Auger	Split Spoon
O.D. / I.D.:	8.0" / 4.25"	2.0" / 1 3/8"
Hammer Wt.:	140lbs	NA
Hammer Fall:	30.0"	NA
TOC Elev.:	795.60'	NA

GROUNDWATER READINGS

Date	Time	Depth	Casing	Stab

Surveyed By: EXXEL **Survey Date:** 8/3/2023

Depth	Sample Information: No.	Pen./ Rec. (in.)	Depth (Ft.)	Blows (/6")	Test Data	Sample Description & Classification	Stratum Desc.	Remarks	Equipment Installed
1						See AREA19-MW-9C for soil and stratum descriptions.			PROTECTIVE COVER; Sand / Cement Pad
2									
3									
4									
5									
6									
7									
8									
9									
10									
11									
12									
13									
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18									
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21									
22									
23									
24									
25									
26									
27									
28									
29									

REMARKS

Stratification lines represent approximate boundary between soil types, transitions may be gradual. Water level readings have been made at times and under conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the time measurements were made.

Boring No.: AREA19-MW-9B

BORING_WELL 62961.11.AREA19.GPJ GZA_CORP.GDT 8/28/23

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Area 19 - RAP Implementation
Rockford, Michigan

Boring No.: AREA19-MW-9B
Page: 2 **of** 3
File No.: 16.0062961.11
Check: J. Groenleer

Depth	Sample Information					Sample Description & Classification	Stratum Desc.	Remarks	Equipment Installed
	No.	Pen./ Rec. (in.)	Depth (Ft.)	Blows (/6")	Test Data				
31								1	
32									
33									
34									
35									
36									
37									
38									
39									
40									
41									
42									
43									
44									
45									
46									Bentonite Grout
47									
48									
49									
50									
51									
52									
53									
54									
55									
56									
57									
58									
59									
60									
61									
62									
63									
64									

REMARKS

1. 10-inch casing installed from ground surface to approximately 31.0 feet below ground surface and grouted in place.

Stratification lines represent approximate boundary between soil types, transitions may be gradual. Water level readings have been made at times and under conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the time measurements were made.

BORING_WELL 62961.11 AREA19.GPJ GZA_CORP.GDT 8/28/23

GZA
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Engineers and Scientists

Wolverine World Wide, Inc.
Area 19 - RAP Implementation
Rockford, Michigan

Boring No.: AREA19-MW-9B
Page: 3 **of** 3
File No.: 16.0062961.11
Check: J. Groenleer

Depth	Sample Information					Sample Description & Classification	Stratum Desc.	Remarks	Equipment Installed
	No.	Pen./ Rec. (in.)	Depth (Ft.)	Blows (/6")	Test Data				
66–99						Bottom of Borehole at 98.0 Feet		2	Filter Sand Pack; Top of Well Screen; 2-Inch Dia. 5-Foot PVC Screen (0.010" Slot); Bottom of Well Screen

REMARKS

2. Monitoring well was installed in borehole upon completion. Well screen was set from approximately 93.0 to 98.0 feet below ground surface.

Stratification lines represent approximate boundary between soil types, transitions may be gradual. Water level readings have been made at times and under conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the time measurements were made.

Boring No.: AREA19-MW-9B

BORING_WELL 62961.11 AREA19.GPJ GZA_CORP.GDT 8/28/23

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Rockford, Michigan

Boring No.: AREA19-MW-9C
Page: 1 of 4
File No.: 16.0062961.11
Check: J. Groenleer

Contractor: Stearns Drilling Company
Foreman: J. Huntoon
Logged by: C. Melby
Date Start/Finish: 12-8-22 / 12-27-22
Boring Location: 599,107.9587 N; 12,798,312.6167 E
GS Elev.: 795.81' **Datum:** NAD83/NAVD88

	Auger/ Casing	Sampler
Type:	Hollow Stem Auger	Split Spoon
O.D. / I.D.:	8.0" / 4.25"	2.0" / 1 3/8"
Hammer Wt.:	140lbs	NA
Hammer Fall:	30.0"	NA
TOC Elev.:	795.32'	NA

GROUNDWATER READINGS

Date	Time	Depth	Casing	Stab
12/22/22	0755	50.1'	augers (150')	15 hrs

Surveyed By: EXXEL **Survey Date:** 8/3/2023

Depth	Sample Information: No.	Pen./ Rec. (in.)	Depth (Ft.)	Blows (/6")	Test Data	Sample Description & Classification	Stratum Desc.	Remarks
1–5	1	24/24	4-6	6-5 6-6		Medium dense, light brown, fine SAND and Silt, moist.	SAND	
6–10	2	24/24	9-11	2-3 2-5		Loose, light brown, fine SAND and Silt, wet. Groundwater was encountered at approximately 9.0 feet.		1 2
11–15	3	24/24	14-16	4-5 6-6		Medium dense, light brown, fine SAND and Silt, wet.		
16–20	4	24/24	19-21	3-5 8-8		Medium dense, light brown, fine SAND and Silt, wet.		3
21–25	5	24/24	24-26	1-4 2-3		Loose, light brown, fine SAND and Silt, wet. Changing at 25.6 feet to: Medium stiff, gray, Silty CLAY, moist to wet.	25.6' Silty CLAY	
26–27	6	24/24	26-28	4-11 11-12		Very stiff, gray, Silty CLAY, moist. Changing at 27.6 feet to: Medium dense, brown and gray, fine to coarse SAND, wet.	27.6' SAND	
28–29	7	24/24	28-30	4-13 47-39			29.5' Silty CLAY	
30–33	8	12/12	30-31	46-50/6"		Medium dense, brown, fine to medium SAND and coarse Gravel, wet. Changing at 29.5 feet to: Hard, gray, Silty CLAY, moist. Hard, gray, Silty CLAY, some fine to coarse Sand embedded, moist to dry.		4
34–38	9	12/12	34-35	24-50/6"		Hard, gray, Silty CLAY, trace fine to medium Sand embedded, moist.		
39–43	10	10/10	39-39.8	33-50/4"		Hard, gray, Silty CLAY, some fine to coarse Sand embedded, moist.		
44	11	10/10	44-44.8	45-50/4"		Hard, gray, Silty CLAY, some fine to coarse		

Equipment Installed



REMARKS

1. Groundwater was encountered at approximately 9.0 feet below ground surface.
2. VAP groundwater sample was collected from approximately 10.0 to 15.0 feet below ground surface and submitted for analytical laboratory testing.
3. VAP groundwater sample was collected from approximately 19.0 to 24.0 feet below ground surface and submitted for analytical laboratory testing.
4. 10-inch casing installed from ground surface to approximately 31.0 feet below ground surface and grouted in place.

Stratification lines represent approximate boundary between soil types, transitions may be gradual. Water level readings have been made at times and under conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the time measurements were made.

Boring No.: AREA19-MW-9C

BORING_WELL 62961.11 AREA19.GPJ GZA_CORP.GDT 8/28/23

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Rockford, Michigan

Boring No.: AREA19-MW-9C
Page: 2 **of** 4
File No.: 16.0062961.11
Check: J. Groenleer

Depth	Sample Information: No.	Pen./ Rec. (in.)	Depth (Ft.)	Blows (/6")	Test Data	Sample Description & Classification	Stratum Desc.	Remarks	Equipment Installed
46						Sand embedded, moist.	Silty CLAY		
47									
48									
49	12	12/12	49-50	26-50/6"		Hard, gray, Silty CLAY, some fine to coarse Sand embedded, moist.			
50									
51									
52									
53							53' GRAVEL	5	
54	13	6/6	54-54.5	75/6"		Very dense, gray, GRAVEL and fine to coarse Sand (cobbles), some Silty Clay, moist.		6	
55									
56									
57									
58									
59	14	18/18	59-60.5	23-40-50/6"		Hard, gray, Silty CLAY, some fine to coarse Sand, moist.	59' Silty CLAY		
60									
61									
62									
63									
64	15	9/1	64-64.8	36-50/3"		Hard, gray, Silty CLAY, some fine to coarse Sand, moist.			
65									
66									
67									
68									
69	16	15/15	69-70.3	14-42-50/3"		Hard, gray, Silty CLAY, some fine to coarse Sand embedded, moist.			
70									
71									
72									
73									
74	17	11/11	74-74.9	10-50/5"		Hard, gray, Silty CLAY, some fine to coarse Sand embedded, moist.			
75									
76									
77							77' SAND	7	
78									
79	18	24/0	79-81	1-WOH 2-7		NO RECOVERY.			Bentonite Grout
80								8	
81									
82									
83									
84	19	9/9	84-84.8	38-50/3"		Very dense, brown, fine to medium SAND, little Silt, wet.			
85									
86									
87									
88									
89	20	24/12	89-91	4-11 31-50		Dense, brown, fine to medium SAND, little Silt, wet.		9	
90									
91									
92									
93									
94	21	12/12	94-95	21-50/6"		Very dense, brown, fine to medium SAND, little Silt, wet.			
95									
96									
97									

REMARKS

5. A temporary well was set from approximately 53.0 to 58.0 feet below ground surface but did not produce enough volume to collect samples for analytical laboratory testing.
6. Driller noted that the augers were advanced through cobbles from approximately 53.0 to 58.0 feet below ground surface.
7. Driller noted a change in auger advancement at approximately 77.0 feet below ground surface. Likely stratum change from silty clay to sand.
8. VAP groundwater sample was collected from approximately 80.0 to 85.0 feet below ground surface and submitted for analytical laboratory testing.
9. VAP groundwater sample was collected from approximately 89.0 to 94.0 feet below ground surface and submitted for analytical laboratory testing.

Stratification lines represent approximate boundary between soil types, transitions may be gradual. Water level readings have been made at times and under conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the time measurements were made.

Boring No.: AREA19-MW-9C

BORING_WELL 62961.11 AREA19.GPJ GZA_CORP.GDT 8/28/23

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Rockford, Michigan

Boring No.: AREA19-MW-9C
Page: 3 **of** 4
File No.: 16.0062961.11
Check: J. Groenleer

Depth	Sample Information: No.	Pen./ Rec. (in.)	Depth (Ft.)	Blows (/6")	Test Data	Sample Description & Classification	Stratum Desc.	Remarks	Equipment Installed
98							SAND		
99	22	12/12	99-100	24-50/6"		Very dense, brown, fine to medium SAND, little Silt, wet. Changing at 99.8 feet to: Gray, SILT and fine to medium Sand, moist to wet.	99.8' SILT	10	
100									
101									
102									
103	23	8/8	103-103.7	50-50/3"		Hard, gray, SILT, little fine Sand, moist.			
104									
105								11	
106									
107									
108							109'		
109	24	17/17	109-110.4	31-39-50/5"		Hard, gray, Silty CLAY, trace fine Sand, moist.	Silty CLAY		
110									
111									
112									
113									
114	25	24/14	114-116	3-18 27-37		Hard, gray, Silty CLAY, some fine to coarse Sand embedded, moist.			
115									
116									
117									
118									
119	26	24/12	119-121	2-2 2-6		Soft, gray, Silty CLAY, some fine to medium Sand lenses interbedded, moist.			
120									
121									
122									
123									
124	27	10/10	124-124.8	38-50/4"		Hard, gray, Silty CLAY, some fine to medium Sand lenses interbedded, moist.			
125									
126									
127									
128									
129	28	6/6	129-129.5	58/6"		Hard, gray, Silty CLAY, little fine to medium Sand embedded, moist.			
130									
131									
132									
133									
134	29	10/10	134-134.8	26-50/4"		Hard, gray, Silty CLAY, trace fine to medium Sand embedded, moist.			
135									
136									
137									
138									
139	30	6/6	139-139.5	58/6"		Hard, gray, Silty CLAY, trace fine to medium Sand embedded, moist.			
140									
141									
142									
143									
144	31	6/6	144-144.5	70/6"		Hard, gray, Silty CLAY, trace fine to medium Sand embedded, moist.			
145									
146									
147									
148									
149	32	5/5	149-149.4	75/5"		Hard, gray, Silty CLAY, trace fine to medium			

REMARKS

10. VAP groundwater sample was collected from approximately 98.0 to 103.0 feet below ground surface and submitted for analytical laboratory testing.
11. Abandoned borehole at approximately 103.7 feet and grouted to surface. Offset boring approximately 7.0 feet north and installed a 10-inch casing from ground surface to approximately 105.0 feet below ground surface and grouted in place.

Stratification lines represent approximate boundary between soil types, transitions may be gradual. Water level readings have been made at times and under conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the time measurements were made.

Boring No.: AREA19-MW-9C

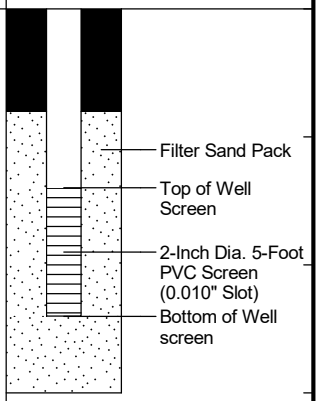
BORING_WELL 62961.11 AREA19.GPJ GZA_CORP.GDT 8/28/23

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Boring No.: AREA19-MW-9C
Page: 4 **of** 4
File No.: 16.0062961.11
Check: J. Groenleer

Depth	Sample Information: No.	Pen./ Rec. (in.)	Depth (Ft.)	Blows (/6")	Test Data	Sample Description & Classification	Stratum Desc.	Remarks	Equipment Installed
151						Sand embedded, moist.	Silty CLAY		
152									
153									
154	33	8/8	154-154.7	44-50/6"		Hard, gray, Silty CLAY, trace fine to medium Sand embedded, moist.			
155									
156									
157								12	
158								13	
159	34	21/21	159-160.8	9-13 37-50/3"		Hard, gray, Silty CLAY, trace fine to medium Sand embedded, moist. Changing at 160.0 feet to: Dense, gray and brown, fine to medium SAND, trace Silt, wet.	160' SAND		
160									
161									
162									
163									
164	35	12/12	164-165	30-59/6"		Hard, gray, Silty CLAY, some fine to medium Sand embedded, moist.	164' 165' Silty CLAY		
165						Bottom of Borehole at 165.0 Feet		14	
166									
167									
168									
169									
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201									
202									



REMARKS

12. Driller noted changes in auger advancement from approximately 157.0 to 162.0 feet below ground surface. Likely interbedded sands in the clay.
13. VAP groundwater sample was collected from approximately 157.0 to 162.0 feet below ground surface and submitted for analytical laboratory testing.
14. Monitoring well was installed in offset borehole upon completion. Well screen was set from approximately 157.0 to 162.0 feet below ground surface.

Stratification lines represent approximate boundary between soil types, transitions may be gradual. Water level readings have been made at times and under conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the time measurements were made.

Boring No.: AREA19-MW-9C

BORING_WELL 62961.11 AREA19.GPJ GZA_CORP.GDT 8/28/23

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Rockford, Michigan

Boring No.: AREA19-MW-14A
Page: 1 **of** 3
File No.: 16.0062961.11
Check: J. Groenleer

Contractor: Stearns Drilling Company
Foreman: J. Huntoon
Logged by: C. Melby
Date Start/Finish: 6-15-23 / 6-23-23
Boring Location: 596,464.7379 N; 12,798,540.1351 E
GS Elev.: 868.18' **Datum:** NAD83/NAVD88

	Auger/ Casing	Sampler
Type:	Hollow Stem Auger	Split Spoon
O.D. / I.D.:	8.0" / 4.25"	2.0" / 1 3/8"
Hammer Wt.:	140lbs	NA
Hammer Fall:	30.0"	NA
TOC Elev.:	870.73'	NA

GROUNDWATER READINGS

Date	Time	Depth	Casing	Stab

Surveyed By: EXXEL **Survey Date:** 8/23/2023

Depth	Sample Information: No.	Pen./ Rec. (in.)	Depth (Ft.)	Blows (/6")	Test Data	Sample Description & Classification	Stratum Desc.	Remarks	Equipment Installed
1–49						See AREA19-MW-14 VAP boring log for soil and stratum descriptions.		1	PROTECTIVE COVER; Sand / Cement Pad

REMARKS

1. 10-inch casing installed from ground surface to approximately 23.0 feet below ground surface and grouted in place.

Stratification lines represent approximate boundary between soil types, transitions may be gradual. Water level readings have been made at times and under conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the time measurements were made.

BORING_WELL 62961.11 AREA19.GPJ GZA_CORP.GDT 1/17/24

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Boring No.: AREA19-MW-14A
Page: 2 **of** 3
File No.: 16.0062961.11
Check: J. Groenleer

Depth	Sample Information: No.	Pen./ Rec. (in.)	Depth (Ft.)	Blows (/6")	Test Data	Sample Description & Classification	Stratum Desc.	Remarks	Equipment Installed
51–108									Bentonite Grout

REMARKS

Stratification lines represent approximate boundary between soil types, transitions may be gradual. Water level readings have been made at times and under conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the time measurements were made.

Boring No.: AREA19-MW-14A

BORING_WELL 62961.11 AREA19.GPJ GZA_CORP.GDT 1/17/24

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Boring No.: AREA19-MW-14A
Page: 3 **of** 3
File No.: 16.0062961.11
Check: J. Groenleer

Depth	Sample Information: No.	Pen./ Rec. (in.)	Depth (Ft.)	Blows (/6")	Test Data	Sample Description & Classification	Stratum Desc.	Remarks	Equipment Installed
109–166						Bottom of Borehole 154.0 Feet		2	Filter Sand Pack; Top of Well Screen; 2-Inch Dia. 5-Foot PVC Screen (0.010" Slot); Bottom of Well Screen

REMARKS

2. Monitoring well was installed in borehole upon completion. Well screen was set from approximately 149.0 to 154.0 feet below ground surface.

Stratification lines represent approximate boundary between soil types, transitions may be gradual. Water level readings have been made at times and under conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the time measurements were made.

BORING_WELL 62961.11 AREA19.GPJ GZA_CORP.GDT 1/17/24

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Area 19 - RAP Implementation
Rockford, Michigan

Boring No.: AREA19-MW-14B
Page: 1 **of** 4
File No.: 16.0062961.11
Check: J. Groenleer

Contractor: Stearns Drilling Company
Foreman: J. Huntoon
Logged by: C. Melby
Date Start/Finish: 6-15-23 / 6-21-23
Boring Location: 596,465.8480 N; 12,798,548.2706 E
GS Elev.: 868.13' **Datum:** NAD83/NAVD88

	Auger/ Casing	Sampler
Type:	Hollow Stem Auger	Split Spoon
O.D. / I.D.:	8.0" / 4.25"	2.0" / 1 3/8"
Hammer Wt.:	140lbs	NA
Hammer Fall:	30.0"	NA
TOC Elev.:	870.92'	NA

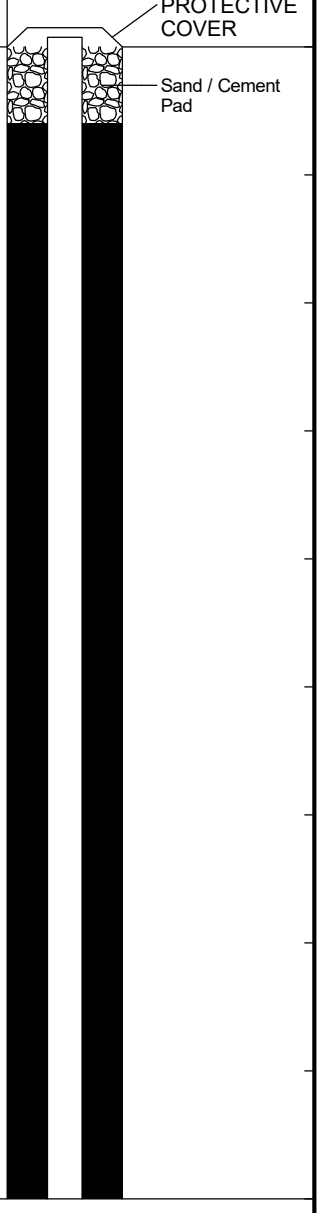
GROUNDWATER READINGS

Date	Time	Depth	Casing	Stab

Surveyed By: EXXEL **Survey Date:** 8/23/2023

Depth	Sample Information: No.	Pen./ Rec. (in.)	Depth (Ft.)	Blows (/6")	Test Data	Sample Description & Classification	Stratum Desc.	Remarks
1–44						See AREA19-MW-14 VAP boring log for soil and stratum descriptions.		1

Equipment Installed



REMARKS

1. 10-inch casing installed from ground surface to approximately 23.0 feet below ground surface and grouted in place.

Stratification lines represent approximate boundary between soil types, transitions may be gradual. Water level readings have been made at times and under conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the time measurements were made.

Boring No.: AREA19-MW-14B

BORING_WELL 62961.11 AREA19.GPJ GZA_CORP.GDT 1/17/24

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Boring No.: AREA19-MW-14B
Page: 2 **of** 4
File No.: 16.0062961.11
Check: J. Groenleer

Depth	Sample Information					Sample Description & Classification	Stratum Desc.	Remarks	Equipment Installed
	No.	Pen./ Rec. (in.)	Depth (Ft.)	Blows (/6")	Test Data				
46–97									Bentonite Grout

REMARKS

Stratification lines represent approximate boundary between soil types, transitions may be gradual. Water level readings have been made at times and under conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the time measurements were made.

Boring No.: AREA19-MW-14B

BORING_WELL 62961.11 AREA19.GPJ GZA_CORP.GDT 1/17/24

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Rockford, Michigan

Boring No.: AREA19-MW-14B
Page: 3 **of** 4
File No.: 16.0062961.11
Check: J. Groenleer

Depth	Sample Information					Sample Description & Classification	Stratum Desc.	Remarks	Equipment Installed
	No.	Pen./ Rec. (in.)	Depth (Ft.)	Blows (/6")	Test Data				
98									
99									
100									
101									
102									
103									
104									
105									
106									
107									
108									
109									
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149									

REMARKS

Stratification lines represent approximate boundary between soil types, transitions may be gradual. Water level readings have been made at times and under conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the time measurements were made.

Boring No.: AREA19-MW-14B

BORING_WELL 62961.11 AREA19.GPJ GZA_CORP.GDT 1/17/24

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Area 19 - RAP Implementation
Rockford, Michigan

Boring No.: AREA19-MW-14B
Page: 4 **of** 4
File No.: 16.0062961.11
Check: J. Groenleer

Depth	Sample Information: No.	Pen./ Rec. (in.)	Depth (Ft.)	Blows (/6")	Test Data	Sample Description & Classification	Stratum Desc.	Remarks	Equipment Installed
151–168									Filter Sand Pack; Top of Well Screen; 2-Inch Dia. 5-Foot PVC Screen (0.010" Slot); Bottom of Well Screen
169						Bottom of Borehole at 169.0 Feet		2	
170–202									

REMARKS

2. Monitoring well was installed in borehole upon completion. Well screen was set from approximately 164.0 to 169.0 feet below ground surface.

Stratification lines represent approximate boundary between soil types, transitions may be gradual. Water level readings have been made at times and under conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the time measurements were made.

Boring No.: AREA19-MW-14B

BORING_WELL 62961.11 AREA19.GPJ GZA_CORP.GDT 1/17/24

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Area 19 - RAP Implementation
Rockford, Michigan

Boring No.: AREA19-MW-15A
Page: 1 **of** 1
File No.: 16.0062961.11
Check: J. Groenleer

Contractor: Stearns Drilling Company
Foreman: J. Huntoon
Logged by: C. Melby
Date Start/Finish: 5-8-23 / 5-9-23
Boring Location: 600,108.0984 N; 12,797,923.1444 E
GS Elev.: 836.22' **Datum:** NAD83/NAVD88

	Auger/ Casing	Sampler
Type:	Hollow Stem Auger	Split Spoon
O.D. / I.D.:	8.0" / 4.25"	2.0" / 1 3/8"
Hammer Wt.:	140lbs	NA
Hammer Fall:	30.0"	NA
TOC Elev.:	835.73'	NA

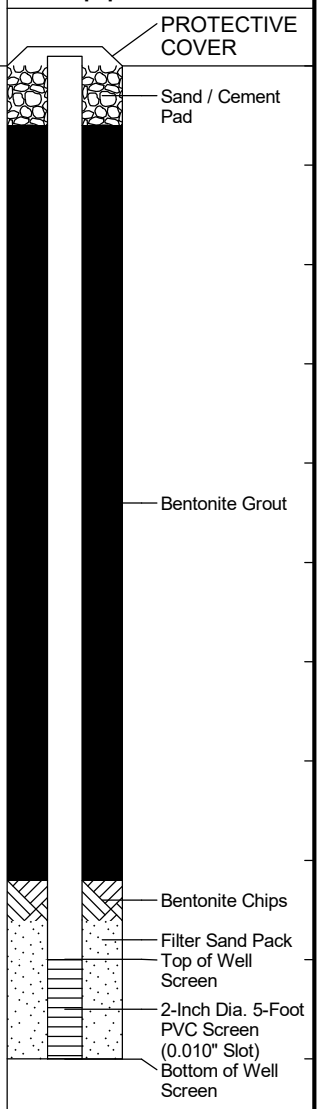
GROUNDWATER READINGS

Date	Time	Depth	Casing	Stab

Surveyed By: EXXEL **Survey Date:** 8/3/2023

Depth	Sample Information: No.	Pen./ Rec. (in.)	Depth (Ft.)	Blows (/6")	Test Data	Sample Description & Classification	Stratum Desc.	Remarks
1–57						See AREA19-MW-15C for soil and stratum descriptions.		
50						Bottom of Borehole at 50.0 Feet		1

Equipment Installed



REMARKS

1. Monitoring well was installed in borehole upon completion. Well screen was set from approximately 45.0 to 50.0 feet below ground surface.

Stratification lines represent approximate boundary between soil types, transitions may be gradual. Water level readings have been made at times and under conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the time measurements were made.

Boring No.: AREA19-MW-15A

BORING_WELL 62961.11 AREA19.GPJ GZA_CORP.GDT 8/28/23

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Wolverine World Wide, Inc.
Area 19 - RAP Implementation
Rockford, Michigan

Boring No.: AREA19-MW-15B
Page: 1 **of** 3
File No.: 16.0062961.11
Check: J. Groenleer

Contractor: Stearns Drilling Company
Foreman: J. Huntoon
Logged by: N. Kampfschulte
Date Start/Finish: 5-2-23 / 5-8-23
Boring Location: 600,112.9324 N; 12,797,922.6844 E
GS Elev.: 836.30' **Datum:** NAD83/NAVD88

	Auger/ Casing	Sampler
Type:	Hollow Stem Auger	Split Spoon
O.D. / I.D.:	8.0" / 4.25"	2.0" / 1 3/8"
Hammer Wt.:	140lbs	NA
Hammer Fall:	30.0"	NA
TOC Elev.:	835.79'	NA

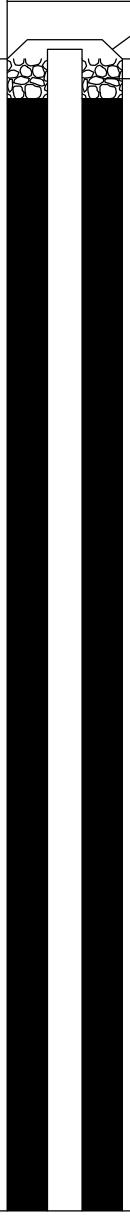
GROUNDWATER READINGS

Date	Time	Depth	Casing	Stab

Surveyed By: EXXEL **Survey Date:** 8/3/2023

Depth	Sample Information: No.	Pen./ Rec. (in.)	Depth (Ft.)	Blows (/6")	Test Data	Sample Description & Classification	Stratum Desc.	Remarks
1–57						See AREA19-MW-15C for soil and stratum descriptions.		1

Equipment Installed



REMARKS

1. 10-inch casing installed from ground surface to approximately 52.0 feet below ground surface and grouted in place.

Stratification lines represent approximate boundary between soil types, transitions may be gradual. Water level readings have been made at times and under conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the time measurements were made.

Boring No.: AREA19-MW-15B

BORING_WELL 62961.11.AREA19.GPJ GZA_CORP.GDT 8/30/23

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Boring No.: AREA19-MW-15B
Page: 2 **of** 3
File No.: 16.0062961.11
Check: J. Groenleer

Depth	Sample Information					Sample Description & Classification	Stratum Desc.	Remarks	Equipment Installed
	No.	Pen./ Rec. (in.)	Depth (Ft.)	Blows (/6")	Test Data				
59–125									Bentonite Grout

REMARKS

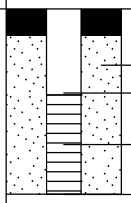
Stratification lines represent approximate boundary between soil types, transitions may be gradual. Water level readings have been made at times and under conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the time measurements were made.

BORING_WELL 62961.11 AREA19.GPJ GZA_CORP.GDT 8/30/23

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Boring No.: AREA19-MW-15B
Page: 3 **of** 3
File No.: 16.0062961.11
Check: J. Groenleer

Depth	Sample Information: No.	Pen./ Rec. (in.)	Depth (Ft.)	Blows (/6")	Test Data	Sample Description & Classification	Stratum Desc.	Remarks	Equipment Installed
127–134									 Filter Sand Pack; Top of Well Screen; 2-Inch Dia. 5-Foot PVC Screen (0.010" Slot); Bottom of Well Screen
135						Bottom of Borehole at 135.0 Feet		2	
136–192									

REMARKS

2. Monitoring well was installed in borehole upon completion. Well screen was set from approximately 130.0 to 135.0 feet below ground surface.

Stratification lines represent approximate boundary between soil types, transitions may be gradual. Water level readings have been made at times and under conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the time measurements were made.

Boring No.: AREA19-MW-15B

BORING_WELL 62961.11 AREA19.GPJ GZA_CORP.GDT 8/30/23

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Rockford, Michigan

Boring No.: AREA19-MW-15C
Page: 1 **of** 4
File No.: 16.0062961.11
Check: J. Groenleer

Contractor: Stearns Drilling Company
Foreman: J. Huntoon
Logged by: C. Melby
Date Start/Finish: 6-9-22 / 6-17-22
Boring Location: 600,119.1890 N; 12,797,922.4548 E
GS Elev.: 836.19' **Datum:** NAD83/NAVD88

	Auger/ Casing	Sampler
Type:	Hollow Stem Auger	Split Spoon
O.D. / I.D.:	8.0" / 4.25"	2.0" / 1 3/8"
Hammer Wt.:	140lbs	NA
Hammer Fall:	30.0"	NA
TOC Elev.:	835.71'	NA

GROUNDWATER READINGS

Date	Time	Depth	Casing	Stab

Surveyed By: EXXEL **Survey Date:** 8/3/2023

Depth	Sample Information No.	Pen./ Rec. (in.)	Depth (Ft.)	Blows (/6")	Test Data	Sample Description & Classification	Stratum Desc.	Remarks	Equipment Installed
1–42	1	24/24	4-6	2-3 2-2		Medium stiff, brown, Silty CLAY, some fine to coarse Sand seams, lenses and embedded, dry.	Silty CLAY		PROTECTIVE COVER; Backfill/Cement Pad
	2	24/20	9-11	7-7 8-9		Stiff, brown, Silty CLAY, some fine to coarse Sand embedded, dry.			
	3	24/18	14-16	6-6 5-3		Stiff, brown, Silty CLAY, some fine to coarse Sand embedded, dry. Changing at 14.2 feet to: Medium dense, brown, fine SAND, little Silt, dry.	14.2' SAND		
	4	24/16	19-21	3-5 7-6		Medium dense, brown, fine SAND, little Silt, dry.			
	5	24/18	24-26	8-5 8-13		Medium dense, brown, fine SAND, little Silt, dry.			
	6	24/20	29-31	8-7 9-10		Medium dense, brown, fine to coarse SAND, little Silt, dry.			
	7	24/14	34-36	2-2 3-7		Loose, brown, fine to coarse SAND, little Silt, dry.			
	8	24/3	39-41	9-7 18-7		Medium dense, brown, fine to coarse SAND, trace Silt, dry.			

REMARKS

Stratification lines represent approximate boundary between soil types, transitions may be gradual. Water level readings have been made at times and under conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the time measurements were made.

Boring No.: AREA19-MW-15C

BORING_WELL 62961.11 AREA19.GPJ GZA_CORP.GDT 8/28/23

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Area 19 - RAP Implementation
Rockford, Michigan

Boring No.: AREA19-MW-15C
Page: 2 **of** 4
File No.: 16.0062961.11
Check: J. Groenleer

Depth	Sample Information: No.	Pen./ Rec. (in.)	Depth (Ft.)	Blows (/6")	Test Data	Sample Description & Classification	Stratum Desc.	Remarks	Equipment Installed
44							SAND		
45	9	24/24	44-46	3-5 7-7		Medium dense, brown, fine to coarse SAND, trace Silt, dry. Changing at 45.0 feet to: Medium stiff, brown and gray, Silty CLAY, little fine to coarse Sand embedded, wet.	45' Silty CLAY	1 2	
46									
47									
48									
49	10	24/24	49-51	5-11 11-13		Medium dense, brown, fine SAND, little Silt, wet. Changing at 50.2 feet to: Very stiff, gray, Silty CLAY, moist.	49' SAND 50.2' Silty CLAY		
50									
51	11	12/12	51-52	21-27		Very stiff, gray, Silty CLAY, trace fine to coarse Sand embedded, moist to dry.		3	
52									
53									
54	12	24/20	54-56	5-9 18-36		Very stiff, brown, Silty CLAY, trace fine to coarse Sand embedded, moist.			
55									
56									
57									
58									
59	13	24/16	59-61	23-34 33-50		Hard, gray, brown, Silty CLAY, little fine to coarse Sand, moist.			
60									
61									
62									
63									
64	14	16/16	64-65.3	31-46-50/4"		Hard, gray, Silty CLAY, little fine to coarse Sand, moist.			
65									
66									
67									
68									
69	15	12/12	69-70	19-50/6"		Hard, gray, Silty CLAY, little fine to coarse Sand, moist.			
70									
71									
72									
73									
74	16	15/15	74-75.3	15-28-50/3"		Hard, gray, Silty CLAY, little fine to coarse Sand, moist.			
75									
76									
77									
78	17	24/24	78-80	4-21 41-49		Hard, brown and dark brown, Silty CLAY, little fine to coarse Sand, moist.			
79									
80									
81									
82									Bentonite Grout
83									
84	18	18/18	84-85.5	3-16-50/6"		Hard, gray, Silty CLAY, little fine to coarse Sand, moist. Changing at 85.4 feet to: Hard, brown, SILT and fine Sand interbedded, moist.	85.4' SILT		
85									
86									
87									
88							89'		
89	19	17/17	89-90.4	28-48-50/5"		Hard, gray, Silty CLAY, little fine to coarse Sand, moist.	Silty CLAY		
90									
91									
92									

REMARKS

1. VAP groundwater sample was collected from approximately 44.0 to 49.0 feet below ground surface and submitted for analytical laboratory testing.
2. Groundwater was encountered at approximately 45.0 feet below ground surface.
3. 10-inch casing installed from ground surface to approximately 52.0 feet below ground surface and grouted in place.

Stratification lines represent approximate boundary between soil types, transitions may be gradual. Water level readings have been made at times and under conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the time measurements were made.

Boring No.: AREA19-MW-15C

BORING_WELL 62961.11 AREA19.GPJ GZA_CORP.GDT 8/28/23

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Rockford, Michigan

Boring No.: AREA19-MW-15C
Page: 3 **of** 4
File No.: 16.0062961.11
Check: J. Groenleer

Depth	Sample Information					Sample Description & Classification	Stratum Desc.	Remarks	Equipment Installed
	No.	Pen./ Rec. (in.)	Depth (Ft.)	Blows (/6")	Test Data				
94–96	20	18/8	94-95.5	12-23-50/6"		Hard, gray, Silty CLAY, little fine to coarse Sand interbedded, Silt seams and lenses, moist.	Silty CLAY		
99–101	21	12/12	99-100	23-50/6"		Hard, gray, Silty CLAY, little fine to coarse Sand interbedded and Silt lenses, moist.			
104–106	22	18/18	104-105.5	8-23-50/6"		Hard, gray, Silty CLAY, trace fine to coarse Sand, moist.			
109–111	23	12/12	109-110	24-50/6"		Hard, gray, Silty CLAY, little fine to coarse Sand, moist.			
114–116	24	12/12	114-115	24-50/6"		Hard, gray, Silty CLAY, little fine to coarse Sand, moist.			
119–121	25	11/11	119-119.9	32-50/5"		Hard, gray, Silty CLAY, little fine to coarse Sand, moist.			
124–126	26	18/18	124-125.5	13-30-50/6"		Hard, gray, Silty CLAY, little fine to coarse Sand, moist with fine to medium Sand seams, interbedded at bottom.			
129–131	27	12/12	129-130	28-50/6"		Hard, gray, Silty CLAY, little fine to medium Sand, moist.	130' SAND	4 5	
134–136	28	11/3	134-134.9	22-50/5"		Very dense, brown, fine to medium SAND and Silt, wet.			
139–141	29	11/6	139-139.9	16-50/5"		Hard, gray, Silty CLAY and fine to medium Sand seams and lenses/layers, interbedded Sand and Silt, wet.	139' Silty CLAY	6	

REMARKS

4. VAP groundwater sample was collected from approximately 130.0 to 135.0 feet below ground surface and submitted for analytical laboratory testing.
5. Driller noted a change in auger advancement (drilled faster) at approximately 130.0 feet below ground surface. Likely a strata change.
6. VAP groundwater sample was collected from approximately 140.0 to 145.0 feet below ground surface and submitted for analytical laboratory testing.

Stratification lines represent approximate boundary between soil types, transitions may be gradual. Water level readings have been made at times and under conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the time measurements were made.

Boring No.: AREA19-MW-15C

BORING_WELL 62961.11 AREA19.GPJ GZA_CORP.GDT 8/28/23

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Area 19 - RAP Implementation
Rockford, Michigan

Boring No.: AREA19-MW-15C
Page: 4 **of** 4
File No.: 16.0062961.11
Check: J. Groenleer

Depth	Sample Information: No.	Pen./ Rec. (in.)	Depth (Ft.)	Blows (/6")	Test Data	Sample Description & Classification	Stratum Desc.	Remarks	Equipment Installed
144	30	8/8	144-144.7	45-50/2"		Hard, gray, SILT & CLAY with fine Sand interbedded, Silt and Sand layers, seams and lenses, wet.	144' SILT & CLAY		
149	31	18/18	149-150.5	30-35-50/6"		Very dense, gray, fine to medium SAND and Silt, some seams of Silty Clay interbedded, wet.	149' SAND	7	
154	32	5	154-154.4	50/5"		Very dense, gray, fine to medium SAND and Silt, some layers and seams of Silty Clay, wet.			
159	33	24/10	159-161	7-8 9-9		Medium dense, brown, fine SAND and Silt, wet.		8	
165	34	5/0	165-165.4	50/5"		NO RECOVERY.			
166	35	10/10	165.5-166.3	35-50/4"		NO RECOVERY.			
169	36	17/12	169-170.4	24-42-50/5"		Hard, gray, Silty CLAY, some fine to coarse Sand embedded, moist.	169' Silty CLAY		
171	37	12/12	171-172	14-59/6"		Hard, gray, Silty CLAY, some fine to coarse Sand embedded, moist.	172'	9	
172						Bottom of Boring at 172.0 Feet			

Filter Sand Pack
Top of Well Screen
2-Inch Dia. 5-Foot PVC Screen (0.010" Slot)
Bottom of Well screen

REMARKS

7. VAP groundwater sample was collected from approximately 150.0 to 155.0 feet below ground surface and submitted for analytical laboratory testing.
8. VAP groundwater sample was collected from approximately 160.0 to 165.0 feet below ground surface and submitted for analytical laboratory testing.
9. Monitoring well was installed in borehole upon completion. Well screen was set from approximately 164.0 to 169.0 feet below ground surface.

Stratification lines represent approximate boundary between soil types, transitions may be gradual. Water level readings have been made at times and under conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the time measurements were made.

Boring No.: AREA19-MW-15C

BORING_WELL 62961.11 AREA19.GPJ GZA_CORP.GDT 8/28/23

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Wolverine World Wide, Inc.
Area 5 - RAP Implementation
Rockford, Michigan

Boring No.: AREA5-RI-3A
Page: 1 **of** 2
File No.: 16.0062961.21
Check: J. Groenleer

Contractor: Stearns Drilling Company
Foreman: D. Krause
Logged by: C. Melby
Date Start/Finish: 10-26-21 / 10-26-21
Boring Location: 579,174.1576 N; 12,790,181.4174 E
GS Elev.: 689.89' **Datum:** NAD83/NAVD88

	Auger/ Casing	Sampler
Type:	Hollow Stem Auger	Split Spoon
O.D. / I.D.:	8.0" / 4.25"	2.0" / 1 3/8"
Hammer Wt.:	140lbs	NA
Hammer Fall:	30.0"	NA
TOC Elev.:	692.25'	NA

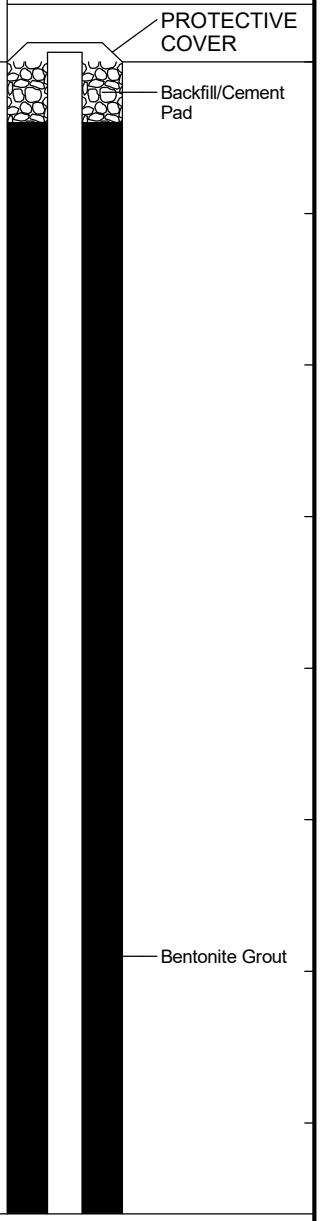
GROUNDWATER READINGS

Date	Time	Depth	Casing	Stab

Surveyed By: EXXEL **Survey Date:** 3/30/2022

Depth	Sample Information: No.	Pen./ Rec. (in.)	Depth (Ft.)	Blows (/6")	Test Data	Sample Description & Classification	Stratum Desc.	Remarks
1	1		0			See Area5-RI-3B for soil descriptions.		

Equipment Installed



REMARKS

Stratification lines represent approximate boundary between soil types, transitions may be gradual. Water level readings have been made at times and under conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the time measurements were made.

Boring No.: AREA5-RI-3A

BORING_WELL 62961.21 AREA5.GPJ GZA_CORP.GDT 1/31/23

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Boring No.: AREA5-RI-3A
Page: 2 **of** 2
File No.: 16.0062961.21
Check: J. Groenleer

Depth	Sample Information: No.	Pen./ Rec. (in.)	Depth (Ft.)	Blows (/6")	Test Data	Sample Description & Classification	Stratum Desc.	Remarks	Equipment Installed
39–64									
65						Bottom of Borehole at 65.0 Feet		1	
66–82									



REMARKS

1. Monitoring well was installed in borehole upon completion. Well screen was set from approximately 60.0 to 65.0 feet below ground surface.

Stratification lines represent approximate boundary between soil types, transitions may be gradual. Water level readings have been made at times and under conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the time measurements were made.

Boring No.: AREA5-RI-3A

BORING_WELL 62961.21 AREA5.GPJ GZA_CORP.GDT 1/31/23

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Area 5 - RAP Implementation
Rockford, Michigan

Boring No.: AREA5-RI-3B
Page: 1 of 3
File No.: 16.0062961.21
Check: J. Groenleer

Contractor: Stearns Drilling Company
Foreman: J. Huntoon
Logged by: C. Melby & M. Myers
Date Start/Finish: 7-26-21 / 8-2-21
Boring Location: 579,173.7075 N; 12,790,175.4916 E
GS Elev.: 690.19' **Datum:** NAD83/NAVD88

	Auger/ Casing	Sampler
Type:	Hollow Stem Auger	Split Spoon
O.D. / I.D.:	8.0" / 4.25"	2.0" / 1 3/8"
Hammer Wt.:	140lbs	NA
Hammer Fall:	30.0"	NA
TOC Elev.:	692.50'	NA

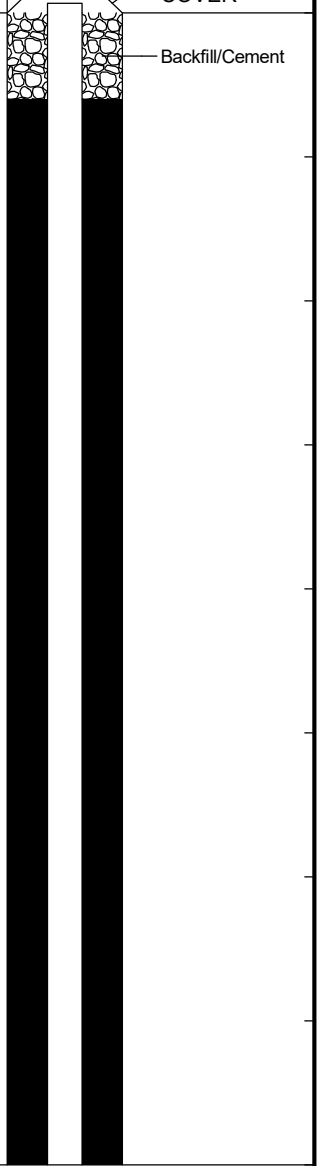
GROUNDWATER READINGS

Date	Time	Depth	Casing	Stab
7/27/21	0800	45.0'	Auger	15 hrs
8/2/21	0800	33.0'	PVC	72 hrs

Surveyed By: EXXEL **Survey Date:** 8/18/2021

Depth	Sample Information No.	Pen./ Rec. (in.)	Depth (Ft.)	Blows (/6")	Test Data	Sample Description & Classification	Stratum Desc.	Remarks
1–5	1	24/14	4-6	1-1 1-1		Very loose, brown, fine to medium SAND, trace Silt, dry.	SAND	
6–10	2	24/8	9-11	3-4 4-4		Loose, brown, fine to medium SAND, trace Silt, dry.		
11–15	3	24/20	14-16	3-6 6-7		Medium dense, light brown, fine to medium SAND, trace Silt, dry.		
16–20	4	24/24	19-21	5-6 8-7		Meddium Dense, light brown, fine to medium SAND, trace Silt, dry.		
21–25	5	24/24	24-26	6-6 9-15		Medium dense, light brown, fine to medium SAND, trace Silt, dry.		
26–30	6	24/24	29-31	13-14 16-17		Medium dense to dense, light brown, SILT and fine to medium SAND, dry.	29' SILT and SAND	
31–35	7	24/24	34-36	9-10 10-12		Medium dense, light brown, fine to medium SAND, some Silt, dry.	34' SAND	
36–39	8	24/24	39-41	1-1		Loose, brown, fine to medium SAND, some		1

Equipment Installed



REMARKS

1. Groundwater encountered at approximately 39.0 feet below ground surface.
2. VAP groundwater sample was collected from approximately 40.0 to 45.0 feet below ground surface and submitted for analytical laboratory testing.

Stratification lines represent approximate boundary between soil types, transitions may be gradual. Water level readings have been made at times and under conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the time measurements were made.

Boring No.: AREA5-RI-3B

BORING_WELL 62961.21 AREA5.GPJ GZA_CORP.GDT 2/22/22

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Engineers and Scientists

Wolverine World Wide, Inc.
Area 5 - RAP Implementation
Rockford, Michigan

Boring No.: AREA5-RI-3B
Page: 2 **of** 3
File No.: 16.0062961.21
Check: J. Groenleer

Depth	Sample Information: No.	Pen./ Rec. (in.)	Depth (Ft.)	Blows (/6")	Test Data	Sample Description & Classification	Stratum Desc.	Remarks	Equipment Installed
41				3-3		Silt, wet.	SAND	2	
42									
43								3	
44	9	24/24	44-46	2-7 9-18		Very stiff, brown, SILT and fine to medium SAND, wet.	44' SILT and SAND		
45									
46									
47									
48									
49	10	24/24	49-51	9-22 33-40		Hard, brown, SILT and fine to medium SAND, wet.		4	
50									
51									
52									
53									Bentonite Grout
54	11	21/21	54-55.8	22-26 40-50/3"		Hard, brown, SILT and fine to medium SAND, wet with (55.1 to 55.3 feet) Clay Seam bottom of spoon.			
55									
56									
57									
58									
59	12	24/24	59-61	2-2 9-21		Medium dense, brown, GRAVEL and fine to coarse SAND, some Silt, wet.	59' GRAVEL		
60								5	
61									
62									
63									
64	13	24/24	64-66	15-29 31-33		Hard, brown, SILT, some fine to coarse Sand, wet with embedded Silt & Clay lenses, some dry lenses.	64' SILT		
65									
66									
67									
68									
69	14	24/24	69-71	8-13 14-17		Very stiff, gray, Clayey SILT and fine SAND, wet.	69' SILT and SAND		
70								6	
71									
72									
73									
74	15	24/24	74-76	17-17 14-18		Very stiff, gray, Clayey SILT and fine SAND, wet.			
75								7	
76									
77									
78									
79	16	24/24	79-81	6-13 15-24		Very stiff, gray, Clayey SILT and fine SAND, trace Gravel, wet.			
80									
81									
82									
83									
84	17	24/10	84-86	18-17 21-29		Very stiff, gray, SILT & CLAY, some Gravel, some fine Sand, dry.	84' SILT & CLAY		
85									
86									

REMARKS

3. Driller noted drilling more firm from 42.5 to >43.0 feet below ground surface.
4. VAP groundwater sample was collected from approximately 50.0 to 55.0 feet below ground surface and submitted for analytical laboratory testing.
5. VAP groundwater sample was collected from approximately 60.0 to 65.0 feet below ground surface and submitted for analytical laboratory testing.
6. VAP groundwater sample was collected from approximately 70.0 to 75.0 feet below ground surface and submitted for analytical laboratory testing.
7. 10-inch casing installed from ground surface to approximately 75 feet below ground surface and grouted in place.

Stratification lines represent approximate boundary between soil types, transitions may be gradual. Water level readings have been made at times and under conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the time measurements were made.

Boring No.: AREA5-RI-3B

BORING_WELL 62961.21 AREA5.GPJ GZA_CORP.GDT 2/22/22

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Area 5 - RAP Implementation
Rockford, Michigan

Boring No.: AREA5-RI-3B
Page: 3 **of** 3
File No.: 16.0062961.21
Check: J. Groenleer

Depth	Sample Information: No.	Pen./ Rec. (in.)	Depth (Ft.)	Blows (/6")	Test Data	Sample Description & Classification	Stratum Desc.	Remarks	Equipment Installed
87–89							SILT & CLAY; 89'		
89–94	18	24/18	89-91	18-48-50/6"		Hard, gray, Clayey SILT, some fine to medium Sand, some fine Gravel, dry to moist.	SILT		
94–99	19	24/20	94-96	2-8 20-34		Hard, gray, Clayey SILT, some fine to medium Sand, some fine Gravel, dry to moist. Changing at 94.7 feet to: Medium dense, gray, fine to coarse SAND, some fine Gravel, wet.		8	
99–104	20	18/18	99-100.5	5-22-50/6"		Very dense, gray, fine to coarse SAND, some fine Gravel, wet.	99'; SAND	9	
104–109	21	24/6	104-106	10-55/6"		Very dense, gray, fine to coarse SAND, some Gravel, some Clay & SILT, wet.		10	Filter Sand Pack; Top of Well Screen; 2-Inch Dia. 5-Foot PVC Screen (0.010" Slot); Bottom of Well Screen
109–112	22	24/12	109-111	12-24-60/6"		Very dense, gray, fine to coarse SAND, some Gravel, some Clay & Silt, wet. Changing at 110.2 feet to: Hard, gray, SILT, some Clay, trace fine Sand, dry.	110.2'; SILT		
112–114	23	24/18	112-114	16-31 58-75		Hard, gray, SILT & CLAY, some fine to medium Sand, moist.	112'; SILT & CLAY; 114'		
114–133	24	24	113.9-115.9			Bottom of Borehole at 114.0 Feet		11	

REMARKS

8. VAP groundwater sample was collected from approximately 95.0 to 100.0 feet below ground surface and submitted for analytical laboratory testing.
9. Drilling hard from 100.5 to 104 feet below ground surface. Sand and gravel blowing into augers.
10. VAP groundwater sample was collected from approximately 105.0 to 110.0 feet below ground surface and submitted for analytical laboratory testing.
11. Monitoring well was installed in borehole upon completion. Well screen was set from 105.0 to 110.0 feet below ground surface.

Stratification lines represent approximate boundary between soil types, transitions may be gradual. Water level readings have been made at times and under conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the time measurements were made.

Boring No.: AREA5-RI-3B

BORING_WELL 62961.21 AREA5.GPJ GZA_CORP.GDT 2/22/22

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Area 5 - RAP Implementation
Rockford, Michigan

Boring No.: AREA5-RI-8A
Page: 1 **of** 2
File No.: 16.0062961.21
Check: J. Groenleer

Contractor: Stearns Drilling Company
Foreman: D. Krause
Logged by: C. Melby
Date Start/Finish: 8-19-21 / 8-20-21
Boring Location: 582,290.4788 N; 12,787,551.1377 E
GS Elev.: 786.62' **Datum:** NAD83/NAVD88

	Auger/ Casing	Sampler
Type:	Hollow Stem Auger	Split Spoon
O.D. / I.D.:	8.0" / 4.25"	2.0" / 1 3/8"
Hammer Wt.:	140lbs	NA
Hammer Fall:	30.0"	NA
TOC Elev.:	786.17'	NA

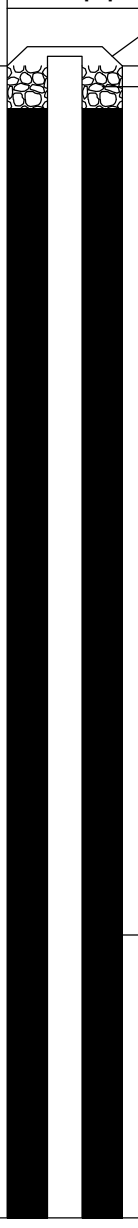
GROUNDWATER READINGS

Date	Time	Depth	Casing	Stab

Surveyed By: EXXEL **Survey Date:** 3/30/2022

Depth	Sample Information: No.	Pen./ Rec. (in.)	Depth (Ft.)	Blows (/6")	Test Data	Sample Description & Classification	Stratum Desc.	Remarks
1–54						See Area5-RI-8C for soil descriptions.		

Equipment Installed



REMARKS

Stratification lines represent approximate boundary between soil types, transitions may be gradual. Water level readings have been made at times and under conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the time measurements were made.

Boring No.: AREA5-RI-8A

BORING_WELL 62961.21 AREA5.GPJ GZA_CORP.GDT 5/31/22

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Rockford, Michigan

Boring No.: AREA5-RI-8A
Page: 2 **of** 2
File No.: 16.0062961.21
Check: J. Groenleer

Depth	Sample Information					Sample Description & Classification	Stratum Desc.	Remarks	Equipment Installed
	No.	Pen./ Rec. (in.)	Depth (Ft.)	Blows (/6")	Test Data				
56–118						Bottom of Borehole at 89.0 Feet		1	Filter Sand Pack; Top of Well Screen; 2-Inch Dia. 5-Foot PVC Screen (0.010" Slot); Bottom of Well Screen

REMARKS

1. Monitoring well was installed in borehole upon completion. Well screen was set from approximately 84.0 to 89.0 feet below ground surface.

Stratification lines represent approximate boundary between soil types, transitions may be gradual. Water level readings have been made at times and under conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the time measurements were made.

BORING_WELL 62961.21 AREA5.GPJ GZA_CORP.GDT 5/31/22

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Rockford, Michigan

Boring No.: AREA5-RI-8B
Page: 1 **of** 3
File No.: 16.0062961.21
Check: J. Groenleer

Contractor: Stearns Drilling Company
Foreman: D. Krause
Logged by: C. Melby
Date Start/Finish: 8-17-21 / 8-18-21
Boring Location: 582,284.9821 N; 12,787,551.285 E
GS Elev.: 785.96' **Datum:** NAD83/NAVD88

	Auger/ Casing	Sampler
Type:	Hollow Stem Auger	Split Spoon
O.D. / I.D.:	8.0" / 4.25"	2.0" / 1 3/8"
Hammer Wt.:	140lbs	NA
Hammer Fall:	30.0"	NA
TOC Elev.:	785.75'	NA

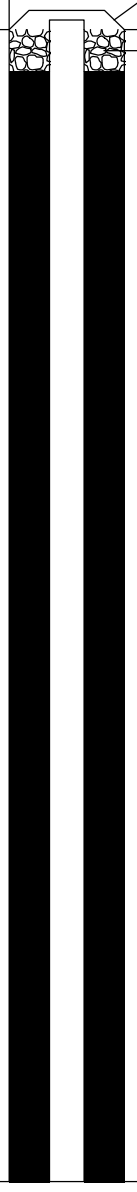
GROUNDWATER READINGS

Date	Time	Depth	Casing	Stab

Surveyed By: EXXEL **Survey Date:** 3/30/2022

Depth	Sample Information: No.	Pen./ Rec. (in.)	Depth (Ft.)	Blows (/6")	Test Data	Sample Description & Classification	Stratum Desc.	Remarks
1	1		0			See Area5-RI-8C for soil descriptions.		

Equipment Installed



REMARKS

Stratification lines represent approximate boundary between soil types, transitions may be gradual. Water level readings have been made at times and under conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the time measurements were made.

Boring No.: AREA5-RI-8B

BORING_WELL 62961.21 AREA5.GPJ GZA_CORP.GDT 8/2/22

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Boring No.: AREA5-RI-8B
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File No.: 16.0062961.21
Check: J. Groenleer

Depth	Sample Information					Sample Description & Classification	Stratum Desc.	Remarks	Equipment Installed
	No.	Pen./ Rec. (in.)	Depth (Ft.)	Blows (/6")	Test Data				
56–118									Bentonite Grout

REMARKS

Stratification lines represent approximate boundary between soil types, transitions may be gradual. Water level readings have been made at times and under conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the time measurements were made.

Boring No.: AREA5-RI-8B

BORING_WELL 62961.21 AREA5.GPJ GZA_CORP.GDT 8/2/22

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Rockford, Michigan

Boring No.: AREA5-RI-8B
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File No.: 16.0062961.21
Check: J. Groenleer

Depth	Sample Information					Sample Description & Classification	Stratum Desc.	Remarks	Equipment Installed
	No.	Pen./ Rec. (in.)	Depth (Ft.)	Blows (/6")	Test Data				
120–158									
159						Bottom of Borehole at 159.0 Feet		1	Filter Sand Pack; Top of Well Screen; 2-Inch Dia. 5-Foot PVC Screen (0.010" Slot); Bottom of Well Screen
160–182									

REMARKS

1. Monitoring well was installed in borehole upon completion. Well screen was set from 154.0 to 159.0 feet below ground surface.

Stratification lines represent approximate boundary between soil types, transitions may be gradual. Water level readings have been made at times and under conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the time measurements were made.

BORING_WELL 62961.21 AREA5.GPJ GZA_CORP.GDT 8/2/22

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Boring No.: AREA5-RI-8C
Page: 1 **of** 5
File No.: 16.0062961.21
Check: J. Groenleer

Contractor: Stearns Drilling Company
Foreman: Jerry Huntoon
Logged by: C. Melby
Date Start/Finish: 5-4-21 / 5-10-21
Boring Location: 582279.1217 N; 12787550.8704 E
GS Elev.: 785.96' **Datum:** NAD83/NAVD88

	Auger/ Casing	Sampler
Type:	Hollow Stem Auger	Split Spoon
O.D. / I.D.:	8.0" / 4.25"	2.0" / 1 3/8"
Hammer Wt.:	140lbs	NA
Hammer Fall:	30.0"	NA
TOC Elev.:	785.70'	NA

GROUNDWATER READINGS

Date	Time	Depth	Casing	Stab
5/4/21	1525	77.5'	79'	20 min
5/5/21	0800	17.5'	84'	15 hrs
5/6/21	0750	77.6'	120'	12 hrs

Surveyed By: EXXEL **Survey Date:** 5/25/2021

Depth	Sample Information: No.	Pen./ Rec. (in.)	Depth (Ft.)	Blows (/6")	Test Data	Sample Description & Classification	Stratum Desc.	Remarks	Equipment Installed
1							0.2' TOPSOIL		PROTECTIVE COVER
2							SAND		
3									Backfill / Cement Pad
4	1	24/18	4-6	1-3 2-3		Dark brown, TOPSOIL. Changing at 0.2 feet to: Loose, light brown, fine to medium SAND, trace Silt, dry.			
5									
6									
7									
8									
9	2	24/22	9-11	3-3 4-4		Loose, light brown, fine to medium SAND, trace Silt, dry.			
10									
11									
12									
13									
14	3	24/24	14-16	3-5 5-5		Loose to medium dense, light brown, fine to medium SAND, trace Silt, dry.			
15									
16									
17									
18									
19	4	24/24	19-21	3-3 4-4		Loose, light brown, fine to medium SAND, trace Silt, dry.			
20									
21									
22									
23									
24	5	24/24	24-26	4-7 8-9		Medium dense, light brown, fine to medium SAND, trace Silt, dry.			
25									
26									
27									
28									
29	6	24/24	29-31	4-7 8-9		Medium dense, light brown, fine to medium SAND, trace Silt, dry.			
30									
31									
32									
33									
34	7	24/24	34-36	8-10 11-13		Medium dense, light brown, fine to medium SAND, trace Silt, dry.			
35									
36									
37									

REMARKS

Stratification lines represent approximate boundary between soil types, transitions may be gradual. Water level readings have been made at times and under conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the time measurements were made.

Boring No.: AREA5-RI-8C

BORING_WELL 62961.21 AREA5.GPJ GZA_CORP.GDT 2/22/22

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Rockford, Michigan

Boring No.: AREA5-RI-8C
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File No.: 16.0062961.21
Check: J. Groenleer

Depth	Sample Information: No.	Pen./ Rec. (in.)	Depth (Ft.)	Blows (/6")	Test Data	Sample Description & Classification	Stratum Desc.	Remarks	Equipment Installed
							SAND		
39–40	8	24/24	39-41	12-16 19-20		Dense, light brown, fine to medium SAND, trace Silt, dry.			
44–45	9	24/24	44-46	13-21 21-29		Dense, light brown, fine to medium SAND, trace Silt, dry.			
49–50	10	24/24	49-51	13-21 24-29		Dense, light brown, fine to medium SAND, trace Silt, dry.			
54–55	11	24/24	54-56	1-7 10-16		Medium dense, light brown, fine to medium SAND, trace Silt, dry.			
59–60	12	24/24	59-61	6-13 15-34		Medium dense, light brown, fine to medium SAND, trace Silt, dry.			
64–65	13	24/24	64-66	7-20 24-32		Dense, light brown, fine to medium SAND, trace Silt, dry.			
69–70	14	24/24	69-71	7-13 21-37		Dense, light brown, fine to medium SAND, trace Silt, dry.			
74–75	15	24/24	74-76	5-13 16-26		Medium dense, light brown, fine to medium SAND, trace Silt, dry.			
79–80	16	24/24	79-81	2-6 10-21		Medium dense, light brown, fine to medium SAND, trace Silt, wet.		1	

REMARKS

1. Groundwater was encountered at approximately 79.0 feet below ground surface.

Stratification lines represent approximate boundary between soil types, transitions may be gradual. Water level readings have been made at times and under conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the time measurements were made.

Boring No.: AREA5-RI-8C

BORING_WELL 62961.21 AREA5.GPJ GZA_CORP.GDT 2/22/22

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Check: J. Groenleer

Depth	Sample Information: No.	Pen./ Rec. (in.)	Depth (Ft.)	Blows (/6")	Test Data	Sample Description & Classification	Stratum Desc.	Remarks	Equipment Installed
83							SAND		
84–85	17	24/24	84-86	2-12 16-26		Medium dense, brown, fine to medium SAND, trace Silt, wet.		2	
86–88									Bentonite Grout
89–90	18	24/24	89-91	2-0 15-20		Medium dense, brown, fine to medium SAND, trace Silt, wet.			
91–93									
94–95	19	24/24	94-96	2-6 14-30		Medium dense, brown, fine to medium SAND, trace Silt, wet.		3	
96–98									
99	20	24/24	99-101	3-7 26-41		Dense, brown, fine to medium SAND, little Silt, wet.	99' SILT		
100–103									
104–105	21	24/24	104-106	2-5 12-33		Medium dense, light brown, fine to medium SAND, some Silt, wet.		4	
106–108									
109–110	22	24/24	109-111	2-3 7-8		Medium dense, light brown, fine to medium SAND, some Silt, wet.			
111–113									
114–115	23	24/24	114-116	2-6 19-20		Medium dense, light brown, fine to medium SAND, some Silt, wet.		5	
116–118									
119–120	24	24/24	119-121	2-6 14-25		Medium dense, light brown, fine to medium SAND, some Silt, wet.			
121–123									
124–125	25	24/24	124-126	2-2 5-14		Loose, brown, fine to medium SAND, some Silt, wet.		6	
126									

REMARKS

2. VAP groundwater sample was collected from approximately 84.0 to 89.0 feet below ground surface and submitted for analytical laboratory testing.
3. VAP groundwater sample was collected from approximately 94.0 to 99.0 feet below ground surface and submitted for analytical laboratory testing.
4. VAP groundwater sample was collected from approximately 104.0 to 109.0 feet below ground surface and submitted for analytical laboratory testing.
5. VAP groundwater sample was collected from approximately 114.0 to 119.0 feet below ground surface and submitted for analytical laboratory testing.
6. VAP groundwater sample was collected from approximately 124.0 to 129.0 feet below ground surface and submitted for analytical laboratory testing.

Stratification lines represent approximate boundary between soil types, transitions may be gradual. Water level readings have been made at times and under conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the time measurements were made.

Boring No.: AREA5-RI-8C

BORING_WELL 62961.21 AREA5.GPJ GZA_CORP.GDT 2/22/22

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Rockford, Michigan

Boring No.: AREA5-RI-8C
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File No.: 16.0062961.21
Check: J. Groenleer

Depth	Sample Information: No.	Pen./ Rec. (in.)	Depth (Ft.)	Blows (/6")	Test Data	Sample Description & Classification	Stratum Desc.	Remarks	Equipment Installed
127							SILT		
128									
129	26	24/24	129-131	2-5 11-16		Medium dense, brown, fine to medium SAND, some Silt, wet.			
130									
131									
132									
133									
134	27	24/24	134-136	3-3 6-12		Loose, brown, fine to medium SAND, little Silt, wet.		7	
135									
136									
137									
138									
139	28	24/24	139-141	3-6 11-14		Medium dense, brown, fine to medium SAND, trace Silt, wet.			
140									
141									
142									
143									
144	29	24/12	144-146	5-7 12-13		Medium dense, brown, fine to medium SAND, trace Silt, wet.	144' SAND	8	
145									
146									
147									
148									
149	30	24/14	149-151	6-10 13-13		Medium dense, brown and gray, fine to coarse SAND, trace Silt, wet.	149' SAND		
150									
151									
152									
153									
154	31	24/14	154-156	3-7 13-18		Medium dense, brown and gray, fine to coarse SAND, trace Silt, wet.		9	
155									
156									
157									
158									
159	32	24/12	159-161	2-8 14-20		Very stiff, gray, Silty CLAY, trace fine Sand, moist to wet.	159' Silty CLAY	10	
160								11	
161	33	24/12	161-163	9-12 57-50		Very stiff, gray, Silty CLAY, with some fine to medium SAND at 162.1 feet, wet.			
162									
163									
164	34	24/12	164-166	3-7 22-20		Medium dense, brown, fine to medium SAND, trace Silt, wet.	164' SAND	12	
165									
166									
167									
168									
169	35	12/12	169-170	12-50/6"		Very dense, brown, fine to medium SAND, trace Silt, wet.			
170									

REMARKS

7. VAP groundwater sample was collected from approximately 134.0 to 139.0 feet below ground surface and submitted for analytical laboratory testing.
8. VAP groundwater sample was collected from approximately 144.0 to 149.0 feet below ground surface and submitted for analytical laboratory testing.
9. VAP groundwater sample was collected from approximately 154.0 to 159.0 feet below ground surface and submitted for analytical laboratory testing.
10. Small stem-like pieces found in Clay from 159.0 to 163.0 feet.
11. Interbedded sand and clay layers from 159.0 to 163.0 feet.
12. VAP groundwater sample was collected from approximately 164.0 to 169.0 feet below ground surface and submitted for analytical laboratory testing.

Stratification lines represent approximate boundary between soil types, transitions may be gradual. Water level readings have been made at times and under conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the time measurements were made.

Boring No.: AREA5-RI-8C

BORING_WELL 62961.21 AREA5.GPJ GZA_CORP.GDT 2/22/22

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Area 5 - RAP Implementation
Rockford, Michigan

Boring No.: AREA5-RI-8C
Page: 5 **of** 5
File No.: 16.0062961.21
Check: J. Groenleer

Depth	Sample Information					Sample Description & Classification	Stratum Desc.	Remarks	Equipment Installed
	No.	Pen./ Rec. (in.)	Depth (Ft.)	Blows (/6")	Test Data				
172							SAND	13	Top of Well Screen
173									
174	36	24/16	174-176	6-14 17-31		Dense, brown, fine to coarse SAND, trace Silt, wet with Silty CLAY in spoon tip.			2-Inch Dia. 5-Foot PVC Screen (0.010" Slot)
175									
176							176' Silty CLAY		
177									Bottom of Well Screen
178									
179	37	5/5	179-179.4	50/5"		Very stiff, gray, Silty CLAY, some fine to medium Sand, moist to dry.	179.4'	14	
180						Bottom of Borehole at 179.4 Feet			
181									
182									
183									
184									
185									
186									
187									
188									
189									
190									
191									
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209									
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212									
213									
214									
215									

REMARKS

13. VAP groundwater sample was collected from approximately 172.0 to 177.0 feet below ground surface and submitted for analytical laboratory testing.
14. Monitoring well was installed in borehole upon completion. Well screen was set from 172.0 to 177.0 feet below ground surface.

Stratification lines represent approximate boundary between soil types, transitions may be gradual. Water level readings have been made at times and under conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the time measurements were made.

Boring No.: AREA5-RI-8C

BORING_WELL 62961.21 AREA5.GPJ GZA_CORP.GDT 2/22/22

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Area 5 - RAP Implementation
Rockford, Michigan

Boring No.: AREA5-RI-9A
Page: 1 **of** 2
File No.: 16.0062961.21
Check: J. Groenleer

Contractor: Stearns Drilling Company
Foreman: M. Myers
Logged by: J. Huntoon
Date Start/Finish: 4-27-22 / 4-28-22
Boring Location: 581,686.7732 N; 12,786,032.9975 E
GS Elev.: 811.39' **Datum:** NAD83/NAVD88

	Auger/ Casing	Sampler
Type:	Hollow Stem Auger	Split Spoon
O.D. / I.D.:	8.0" / 4.25"	2.0" / 1 3/8"
Hammer Wt.:	140lbs	NA
Hammer Fall:	30.0"	NA
TOC Elev.:	813.54'	NA

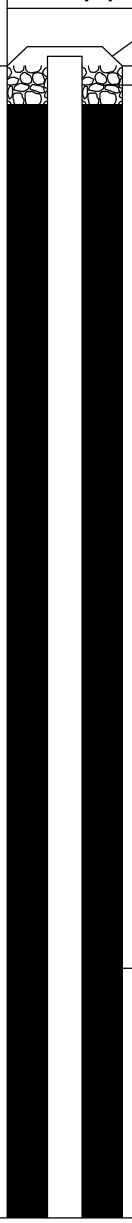
GROUNDWATER READINGS

Date	Time	Depth	Casing	Stab

Surveyed By: EXXEL **Survey Date:** 5/20/2022

Depth	Sample Information: No.	Pen./ Rec. (in.)	Depth (Ft.)	Blows (/6")	Test Data	Sample Description & Classification	Stratum Desc.	Remarks
1–59						See Area5-RI-9C for soil and stratum descriptions.		

Equipment Installed



REMARKS

Stratification lines represent approximate boundary between soil types, transitions may be gradual. Water level readings have been made at times and under conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the time measurements were made.

Boring No.: AREA5-RI-9A

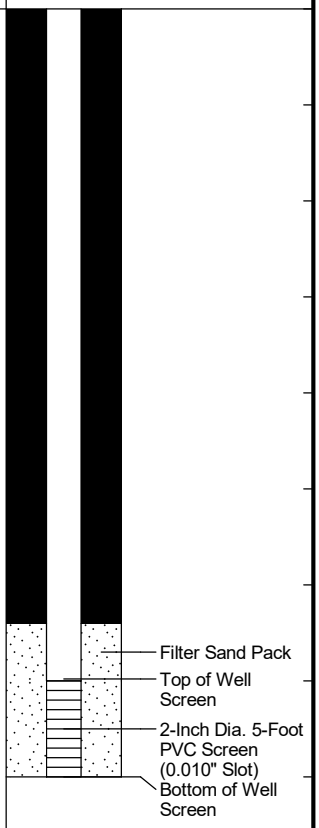
BORING_WELL 62961.21 AREA5.GPJ GZA_CORP.GDT 2/6/23

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Boring No.: AREA5-RI-9A
Page: 2 **of** 2
File No.: 16.0062961.21
Check: J. Groenleer

Depth	Sample Information: No.	Pen./ Rec. (in.)	Depth (Ft.)	Blows (/6")	Test Data	Sample Description & Classification	Stratum Desc.	Remarks	Equipment Installed
61–99									
100						Bottom of Borehole at 100.0 Feet		1	
101–129									



REMARKS

1. Monitoring well was installed in borehole upon completion. Well screen was set from approximately 95.0 to 100.0 feet below ground surface.

Stratification lines represent approximate boundary between soil types, transitions may be gradual. Water level readings have been made at times and under conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the time measurements were made.

Boring No.: AREA5-RI-9A

BORING_WELL 62961.21 AREA5.GPJ GZA_CORP.GDT 2/6/23

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Boring No.: AREA5-RI-9B
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File No.: 16.0062961.21
Check: J. Groenleer

Contractor: Stearns Drilling Company
Foreman: M. Myers
Logged by: J. Huntoon
Date Start/Finish: 4-26-22 / 4-27-22
Boring Location: 581,682.1011 N; 12,786,030.0259 E
GS Elev.: 811.27' **Datum:** NAD83/NAVD88

	Auger/ Casing	Sampler
Type:	Hollow Stem Auger	Split Spoon
O.D. / I.D.:	8.0" / 4.25"	2.0" / 1 3/8"
Hammer Wt.:	140lbs	NA
Hammer Fall:	30.0"	NA
TOC Elev.:	813.91'	NA

GROUNDWATER READINGS

Date	Time	Depth	Casing	Stab

Surveyed By: EXXEL **Survey Date:** 5/20/2022

Depth	Sample Information: No.	Pen./ Rec. (in.)	Depth (Ft.)	Blows (/6")	Test Data	Sample Description & Classification	Stratum Desc.	Remarks	Equipment Installed
1–59						See Area5-RI-9C for soil and stratum descriptions.			PROTECTIVE COVER; Backfill/Cement Pad

REMARKS

Stratification lines represent approximate boundary between soil types, transitions may be gradual. Water level readings have been made at times and under conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the time measurements were made.

Boring No.: AREA5-RI-9B

BORING_WELL 62961.21 AREA5.GPJ GZA_CORP.GDT 11/8/22

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Check: J. Groenleer

Depth	Sample Information					Sample Description & Classification	Stratum Desc.	Remarks	Equipment Installed
	No.	Pen./ Rec. (in.)	Depth (Ft.)	Blows (/6")	Test Data				
61–129									Bentonite Grout

REMARKS

Stratification lines represent approximate boundary between soil types, transitions may be gradual. Water level readings have been made at times and under conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the time measurements were made.

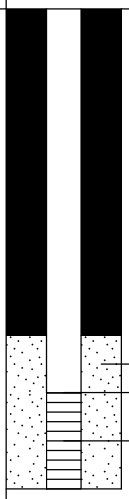
Boring No.: AREA5-RI-9B

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Boring No.: AREA5-RI-9B
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Check: J. Groenleer

Depth	Sample Information: No.	Pen./ Rec. (in.)	Depth (Ft.)	Blows (/6")	Test Data	Sample Description & Classification	Stratum Desc.	Remarks	Equipment Installed
131–154									 Filter Sand Pack; Top of Well Screen; 2-Inch Dia. 5-Foot PVC Screen (0.010" Slot)
155						Bottom of Borehole at 155.0 Feet		1	
156–199									

REMARKS

1. Monitoring well was installed in borehole upon completion. Well screen was set from approximately 150.0 to 155.0 feet below ground surface.

Stratification lines represent approximate boundary between soil types, transitions may be gradual. Water level readings have been made at times and under conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the time measurements were made.

BORING_WELL 62961.21 AREA5.GPJ GZA_CORP.GDT 11/8/22

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Boring No.: AREA5-RI-9C
Page: 1 **of** 6
File No.: 16.0062961.21
Check: J. Groenleer

Contractor: Stearns Drilling Company
Foreman: D. Krause
Logged by: C. Melby / M. Myers
Date Start/Finish: 9-14-21 / 9-22-21
Boring Location: 581,677.5475 N; 12,786,025.7172 E
GS Elev.: 811.56' **Datum:** NAD83/NAVD88

	Auger/ Casing	Sampler
Type:	Hollow Stem Auger	Split Spoon
O.D. / I.D.:	8.0" / 4.25"	2.0" / 1 3/8"
Hammer Wt.:	140lbs	NA
Hammer Fall:	30.0"	NA
TOC Elev.:	814.55'	NA

GROUNDWATER READINGS

Date	Time	Depth	Casing	Stab

Surveyed By: EXXEL **Survey Date:** 3/30/2022

Depth	Sample Information No.	Pen./ Rec. (in.)	Depth (Ft.)	Blows (/6")	Test Data	Sample Description & Classification	Stratum Desc.	Remarks
1							SAND	
2								
3								
4	1	24/19	4-6	8-6 6-5		Medium dense, brown, fine to medium SAND, trace Silt, dry.		
5								
6								
7								
8								
9	2	24/16	9-11	3-3 4-4		Loose, light brown, fine to medium SAND, dry.		
10								
11								
12								
13								
14	3	24/16	14-16	3-3 4-5		Loose, light brown, fine to medium SAND, dry.		
15								
16								
17								
18								
19	4	24/16	19-21	3-3 5-6		Loose, light brown, fine to medium SAND, dry.		
20								
21								
22								
23								
24	5	24/17	24-26	3-6 8-10		Medium dense, light brown, fine to medium SAND, dry.		
25								
26								
27								
28								
29	6	24/18	29-31	3-6 7-9		Medium dense, light brown, fine to medium SAND, trace Silt, dry.		
30								
31								
32								
33								
34	7	12/18	34-35	2-7 7-14		Medium dense, light brown, fine to medium SAND, trace Silt, dry.		
35								
36								
37								

Equipment Installed



REMARKS

Stratification lines represent approximate boundary between soil types, transitions may be gradual. Water level readings have been made at times and under conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the time measurements were made.

Boring No.: AREA5-RI-9C

BORING_WELL 62961.21 AREA5.GPJ GZA_CORP.GDT 5/30/22

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Boring No.: AREA5-RI-9C
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File No.: 16.0062961.21
Check: J. Groenleer

Depth	Sample Information: No.	Pen./ Rec. (in.)	Depth (Ft.)	Blows (/6")	Test Data	Sample Description & Classification	Stratum Desc.	Remarks	Equipment Installed
							SAND		
39–41	8	24/18	39-41	3-10 12-17		Medium dense, light brown, fine to medium SAND, trace Silt, dry.			
44–46	9	24/18	44-46	3-6 9-13		Medium dense, light brown, fine to medium SAND, trace Silt, dry.			
49–51	10	24/18	49-51	6-20 42-45		Very dense, light brown, fine to medium SAND, trace Silt, dry.			
54–56	11	24/18	54-56	3-6 12-25		Medium dense, light brown, fine to medium SAND, trace Silt, dry.			
59–61	12	24/24	59-61	5-14 25-28		Dense, light brown, fine to medium SAND, trace Silt, dry.			
64–66	13	24/18	64-66	3-7 19-36		Medium dense, light brown, fine to medium SAND, trace Silt, dry.			
69–71	14	24/20	69-71	3-13 19-40		Dense, light brown, fine to medium SAND, trace Silt with small Clay seam at 70.75 feet, dry.			
74–76	15	24/24	74-76	15-25 23-27		Dense, brown, fine to coarse SAND and Clayey Silt, some Gravel, moist.			
79–81	16	18/18	79-80.5	22-38-56/6"		Dense, brown, fine to coarse SAND and Clayey Silt, some Gravel, moist. Spoon Tip: Gray, Silty CLAY with fine to coarse Sand embedded, moist.	80.5' CLAY		

REMARKS

Stratification lines represent approximate boundary between soil types, transitions may be gradual. Water level readings have been made at times and under conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the time measurements were made.

Boring No.: AREA5-RI-9C

BORING_WELL 62961.21 AREA5.GPJ GZA_CORP.GDT 5/30/22

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Depth	Sample Information					Sample Description & Classification	Stratum Desc.	Remarks	Equipment Installed
	No.	Pen./ Rec. (in.)	Depth (Ft.)	Blows (/6")	Test Data				
83							CLAY		
84	17	24/24	84-86	14-19 32-56		Hard, gray, Silty CLAY and fine to coarse Sand embedded, moist.			
85									
86									
87									
88									
89	18	21/21	89-90.8	17-18 40-50/3"		Hard, gray, SILT & CLAY and Gravel, some fine to coarse Sand embedded, dry to moist.	89' SILT & CLAY		
90									
91									
92									
93									
94	19	12/12	94-95	20-70/6"		Very dense, brown, GRAVEL and Sand embedded, some Silty Clay, wet.	94' GRAVEL	1	
95								2	
96									
97									
98									
99	20	12/12	99-100	40-56/6"		Very dense, brown, GRAVEL and fine to coarse Sand embedded, trace Silt, wet.			
100									
101									
102							102' CLAY & SILT	3	
103									
104	21	10/10	104-104.8	19-50/4"		Hard, gray, CLAY & SILT and fine to coarse Sand embedded, moist.			
105									
106									
107									
108									Bentonite Grout
109	22	18/18	109-110.5	24-56-55/6"		Hard, gray, CLAY & SILT, some fine to coarse Sand embedded, moist.			
110									
111									
112									
113									
114	23	15/15	114-115.3	21-47-50/3"		Hard, gray, CLAY & SILT, some fine to coarse Sand embedded, moist.			
115									
116									
117									
118									
119	24	20/20	119-120.7	11-21 40-50/2"		Hard, gray, Silty CLAY, little fine to medium Sand embedded, moist.	119' CLAY		
120									
121									
122									
123									
124	25	12/12	124-125	36-75/6"		Hard, gray, Clayey SILT, some fine to coarse Sand embedded in seams, moist.	124' SILT	4	
125									
126									

REMARKS

1. Groundwater was encoutered at approximately 94.0 feet below ground surface.
2. VAP groundwater sample was collected from approximately 95.0 to 100.0 feet below ground surface and submitted for analytical laboratory testing.
3. Driller noted a changed in auger advancement from rough chatter to smooth at 102.0 feet below ground surface.
4. Driller noted augers drilled hard for approximately 1.0 to 2.0 feet (likely clay), then easy for aprroximately 1.0 to 2.0 feet (likely sand).

Stratification lines represent approximate boundary between soil types, transitions may be gradual. Water level readings have been made at times and under conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the time measurements were made.

Boring No.: AREA5-RI-9C

BORING_WELL 62961.21 AREA5.GPJ GZA_CORP.GDT 5/30/22

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Boring No.: AREA5-RI-9C
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Check: J. Groenleer

Depth	Sample Information: No.	Pen./ Rec. (in.)	Depth (Ft.)	Blows (/6")	Test Data	Sample Description & Classification	Stratum Desc.	Remarks	Equipment Installed
127							SILT		
128									
129	26	8/8	129-129.7	28-56/2"		Hard, gray, Silty CLAY, some fine to medium Sand embedded, moist. Changing at 129.3 feet to: Gray, fine to medium SAND, little Silt, wet.	129' 129.3' CLAY SAND	5	
130									
131									
132									
133									
134	27	24/12	134-136	2-3 3-6		Loose, gray, fine to coarse SAND, some Clayey Silt interbedded, wet.			
135									
136									
137									
138									
139	28	12/12	139-140	21-60/6"		Very dense, gray, fine to medium SAND and Silt, wet.		6	
140									
141									
142									
143									
144	29	20/20	144-145.7	4-17-50/5"		Very dense, gray, fine to medium SAND, little Silt, wet.			
145									
146									
147									
148									
149	30	15/12	149-150.3	10-46-50/3"		Very dense, gray, fine to coarse SAND, little Silt, wet.		7	
150									
151									
152									
153									
154	31	15/15	154-155.3	7-40-50/3"		Very dense, gray, fine to coarse SAND, little Silt, wet.			
155									
156									
157									
158									
159	32	18/12	159-160.5	11-24-56/6"		Very dense, gray, fine to coarse SAND, little Gravel, wet.		8	
160									
161									
162									
163									
164	33	24/18	164-166	9-19 28-44		Dense, gray, fine to coarse SAND, little Gravel, wet.			
165									
166									
167									
168									
169	34	18/18	169-170.5	11-19-56/6"		Very dense, gray, fine to coarse SAND, little Gravel, wet.		9	
170									

REMARKS

5. VAP groundwater sample was collected from approximately 130.0 to 135.0 feet below ground surface and submitted for analytical laboratory testing.
6. VAP groundwater sample was collected from approximately 140.0 to 145.0 feet below ground surface and submitted for analytical laboratory testing.
7. VAP groundwater sample was collected from approximately 150.0 to 155.0 feet below ground surface and submitted for analytical laboratory testing.
8. VAP groundwater sample was collected from approximately 160.0 to 165.0 feet below ground surface and submitted for analytical laboratory testing.
9. VAP groundwater sample was collected from approximately 170.0 to 175.0 feet below ground surface and submitted for analytical laboratory testing.

Stratification lines represent approximate boundary between soil types, transitions may be gradual. Water level readings have been made at times and under conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the time measurements were made.

Boring No.: AREA5-RI-9C

BORING_WELL 62961.21 AREA5.GPJ GZA_CORP.GDT 5/30/22

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Boring No.: AREA5-RI-9C
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Depth	Sample Information					Sample Description & Classification	Stratum Desc.	Remarks	Equipment Installed
	No.	Pen./ Rec. (in.)	Depth (Ft.)	Blows (/6")	Test Data				
172							SAND		
173									
174	35	16/16	174-175.3	14-39-50/4"		Very dense, gray, fine to coarse SAND, little Gravel with red Clay in spoon tip, wet.			
175									
176									
177									
178									
179	36	24/16	179-181	11-19 28-43		Dense, gray, fine to coarse SAND, little Silt, wet.		10	
180									
181									
182									
183									
184	37	24/14	184-186	11-16 28-44		Dense, gray, fine to coarse SAND, trace Silt with black Granite rock in spoon tip, wet.			
185									
186									
187									
188									
189	38	24/24	189-191	17-21 29-56/6"		Dense, gray, fine to coarse SAND and Gravel with Limestone in shoe, wet.		11	
190									
191									
192									
193									
194	39	24/16	194-196	15-30-53/6"		Dense, gray, fine to coarse SAND and Gravel, wet.			
195									
196									
197									
198									
199	40	24/12	199-201	16-33-50/3"		Very dense, gray, fine to coarse SAND, some Gravel, trace Silt, wet.		12	
200									
201									
202									
203									
204	41	24/18	204-206	16-34-50/4"		Very dense, gray, fine to coarse SAND, some fine to medium Gravel with Clay seams (<0.5"), wet.			
205									
206									
207									
208									
209	42	18/18	209-210.5	13-20-59/6"		Very dense, gray, fine to coarse SAND and Gravel, little Silt, wet.		13	
210									
211									
212									
213									
214	43	24	214-216	8-14 58-57		Dense, gray, fine to coarse SAND, little Silt,			
215									

REMARKS

10. VAP groundwater sample was collected from approximately 180.0 to 185.0 feet below ground surface and submitted for analytical laboratory testing.
11. VAP groundwater sample was collected from approximately 190.0 to 195.0 feet below ground surface and submitted for analytical laboratory testing.
12. VAP groundwater sample was collected from approximately 200.0 to 205.0 feet below ground surface and submitted for analytical laboratory testing.
13. VAP groundwater sample was collected from approximately 210.0 to 215.0 feet below ground surface and submitted for analytical laboratory testing.

Stratification lines represent approximate boundary between soil types, transitions may be gradual. Water level readings have been made at times and under conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the time measurements were made.

Boring No.: AREA5-RI-9C

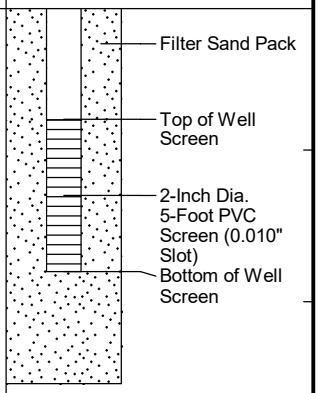
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Boring No.: AREA5-RI-9C
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Check: J. Groenleer

Depth	Sample Information: No.	Pen./ Rec. (in.)	Depth (Ft.)	Blows (/6")	Test Data	Sample Description & Classification	Stratum Desc.	Remarks	Equipment Installed
216						with Shale/Limestone in spoon tip, wet.	SAND		
217									
218									
219	44	12/12	219-220	45-70/6"		Very dense, gray, fine to coarse SAND and Gravel, trace Silt, wet.		14	
220									
221									
222									
223									
224	45	11/11	224-224.9	35-100/3"		Very dense, gray, fine to coarse SAND and Gravel, trace Silt, wet. Changing at 224.5 feet to: Gray, Silty CLAY, some fine to coarse Sand embedded, dry.	224.5' CLAY		
225									
226									
227	46	8/6	227-227.7	87/6"		Gray, Silty CLAY, some fine to coarse Sand embedded, dry. Changing at 227.5 feet to: Gray, weather SHALE, some fine to coarse Sand embedded, dry.	227.5' Weathered SHALE	15	
228						Bottom of Borehole at 227.7 Feet			
229									
230									
231									
232									
233									
234									
235									
236									
237									
238									
239									
240									
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256									
257									
258									
259									



REMARKS

14. VAP groundwater sample was collected from approximately 220.0 to 225.0 feet below ground surface and submitted for analytical laboratory testing.
15. Monitoring well was installed in borehole upon completion. Well screen was set from approximately 219.0 to 224.0 feet below ground surface.

Stratification lines represent approximate boundary between soil types, transitions may be gradual. Water level readings have been made at times and under conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the time measurements were made.

Boring No.: AREA5-RI-9C

BORING_WELL 62961.21 AREA5.GPJ GZA_CORP.GDT 5/30/22

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Boring No.: AREA5-RI-11A
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Check: J. Groenleer

Contractor: Stearns Drilling Company
Foreman: D. Krause
Logged by: C. Melby
Date Start/Finish: 11-4-21 / 11-5-21
Boring Location: 582218.6495 N; 12,788,795.7084 E
GS Elev.: 790.22' **Datum:** NAD83/NAVD88

	Auger/ Casing	Sampler
Type:	Hollow Stem Auger	Split Spoon
O.D. / I.D.:	8.0" / 4.25"	2.0" / 1 3/8"
Hammer Wt.:	140lbs	NA
Hammer Fall:	30.0"	NA
TOC Elev.:	793.38'	NA

GROUNDWATER READINGS

Date	Time	Depth	Casing	Stab

Surveyed By: EXXEL **Survey Date:** 11/23/2021

Depth	Sample Information: No.	Pen./ Rec. (in.)	Depth (Ft.)	Blows (/6")	Test Data	Sample Description & Classification	Stratum Desc.	Remarks	Equipment Installed
1						See AREA5-RI-11D for soil descriptions.			PROTECTIVE COVER; Backfill / Cement
2									
3									
4									
5									
6									
7									
8									
9									
10									
11									
12									
13									
14									
15									
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28									
29									
30									
31									
32									
33									
34									
35									
36									
37									

REMARKS

Stratification lines represent approximate boundary between soil types, transitions may be gradual. Water level readings have been made at times and under conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the time measurements were made.

Boring No.: AREA5-RI-11A

BORING_WELL 62961.21 AREA5.GPJ GZA_CORP.GDT 2/21/22

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Depth	Sample Information					Sample Description & Classification	Stratum Desc.	Remarks	Equipment Installed
	No.	Pen./ Rec. (in.)	Depth (Ft.)	Blows (/6")	Test Data				
39									
40									
41									
42									
43									
44									
45									
46									
47									
48									
49									
50									
51									
52									Bentonite Grout
53									
54									
55									
56									
57									
58									
59									
60									
61									
62									
63									
64									
65									
66									
67									
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74									
75									
76									
77									
78									
79									
80									
81									
82									

REMARKS

Stratification lines represent approximate boundary between soil types, transitions may be gradual. Water level readings have been made at times and under conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the time measurements were made.

Boring No.: AREA5-RI-11A

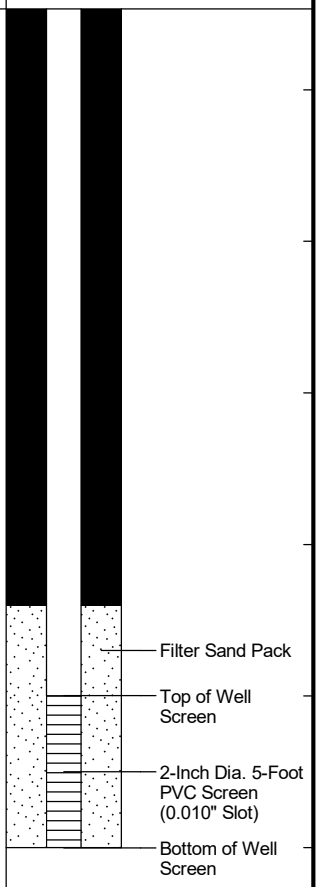
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File No.: 16.0062961.21
Check: J. Groenleer

Depth	Sample Information					Sample Description & Classification	Stratum Desc.	Remarks	Equipment Installed
	No.	Pen./ Rec. (in.)	Depth (Ft.)	Blows (/6")	Test Data				
83–109									
110						Bottom of borehole at 110.0 Feet		1	
111–126									



REMARKS

1. Monitoring well was installed in borehole upon completion. Well screen was set from 105.0 to 110.0 feet below ground surface.

Stratification lines represent approximate boundary between soil types, transitions may be gradual. Water level readings have been made at times and under conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the time measurements were made.

Boring No.: AREA5-RI-11A

BORING_WELL 62961.21 AREA5.GPJ GZA_CORP.GDT 2/21/22

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Rockford, Michigan

Boring No.: AREA5-RI-11B
Page: 1 **of** 4
File No.: 16.0062961.21
Check: J. Groenleer

Contractor: Stearns Drilling Company
Foreman: D. Krause
Logged by: C. Melby
Date Start/Finish: 11-3-21 / 11-4-21
Boring Location: 582,213.5109 N; 12,788,800.2316 E
GS Elev.: 790.38' **Datum:** NAD83/NAVD88

	Auger/ Casing	Sampler
Type:	Hollow Stem Auger	Split Spoon
O.D. / I.D.:	8.0" / 4.25"	2.0" / 1 3/8"
Hammer Wt.:	140lbs	NA
Hammer Fall:	30.0"	NA
TOC Elev.:	793.39'	NA

GROUNDWATER READINGS

Date	Time	Depth	Casing	Stab

Surveyed By: EXXEL **Survey Date:** 11/23/2021

Depth	Sample Information: No.	Pen./ Rec. (in.)	Depth (Ft.)	Blows (/6")	Test Data	Sample Description & Classification	Stratum Desc.	Remarks	Equipment Installed
1						See AREA5-RI-11D for soil descriptions.			PROTECTIVE CASING; Backfill / Cement
2									
3									
4									
5									
6									
7									
8									
9									
10									
11									
12									
13									
14									
15									
16									
17									
18									
19									
20									
21									
22									
23									
24									
25									
26									
27									
28									
29									
30									
31									
32									
33									
34									
35									
36									
37									

REMARKS

Stratification lines represent approximate boundary between soil types, transitions may be gradual. Water level readings have been made at times and under conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the time measurements were made.

Boring No.: AREA5-RI-11B

BORING_WELL 62961.21 AREA5.GPJ GZA_CORP.GDT 2/21/22

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Boring No.: AREA5-RI-11B
Page: 2 **of** 4
File No.: 16.0062961.21
Check: J. Groenleer

Depth	Sample Information					Sample Description & Classification	Stratum Desc.	Remarks	Equipment Installed
	No.	Pen./ Rec. (in.)	Depth (Ft.)	Blows (/6")	Test Data				
39									
40									
41									
42									
43									
44									
45									
46									
47									
48									
49									
50									
51									
52									
53									
54									
55									
56									
57									
58									
59									
60									
61									
62									
63									
64									
65									
66									Bentonite Grout
67									
68									
69									
70									
71									
72									
73									
74									
75									
76									
77									
78									
79									
80									
81									
82									

REMARKS

Stratification lines represent approximate boundary between soil types, transitions may be gradual. Water level readings have been made at times and under conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the time measurements were made.

Boring No.: AREA5-RI-11B

BORING_WELL 62961.21 AREA5.GPJ GZA_CORP.GDT 2/21/22

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Rockford, Michigan

Boring No.: AREA5-RI-11B
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File No.: 16.0062961.21
Check: J. Groenleer

Depth	Sample Information					Sample Description & Classification	Stratum Desc.	Remarks	Equipment Installed
	No.	Pen./ Rec. (in.)	Depth (Ft.)	Blows (/6")	Test Data				
83									
84									
85									
86									
87									
88									
89									
90									
91									
92									
93									
94									
95									
96									
97									
98									
99									
100									
101									
102									
103									
104									
105									
106									
107									
108									
109									
110									
111									
112									
113									
114									
115									
116									
117									
118									
119									
120									
121									
122									
123									
124									
125									
126									

REMARKS

Stratification lines represent approximate boundary between soil types, transitions may be gradual. Water level readings have been made at times and under conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the time measurements were made.

Boring No.: AREA5-RI-11B

BORING_WELL 62961.21 AREA5.GPJ GZA_CORP.GDT 2/21/22

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Boring No.: AREA5-RI-11B
Page: 4 **of** 4
File No.: 16.0062961.21
Check: J. Groenleer

Depth	Sample Information					Sample Description & Classification	Stratum Desc.	Remarks	Equipment Installed
	No.	Pen./ Rec. (in.)	Depth (Ft.)	Blows (/6")	Test Data				
127–170						Bottom of Borehole at 140.0 Feet		1	Filter Sand Pack; Top of Well Screen; 2-Inch Dia. 5-Foot PVC Screen (0.010" Slot); Bottom of Well Screen

REMARKS

1. Monitoring well was installed in borehole upon completion. Well screen was set from 135.0 to 140.0 feet below ground surface.

Stratification lines represent approximate boundary between soil types, transitions may be gradual. Water level readings have been made at times and under conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the time measurements were made.

Boring No.: AREA5-RI-11B

BORING_WELL 62961.21 AREA5.GPJ GZA_CORP.GDT 2/21/22

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Boring No.: AREA5-RI-11C
Page: 1 **of** 4
File No.: 16.0062961.21
Check: J. Groenleer

Contractor: Stearns Drilling Company
Foreman: D. Krause
Logged by: C. Melby
Date Start/Finish: 10-28-21 / 11-2-21
Boring Location: 582,208.1606 N; 12,788,794.8346 E
GS Elev.: 790.94' **Datum:** NAD83/NAVD88

	Auger/ Casing	Sampler
Type:	Hollow Stem Auger	Split Spoon
O.D. / I.D.:	8.0" / 4.25"	2.0" / 1 3/8"
Hammer Wt.:	140lbs	NA
Hammer Fall:	30.0"	NA
TOC Elev.:	793.98'	NA

GROUNDWATER READINGS

Date	Time	Depth	Casing	Stab

Surveyed By: EXXEL **Survey Date:** 11/23/2021

Depth	Sample Information: No.	Pen./ Rec. (in.)	Depth (Ft.)	Blows (/6")	Test Data	Sample Description & Classification	Stratum Desc.	Remarks	Equipment Installed
1–54						See AREA5-RI-11D for soil descriptions.			PROTECTIVE CASING; Backfill / Cement

REMARKS

Stratification lines represent approximate boundary between soil types, transitions may be gradual. Water level readings have been made at times and under conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the time measurements were made.

Boring No.: AREA5-RI-11C

BORING_WELL 62961.21 AREA5.GPJ GZA_CORP.GDT 2/21/22

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Boring No.: AREA5-RI-11C
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File No.: 16.0062961.21
Check: J. Groenleer

Depth	Sample Information					Sample Description & Classification	Stratum Desc.	Remarks	Equipment Installed
	No.	Pen./ Rec. (in.)	Depth (Ft.)	Blows (/6")	Test Data				
56–118									Bentonite Grout

REMARKS

Stratification lines represent approximate boundary between soil types, transitions may be gradual. Water level readings have been made at times and under conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the time measurements were made.

Boring No.: AREA5-RI-11C

BORING_WELL 62961.21 AREA5.GPJ GZA_CORP.GDT 2/21/22

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Boring No.: AREA5-RI-11C
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File No.: 16.0062961.21
Check: J. Groenleer

Depth	Sample Information					Sample Description & Classification	Stratum Desc.	Remarks	Equipment Installed
	No.	Pen./ Rec. (in.)	Depth (Ft.)	Blows (/6")	Test Data				
120–182									

REMARKS

Stratification lines represent approximate boundary between soil types, transitions may be gradual. Water level readings have been made at times and under conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the time measurements were made.

Boring No.: AREA5-RI-11C

BORING_WELL 62961.21 AREA5.GPJ GZA_CORP.GDT 2/21/22

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Boring No.: AREA5-RI-11C
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File No.: 16.0062961.21
Check: J. Groenleer

Depth	Sample Information					Sample Description & Classification	Stratum Desc.	Remarks	Equipment Installed
	No.	Pen./ Rec. (in.)	Depth (Ft.)	Blows (/6")	Test Data				
184–247						Bottom of borehole at 230.0 Feet		1	Filter Sand Pack; Top of Well Screen; 2-Inch Dia. 5-Foot PVC Screen (0.010" Slot); Bottom of Well Screen

REMARKS

1. Monitoring well was installed in borehole upon completion. Well screen was set from 225.0 to 230.0 feet below ground surface.

Stratification lines represent approximate boundary between soil types, transitions may be gradual. Water level readings have been made at times and under conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the time measurements were made.

Boring No.: AREA5-RI-11C

BORING_WELL 62961.21 AREA5.GPJ GZA_CORP.GDT 2/21/22

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Boring No.: AREA5-RI-11D
Page: 1 of 6
File No.: 16.0062961.21
Check: J. Groenleer

Contractor: Stearns Drilling Company
Foreman: J. Huntoon
Logged by: E. Stapleton/C. Melby
Date Start/Finish: 8-2-21 / 8-10-21
Boring Location: 582,200.7831N; 12,788,794.5534 E
GS Elev.: 791.55' **Datum:** NAD83/NAVD88

	Auger/ Casing	Sampler
Type:	Hollow Stem Auger	Split Spoon
O.D. / I.D.:	8.0" / 4.25"	2.0" / 1 3/8"
Hammer Wt.:	140lbs	NA
Hammer Fall:	30.0"	NA
TOC Elev.:	794.56'	NA

GROUNDWATER READINGS

Date	Time	Depth	Casing	Stab

Surveyed By: EXXEL **Survey Date:** 11/23/2021

Depth	Sample Information No.	Pen./ Rec. (in.)	Depth (Ft.)	Blows (/6")	Test Data	Sample Description & Classification	Stratum Desc.	Remarks	Equipment Installed
1							SAND		PROTECTIVE COVER
2									
3									Backfill / Cement
4	1	24/19	4-6	2-3 4-4		Loose, light brown, fine to medium SAND, trace Silt, dry.			
5									
6									
7									
8									
9	2	24/20	9-11	3-4 6-5		Medium dense, light brown, fine to medium SAND, trace Silt, dry.			
10									
11									
12									
13									
14	3	24/4	14-16	6-8 9-9		Medium dense, light brown, fine to medium SAND, trace Silt, dry.			
15									
16									
17									
18									
19	4	24/24	19-21	6-8 10-11		Medium dense, light brown and gray, fine to medium SAND, trace Silt, dry.			
20									
21									
22									
23									
24	5	24/18	24-26	5-8 10-11		Medium dense, light brown and gray, fine to coarse SAND, trace Silt, dry.			
25									
26									
27									
28									
29	6	24/24	29-31	15-33 20-16		Very dense, light brown and gray, GRAVEL and fine to coarse SAND, trace Silt, dry.	29' GRAVEL and SAND		
30									
31									
32									
33									
34	7	12	34-35	18-31-50/0"		Very dense, light brown and gray, GRAVEL and fine to coarse SAND, trace Silt, dry.	34' SAND		
35									
36									
37									
38									
39	8	24/24	39-41	8-10		Medium dense, light brown, fine to medium			

REMARKS

Stratification lines represent approximate boundary between soil types, transitions may be gradual. Water level readings have been made at times and under conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the time measurements were made.

Boring No.: AREA5-RI-11D

BORING_WELL 62961.21 AREA5.GPJ GZA_CORP.GDT 2/21/22

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Rockford, Michigan

Boring No.: AREA5-RI-11D
Page: 2 **of** 6
File No.: 16.0062961.21
Check: J. Groenleer

Depth	Sample Information: No.	Pen./ Rec. (in.)	Depth (Ft.)	Blows (/6")	Test Data	Sample Description & Classification	Stratum Desc.	Remarks	Equipment Installed
41				11-9		SAND, trace Silt, dry with spoon tip wet (<1").	SAND		
42									
43									
44	9	24/24	44-46	5-8		Medium dense, light brown, fine to medium SAND, trace Silt, dry.			
45				9-15					
46									
47									
48									
49	10	24/24	49-51	6-11		Medium dense, light brown, fine to medium SAND, trace Silt, dry.			
50				13-13					
51									
52									
53									
54	11	24/24	54-56	8-12		Dense, light brown, fine to medium SAND, trace Silt, dry.			
55				18-23					
56									
57									
58									
59	12	24/24	59-61	11-18		Dense, light brown, fine to medium SAND, trace Silt, dry.			
60				21-31					
61									
62									
63									
64	13	24/24	64-66	11-17		Dense, light brown, fine to medium SAND, trace Silt, dry.			
65				18-21					
66									
67									
68									
69	14	24/24	69-71	8-14		Dense, light brown and gray, fine to medium SAND, trace Silt, dry.			
70				20-26					
71									
72									
73									
74	15	24/24	74-76	9-16		Medium dense, light brown and gray, fine to medium SAND, trace Silt, dry.			
75				19-24					
76									
77									
78									
79	16	24/24	79-81	11-22		Very dense, light brown and gray, fine to medium SAND, trace Silt, dry.			
80				32-36					
81									
82									
83									
84	17	24/24	84-86	6-12		Medium dense, light brown and gray, fine to medium SAND, trace Silt, dry.			
85				17-23					
86									

REMARKS

Stratification lines represent approximate boundary between soil types, transitions may be gradual. Water level readings have been made at times and under conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the time measurements were made.

Boring No.: AREA5-RI-11D

BORING_WELL 62961.21 AREA5.GPJ GZA_CORP.GDT 2/21/22

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Boring No.: AREA5-RI-11D
Page: 3 **of** 6
File No.: 16.0062961.21
Check: J. Groenleer

Depth	Sample Information: No.	Pen./ Rec. (in.)	Depth (Ft.)	Blows (/6")	Test Data	Sample Description & Classification	Stratum Desc.	Remarks	Equipment Installed
87							SAND		
88									
89	18	24/24	89-91	6-12 17-17		Medium dense, light brown and gray, fine to medium SAND, trace Silt, dry.			
90									
91									
92								1	
93									
94	19	24/24	94-96	1-3 6-8		Loose, brown, fine to medium SAND, trace Silt, wet.			
95								2	
96									
97									
98									
99	20	24/0	99-101	1-1 4-14		NO RECOVERY (Sand bailer: Brown fine to medium SAND and SILT, wet).	99' NO RECOVERY		
100									
101									
102									
103									
104	21	24/24	104-106	2-9 15-23		Medium dense, brown, fine to medium SAND, trace Silt, wet.	104' SAND		
105								3	
106									
107									
108									
109	22	24/24	109-111	4-5 11-11		Medium dense, brown, fine to medium SAND, trace Silt, wet.			
110									
111									
112									
113									
114	23	24/4	114-116	3-3 6-21		Loose, brown, fine to medium SAND, trace Silt, wet.			
115								4	
116									
117									
118									
119	24	24/24	119-121	5-7 10-16		Medium dense, brown, fine to medium SAND, some Silt, wet with small Clay lense at 120.5 feet.			
120									
121									
122									
123									
124	25	24/24	124-126	2-2 5-10		Loose, brown, fine to medium SAND, trace Silt, wet.			Bentonite Grout
125								5	
126									
127									
128									
129	26	18/18	129-130.5	3-12-50/6"		Very dense, brown, fine to medium SAND, trace Silt, wet.			
130									
131									
132									
133									

REMARKS

1. Groundwater was encountered at approximately 92.0 feet below ground surface.
2. VAP groundwater sample was collected from approximately 95.0 to 100.0 feet below ground surface and submitted for analytical laboratory testing.
3. VAP groundwater sample was collected from approximately 105.0 to 110.0 feet below ground surface and submitted for analytical laboratory testing.
4. VAP groundwater sample was collected from approximately 115.0 to 120.0 feet below ground surface and submitted for analytical laboratory testing.
5. VAP groundwater sample was collected from approximately 125.0 to 130.0 feet below ground surface and submitted for analytical laboratory testing.

Stratification lines represent approximate boundary between soil types, transitions may be gradual. Water level readings have been made at times and under conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the time measurements were made.

Boring No.: AREA5-RI-11D

BORING_WELL 62961.21 AREA5.GPJ GZA_CORP.GDT 2/21/22

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Rockford, Michigan

Boring No.: AREA5-RI-11D
Page: 4 **of** 6
File No.: 16.0062961.21
Check: J. Groenleer

Depth	Sample Information: No.	Pen./ Rec. (in.)	Depth (Ft.)	Blows (/6")	Test Data	Sample Description & Classification	Stratum Desc.	Remarks	Equipment Installed
134	27	24/18	134-136	2-4 8-17		Medium dense, brown, fine to medium SAND, trace Silt, wet.	SAND	6	
139	28	24/10	139-141	3-8 14-19		Medium dense, brown, fine to medium SAND, trace Silt, wet.			
144	29	24/18	144-146	3-11 26-43		Dense, brown, fine to medium SAND, trace Silt, wet.		7	
149	30	24/24	149-151	1-7 23-43		Medium dense, brown, fine to medium SAND, trace Silt, wet.			
154	31	24/18	154-156	7-7 9-22		Medium dense, brown, fine to medium SAND, trace Silt, wet. Changing at 155.0 feet to: Very stiff, brown, CLAY & SILT, some fine Sand, dry.	155'		
156	32	24/24	156-158	2-6 14-24		Medium dense, brown and gray, fine to medium SAND, some Silt, trace Clay, wet.	156' CLAY & SILT SAND	8	
164	33	24/24	164-166	2-8 11-22		Very stiff, brown and gray, SILT, some fine Sand, some Clay, moist.	164' SILT	9	
168	34	24/24	168-170	3-13 10-19		Very stiff, medium dense, brown and gray, fine SAND and SILT, some Clay interbedded (>2" seams), wet.	168' SAND and SILT		
174	35	24/24	174-176	4-5 9-13		Stiff, brown and gray, Clayey SILT and fine SAND, wet.	174' SILT and SAND	10	
179	36	24/24	179-181	3-7		Very stiff, rown and gray, Clayey SILT and			

REMARKS

6. VAP groundwater sample was collected from approximately 135.0 to 140.0 feet below ground surface and submitted for analytical laboratory testing.
7. VAP groundwater sample was collected from approximately 145.0 to 150.0 feet below ground surface and submitted for analytical laboratory testing.
8. VAP groundwater sample was collected from approximately 155.0 to 160.0 feet below ground surface and submitted for analytical laboratory testing.
9. VAP groundwater sample was collected from approximately 165.0 to 170.0 feet below ground surface and submitted for analytical laboratory testing.
10. VAP groundwater sample was collected from approximately 175.0 to 180.0 feet below ground surface and submitted for analytical laboratory testing.

Stratification lines represent approximate boundary between soil types, transitions may be gradual. Water level readings have been made at times and under conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the time measurements were made.

Boring No.: AREA5-RI-11D

BORING_WELL 62961.21 AREA5.GPJ GZA_CORP.GDT 2/21/22

Depth	Sample Information: No.	Pen./ Rec. (in.)	Depth (Ft.)	Blows (/6")	Test Data	Sample Description & Classification	Stratum Desc.	Remarks	Equipment Installed
181				9-32		fine SAND, some Clay, dry.	SILT and SAND		
182									
183									
184	37	24/24	184-186	2-7		Very stiff, brown and gray, Clayey SILT and			
185				12-13		fine SAND, wet.		11	
186									
187									
188									
189	38	24/24	189-191	3-10		Very stiff, brown and gray, Clayey SILT and			
190				10-14		fine SAND, wet.			
191									
192									
193									
194	39	24/24	194-196	5-10		Very stiff, gray and brown, SILT and fine			
195				17-22		SAND, some Clay, wet.		12	
196									
197									
198									
199	40	24/24	199-201	7-11		Hard, gray and brown, SILT and fine SAND,	199.5'		
200				23-50/6"		some Clay, wet. Changing at 199.5 feet to:	SILT 200.5'		
201						Hard, clayey SILT, dry. Changing at 200.5	SILT and SAND		
202						feet to: Hard, SILT and SAND, wet.			
203									
204	41	24/24	204-206	6-8		Medium dense, gray and brown, fine SAND	204'		
205				7-17		and SILT, Clayey intervals, wet.	SAND and SILT	13	
206									
207									
208									
209	42	24/24	209-211	12-13		Medium dense, gray and brown, fine SAND			
210				9-20		and SILT, Clayey intervals, wet. Changing at	210'		
211						210.0 feet to: Very stiff, gray and brown,	SILT		
212						SILT, wet. Changing at 210.5 feet to: Very			
213						stiff, gray and brown, Clayey SILT, wet.			
214	43	24/24	214-216	1-6		Medium dense, gray and brown, fine to	214'		
215				9-20		medium SAND, little Silt, wet.	SAND	14	
216									
217									
218									
219	44	24/18	219-221	1-5		Medium dense, gray and brown, fine to			
220				8-17		medium SAND, little Silt, wet.			
221									
222									
223									
224	45	24/24	224-226	3-6		Medium dense, gray and brown, fine to			
225				16-36		medium SAND, little Silt, wet.			
226									

REMARKS

11. VAP groundwater sample was collected from approximately 185.0 to 190.0 feet below ground surface and submitted for analytical laboratory testing.
12. VAP groundwater sample was collected from approximately 195.0 to 200.0 feet below ground surface and submitted for analytical laboratory testing.
13. VAP groundwater sample was collected from approximately 205.0 to 210.0 feet below ground surface and submitted for analytical laboratory testing.
14. VAP groundwater sample was collected from approximately 215.0 to 220.0 feet below ground surface and submitted for analytical laboratory testing.

Stratification lines represent approximate boundary between soil types, transitions may be gradual. Water level readings have been made at times and under conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the time measurements were made.

Boring No.: AREA5-RI-11D

BORING_WELL 62961.21 AREA5.GPJ GZA_CORP.GDT 2/21/22

GZA GeoEnvironmental, Inc.
Engineers and Scientists

Wolverine World Wide, Inc.
Area 5 - RAP Implementation
Rockford, Michigan

Boring No.: AREA5-RI-11D
Page: 6 **of** 6
File No.: 16.0062961.21
Check: J. Groenleer

Depth	Sample Information: No.	Pen./ Rec. (in.)	Depth (Ft.)	Blows (/6")	Test Data	Sample Description & Classification	Stratum Desc.	Remarks	Equipment Installed
227							SAND		
228									
229	46	24/24	229-231	7-24 28-50/5"		Very dense, tan and brown, fine to medium SAND, little Silt, wet. Changing at 229.5 feet to: Hard, tan and brown, SILT, wet.			
230									
231									
232									
233									
234	47	18/18	234-235.5	10-17-30		Dense, tan, fine SAND, little Silt, wet.			
235									
236									
237									
238									
239	48	24/18	239-241	6-15 30-50/4"		Dense, tan, fine SAND, little Silt, wet.			
240									
241									
242									
243									
244									
245									
246									
247									
248									
249									
250									Filter Sand Pack
251									
252									
253									
254	49	18/18	254-255.5	4-38-53		Very dense, tan, fine SAND, little Silt, wet with Rock fragments in shoe.			
255									Top of Well Screen
256									
257									
258									2-Inch Dia. 5-Foot PVC Screen (0.010" Slot)
259	50	9/9	259-259.8	40-50/3"		Very dense, tan, fine SAND, little Silt, wet, transitioning to tan and gray, trace fine Gravel, wet.	259.8'		
260						Bottom of Borehole at 259.8 Feet		15	Bottom of Well Screen
261									
262									
263									
264									
265									
266									
267									
268									
269									
270									
271									
272									
273									

REMARKS

15. Monitoring well was installed in borehole upon completion. Well screen was set from 255.0 to 260.0 feet below ground surface.

Stratification lines represent approximate boundary between soil types, transitions may be gradual. Water level readings have been made at times and under conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the time measurements were made.

Boring No.: AREA5-RI-11D

BORING_WELL 62961.21 AREA5.GPJ GZA_CORP.GDT 2/21/22

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Woverine World Wide, Inc.
Area 5 RAP
Rockford, Michigan

Boring No.: HS-PMW-RI-103A
Page: 1 **of** 2
File No.: 16.0062961.21
Check: J. Groenleer

Contractor: Stearns Drilling Company
Foreman: J. Huntoon
Logged by: C. Melby
Date Start/Finish: 4-13-22 / 4-14-22
Boring Location: 582,330.6299 N; 12,790,582.1895 E
GS Elev.: 764.00' **Datum:** NAD83/NAVD88

	Auger/ Casing	Sampler
Type:	Hollow Stem Auger	Split Spoon
O.D. / I.D.:	8.0" / 4.25"	2.0" / 1 3/8"
Hammer Wt.:	140lbs	NA
Hammer Fall:	30.0"	NA
TOC Elev.:	766.42'	NA

GROUNDWATER READINGS

Date	Time	Depth	Casing	Stab

Surveyed By: EXXEL **Survey Date:** 5/20/2022

Depth	Sample Information: No.	Pen./ Rec. (in.)	Depth (Ft.)	Blows (/6")	Test Data	Sample Description & Classification	Stratum Desc.	Remarks	Equipment Installed
1–64						See HS-PMW-RI-103B for soil descriptions.			PROTECTIVE COVER; Backfill/Cement; Bentonite Grout

REMARKS

Stratification lines represent approximate boundary between soil types, transitions may be gradual. Water level readings have been made at times and under conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the time measurements were made.

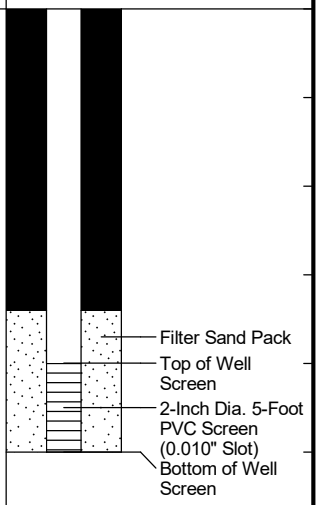
BORING_WELL 6296121 PMW-RI.GPJ GZA_CORP.GDT 11/9/22

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Rockford, Michigan

Boring No.: HS-PMW-RI-103A
Page: 2 **of** 2
File No.: 16.0062961.21
Check: J. Groenleer

Depth	Sample Information: No.	Pen./ Rec. (in.)	Depth (Ft.)	Blows (/6")	Test Data	Sample Description & Classification	Stratum Desc.	Remarks	Equipment Installed
66–89									
90						Bottom of Borehole at 90.0 Feet		1	
91–140									



REMARKS

1. Monitoring well was installed in borehole upon completion. Well screen was set from approximately 85.0 to 90.0 feet below ground surface.

Stratification lines represent approximate boundary between soil types, transitions may be gradual. Water level readings have been made at times and under conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the time measurements were made.

Boring No.: HS-PMW-RI-103A

BORING_WELL 6296121 PMW-RI.GPJ GZA_CORP.GDT 11/9/22

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Area 5 RAP
Rockford, Michigan

Boring No.: HS-PMW-RI-103B
Page: 1 **of** 3
File No.: 16.0062961.21
Check: J. Groenleer

Contractor: Stearns Drilling Company
Foreman: J. Huntoon/D. Krause
Logged by: C. Melby
Date Start/Finish: 8-12-21 / 8-17-21
Boring Location: 582,325.6374 N; 12,790,577.9313 E
GS Elev.: 764.37' **Datum:** NAD83/NAVD88

	Auger/ Casing	Sampler
Type:	Hollow Stem Auger	Split Spoon
O.D. / I.D.:	8.0" / 4.25"	2.0" / 1 3/8"
Hammer Wt.:	140lbs	NA
Hammer Fall:	30.0"	NA
TOC Elev.:	767.11'	NA

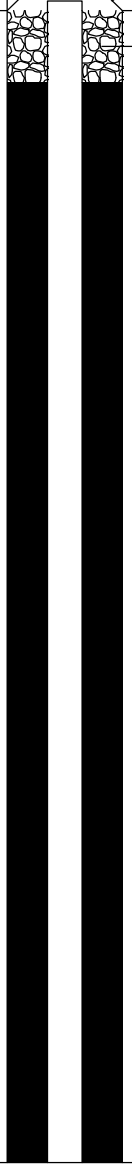
GROUNDWATER READINGS

Date	Time	Depth	Casing	Stab

Surveyed By: EXXEL **Survey Date:** 11/23/2021

Depth	Sample Information: No.	Pen./ Rec. (in.)	Depth (Ft.)	Blows (/6")	Test Data	Sample Description & Classification	Stratum Desc.	Remarks
1							SAND	
2								
3								
4	1	24/24	4-6	3-3 3-4		Loose, tan, fine SAND, little Silt, dry.		
5								
6								
7								
8								
9	2	24/24	9-11	3-5 5-8		Medium dense, tan, fine to medium SAND, trace Silt, moist.		
10								
11								
12								
13								
14	3	24/18	14-16	4-4 7-8		Medium dense, tan, fine to medium SAND, trace Silt, moist.		
15								
16								
17								
18								
19	4	24/18	19-21	4-9 12-14		Medium dense, tan, fine to medium SAND, trace Silt, moist.		
20								
21								
22								
23								
24	5	24/16	24-26	4-4 5-6		Loose, tan, fine to medium SAND, trace Silt, moist.		
25								
26								
27								
28								
29	6	24/24	29-31	3-6 6-10		Medium dense, tan, fine to medium SAND, trace Silt, moist.		
30								
31								
32								
33								
34	7	24/20	34-36	6-9 10-12		Medium dense, tan, fine to medium SAND, trace Silt, moist.		
35								
36								
37								
38								
39	8	24/24	39-41	6-11		Medium dense, tan, fine to medium SAND,		

Equipment Installed



REMARKS

Stratification lines represent approximate boundary between soil types, transitions may be gradual. Water level readings have been made at times and under conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the time measurements were made.

Boring No.: HS-PMW-RI-103B

BORING_WELL 6296121 PMW-RI.GPJ GZA_CORP.GDT 5/30/22

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Area 5 RAP
Rockford, Michigan

Boring No.: HS-PMW-RI-103B
Page: 2 **of** 3
File No.: 16.0062961.21
Check: J. Groenleer

Depth	Sample Information: No.	Pen./ Rec. (in.)	Depth (Ft.)	Blows (/6")	Test Data	Sample Description & Classification	Stratum Desc.	Remarks	Equipment Installed
41				12-20		trace Silt, moist.	SAND		
42									
43									
44	9	24/24	44-46	3-5 8-10		Medium dense, tan, fine to medium SAND, trace Silt, moist.			
45									
46									
47									
48									
49	10	24/18	49-51	2-2 3-5		Loose, tan, fine to medium SAND, trace Silt, with Silty lens at 49.0 feet, moist to wet.			
50									
51									
52									
53									Bentonite Grout
54	11	24/18	54-56	1-1 3-3		Loose, tan, fine to medium SAND, trace Silt, moist.			
55									
56									
57									
58									
59	12	24/20	59-61	1-3 9-11		Medium dense, tan, fine to medium SAND, trace Silt, moist.			
60									
61									
62									
63									
64	13	24/20	64-66	2-7 7-10		Medium dense, tan, fine to medium SAND, trace Silt, moist.			
65									
66									
67									
68									
69	14	24/18	69-71	4-16 17-17		Dense, tan, fine to medium SAND, trace Silt, moist.			
70									
71									
72									
73									
74	15	24/24	74-76	1-3 5-16		Loose, tan, fine to medium SAND, trace Silt, moist. Changing at 75.0 feet to: Loose, tan, fine to medium SAND, trace Silt, wet.		1 2	
75									
76									
77									
78									
79	16	24/24	79-81	1-2 8-15		Medium dense, tan, fine to medium SAND, trace Silt, wet.			
80									
81									
82									
83									
84	17	24/8	84-86	1-3 7-15		Medium dense, tan, fine to medium SAND, trace Silt, wet.			
85									
86									

REMARKS

1. Groundwater was encountered at approximately 75.0 feet below ground surface.
2. VAP groundwater sample was collected from approximately 75.0 to 80.0 feet below ground surface and submitted for analytical laboratory testing.

Stratification lines represent approximate boundary between soil types, transitions may be gradual. Water level readings have been made at times and under conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the time measurements were made.

Boring No.: HS-PMW-RI-103B

BORING_WELL 6296121 PMW-RI.GPJ GZA_CORP.GDT 5/30/22

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Woverine World Wide, Inc.
Area 5 RAP
Rockford, Michigan

Boring No.: HS-PMW-RI-103B
Page: 3 **of** 3
File No.: 16.0062961.21
Check: J. Groenleer

Depth	Sample Information					Sample Description & Classification	Stratum Desc.	Remarks	Equipment Installed
	No.	Pen./ Rec. (in.)	Depth (Ft.)	Blows (/6")	Test Data				
87–89	18	24/24	89-91	2-7 16-20		Medium dense, tan, fine to medium SAND, trace Silt, wet.	SAND	3	
90–94	19	24/24	94-96	5-10 21-50/5"		Dense, tan, fine to medium SAND, trace Silt, wet. Changing at 95.5 feet to: Dense, tan, fine SAND, some Silt, wet.		4	
95–99	20	24/24	99-101	10-15 19-34		Hard, tan and brown, SILT, little fine Sand, wet.	99' SILT		
100–104	21	24/24	104-106	11-15 19-20		Hard, brown, Clayey SILT, some fine to medium Sand, wet. Changing at 104.5 feet to: Dense, brown and tan, fine to medium SAND, trace Silt, wet.	104.5' SAND	5	Filter Sand Pack Top of Well Screen
105–109	22	24/24	109-111	5-9 10-18		Medium dense, brown and tan, fine to medium SAND, trace Silt, wet. Changing at 109.5 feet to: Stiff, gray, SILT & CLAY, little fine Sand, wet.	109.5' SILT & CLAY		2-Inch Dia. 5-Foot PVC Screen (0.010" Slot) Bottom of Well Screen
110–114	23	24/24	114-116	7-8 11-15		Very stiff, gray, Silty CLAY, trace fine Sand seams, wet to moist.	114' CLAY		
115–118	24	24/24	116-118	5-8 11-15		Very stiff, gray, Silty CLAY, trace fine Sand seams, wet to moist.	118'		
119–133						Bottom of Borehole at 118.0 Feet		6	

REMARKS

3. VAP groundwater sample was collected from approximately 85.0 to 90.0 feet below ground surface and submitted for analytical laboratory testing.
4. VAP groundwater sample was collected from approximately 95.0 to 100.0 feet below ground surface and submitted for analytical laboratory testing.
5. VAP groundwater sample was collected from approximately 105.0 to 110.0 feet below ground surface and submitted for analytical laboratory testing.
6. Monitoring well was installed in borehole upon completion. Well screen was set from approximately 106.0 to 111.0 feet below ground surface.

Stratification lines represent approximate boundary between soil types, transitions may be gradual. Water level readings have been made at times and under conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the time measurements were made.

Boring No.: HS-PMW-RI-103B

BORING_WELL 6296121 PMW-RI.GPJ GZA_CORP.GDT 5/30/22

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Area 5 RAP
Rockford, Michigan

Boring No.: HS-PMW-RI-104A
Page: 1 **of** 1
File No.: 16.0062961.21
Check: J. Groenleer

Contractor: Stearns Drilling Company
Foreman: J. Huntoon
Logged by: C. Melby
Date Start/Finish: 4-12-22 / 4-13-22
Boring Location: 580,466.2903 N; 12,792,378.6107 E
GS Elev.: 662.51' **Datum:** NAD83/NAVD88

	Auger/ Casing	Sampler
Type:	Hollow Stem Auger	Split Spoon
O.D. / I.D.:	8.0" / 4.25"	2.0" / 1 3/8"
Hammer Wt.:	140lbs	NA
Hammer Fall:	30.0"	NA
TOC Elev.:	662.03'	NA

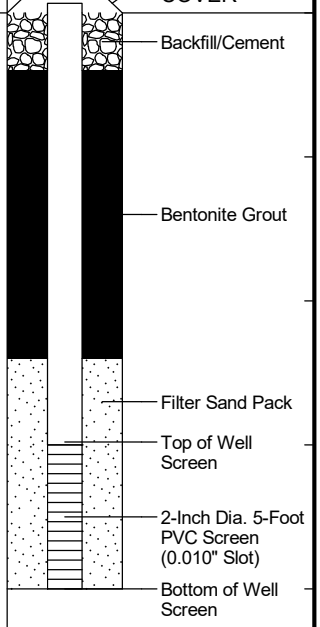
GROUNDWATER READINGS

Date	Time	Depth	Casing	Stab

Surveyed By: EXXEL **Survey Date:** 5/20/2022

Depth	Sample Information: No.	Pen./ Rec. (in.)	Depth (Ft.)	Blows (/6")	Test Data	Sample Description & Classification	Stratum Desc.	Remarks
1–19						See HS-PMW-RI-104D (112-117) for soil descriptions.		
20						Bottom of Borehole at 20.0 Feet		1
21–39								

Equipment Installed



REMARKS

1. Monitoring well was installed in borehole upon completion. Well screen was set from approximately 15.0 to 20.0 feet below ground surface.

Stratification lines represent approximate boundary between soil types, transitions may be gradual. Water level readings have been made at times and under conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the time measurements were made.

Boring No.: HS-PMW-RI-104A

BORING_WELL 6296121 PMW-RI.GPJ GZA_CORP.GDT 11/9/22

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Woverine World Wide, Inc.
Area 5 RAP
Rockford, Michigan

Boring No.: HS-PMW-RI-104B
Page: 1 **of** 1
File No.: 16.0062961.21
Check: J. Groenleer

Contractor: Stearns Drilling Company
Foreman: J. Huntoon
Logged by: C. Melby
Date Start/Finish: 4-12-22 / 4-12-22
Boring Location: 580,471.0955 N; 12,792,379.3431 E
GS Elev.: 662.67' **Datum:** NAD83/NAVD88

	Auger/ Casing	Sampler
Type:	Hollow Stem Auger	Split Spoon
O.D. / I.D.:	8.0" / 4.25"	2.0" / 1 3/8"
Hammer Wt.:	140lbs	NA
Hammer Fall:	30.0"	NA
TOC Elev.:	662.14'	NA

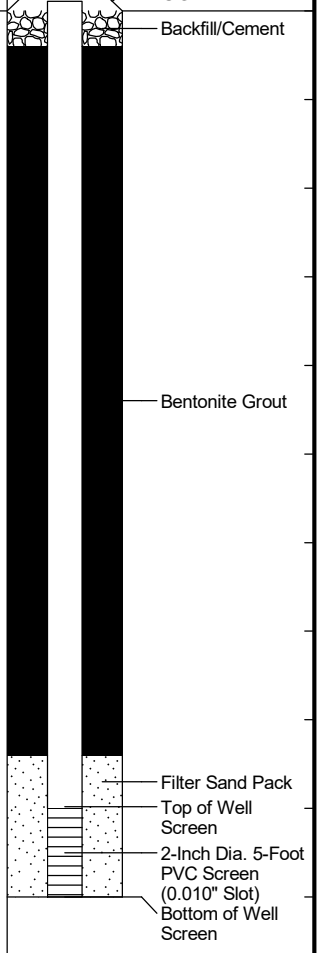
GROUNDWATER READINGS

Date	Time	Depth	Casing	Stab

Surveyed By: EXXEL **Survey Date:** 5/20/2022

Depth	Sample Information: No.	Pen./ Rec. (in.)	Depth (Ft.)	Blows (/6")	Test Data	Sample Description & Classification	Stratum Desc.	Remarks
1–64						See HS-PMW-RI-104D (112-117) for soil descriptions.		
50						Bottom of Borehole at 50.0 Feet		1

Equipment Installed



REMARKS

1. Monitoring well was installed in borehole upon completion. Well screen was set from approximately 45.0 to 50.0 feet below ground surface.

Stratification lines represent approximate boundary between soil types, transitions may be gradual. Water level readings have been made at times and under conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the time measurements were made.

Boring No.: HS-PMW-RI-104B

BORING_WELL 6296121 PMW-RI.GPJ GZA_CORP.GDT 11/9/22

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Area 5 RAP
Rockford, Michigan

Boring No.: HS-PMW-RI-104C
Page: 1 **of** 2
File No.: 16.0062961.21
Check: J. Groenleer

Contractor: Stearns Drilling Company
Foreman: J. Huntoon
Logged by: C. Melby
Date Start/Finish: 4-11-22 / 4-12-22
Boring Location: 580,475.0056 N; 12,792,382.6553 E
GS Elev.: 662.72' **Datum:** NAD83/NAVD88

	Auger/ Casing	Sampler
Type:	Hollow Stem Auger	Split Spoon
O.D. / I.D.:	8.0" / 4.25"	2.0" / 1 3/8"
Hammer Wt.:	140lbs	NA
Hammer Fall:	30.0"	NA
TOC Elev.:	662.23'	NA

GROUNDWATER READINGS

Date	Time	Depth	Casing	Stab

Surveyed By: EXXEL **Survey Date:** 5/20/2022

Depth	Sample Information: No.	Pen./ Rec. (in.)	Depth (Ft.)	Blows (/6")	Test Data	Sample Description & Classification	Stratum Desc.	Remarks	Equipment Installed
1–64						See HS-PMW-RI-104D for soil descriptions.			PROTECTIVE COVER; Backfill/Cement; Bentonite Grout

REMARKS

Stratification lines represent approximate boundary between soil types, transitions may be gradual. Water level readings have been made at times and under conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the time measurements were made.

BORING_WELL 6296121 PMW-RI.GPJ GZA_CORP.GDT 11/9/22

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Area 5 RAP
Rockford, Michigan

Boring No.: HS-PMW-RI-104C
Page: 2 **of** 2
File No.: 16.0062961.21
Check: J. Groenleer

Depth	Sample Information: No.	Pen./ Rec. (in.)	Depth (Ft.)	Blows (/6")	Test Data	Sample Description & Classification	Stratum Desc.	Remarks	Equipment Installed
66–80									Filter Sand Pack; Top of Well Screen; 2-Inch Dia. 5-Foot PVC Screen (0.010" Slot); Bottom of Well Screen
80						Bottom of Borehole at 80.0 Feet		1	

REMARKS

1. Monitoring well was installed in borehole upon completion. Well screen was set from approximately 75.0 to 80.0 feet below ground surface.

Stratification lines represent approximate boundary between soil types, transitions may be gradual. Water level readings have been made at times and under conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the time measurements were made.

Boring No.: HS-PMW-RI-104C

BORING_WELL 6296121 PMW-RI.GPJ GZA_CORP.GDT 11/9/22

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Rockford, Michigan

Boring No.: HS-PMW-RI-104D
Page: 1 of 3
File No.: 16.0062961.21
Check: J. Groenleer

Contractor: Stearns Drilling Company
Foreman: D. Krause
Logged by: C. Martin
Date Start/Finish: 9-23-21 / 10-4-21
Boring Location: 580,480.9452 N; 12,792,383.735 E
GS Elev.: 663.18' **Datum:** NAD83/NAVD88

	Auger/ Casing	Sampler
Type:	Hollow Stem Auger	Split Spoon
O.D. / I.D.:	8.0" / 4.25"	2.0" / 1 3/8"
Hammer Wt.:	140lbs	NA
Hammer Fall:	30.0"	NA
TOC Elev.:	662.44'	NA

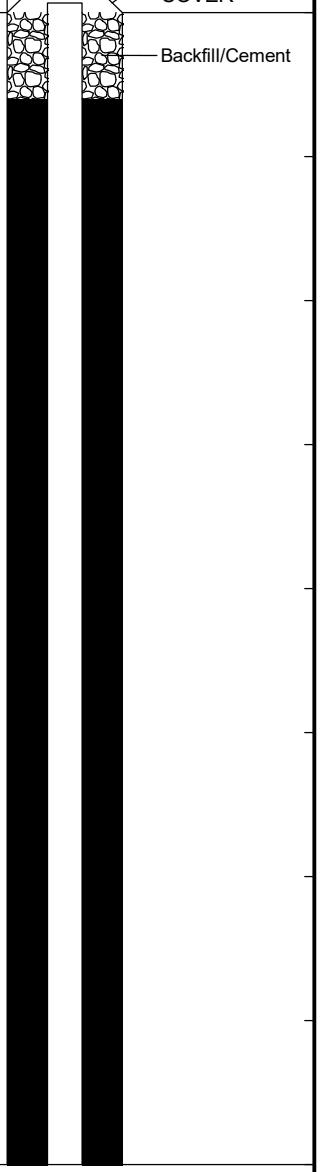
GROUNDWATER READINGS

Date	Time	Depth	Casing	Stab

Surveyed By: EXXEL **Survey Date:** 11/23/2021

Depth	Sample Information No.	Pen./ Rec. (in.)	Depth (Ft.)	Blows (/6")	Test Data	Sample Description & Classification	Stratum Desc.	Remarks
1							SAND	
2								
3								
4	1	24/14	4-6	1-2 2-3		Very loose, light brown, fine to medium SAND, trace Silt, dry.		
5								
6								
7								
8	2	24/16	9-11	1-1 2-3		Very loose, light brown, fine to medium SAND, trace Silt, dry.		
9								
10								
11								
12								
13								
14	3	24/14	14-16	1-1 1-2		Very loose, light brown, fine to medium SAND, trace Silt, wet.		1 2
15								
16								
17								
18								
19	4	24/17	19-21	2-3 5-5		Loose, light brown, fine to medium SAND, trace Silt, wet.		
20								
21								
22								
23								
24	5	24/17	24-26	2-4 7-11		Medium dense, light brown, fine to medium SAND, trace Silt, wet.		3
25								
26								
27								
28								
29	6	24/22	29-31	5-14 22-24		Dense, light brown, fine to medium SAND, trace Silt, wet.		
30								
31								
32								
33								
34	7	18/17	34-35.5	3-8-15		Medium dense, light brown, fine to medium SAND, trace Silt, wet.		4
35								
36								
37								
38								
39	8	24/22	39-41	2-5		Medium dense, light brown, fine to medium		

Equipment Installed



REMARKS

1. Groundwater was encountered at approximately 14.0 feet below ground surface.
2. VAP groundwater sample was collected from approximately 15.0 to 20.0 feet below ground surface and submitted for analytical laboratory testing.
3. VAP groundwater sample was collected from approximately 25.0 to 30.0 feet below ground surface and submitted for analytical laboratory testing.
4. VAP groundwater sample was collected from approximately 35.0 to 40.0 feet below ground surface and submitted for analytical laboratory testing.

Stratification lines represent approximate boundary between soil types, transitions may be gradual. Water level readings have been made at times and under conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the time measurements were made.

Boring No.: HS-PMW-RI-104D

BORING_WELL 6296121 PMW-RI.GPJ GZA_CORP.GDT 5/30/22

GZA GeoEnvironmental, Inc.
Engineers and Scientists

Woverine World Wide, Inc.
Area 5 RAP
Rockford, Michigan

Boring No.: HS-PMW-RI-104D
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File No.: 16.0062961.21
Check: J. Groenleer

Depth	Sample Information: No.	Pen./ Rec. (in.)	Depth (Ft.)	Blows (/6")	Test Data	Sample Description & Classification	Stratum Desc.	Remarks	Equipment Installed
41				14-19		SAND, trace Silt, wet.	SAND		
42									
43									
44	9	24/19	44-46	3-6		Medium dense, light brown, fine to medium			
45				9-12		SAND, trace Silt, wet.		5	
46									
47									
48									
49	10	24/22	49-51	5-8		Medium dense, light brown, fine to medium			
50				16-28		SAND, trace Silt, wet.			
51									
52									
53									
54	11	24/15	54-56	4-10		Medium dense, light brown, fine to medium			
55				12-12		SAND, trace Silt, wet.			
56								6	Bentonite Grout
57									
58									
59	12	24/19	59-61	4-3		Loose, light brown, fine to medium SAND,			
60				3-9		trace Silt, wet.			
61									
62									
63									
64	13	24/12	64-66	3-3		Loose, light brown, fine to medium SAND,			
65				4-10		trace Silt, wet. Changing at 65.8 feet to: Loose,			
66						light brown, fine to medium SAND and		7	
67						GRAVEL, trace Silt, wet.			
68									
69	14	24/15	69-71	3-8		Medium dense, light brown, fine to medium			
70				10-11		SAND, trace Silt, trace Gravel, wet.			
71									
72									
73									
74	15	24/10	74-76	2-5		Medium dense, light brown, fine to medium			
75				8-9		SAND, trace Silt, wet.			
76								8	
77									
78									
79	16	24/20	79-81	2-9		Medium dense, light brown, fine to medium			
80				15-8		SAND, trace Silt, wet.			
81									
82									
83									
84	17	24/20	84-86	6-6		Medium dense, light brown, fine to medium	85.2'		
85				8-7		SAND, trace Silt, wet. Changing at 85.2 feet	86' SILT		
86						to: Medium dense, gray, SILT, little fine Sand,	CLAY	9	

REMARKS

5. VAP groundwater sample was collected from approximately 45.0 to 50.0 feet below ground surface and submitted for analytical laboratory testing.
6. VAP groundwater sample was collected from approximately 55.0 to 60.0 feet below ground surface and submitted for analytical laboratory testing.
7. VAP groundwater sample was collected from approximately 65.0 to 70.0 feet below ground surface and submitted for analytical laboratory testing.
8. VAP groundwater sample was collected from approximately 75.0 to 80.0 feet below ground surface and submitted for analytical laboratory testing.
9. VAP groundwater sample was collected from approximately 85.0 to 90.0 feet below ground surface and submitted for analytical laboratory testing.
10. Driller noted a change in drilling at approximately 86.0 feet, likely CLAY.

Stratification lines represent approximate boundary between soil types, transitions may be gradual. Water level readings have been made at times and under conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the time measurements were made.

Boring No.: HS-PMW-RI-104D

BORING_WELL 6296121 PMW-RI.GPJ GZA_CORP.GDT 5/30/22

GZA GeoEnvironmental, Inc.
Engineers and Scientists

Woverine World Wide, Inc.
Area 5 RAP
Rockford, Michigan

Boring No.: HS-PMW-RI-104D
Page: 3 **of** 3
File No.: 16.0062961.21
Check: J. Groenleer

Depth	Sample Information: No.	Pen./ Rec. (in.)	Depth (Ft.)	Blows (/6")	Test Data	Sample Description & Classification	Stratum Desc.	Remarks	Equipment Installed
87						wet.	CLAY	10	
88									
89	18	15/6	89-90.3	8-39-50/3"		Hard, gray, Silty CLAY, trace Gravel, moist.		11	
90									
91									
92									
93									
94	19	12/9	94-95	14-59		Hard, gray, Silty CLAY, little Sand, trace Gravel, moist.			
95									
96									
97							97' GRAVEL / SAND	12	
98									
99	20	24/6	99-101	2-3 7-10		Medium dense, gray, GRAVEL and fine to coarse SAND, wet.			
100								13	
101									
102									
103									
104	21	24/24	104-106	9-30 9-56		Dense, light brrown, fine to medium SAND, trace Silt, wet. Changing at 105.2 feet to: Dense, light brown, fine to coarse SAND, little Gravel, trace Silt, wet.	104' SAND		
105									
106									
107									
108									
109	22	24/15	109-111	3-8 10-38		Dense, light brown, fine to coarse SAND, little Gravel, trace Silt, wet.		14	Filter Sand Pack
110									Top of Well Screen
111									
112									
113									
114	23	24/24	114-116	5-19 38-49		Very dense, light brown, fine to coarse SAND, little Gravel, trace Silt, wet.			2-Inch Dia. 5-Foot PVC Screen (0.010" Slot)
115									
116									
117							117.5' CLAY		
118								15	Bottom of Well Screen
119	24	16/10	119-120.3	8-33-50/4"		Hard, gray, Silty CLAY, trace Gravel, moist.			
120									
121	25	15/15	121-122.3	59-70-50/3"		Hard, gray, Silty CLAY, trace Gravel, moist.	122.3'		
122									
123						Bottom of Borehole at 122.3 Feet		16	
124									
125									
126									
127									
128									
129									
130									
131									
132									
133									

REMARKS

11. 10-inch casing installed from ground surface to approximately 89.0 feet below ground surface and grouted in place.
12. Driller noted a change in drilling at approximately 97.0 feet, likely GRAVEL/SAND.
13. VAP groundwater sample was collected from approximately 100.0 to 105.0 feet below ground surface and submitted for analytical laboratory testing.
14. VAP groundwater sample was collected from approximately 110.0 to 115.0 feet below ground surface and submitted for analytical laboratory testing.
15. Driller noted a change in drilling at approximately 117.5 feet, likely CLAY.
16. Monitoring well was installed in borehole upon completion. Well screen was set from 112.0 to 117.0 feet below ground surface.

Stratification lines represent approximate boundary between soil types, transitions may be gradual. Water level readings have been made at times and under conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the time measurements were made.

Boring No.: HS-PMW-RI-104D

BORING_WELL 6296121 PMW-RI.GPJ GZA_CORP.GDT 5/30/22

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Woverine World Wide, Inc.
Area 5 RAP
Rockford, Michigan

Boring No.: HS-PMW-RI-107A
Page: 1 **of** 2
File No.: 16.0062961.21
Check: J. Groenleer

Contractor: Stearns Drilling Company
Foreman: J. Huntoon
Logged by: C. Melby
Date Start/Finish: 4-14-22 / 4-15-22
Boring Location: 582,193.7067 N; 12,789,507.4994 E
GS Elev.: 740.10' **Datum:** NAD83/NAVD88

	Auger/ Casing	Sampler
Type:	Hollow Stem Auger	Split Spoon
O.D. / I.D.:	8.0" / 4.25"	2.0" / 1 3/8"
Hammer Wt.:	140lbs	NA
Hammer Fall:	30.0"	NA
TOC Elev.:	742.80'	NA

GROUNDWATER READINGS

Date	Time	Depth	Casing	Stab

Surveyed By: EXXEL **Survey Date:** 5/20/2022

Depth	Sample Information: No.	Pen./ Rec. (in.)	Depth (Ft.)	Blows (/6")	Test Data	Sample Description & Classification	Stratum Desc.	Remarks	Equipment Installed
1–64						See HS-PMW-RI-107D for soil descriptions.			PROTECTIVE COVER; Backfill/Cement; Bentonite Grout

REMARKS

Stratification lines represent approximate boundary between soil types, transitions may be gradual. Water level readings have been made at times and under conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the time measurements were made.

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Rockford, Michigan

Boring No.: HS-PMW-RI-107A
Page: 2 **of** 2
File No.: 16.0062961.21
Check: J. Groenleer

Depth	Sample Information: No.	Pen./ Rec. (in.)	Depth (Ft.)	Blows (/6")	Test Data	Sample Description & Classification	Stratum Desc.	Remarks	Equipment Installed
66–80									Filter Sand Pack; Top of Well Screen; 2-Inch Dia. 5-Foot PVC Screen (0.010" Slot); Bottom of Well Screen
80						Bottom of Borehole at 80.0 Feet		1	

REMARKS

1. Monitoring well was installed in borehole upon completion. Well screen was set from approximately 75.0 to 80.0 feet below ground surface.

Stratification lines represent approximate boundary between soil types, transitions may be gradual. Water level readings have been made at times and under conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the time measurements were made.

Boring No.: HS-PMW-RI-107A

BORING_WELL 6296121 PMW-RI.GPJ GZA_CORP.GDT 11/9/22

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Area 5 RAP
Rockford, Michigan

Boring No.: HS-PMW-RI-107B
Page: 1 **of** 3
File No.: 16.0062961.21
Check: J. Groenleer

Contractor: Stearns Drilling Company
Foreman: J. Huntoon
Logged by: M. Myers
Date Start/Finish: 4-25-22 / 4-26-22
Boring Location: 582,196.3670 N; 12,789,496.2267 E
GS Elev.: 740.30' **Datum:** NAD83/NAVD88

	Auger/ Casing	Sampler
Type:	Hollow Stem Auger	Split Spoon
O.D. / I.D.:	8.0" / 4.25"	2.0" / 1 3/8"
Hammer Wt.:	140lbs	NA
Hammer Fall:	30.0"	NA
TOC Elev.:	742.77'	NA

GROUNDWATER READINGS

Date	Time	Depth	Casing	Stab

Surveyed By: EXXEL **Survey Date:** 5/20/2022

Depth	Sample Information: No.	Pen./ Rec. (in.)	Depth (Ft.)	Blows (/6")	Test Data	Sample Description & Classification	Stratum Desc.	Remarks	Equipment Installed
1–64						See HS-PMW-RI-107D for soil descriptions.			PROTECTIVE COVER; Backfill/Cement

REMARKS

Stratification lines represent approximate boundary between soil types, transitions may be gradual. Water level readings have been made at times and under conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the time measurements were made.

Boring No.: HS-PMW-RI-107B

BORING_WELL 6296121 PMW-RI.GPJ GZA_CORP.GDT 11/9/22

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Rockford, Michigan

Boring No.: HS-PMW-RI-107B
Page: 2 **of** 3
File No.: 16.0062961.21
Check: J. Groenleer

Depth	Sample Information: No.	Pen./ Rec. (in.)	Depth (Ft.)	Blows (/6")	Test Data	Sample Description & Classification	Stratum Desc.	Remarks	Equipment Installed
66–140									Bentonite Grout

REMARKS

Stratification lines represent approximate boundary between soil types, transitions may be gradual. Water level readings have been made at times and under conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the time measurements were made.

Boring No.: HS-PMW-RI-107B

BORING_WELL 6296121 PMW-RI.GPJ GZA_CORP.GDT 11/9/22

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Rockford, Michigan

Boring No.: HS-PMW-RI-107B
Page: 3 **of** 3
File No.: 16.0062961.21
Check: J. Groenleer

Depth	Sample Information: No.	Pen./ Rec. (in.)	Depth (Ft.)	Blows (/6")	Test Data	Sample Description & Classification	Stratum Desc.	Remarks	Equipment Installed
142–176									Filter Sand Pack; Top of Well Screen; 2-Inch Dia. 5-Foot PVC Screen (0.010" Slot); Bottom of Well Screen
176						Bottom of Borehole at 176.0 Feet		1	

REMARKS

1. Monitoring well was installed in borehole upon completion. Well screen was set from approximately 171.0.0 to 176.0 feet below ground surface.

Stratification lines represent approximate boundary between soil types, transitions may be gradual. Water level readings have been made at times and under conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the time measurements were made.

Boring No.: HS-PMW-RI-107B

BORING_WELL 6296121 PMW-RI.GPJ GZA_CORP.GDT 11/9/22

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Area 5 RAP
Rockford, Michigan

Boring No.: HS-PMW-RI-107C
Page: 1 **of** 3
File No.: 16.0062961.21
Check: J. Groenleer

Contractor: Stearns Drilling Company
Foreman: J. Huntoon
Logged by: C. Melby
Date Start/Finish: 4-14-22 / 4-25-22
Boring Location: 582,190.7687 N; 12,789,493.7872 E
GS Elev.: 740.97' **Datum:** NAD83/NAVD88

	Auger/ Casing	Sampler
Type:	Hollow Stem Auger	Split Spoon
O.D. / I.D.:	8.0" / 4.25"	2.0" / 1 3/8"
Hammer Wt.:	140lbs	NA
Hammer Fall:	30.0"	NA
TOC Elev.:	742.86'	NA

GROUNDWATER READINGS

Date	Time	Depth	Casing	Stab
4/22/22	1330	62.9'	PVC	15 min

Surveyed By: EXXEL **Survey Date:** 5/20/2022

Depth	Sample Information: No.	Pen./ Rec. (in.)	Depth (Ft.)	Blows (/6")	Test Data	Sample Description & Classification	Stratum Desc.	Remarks
1	1		0			See HS-PMW-107D for soil descriptions.		1

Equipment Installed



REMARKS

1. 10-inch casing installed from ground surface to approximately 105 feet below ground surface and grouted in place.

Stratification lines represent approximate boundary between soil types, transitions may be gradual. Water level readings have been made at times and under conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the time measurements were made.

Boring No.: HS-PMW-RI-107C

BORING_WELL 6296121 PMW-RI.GPJ GZA_CORP.GDT 11/9/22

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Area 5 RAP
Rockford, Michigan

Boring No.: HS-PMW-RI-107C
Page: 2 **of** 3
File No.: 16.0062961.21
Check: J. Groenleer

Depth	Sample Information					Sample Description & Classification	Stratum Desc.	Remarks	Equipment Installed
	No.	Pen./ Rec. (in.)	Depth (Ft.)	Blows (/6")	Test Data				
66–140									Bentonite Grout

REMARKS

Stratification lines represent approximate boundary between soil types, transitions may be gradual. Water level readings have been made at times and under conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the time measurements were made.

BORING_WELL 6296121 PMW-RI.GPJ GZA_CORP.GDT 11/9/22

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Rockford, Michigan

Boring No.: HS-PMW-RI-107C
Page: 3 **of** 3
File No.: 16.0062961.21
Check: J. Groenleer

Depth	Sample Information: No.	Pen./ Rec. (in.)	Depth (Ft.)	Blows (/6")	Test Data	Sample Description & Classification	Stratum Desc.	Remarks	Equipment Installed
142–187									Filter Sand Pack; Top of Well Screen; 2-Inch Dia. 5-Foot PVC Screen (0.010" Slot); Bottom of Well Screen
188						Bottom of Borehole at 188.0 Feet		2	
189–216									

REMARKS

2. Monitoring well was installed in borehole upon completion. Well screen was set from approximately 183.0 to 188.0 feet below ground surface.

Stratification lines represent approximate boundary between soil types, transitions may be gradual. Water level readings have been made at times and under conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the time measurements were made.

Boring No.: HS-PMW-RI-107C

BORING_WELL 6296121 PMW-RI.GPJ GZA_CORP.GDT 11/9/22

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Woverine World Wide, Inc.
Area 5 RAP
Rockford, Michigan

Boring No.: HS-PMW-RI-107D
Page: 1 of 5
File No.: 16.0062961.21
Check: J. Groenleer

Contractor: Stearns Drilling Company
Foreman: D. Krause
Logged by: C. Martin/C. Melby
Date Start/Finish: 10-6-21 / 10-21-21
Boring Location: 582,188.5392 N; 12,789,498.1678 E
GS Elev.: 740.70' **Datum:** NAD83/NAVD88

	Auger/ Casing	Sampler
Type:	Hollow Stem Auger	Split Spoon
O.D. / I.D.:	8.0" / 4.25"	2.0" / 1 3/8"
Hammer Wt.:	140lbs	NA
Hammer Fall:	30.0"	NA
TOC Elev.:	741.58'	NA

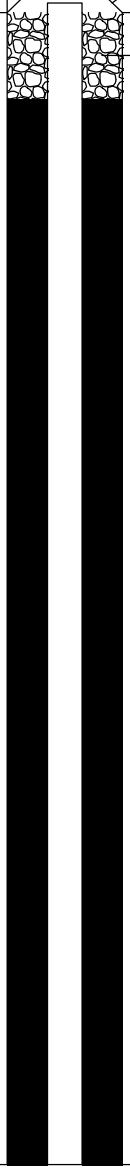
GROUNDWATER READINGS

Date	Time	Depth	Casing	Stab

Surveyed By: EXXEL **Survey Date:** 11/23/2021

Depth	Sample Information No.	Pen./ Rec. (in.)	Depth (Ft.)	Blows (/6")	Test Data	Sample Description & Classification	Stratum Desc.	Remarks
1							SAND	
2								
3								
4	1	24/15	4-6	1-2 2-2		Very loose, light brown, fine to medium SAND, trace Silt, dry.		
5								
6								
7								
8								
9	2	24/10	9-11	1-3 6-8		Very loose, light brown, fine to medium SAND, trace Silt, dry. Changing at 9.5 feet to: Loose, light brown, fine to medium SAND, trace Gravel, trace Silt, dry.		
10								
11								
12								
13								
14	3	24/17	14-16	6-8 11-11		Loose, light brown, fine to medium SAND, trace Gravel, trace Silt, dry. Changing at 4.3 feet to: Medium dense, light brown, fine to medium SAND, trace Silt, dry.		
15								
16								
17								
18								
19	4	24/17	19-21	3-5 7-9		Medium dense, light brown, fine to medium SAND, trace Silt, dry.		
20								
21								
22								
23								
24	5	24/22	24-26	4-7 10-11		Medium dense, light brown, fine to medium SAND, trace Silt, dry.		
25								
26								
27								
28								
29	6	24/23	29-31	9-13 17-12		Dense, light brown, fine to medium SAND, trace Silt, dry.		
30								
31								
32								
33								
34	7	24/24	34-36	2-3 6-6		Loose, light brown, fine to medium SAND, trace Silt, dry.		
35								
36								
37								
38								
39	8	24/22	39-41	3-7		Medium dense, light brown, fine to medium		

Equipment Installed



REMARKS

Stratification lines represent approximate boundary between soil types, transitions may be gradual. Water level readings have been made at times and under conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the time measurements were made.

Boring No.: HS-PMW-RI-107D

BORING_WELL 6296121 PMW-RI.GPJ GZA_CORP.GDT 5/30/22

GZA GeoEnvironmental, Inc.
Engineers and Scientists

Woverine World Wide, Inc.
Area 5 RAP
Rockford, Michigan

Boring No.: HS-PMW-RI-107D
Page: 2 **of** 5
File No.: 16.0062961.21
Check: J. Groenleer

Depth	Sample Information: No.	Pen./ Rec. (in.)	Depth (Ft.)	Blows (/6")	Test Data	Sample Description & Classification	Stratum Desc.	Remarks	Equipment Installed
41				12-11		SAND, trace Silt, dry.	SAND		
42									
43									
44	9	24/21	44-46	4-6		Medium dense, light brown, fine to medium SAND, trace Silt, dry. Changing at 45.8 feet to: Medium dense, light brown, fine to medium SAND, trace Silt, wet.		1	
45				11-11				2	
46									
47									
48									
49	10	24/20	49-51	2-5		Medium dense, light brown, fine to medium SAND, trace Silt, wet.			
50				10-10					
51									
52									
53									
54	11	24/10	54-56	1-1		Loose, light brown, fine to medium SAND, trace Silt, wet.		3	
55				2-4					
56									
57									
58									
59	12	24/11	59-61	2-3		Loose, light brown, fine to medium SAND, trace Silt, wet.			
60				9-18					
61									
62									
63									
64	13	24/24	64-66	2-7		Loose, light brown, fine to medium SAND, trace Silt, wet.		4	
65				16-14					
66									
67									
68									
69	14	24/17	69-71	3-6		Loose, light brown, fine to medium SAND, trace Silt, wet.			
70				10-22					
71									
72									
73									
74	15	24/13	74-76	3-5		Loose, light brown, fine to medium SAND, trace Silt, wet.		5	
75				11-12					
76									
77									
78									
79	16	24/19	79-81	2-3		Loose, light brown, fine to medium SAND, trace Silt, wet.			
80				3-6					
81									
82									
83									
84	17	24/17	84-86	2-3		Medium dense, light brown, fine to medium SAND, trace Silt, wet.		6	
85				8-15					
86									

REMARKS

1. VAP groundwater sample was collected from approximately 45.0 to 50.0 feet below ground surface and submitted for analytical laboratory testing.
2. Groundwater was encountered at approximately 45.8 feet below ground surface.
3. VAP groundwater sample was collected from approximately 55.0 to 60.0 feet below ground surface and submitted for analytical laboratory testing.
4. VAP groundwater sample was collected from approximately 65.0 to 70.0 feet below ground surface and submitted for analytical laboratory testing.
5. VAP groundwater sample was collected from approximately 75.0 to 80.0 feet below ground surface and submitted for analytical laboratory testing.
6. VAP groundwater sample was collected from approximately 85.0 to 90.0 feet below ground surface and submitted for analytical laboratory testing.

Stratification lines represent approximate boundary between soil types, transitions may be gradual. Water level readings have been made at times and under conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the time measurements were made.

Boring No.: HS-PMW-RI-107D

BORING_WELL 6296121 PMW-RI.GPJ GZA_CORP.GDT 5/30/22

GZA GeoEnvironmental, Inc.
Engineers and Scientists

Woverine World Wide, Inc.
Area 5 RAP
Rockford, Michigan

Boring No.: HS-PMW-RI-107D
Page: 3 **of** 5
File No.: 16.0062961.21
Check: J. Groenleer

Depth	Sample Information: No.	Pen./ Rec. (in.)	Depth (Ft.)	Blows (/6")	Test Data	Sample Description & Classification	Stratum Desc.	Remarks	Equipment Installed
87							SAND		
88									
89	18	24/15	89-91	1-2 4-7		Loose, light brown, fine to medium SAND, trace Silt, wet.			
90									
91									
92									
93									
94	19	24/24	94-96	5-7 11-31		Medium dense, light brown, fine to medium SAND, trace Silt, wet. Changing at 95.5 feet to: Very stiff, gray, Silty CLAY, moist.	95.5'	7	
95									
96	20	24/24	96-98	4-7 11-13		Very stiff, gray, SILT, little Clay, wet.	96' CLAY SILT		
97									Bentonite Grout
98									
99	21	24/24	99-101	4-12 24-44		Dense, gray, fine SAND, some Silt, wet.	99' SAND		
100									
101									
102									
103									
104	22	24/24	104-106	4-11 19-26		Very stiff, gray, Silty CLAY, trace Sand, moist.	104' CLAY		
105									
106	23	24/24	106-108	6-10 11-12		Very stiff, gray, Silty CLAY, moist.		8	
107									
108									
109	24	24/24	109-111	6-11 10-12		Very stiff, gray, Silty CLAY, moist.			
110									
111									
112									
113									
114	25	24/24	114-116	5-6 8-12		Stiff, gray, Silty CLAY, moist.			
115									
116									
117									
118									
119	26	24/24	119-121	4-4 8-19		Stiff, gray, Silty CLAY with lenses and seams of Silty and fine Sand interbedded, moist.			
120								9	
121									
122									
123									
124	27	24/24	124-126	7-19 29-31		Dense, gray, fine SAND and SILT, wet.	124' SAND and SILT		
125								10	
126									
127									
128									
129	28	20/20	129-130.7	6-10 45-50/4"		Very dense, gray, fine SAND and SILT, wet.			
130									
131									
132									
133									

REMARKS

7. VAP groundwater sample was collected from approximately 95.0 to 100.0 feet below ground surface and submitted for analytical laboratory testing.
8. 10-inch casing installed from ground surface to approximately 105.8 feet below ground surface and grouted in place.
9. VAP temporary well from approximately 120.0 to 125.0 feet below ground surface but did not produce enough groundwater for sample collection. No samples were submitted for analytical laboratory testing from this interval.
10. VAP groundwater sample was collected from approximately 125.0 to 130.0 feet below ground surface and submitted for analytical laboratory testing.

Stratification lines represent approximate boundary between soil types, transitions may be gradual. Water level readings have been made at times and under conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the time measurements were made.

Boring No.: HS-PMW-RI-107D

BORING_WELL 6296121 PMW-RI.GPJ GZA_CORP.GDT 5/30/22

GZA GeoEnvironmental, Inc.
Engineers and Scientists

Woverine World Wide, Inc.
Area 5 RAP
Rockford, Michigan

Boring No.: HS-PMW-RI-107D
Page: 4 **of** 5
File No.: 16.0062961.21
Check: J. Groenleer

Depth	Sample Information					Sample Description & Classification	Stratum Desc.	Remarks	Equipment Installed
	No.	Pen./ Rec. (in.)	Depth (Ft.)	Blows (/6")	Test Data				
134	29	24/24	134-136	8-19 31-48		Very dense, gray, fine SAND and SILT, wet.	SAND and SILT	11	
139	30	24/24	139-141	5-11 12-31		Medium dense, gray, fine SAND and SILT, wet.			
144	31	24/24	144-146	5-6 18-27		Medium dense, gray, fine to medium SAND, some Silt, wet.		12	
149	32	24/24	149-151	4-6 8-12		Medium dense, gray, fine to coarse SAND, little Silt, wet.			
154	33	24/14	154-156	11-13 15-21		Medium dense, gray, fine to coarse SAND, little Silt, wet (rock in spoon tip).		13	
159	34	24/16	159-161	3-7 25-32		Dense, gray, fine to medium SAND, little Silt, wet.		14	
164	35	24/0	164-166	10-6 19-21		NO RECOVERY (rock in spoon tip).	164' NO RECOVERY		
169	36	24/0	169-171	4-14 39-50/4"		NO RECOVERY. Attempt second spoon with new basket. No recovery. Sand bailer is brown, fine to medium Sand, little Silt, wet.	169' SAND		
174	37	24/0	174-176	1-6 14-24		NO RECOVERY. Sand bailer is brown, fine to medium Sand, little Silt, wet.		15	
179	38	24/0	179-181	3-7		NO RECOVERY. Sand bailer is brown, fine to			

REMARKS

11. VAP groundwater sample was collected from approximately 135.0 to 140.0 feet below ground surface and submitted for analytical laboratory testing.
12. VAP groundwater sample was collected from approximately 145.0 to 150.0 feet below ground surface and submitted for analytical laboratory testing.
13. VAP groundwater sample was collected from approximately 155.0 to 160.0 feet below ground surface and submitted for analytical laboratory testing.
14. VAP groundwater sample was collected from approximately 165.0 to 170.0 feet below ground surface and submitted for analytical laboratory testing.
15. VAP groundwater sample was collected from approximately 175.0 to 185.0 feet below ground surface and submitted for analytical laboratory testing.

Stratification lines represent approximate boundary between soil types, transitions may be gradual. Water level readings have been made at times and under conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the time measurements were made.

Boring No.: HS-PMW-RI-107D

BORING_WELL 6296121 PMW-RI.GPJ GZA_CORP.GDT 5/30/22

GZA GeoEnvironmental, Inc.
Engineers and Scientists

Woverine World Wide, Inc.
Area 5 RAP
Rockford, Michigan

Boring No.: HS-PMW-RI-107D
Page: 5 of 5
File No.: 16.0062961.21
Check: J. Groenleer

Depth	Sample Information: No.	Pen./ Rec. (in.)	Depth (Ft.)	Blows (/6")	Test Data	Sample Description & Classification	Stratum Desc.	Remarks	Equipment Installed
181				9-25		medium Sand, little Silt, wet.	SAND		
182									
183									
184	39	24/0	184-186	4-11		NO RECOVERY. Sand bailer is brown, fine to			
185				20-32		medium Sand, little Silt, wet.		16	
186									
187									
188									
189	40	24/0	189-191	4-4		NO RECOVERY. Sand bailer is brown, fine to			
190				5-7		medium Sand, little Silt, wet.			
191									
192									
193									
194	41	12/12	194-195	81-121		Very dense, brown, fine to medium SAND, little			
195						Silt, wet.		17	
196									
197									
198									
199	42	24/12	199-201	8-14		Hard, brown, SILT & CLAY, little fine Sand,	199' SILT & CLAY		
200				19-25		moist to wet.			
201	43	15/15	201-202.3	17-50-50/3"		Hard, brown, SILT & CLAY, little fine Sand,			
202						moist.	202'		
203						Bottom of Borehole at 202.3 Feet		18	
204									
205									
206									
207									
208									
209									
210									
211									
212									
213									
214									
215									
216									
217									
218									
219									
220									
221									
222									
223									
224									
225									
226									

Filter Sand Pack
Top of Well Screen
2-Inch Dia. 5-Foot PVC Screen (0.010" Slot)
Bottom of Well Screen

REMARKS

16. VAP groundwater sample was collected from approximately 185.0 to 170.0 feet below ground surface and submitted for analytical laboratory testing.
17. VAP groundwater sample was collected from approximately 194.0 to 199.0 feet below ground surface and submitted for analytical laboratory testing.
18. Monitoring well was installed in borehole upon completion. Well screen was set from 194.0 to 199.0 feet below ground surface.

Stratification lines represent approximate boundary between soil types, transitions may be gradual. Water level readings have been made at times and under conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the time measurements were made.

Boring No.: HS-PMW-RI-107D

BORING_WELL 6296121 PMW-RI.GPJ GZA_CORP.GDT 5/30/22

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Wolverine World Wide, LLC
Area 6 - RAP Implementation
Rockford, Michigan

Boring No.: HS-PMW-16A
Page: 1 **of** 2
File No.: 16.0062961.31
Check: J. Groenleer

Contractor: Stearns Drilling Company
Foreman: T. Hocking
Logged by: C. Melby
Date Start/Finish: 2-17-23 / 2-20-23
Boring Location: 585,199.1693 N; 12,790,557.5801E
GS Elev.: 766.40' **Datum:** NAD82/NAVD88

	Auger/ Casing	Sampler
Type:	Hollow Stem Auger	Split Spoon
O.D. / I.D.:	8.0" / 4.25"	2.0" / 1 3/8"
Hammer Wt.:	140lbs	NA
Hammer Fall:	30.0"	NA
TOC Elev.:	766.09'	NA

GROUNDWATER READINGS

Date	Time	Depth	Casing	Stab
2/20/23	0845	74.5'	-	>72 hrs

Surveyed By: EXXEL **Survey Date:** 2/24/2023

Depth	Sample Information: No.	Pen./ Rec. (in.)	Depth (Ft.)	Blows (/6")	Test Data	Sample Description & Classification	Stratum Desc.	Remarks	Equipment Installed
1–49						See HS-PMW-16C for soil and stratum descriptions.			PROTECTIVE COVER; Backfill / Cement Pad; Bentonite Grout

REMARKS

Stratification lines represent approximate boundary between soil types, transitions may be gradual. Water level readings have been made at times and under conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the time measurements were made.

Boring No.: HS-PMW-RI-16A

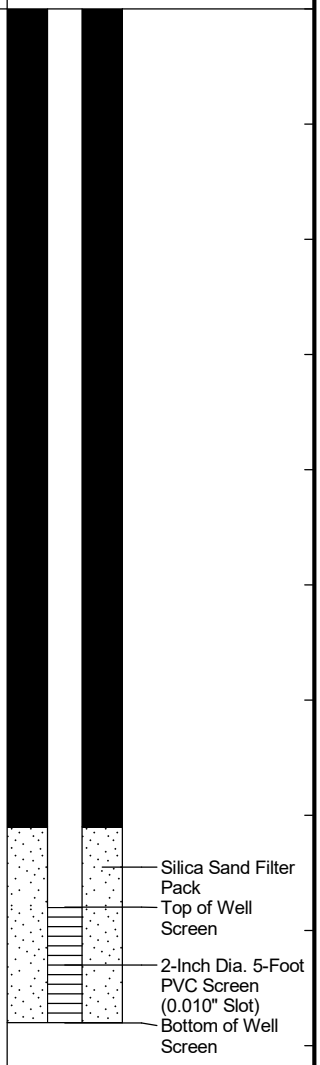
BORING_WELL 62961.31 AREA6.GPJ GZA_CORP.GDT 4/25/23

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Area 6 - RAP Implementation
Rockford, Michigan

Boring No.: HS-PMW-RI-16A
Page: 2 **of** 2
File No.: 16.0062961.31
Check: J. Groenleer

Depth	Sample Information: No.	Pen./ Rec. (in.)	Depth (Ft.)	Blows (/6")	Test Data	Sample Description & Classification	Stratum Desc.	Remarks	Equipment Installed
51–108									
94						Bottom of Borehole at 94.0 Feet		1	



REMARKS

1. Monitoring well was installed in borehole upon completion. Well screen set from approximately 89.0 to 94.0 feet below ground surface.

Stratification lines represent approximate boundary between soil types, transitions may be gradual. Water level readings have been made at times and under conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the time measurements were made.

Boring No.: HS-PMW-RI-16A

BORING_WELL 62961.31 AREA6.GPJ GZA_CORP.GDT 4/25/23

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Area 6 - RAP Implementation
Rockford, Michigan

Boring No.: HS-PMW-16B
Page: 1 **of** 2
File No.: 16.0062961.31
Check: J. Groenleer

Contractor: Stearns Drilling Company
Foreman: T. Hocking
Logged by: C. Melby
Date Start/Finish: 2-16-23 / 2-20-23
Boring Location: 585,193.1990 N; 12,790,557.8229 E
GS Elev.: 766.67' **Datum:** NAD82/NAVD88

	Auger/ Casing	Sampler
Type:	Hollow Stem Auger	Split Spoon
O.D. / I.D.:	8.0" / 4.25"	2.0" / 1 3/8"
Hammer Wt.:	140lbs	NA
Hammer Fall:	30.0"	NA
TOC Elev.:	766.09'	NA

GROUNDWATER READINGS

Date	Time	Depth	Casing	Stab
2/20/23	1400	74.7'	-	3hrs

Surveyed By: EXXEL **Survey Date:** 2/24/2023

Depth	Sample Information: No.	Pen./ Rec. (in.)	Depth (Ft.)	Blows (/6")	Test Data	Sample Description & Classification	Stratum Desc.	Remarks	Equipment Installed
1–61						See HS-PMW-16C for soil and stratum descriptions.			PROTECTIVE COVER; Backfill / Cement Pad; Bentonite Grout

REMARKS

Stratification lines represent approximate boundary between soil types, transitions may be gradual. Water level readings have been made at times and under conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the time measurements were made.

Boring No.: HS-PMW-RI-16B

BORING_WELL 62961.31 AREA6.GPJ GZA_CORP.GDT 3/29/23

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Rockford, Michigan

Boring No.: HS-PMW-RI-16B
Page: 2 **of** 2
File No.: 16.0062961.31
Check: J. Groenleer

Depth	Sample Information					Sample Description & Classification	Stratum Desc.	Remarks	Equipment Installed
	No.	Pen./ Rec. (in.)	Depth (Ft.)	Blows (/6")	Test Data				
63–133						Bottom of Borehole at 121.0 Feet		1	Silica Sand Filter Pack; Top of Well Screen; 2-Inch Dia. 5-Foot PVC Screen (0.010" Slot); Bottom of Well Screen

REMARKS

1. Monitoring well was installed in borehole upon completion. Well screen set from approximately 116.0 to 121.0 feet below ground surface.

Stratification lines represent approximate boundary between soil types, transitions may be gradual. Water level readings have been made at times and under conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the time measurements were made.

Boring No.: HS-PMW-RI-16B

BORING_WELL 62961.31 AREA6.GPJ GZA_CORP.GDT 3/29/23

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Area 6 - RAP Implementation
Rockford, Michigan

Boring No.: HS-PMW-16C
Page: 1 **of** 4
File No.: 16.0062961.31
Check: J. Groenleer

Contractor: Stearns Drilling Company
Foreman: J. Huntoon
Logged by: C. Melby/N. Kampfschulte
Date Start/Finish: 12-29-22 / 1-9-23
Boring Location: 585,187.5119 N; 12,790,557.8017 E
GS Elev.: 766.82' **Datum:** NAD82/NAVD88

	Auger/ Casing	Sampler
Type:	Hollow Stem Auger	Split Spoon
O.D. / I.D.:	8.0" / 4.25"	2.0" / 1 3/8"
Hammer Wt.:	140lbs	NA
Hammer Fall:	30.0"	NA
TOC Elev.:	766.54'	NA

GROUNDWATER READINGS

Date	Time	Depth	Casing	Stab

Surveyed By: EXXEL **Survey Date:** 2/24/2023

Depth	Sample Information No.	Pen./ Rec. (in.)	Depth (Ft.)	Blows (/6")	Test Data	Sample Description & Classification	Stratum Desc.	Remarks	Equipment Installed
1–39	1	24/22	4-6	5-6 6-11		Medium dense, brown, fine to medium SAND, trace Silt, moist.	SAND		PROTECTIVE COVER; Backfill/Cement Pad
	2	24/24	9-11	8-11 12-12		Medium dense, light brown, fine SAND, some Silt, moist.			
	3	24/24	14-16	5-8 9-10		Medium dense, light brown, fine SAND, some Silt, moist.			
	4	24/24	19-21	8-11 13-15		Medium dense, light brown, fine SAND, some Silt, moist.			
	5	24/24	24-26	9-12 13-15		Medium dense, light brown, fine SAND, some Silt, moist.			
	6	24/24	29-31	10-14 17-18		Dense, light brown, fine SAND, some Silt, moist.			
	7	24/24	34-36	10-13 17-22		Dense, light brown, fine SAND, some Silt, moist.			
	8	24/24	39-41	12-22		Dense, light brown, fine SAND, some Silt,			

REMARKS

Stratification lines represent approximate boundary between soil types, transitions may be gradual. Water level readings have been made at times and under conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the time measurements were made.

Boring No.: HS-PMW-16C

BORING_WELL 62961.31 AREA6.GPJ GZA_CORP.GDT 3/29/23

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Wolverine World Wide, LLC
Area 6 - RAP Implementation
Rockford, Michigan

Boring No.: HS-PMW-16C
Page: 2 **of** 4
File No.: 16.0062961.31
Check: J. Groenleer

Depth	Sample Information: No.	Pen./ Rec. (in.)	Depth (Ft.)	Blows (/6")	Test Data	Sample Description & Classification	Stratum Desc.	Remarks	Equipment Installed
41				24-50		moist.	SAND		
42									
43									
44	9	24/24	44-46	14-18 19-33		Dense, light brown, fine SAND, some Silt, moist.			
45									
46									
47									
48									
49	10	24/24	49-51	12-13 10-14		Medium dense, light brown, fine SAND, some Silt, moist. Changing at 50.8 feet to: Very stiff, brown and gray, SILT & CLAY, moist.	50.8' SILT & CLAY		
50									
51									
52									
53									
54	11	23/23	54-55.9	10-25 31-50/5"		Very dense, light brown, fine SAND, some Silt, moist.	54' SAND		
55									
56									
57									
58									
59	12	24/24	59-61	11-27 39-41		Very dense, light brown, fine SAND, some Silt, moist.			
60									
61									
62									
63									
64	13	24/24	64-66	5-12 20-28		Dense, light brown, fine SAND, some Silt, moist.			
65									
66									
67									
68									
69	14	24/24	69-71	8-15 27-48		Dense, light brown, fine SAND, some Silt, moist.			
70									
71									
72									
73									
74	15	24/24	74-76	6-9 14-16		Medium dense, light brown, fine SAND, some Silt, moist. Changing at 74.3 feet to: Medium dense, light brown, fine SAND, some Silt, wet.		1	
75									
76									
77									
78									Bentonite Grout
79	16	24/24	79-81	6-8 11-13		Medium dense, light brown, fine SAND, some Silt, moist.		2	
80									
81									
82									
83									
84	17	24/24	84-86	1-2 5-8		Loose, brown, fine SAND, some Silt, wet.			
85									
86									

REMARKS

1. Groundwater was encountered at approximately 74.0 feet below ground surface.
2. VAP groundwater sample was collected from approximately 79.0 to 84.0 feet below ground surface and submitted for analytical laboratory testing.

Stratification lines represent approximate boundary between soil types, transitions may be gradual. Water level readings have been made at times and under conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the time measurements were made.

Boring No.: HS-PMW-16C

BORING_WELL 62961.31 AREA6.GPJ GZA_CORP.GDT 3/29/23

GZA GeoEnvironmental, Inc.
Engineers and Scientists

Wolverine World Wide, LLC
Area 6 - RAP Implementation
Rockford, Michigan

Boring No.: HS-PMW-16C
Page: 3 **of** 4
File No.: 16.0062961.31
Check: J. Groenleer

Depth	Sample Information: No.	Pen./ Rec. (in.)	Depth (Ft.)	Blows (/6")	Test Data	Sample Description & Classification	Stratum Desc.	Remarks	Equipment Installed
87							SAND		
88									
89	18	24/24	89-91	6-10 19-25		Medium dense, brown, fine SAND, some Silt, wet.		3	
90									
91									
92									
93									
94	19	24/24	94-96	1-4 6-16		Medium dense, brown, fine SAND, some Silt, wet.			
95									
96									
97									
98									
99	20	24/24	99-101	1-2 3-11		Loose, brown, fine to medium SAND, some Silt, wet.		4	
100									
101									
102									
103									
104	21	24/24	104-106	3-4 12-22		Medium dense, brown, fine to medium SAND, some Silt, wet.			
105									
106									
107									
108									
109	22	24/24	109-111	4-8 20-28		Medium dense, brown, fine to medium SAND, some Silt, wet.		5	
110									
111									
112									
113									
114	23	24/24	114-116	2-6 12-31		Medium dense, brown, fine to medium SAND, some Silt, wet.			
115									
116									
117									
118									
119	24	24/20	119-121	1-1 2-5		Very loose, brown, fine to medium SAND, trace Silt, wet.		6	
120									
121									
122									
123									
124	25	24/24	124-126	3-12 35-50/5"		Dense, brown, fine to medium SAND, trace Silt, wet.			
125									
126									
127									
128									
129	26	24/24	129-131	3-12 28-40		Dense, brown, fine to medium SAND, little Silt, wet.		7	
130									
131									
132									
133									

REMARKS

3. VAP groundwater sample was collected from approximately 89.0 to 94.0 feet below ground surface and submitted for analytical laboratory testing.
4. VAP groundwater sample was collected from approximately 99.0 to 104.0 feet below ground surface and submitted for analytical laboratory testing.
5. VAP groundwater sample was collected from approximately 109.0 to 114.0 feet below ground surface and submitted for analytical laboratory testing.
6. VAP groundwater sample was collected from approximately 119.0 to 124.0 feet below ground surface and submitted for analytical laboratory testing.
7. VAP groundwater sample was collected from approximately 129.0 to 134.0 feet below ground surface and submitted for analytical laboratory testing.

Stratification lines represent approximate boundary between soil types, transitions may be gradual. Water level readings have been made at times and under conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the time measurements were made.

Boring No.: HS-PMW-16C

BORING_WELL 62961.31 AREA6.GPJ GZA_CORP.GDT 3/29/23

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GeoEnvironmental, Inc.
Engineers and Scientists

Wolverine World Wide, LLC
Area 6 - RAP Implementation
Rockford, Michigan

Boring No.: HS-PMW-16C
Page: 4 **of** 4
File No.: 16.0062961.31
Check: J. Groenleer

Depth	Sample Information: No.	Pen./ Rec. (in.)	Depth (Ft.)	Blows (/6")	Test Data	Sample Description & Classification	Stratum Desc.	Remarks	Equipment Installed
134	27	22/22	134-135.8	10-22 35-50/4"		Very dense, brown, fine to medium SAND, little Silt, wet.	SAND		
139	28	17/17	139-140.4	13-40-50/5"		Very dense, brown, fine to medium SAND, little Silt, wet.		8	
144	29	24/24	144-146	4-4 8-16		Medium dense, brown, fine to medium SAND, little Silt, wet.			
149	30	22/22	149-150.8	4-15 34-50/4"		Dense, brown, fine to medium SAND, little Silt, wet.		9	
154	31	21/21	154-155.8	7-19 44-50/3"		Very dense, brown, fine to medium SAND, little Silt, wet.			Silica Sand Filter Pack
159	32	18/18	159-160.5	10-20-50/6"		Very dense, brown, fine to medium SAND, little Silt, wet.		10	Top of Well Screen 2-Inch Dia. 5-Foot PVC Screen (0.010" Slot)
164	33	11/11	164-164.9	34-50/5"		Very dense, brown, fine to medium SAND, little Silt, wet. Changing at 164.1 feet to:	164.1' Silty CLAY		Bottom of Well screen
165	34	11/11	165-165.9	37-50/5"		Gray, Silty CLAY and fine to coarse Sand embedded, moist to wet. Gray, Silty CLAY and fine to coarse Sand embedded, moist to wet. Bottom of Borehole at 165.9 Feet	165.9'	11	

REMARKS

8. VAP groundwater sample was collected from approximately 139.0 to 144.0 feet below ground surface and submitted for analytical laboratory testing.
9. VAP groundwater sample was collected from approximately 149.0 to 154.0 feet below ground surface and submitted for analytical laboratory testing.
10. VAP groundwater sample was collected from approximately 159.0 to 164.0 feet below ground surface and submitted for analytical laboratory testing.
11. Monitoring well was installed in borehole upon completion. Well screen set from approximately 159.0 to 164.0 feet below ground surface.

Stratification lines represent approximate boundary between soil types, transitions may be gradual. Water level readings have been made at times and under conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the time measurements were made.

Boring No.: HS-PMW-16C

BORING_WELL 62961.31 AREA6.GPJ GZA_CORP.GDT 3/29/23

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Wolverine World Wide, Inc.
Area 6 - RAP Implementation
Rockford, Michigan

Boring No.: HS-PMW-RI-108A
Page: 1 **of** 2
File No.: 16.0062961.31
Check: J. Groenleer

Contractor: Stearns Drilling Company
Foreman: Jerry Huntoon
Logged by: C. Melby
Date Start/Finish: 3-18-21 / 3-22-21
Boring Location: 588,318.2542 N; 12,791,007.6131 E
GS Elev.: 816.50' **Datum:** NAD82/NAVD88

	Auger/ Casing	Sampler
Type:	Hollow Stem Auger	Split Spoon
O.D. / I.D.:	8.0" / 4.25"	2.0" / 1 3/8"
Hammer Wt.:	140lbs	NA
Hammer Fall:	30.0"	NA
TOC Elev.:	815.86'	NA

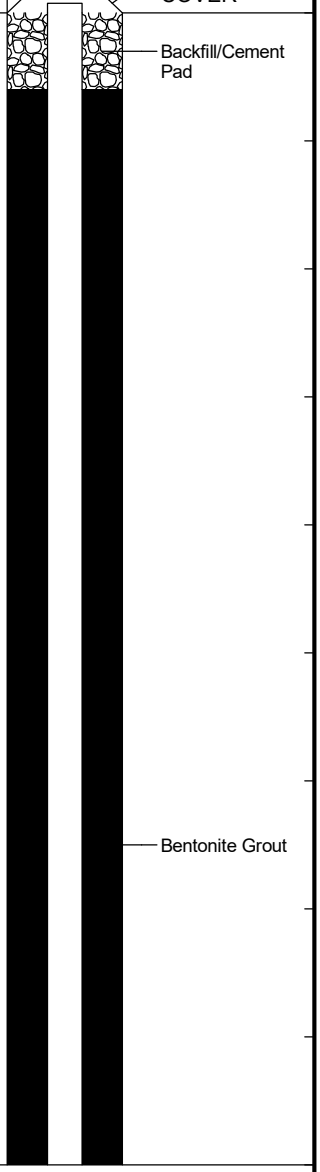
GROUNDWATER READINGS

Date	Time	Depth	Casing	Stab
3/18/21	1030	13.0'	15.0'	5min

Surveyed By: EXXEL **Survey Date:** 5/25/2021

Depth	Sample Information No.	Pen./ Rec. (in.)	Depth (Ft.)	Blows (/6")	Test Data	Sample Description & Classification	Stratum Desc.	Remarks
1–8	1	24/24	4-6	2-2 3-5		Medium stiff, brown, CLAY & SILT, some fine to medium Sand, dry.	CLAY & SILT	
9–13	2	24/24	9-11	4-7 8-9		Medium stiff, brown, CLAY & SILT, dry. Changing at 9.3 feet to: Medium dense, brown, fine to medium SAND, trace Silt, dry.	9.3' SAND	
14–18	3	24/24	14-16	4-4 4-3		Loose, brown, fine to medium SAND, trace Silt, dry.		
19–23	4	24/24	19-21	7-9 12-18		Medium dense, brown, fine to medium SAND, trace Silt, wet.		1
24–28	5	24/24	24-26	3-9 4-4		Medium dense, brown, fine to medium SAND, trace Silt, wet. Changing at 25.8 feet to: Medium dense, brown, GRAVEL and fine to medium SAND, wet.	25.8' GRAVEL / SAND	
29–33	6	24/16	29-31	10-7 10-10		Very stiff, gray, CLAY & SILT, some medium to coarse Sand, embedded, moist.	29' CLAY & SILT	2
34–38	7	24/10	34-36	7-7 12-20		Very stiff, gray and brown, CLAY & SILT, some medium to coarse Sand, embedded, moist.		
39–43	8	24/18	39-41	9-10 13-16		Very stiff, gray and brown, CLAY & SILT, some medium to coarse Sand, embedded, moist.		
44	9	24/24	44-46	3-5		Stiff, gray and brown, CLAY & SILT, some		

Equipment Installed



REMARKS

1. VAP groundwater sample was collected from approximately 20.0 to 25.0 feet below ground surface and submitted for analytical laboratory testing.
2. 10-inch casing installed from ground surface to approximately 30.0 feet below ground surface and grouted in place.

Stratification lines represent approximate boundary between soil types, transitions may be gradual. Water level readings have been made at times and under conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the time measurements were made.

Boring No.: HS-PMW-RI-108A

BORING_WELL 62961.31 AREA6 PMW RI 108.GPJ GZA_CORP.GDT 2/22/22

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Engineers and Scientists

Wolverine World Wide, Inc.
Area 6 - RAP Implementation
Rockford, Michigan

Boring No.: HS-PMW-RI-108A
Page: 2 **of** 2
File No.: 16.0062961.31
Check: J. Groenleer

Depth	Sample Information: No.	Pen./ Rec. (in.)	Depth (Ft.)	Blows (/6")	Test Data	Sample Description & Classification	Stratum Desc.	Remarks	Equipment Installed
46				10-21		medium Sand, embedded, moist. Changing at 45.5 feet to: Brown, fine to medium SAND, trace Silt, wet.	45.5' SAND		
49	10	24/12	49-51	2-4 11-16		Medium dense, brown, fine to medium SAND, trace Silt, wet.		3	
54	11	24/24	54-56	7-16 27-27		Dense, gray and brown, fine SAND and SILT, wet.	54' SAND and SILT		
59	12	24/16	59-61	4-11 14-16		Medium dense, gray and brown, fine SAND and SILT, wet.		4	
64	13	24/18	64-66	8-5 17-26		Medium dense, gray and brown, fine SAND and SILT, wet.			Silica Sand Filter Pack Top of Well Screen 2-Inch Dia. 5-Foot PVC Screen (0.010" Slot)
69	14	24/15	69-71	25-54-50/3"		Very dense, gray and brown, fine to medium SAND, some Silt, interbedded, wet.	69' SAND	5	
74	15	24/24	74-76	8-13 34-37		Medium dense, brown and gray, fine to medium SAND and SILT, wet. Changing at 74.5 feet to: Gray, CLAY & SILT, some fine to coarse Sand, wet.	74' 74.5' SAND and SILT / CLAY & SILT 76'		
76						Bottom of Borehole at 76.0 Feet		6	

REMARKS

3. VAP groundwater sample was collected from approximately 50.0 to 55.0 feet below ground surface and submitted for analytical laboratory testing.
4. VAP groundwater sample was collected from approximately 60.0 to 65.0 feet below ground surface and submitted for analytical laboratory testing.
5. VAP groundwater sample was collected from approximately 70.0 to 70.5 feet below ground surface and submitted for analytical laboratory testing.
6. Monitoring well was installed in borehole upon completion. Well screen set from 65.0 to 70.0 feet below ground surface.

Stratification lines represent approximate boundary between soil types, transitions may be gradual. Water level readings have been made at times and under conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the time measurements were made.

Boring No.: HS-PMW-RI-108A

BORING_WELL 62961.31 AREA6 PMW RI 108.GPJ GZA_CORP.GDT 2/22/22

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Area 6 - RAP Implementation
Rockford, Michigan

Boring No.: HS-PMW-RI-108B
Page: 1 **of** 3
File No.: 16.0062961.31
Check: J. Groenleer

Contractor: Stearns Drilling Company
Foreman: Jerry Huntoon
Logged by: C. Melby
Date Start/Finish: 6-15-21 / 6-21-21
Boring Location: 588,323.0558 N; 12,791,000.9100 E
GS Elev.: 816.06' **Datum:** NAD82/NAVD88

	Auger/ Casing	Sampler
Type:	Hollow Stem Auger	Split Spoon
O.D. / I.D.:	8.0" / 4.25"	2.0" / 1 3/8"
Hammer Wt.:	140lbs	NA
Hammer Fall:	30.0"	NA
TOC Elev.:	815.52'	NA

GROUNDWATER READINGS

Date	Time	Depth	Casing	Stab

Surveyed By: EXXEL **Survey Date:** 8/18/2021

Depth	Sample Information: No.	Pen./ Rec. (in.)	Depth (Ft.)	Blows (/6")	Test Data	Sample Description & Classification	Stratum Desc.	Remarks	Equipment Installed
1–44						See HS-PMW-RI-108A and HS-PMW-RI-108D for soil descriptions.			PROTECTIVE COVER; Backfill/Cement Pad

REMARKS

Stratification lines represent approximate boundary between soil types, transitions may be gradual. Water level readings have been made at times and under conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the time measurements were made.

Boring No.: HS-PMW-RI-108B

BORING_WELL 62961.31 AREA6 PMW RI 108.GPJ GZA_CORP.GDT 2/22/22

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Rockford, Michigan

Boring No.: HS-PMW-RI-108B
Page: 2 **of** 3
File No.: 16.0062961.31
Check: J. Groenleer

Depth	Sample Information					Sample Description & Classification	Stratum Desc.	Remarks	Equipment Installed
	No.	Pen./ Rec. (in.)	Depth (Ft.)	Blows (/6")	Test Data				
46–97								1	Bentonite Grout

REMARKS

1. 10-inch casing installed from ground surface to approximately 75 feet below ground surface and grouted in place.

Stratification lines represent approximate boundary between soil types, transitions may be gradual. Water level readings have been made at times and under conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the time measurements were made.

Boring No.: HS-PMW-RI-108B

BORING_WELL 62961.31 AREA6 PMW RI 108.GPJ GZA_CORP.GDT 2/22/22

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Boring No.: HS-PMW-RI-108B
Page: 3 **of** 3
File No.: 16.0062961.31
Check: J. Groenleer

Depth	Sample Information: No.	Pen./ Rec. (in.)	Depth (Ft.)	Blows (/6")	Test Data	Sample Description & Classification	Stratum Desc.	Remarks	Equipment Installed
98–149						Bottom of Borehole at 135.0 Feet		2	Silica Sand Filter Pack; Top of Well Screen; 2-Inch Dia. 5-Foot PVC Screen (0.010" Slot); Bottom of Well screen

REMARKS

2. Monitoring well was installed in borehole upon completion. Well screen set from 130.0 to 135.0 feet below ground surface.

Stratification lines represent approximate boundary between soil types, transitions may be gradual. Water level readings have been made at times and under conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the time measurements were made.

BORING_WELL 62961.31 AREA6 PMW RI 108.GPJ GZA_CORP.GDT 2/22/22

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Rockford, Michigan

Boring No.: HS-PMW-RI-108C
Page: 1 **of** 3
File No.: 16.0062961.31
Check: J. Groenleer

Contractor: Stearns Drilling Company
Foreman: Jerry Huntoon
Logged by: C. Melby
Date Start/Finish: 6-1-21 / 6-23-21
Boring Location: 588,320.8123 N; 12,791,005.5733 E
GS Elev.: 816.18' **Datum:** NAD83/NAVD88

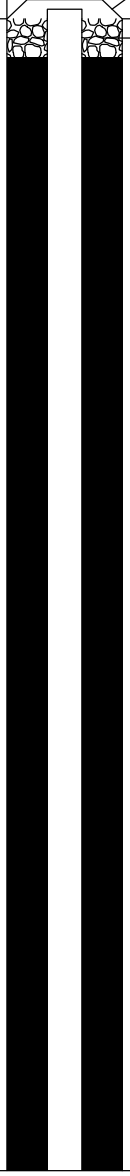
	Auger/ Casing	Sampler
Type:	Hollow Stem Auger	Split Spoon
O.D. / I.D.:	8.0" / 4.25"	2.0" / 1 3/8"
Hammer Wt.:	140lbs	NA
Hammer Fall:	30.0"	NA
TOC Elev.:	815.84'	815.84'

GROUNDWATER READINGS

Date	Time	Depth	Casing	Stab

Surveyed By: EXXEL **Survey Date:** 8/18/2021

Depth	Sample Information: No.	Pen./ Rec. (in.)	Depth (Ft.)	Blows (/6")	Test Data	Sample Description & Classification	Stratum Desc.	Remarks	Equipment Installed
1–59						See HS-PMW-RI-108A and HS-PMW-RI-108D for soil descriptions.			PROTECTIVE COVER; Backfill/Cement Pad



REMARKS

Stratification lines represent approximate boundary between soil types, transitions may be gradual. Water level readings have been made at times and under conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the time measurements were made.

Boring No.: HS-PMW-RI-108C

BORING_WELL 62961.31 AREA6 PMW RI 108.GPJ GZA_CORP.GDT 2/21/22

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Boring No.: HS-PMW-RI-108C
Page: 2 **of** 3
File No.: 16.0062961.31
Check: J. Groenleer

Depth	Sample Information					Sample Description & Classification	Stratum Desc.	Remarks	Equipment Installed
	No.	Pen./ Rec. (in.)	Depth (Ft.)	Blows (/6")	Test Data				
61–129								1	Bentonite Grout

REMARKS

1. 10-inch casing installed from ground surface to approximately 76 feet below ground surface and grouted in place.

Stratification lines represent approximate boundary between soil types, transitions may be gradual. Water level readings have been made at times and under conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the time measurements were made.

Boring No.: HS-PMW-RI-108C

BORING_WELL 62961.31 AREA6 PMW RI 108.GPJ GZA_CORP.GDT 2/21/22

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Boring No.: HS-PMW-RI-108C
Page: 3 **of** 3
File No.: 16.0062961.31
Check: J. Groenleer

Depth	Sample Information: No.	Pen./ Rec. (in.)	Depth (Ft.)	Blows (/6")	Test Data	Sample Description & Classification	Stratum Desc.	Remarks	Equipment Installed
131–199						Bottom of Borehole at 175.0 Feet		2	Silica Sand Filter Pack; Top of Well Screen; 2-Inch Dia. 5-Foot PVC Screen (0.010" Slot); Bottom of Well screen

REMARKS

2. Monitoring well was installed in borehole upon completion. Well screen set from 170.0 to 175.0 feet below ground surface.

Stratification lines represent approximate boundary between soil types, transitions may be gradual. Water level readings have been made at times and under conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the time measurements were made.

BORING_WELL 62961.31 AREA6 PMW RI 108.GPJ GZA_CORP.GDT 2/21/22

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Rockford, Michigan

Boring No.: HS-PMW-RI-108D
Page: 1 **of** 5
File No.: 16.0062961.31
Check: J. Groenleer

Contractor: Stearns Drilling Company
Foreman: Jerry Huntoon
Logged by: C. Melby
Date Start/Finish: 3-23-21 / 4-2-21
Boring Location: 588,314.8213 N; 12,791,010.2523 E
GS Elev.: 816.19' **Datum:** NAD83/NAVD88

	Auger/ Casing	Sampler
Type:	Hollow Stem Auger	Split Spoon
O.D. / I.D.:	8.0" / 4.25"	2.0" / 1 3/8"
Hammer Wt.:	140lbs	NA
Hammer Fall:	30.0"	NA
TOC Elev.:	815.86'	NA

GROUNDWATER READINGS

Date	Time	Depth	Casing	Stab

Surveyed By: EXXEL **Survey Date:** 5/25/2021

Depth	Sample Information: No.	Pen./ Rec. (in.)	Depth (Ft.)	Blows (/6")	Test Data	Sample Description & Classification	Stratum Desc.	Remarks	Equipment Installed
1–44						See HS-PMW-RI-108A for soil descriptions from 0.0 to 76.0 feet.			PROTECTIVE COVER; Backfill/Cement Pad

REMARKS

Stratification lines represent approximate boundary between soil types, transitions may be gradual. Water level readings have been made at times and under conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the time measurements were made.

Boring No.: HS-PMW-RI-108D

BORING_WELL_62961.31 AREA6 PMW RI 108.GPJ GZA_CORP.GDT 2/21/22

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Rockford, Michigan

Boring No.: HS-PMW-RI-108D
Page: 2 **of** 5
File No.: 16.0062961.31
Check: J. Groenleer

Depth	Sample Information					Sample Description & Classification	Stratum Desc.	Remarks	Equipment Installed
	No.	Pen./ Rec. (in.)	Depth (Ft.)	Blows (/6")	Test Data				
46–97								1	
79–80	16	24/24	79-81	13-19 23-45		Hard, gray, CLAY & SILT, some medium to coarse Sand, embedded, moist.	CLAY & SILT		
84–85	17	24/24	84-86	11-16 22-24		Hard, gray, CLAY & SILT, some medium to coarse Sand, embedded, moist.			
89–90	18	24/24	89-91	9-17 27-36		Hard, gray, CLAY & SILT, some medium to coarse Sand, embedded, moist.			
94–95	19	24/24	94-96	15-23 35-43		Hard, gray, CLAY & SILT, some medium to coarse Sand, embedded, moist.			

REMARKS

1. 10-inch casing installed from ground surface to approximately 75.5 feet below ground surface and grouted in place.

Stratification lines represent approximate boundary between soil types, transitions may be gradual. Water level readings have been made at times and under conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the time measurements were made.

Boring No.: HS-PMW-RI-108D

BORING_WELL 62961.31 AREA6 PMW RI 108.GPJ GZA_CORP.GDT 2/21/22

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Rockford, Michigan

Boring No.: HS-PMW-RI-108D
Page: 3 **of** 5
File No.: 16.0062961.31
Check: J. Groenleer

Depth	Sample Information: No.	Pen./ Rec. (in.)	Depth (Ft.)	Blows (/6")	Test Data	Sample Description & Classification	Stratum Desc.	Remarks	Equipment Installed
98							CLAY & SILT		
99	20	24/24	99-101	10-33 30-32		Hard, gray, CLAY & SILT, some medium to coarse Sand, embedded, moist.			
100									
101									
102									
103									
104	21	24/24	104-106	15-26 30-32		Hard, gray, CLAY & SILT, some medium to coarse Sand, embedded, moist.			
105									
106									
107									
108									
109	22	24/23	109-111	26-35 45-50/5"		Hard, gray, CLAY & SILT, some medium to coarse SAND, embedded, moist to dry.			Bentonite Grout
110									
111									
112									
113								2	
114							114'		
115	23	18/18	114-115.5	30-46-50/6"		Very dense, gray, SILT, little Clay, some fine Sand, moist to wet.	SILT	3	
116									
117									
118									
119	24	11/11	119-119.9	32-50/5"		Very dense, gray, SILT, some fine Sand, wet.			
120								4	
121									
122									
123									
124	25	10/10	124-124.8	35-50/4"		Very dense, gray, SILT, some fine Sand, wet.			
125									
126									
127									
128							129'		
129	26	9/9	129-129.8	31-50/3"		Very dense, gray, fine to medium SAND, some Silt, wet with bottom 1.0 inch medium to coarse SAND, wet.	SAND		
130								5	
131									
132									
133									
134	27	9/9	134-134.8	38-50/3"		Very dense, gray, fine to medium SAND, some Silt, wet.			
135									
136									
137									
138									
139	28	9/9	139-139.8	4-50/3"		Very dense, gray, fine to coarse SAND, little Gravel, trace Silt, wet.			
140								6	
141									
142									
143									
144	29	18/18	144-145.5	7-28-50/6"		Very dense, gray, fine to coarse SAND, some Gravel, trace Silt, wet.			
145									
146									
147									
148							149'		
149	30	24/24	149-151	20-48		Very dense, gray, fine to coarse SAND and	SAND / GRAVEL		

REMARKS

2. Driller states drilling was easier around 112.0 feet below ground surface. Possibly strata change.
3. Groundwater was encounter at approximately 114.0 feet below ground surface.
4. VAP groundwater sample was collected from approximately 120.0 to 125.0 feet below ground surface and submitted for analytical laboratory testing.
5. VAP groundwater sample was collected from approximately 130.0 to 135.0 feet below ground surface and submitted for analytical laboratory testing.
6. VAP groundwater sample was collected from approximately 140.0 to 145.0 feet below ground surface and submitted for analytical laboratory testing.
7. VAP groundwater sample was collected from approximately 150.0 to 155.0 feet below ground surface and submitted for analytical laboratory testing.

Stratification lines represent approximate boundary between soil types, transitions may be gradual. Water level readings have been made at times and under conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the time measurements were made.

Boring No.: HS-PMW-RI-108D

BORING_WELL 62961.31 AREA6 PMW RI 108.GPJ GZA_CORP.GDT 2/21/22

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Area 6 - RAP Implementation
Rockford, Michigan

Boring No.: HS-PMW-RI-108D
Page: 4 **of** 5
File No.: 16.0062961.31
Check: J. Groenleer

Depth	Sample Information: No.	Pen./ Rec. (in.)	Depth (Ft.)	Blows (/6")	Test Data	Sample Description & Classification	Stratum Desc.	Remarks	Equipment Installed
151				47-59		GRAVEL, trace Silt, wet with occational Clayey Silt.	SAND / GRAVEL	7	
154	31	15/15	154-155.3	5-23-50/5"		Very dense, gray, fine to coarse SAND and GRAVEL, trace Silt, wet with occational Clayey Silt.			
159	32	12/12	159-160	12-42		Very dense, gray, fine to coarse SAND and GRAVEL, some Silt, wet.		8	
164	33	18/4	164-165.5	6-18-50/6"		Very dense, gray, fine to medium SAND, trace Silt, wet.	164' SAND	9	
169	34	9/0	169-169.8	20-50/2"		NO RECOVERY. Based on bailer recovery: Gray to brown, fine to medium SAND and GRAVEL, wet.	169' SAND / GRAVEL	10	
174	35	21/18	174-175.8	16-28 39-50/3"		Very dense, gray and brown, fine to coarse SAND, little Silt, wet.	174' SAND		
179	36	23/8	179-180.9	6-13 36-50/5"		Dense, gray and brown, fine to medium SAND, little Silt, wet.		11	
184	37	23/10	184-185.9	1-4 21-50/5"		Medium dense, gray and brown, fine to medium SAND, little Silt, wet.			
189	38	23/23	189-190.9	6-17 44-50/5"		Very dense, gray and brown, fine to medium SAND, little Silt, little Clayey Silt lens in spoon tip, wet.		12	
194	39	18/18	194-195.5	4-12-50		Very dense, gray and brown, fine to medium SAND, little Silt, wet.			
199	40	24/24	199-201	9-12 34-5		Dense, gray and brown, fine to medium SAND, little Silt, wet.		13	
202									

REMARKS

8. VAP groundwater sample was collected from approximately 160.0 to 165.0 feet below ground surface and submitted for analytical laboratory testing.
9. Gravel in bottom of ager, not entering spoon.
10. VAP groundwater sample was collected from approximately 170.0 to 175.0 feet below ground surface and submitted for analytical laboratory testing.
11. VAP groundwater sample was collected from approximately 180.0 to 185.0 feet below ground surface and submitted for analytical laboratory testing.
12. VAP groundwater sample was collected from approximately 190.0 to 195.0 feet below ground surface and submitted for analytical laboratory testing.
13. VAP groundwater sample was collected from approximately 200.0 to 205.0 feet below ground surface and submitted for analytical laboratory testing.

Stratification lines represent approximate boundary between soil types, transitions may be gradual. Water level readings have been made at times and under conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the time measurements were made.

Boring No.: HS-PMW-RI-108D

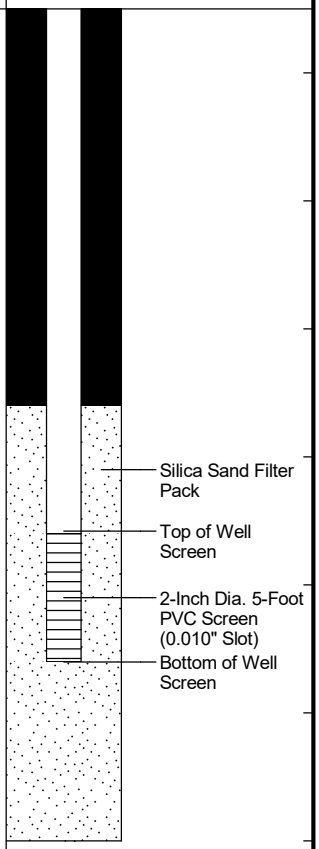
BORING_WELL 62961.31 AREA6 PMW RI 108.GPJ GZA_CORP.GDT 2/21/22

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Rockford, Michigan

Boring No.: HS-PMW-RI-108D
Page: 5 **of** 5
File No.: 16.0062961.31
Check: J. Groenleer

Depth	Sample Information: No.	Pen./ Rec. (in.)	Depth (Ft.)	Blows (/6")	Test Data	Sample Description & Classification	Stratum Desc.	Remarks	Equipment Installed
203–234	41	24/24	204-206	4-4 14-36		Medium dense, gray and brown, fine to medium SAND, little Silt, wet.	SAND		
209–213	42	14/0	209-210.2	60-40-32/2"		NO RECOVERY. Based on bailer recovery: Gray to brown, fine to medium SAND, little Silt, wet.		14	
214–234	43	18/7	214-215.5	9-22-50/6"		Very dense, gray and brown, fine to medium SAND, little Silt, wet.	235'		
235						Bottom of Borehole at 235.0 Feet		15	



REMARKS

14. VAP groundwater sample was collected from approximately 210.0 to 215.0 feet below ground surface and submitted for analytical laboratory testing.
15. Monitoring well was installed in borehole upon completion. Well screen set from 65.0 to 70.0 and 222.3 to 228.0 feet below ground surface.

Stratification lines represent approximate boundary between soil types, transitions may be gradual. Water level readings have been made at times and under conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the time measurements were made.

Boring No.: HS-PMW-RI-108D

BORING_WELL 62961.31 AREA6 PMW RI 108.GPJ GZA_CORP.GDT 2/21/22

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Area 6 - RAP Implementation
Rockford, Michigan

Boring No.: HS-PMW-RI-109A
Page: 1 **of** 1
File No.: 16.0062961.31
Check: J. Groenleer

Contractor: Stearns Drilling Company
Foreman: J. Huntoon
Logged by: C. Melby
Date Start/Finish: 8-16-22 / 8-17-22
Boring Location: 586,838.6878 N; 12,790,114.1896 E
GS Elev.: 786.25' **Datum:** NAD82/NAVD88

	Auger/ Casing	Sampler
Type:	Hollow Stem Auger	Split Spoon
O.D. / I.D.:	8.0" / 4.25"	2.0" / 1 3/8"
Hammer Wt.:	140lbs	NA
Hammer Fall:	30.0"	NA
TOC Elev.:	785.82'	NA

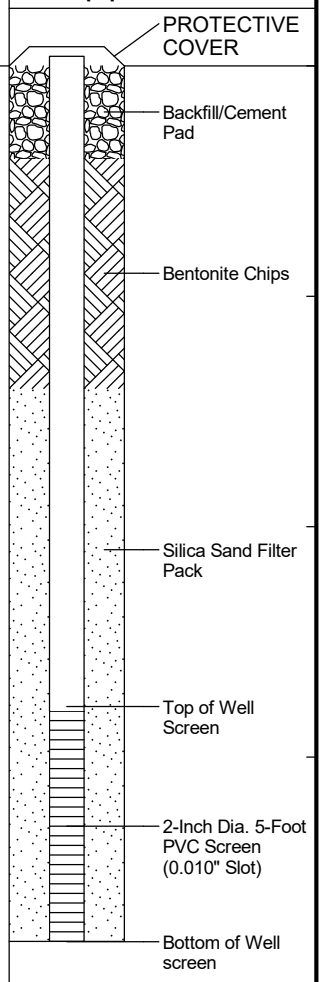
GROUNDWATER READINGS

Date	Time	Depth	Casing	Stab

Surveyed By: EXXEL **Survey Date:** 11/18/2022

Depth	Sample Information: No.	Pen./ Rec. (in.)	Depth (Ft.)	Blows (/6")	Test Data	Sample Description & Classification	Stratum Desc.	Remarks
1–18						See HS-PMW-RI-109C for soil and stratum descriptions.		
19						Bottom of Borehole at 19.0 Feet		1
20–24								

Equipment Installed



REMARKS

1. Monitoring well was installed in borehole upon completion. Well screen set from approximately 14.0 to 19.0 feet below ground surface.

Stratification lines represent approximate boundary between soil types, transitions may be gradual. Water level readings have been made at times and under conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the time measurements were made.

Boring No.: HS-PMW-RI-109A

BORING_WELL 62961.31 AREA6.GPJ GZA_CORP.GDT 1/9/23

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Wolverine World Wide, LLC
Area 6 - RAP Implementation
Rockford, Michigan

Boring No.: HS-PMW-RI-109B
Page: 1 **of** 3
File No.: 16.0062961.31
Check: J. Groenleer

Contractor: Stearns Drilling Company
Foreman: J. Huntoon
Logged by: C. Melby
Date Start/Finish: 8-15-22 / 8-16-22
Boring Location: 586,838.4101 N; 12,790,118.8727 E
GS Elev.: 786.27' **Datum:** NAD82/NAVD88

	Auger/ Casing	Sampler
Type:	Hollow Stem Auger	Split Spoon
O.D. / I.D.:	8.0" / 4.25"	2.0" / 1 3/8"
Hammer Wt.:	140lbs	NA
Hammer Fall:	30.0"	NA
TOC Elev.:	785.85'	NA

GROUNDWATER READINGS

Date	Time	Depth	Casing	Stab

Surveyed By: EXXEL **Survey Date:** 11/18/2022

Depth	Sample Information: No.	Pen./ Rec. (in.)	Depth (Ft.)	Blows (/6")	Test Data	Sample Description & Classification	Stratum Desc.	Remarks	Equipment Installed
1–49						See HS-PMW-RI-109C for soil and stratum descriptions.		1	PROTECTIVE COVER; Backfill/Cement Pad

REMARKS

1. 10-inch casing installed from ground surface to approximately 20.0 feet below ground surface and grouted in place.

Stratification lines represent approximate boundary between soil types, transitions may be gradual. Water level readings have been made at times and under conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the time measurements were made.

BORING_WELL_62961.31 AREA6.GPJ GZA_CORP.GDT 1/9/23

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Engineers and Scientists

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Area 6 - RAP Implementation
Rockford, Michigan

Boring No.: HS-PMW-RI-109B
Page: 2 **of** 3
File No.: 16.0062961.31
Check: J. Groenleer

Depth	Sample Information					Sample Description & Classification	Stratum Desc.	Remarks	Equipment Installed
	No.	Pen./ Rec. (in.)	Depth (Ft.)	Blows (/6")	Test Data				
51–108									Bentonite Grout

REMARKS

Stratification lines represent approximate boundary between soil types, transitions may be gradual. Water level readings have been made at times and under conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the time measurements were made.

Boring No.: HS-PMW-RI-109B

BORING_WELL 62961.31 AREA6.GPJ GZA_CORP.GDT 1/9/23

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Rockford, Michigan

Boring No.: HS-PMW-RI-109B
Page: 3 **of** 3
File No.: 16.0062961.31
Check: J. Groenleer

Depth	Sample Information: No.	Pen./ Rec. (in.)	Depth (Ft.)	Blows (/6")	Test Data	Sample Description & Classification	Stratum Desc.	Remarks	Equipment Installed
109–166						Bottom of Borehole at 130.0 Feet		2	Silica Sand Filter Pack; Top of Well Screen; 2-Inch Dia. 5-Foot PVC Screen (0.010" Slot); Bottom of Well screen

REMARKS

2. Monitoring well was installed in borehole upon completion. Well screen set from approximately 125.0 to 130.0 feet below ground surface.

Stratification lines represent approximate boundary between soil types, transitions may be gradual. Water level readings have been made at times and under conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the time measurements were made.

BORING_WELL 62961.31 AREA6.GPJ GZA_CORP.GDT 1/9/23

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Rockford, Michigan

Boring No.: HS-PMW-RI-109C
Page: 1 **of** 4
File No.: 16.0062961.31
Check: J. Groenleer

Contractor: Stearns Drilling Company
Foreman: J. Huntoon
Logged by: M. Myers/C. Melby/D. Watt
Date Start/Finish: 2-22-22 / 8-17-22
Boring Location: 586,838.6095 N; 12,790,125.0805 E
GS Elev.: 786.4' **Datum:** NAD82/NAVD88

	Auger/ Casing	Sampler
Type:	Hollow Stem Auger	Split Spoon
O.D. / I.D.:	8.0" / 4.25"	2.0" / 1 3/8"
Hammer Wt.:	140lbs	NA
Hammer Fall:	30.0"	NA
TOC Elev.:	785.97'	NA

GROUNDWATER READINGS

Date	Time	Depth	Casing	Stab
2/28/22		65.6'	Augers (149')	

Surveyed By: EXXEL **Survey Date:** 11/18/2022

Depth	Sample Information: No.	Pen./ Rec. (in.)	Depth (Ft.)	Blows (/6")	Test Data	Sample Description & Classification	Stratum Desc.	Remarks	Equipment Installed
1–5	1	24/18	4-6	5-9 10-8		Medium dense, light brown, fine to medium GRAVEL, some Sand, dry.	GRAVEL		PROTECTIVE COVER; Sand / Cement
9–10	2	24/20	9-11	5-11 15-12		Medium dense, light brown, fine to coarse SAND and Gravel, moist to wet.	9' SAND		
14–15	3	24/3	14-16	25-32 32-30		Very dense, light brown, fine SAND, wet.		1 2	
19–20	4	24/24	19-21	9-14 14-12		Very stiff, brown, Silty CLAY, dry. Changing at 20.0 feet to: Medium dense, light brown, fine SAND, dry.	19' 20' CLAY SAND		
24–25	5	24/12	24-26	7-11 13-18		Medium dense, light brown, fine SAND, some Silt, dry.			
29–30	6	24/18	29-31	5-10 10-13		Medium dense, light brown, fine SAND, some Silt, dry.			
34–35	7	24/18	34-36	4-7 9-12		Medium dense, light brown, fine SAND, some Silt, dry.			
39–40	8	24/24	39-41	6-19 29-37		Dense, light brown, fine SAND, some Silt, dry. Changing at 40.0 feet to: Dense, light brown, fine SAND and Silt, dry.			

REMARKS

1. VAP groundwater sample was collected from approximately 14.0 to 19.0 feet below ground surface and submitted for analytical laboratory testing.
2. Perched water encountered at approximately 14.0 feet below ground surface.

Stratification lines represent approximate boundary between soil types, transitions may be gradual. Water level readings have been made at times and under conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the time measurements were made.

Boring No.: HS-PMW-RI-109C

BORING_WELL 62961.31 AREA6.GPJ GZA_CORP.GDT 1/9/23

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Rockford, Michigan

Boring No.: HS-PMW-RI-109C
Page: 2 **of** 4
File No.: 16.0062961.31
Check: J. Groenleer

Depth	Sample Information: No.	Pen./ Rec. (in.)	Depth (Ft.)	Blows (/6")	Test Data	Sample Description & Classification	Stratum Desc.	Remarks	Equipment Installed
43							SAND		
44	9	24/24	44-46	14-23 25-27		Dense, light brown, fine to coarse SAND, some Silt, little fine Gravel, moist to wet.			
45									
46									
47									
48									
49	10	24/24	49-51	8-16 10-25		Medium dense, light brown, fine to medium SAND, some Silt, damp to dry.			
50									
51									
52									
53									
54	11	24/24	54-56	13-15 25-26		Dense, light brown, fine to medium SAND, some Silt, some fine to medium Gravel, dry to damp.			
55									
56									
57									
58									
59	12	24/18	59-61	7-18 25-27		Dense, light brown, fine to medium SAND, some Silt, dry to damp.			
60									
61									
62									
63									
64	13	24/24	64-66	10-23 19-22		Dense, light brown, fine to medium SAND, some Silt, wet.		3 4	
65									
66									
67									
68									
69	14	24/18	69-71	7-13 14-15		Medium dense, light brown, fine to coarse SAND, little Gravel, little Silt, wet.			
70									
71									Bentonite Grout
72									
73									
74	15	24/18	74-76	1-1 7-8		Loose, light brown, fine to coarse SAND, little Gravel, little Silt, wet. Changing at 74.5 feet to: Loose, brown, fine to coarse SAND, some fine Gravel, wet.		5	
75									
76									
77									
78									
79	16	24/18	79-81	7-11 18-29		Medium dense, gray, fine to coarse SAND, some fine Gravel, wet.			
80									
81									
82									
83									
84	17	24/24	84-86	11-22 28-50/5"		Very dense, gray, fine to coarse SAND, some fine Gravel, wet. Changing at 84.5 feet to: Very dense, gray, fine SAND and Silt, wet.		6	
85									
86									
87									
88									
89	18	24/24	89-91	6-14 22-31		Medium dense, gray, fine SAND and Silt, wet.			
90									

REMARKS

3. Groundwater was encountered at approximately 64.0 feet below ground surface.
4. VAP groundwater sample was collected from approximately 65.0 to 70.0 feet below ground surface and submitted for analytical laboratory testing.
5. VAP groundwater sample was collected from approximately 75.0 to 80.0 feet below ground surface and submitted for analytical laboratory testing.
6. VAP groundwater sample was collected from approximately 85.0 to 90.0 feet below ground surface and submitted for analytical laboratory testing.

Stratification lines represent approximate boundary between soil types, transitions may be gradual. Water level readings have been made at times and under conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the time measurements were made.

Boring No.: HS-PMW-RI-109C

BORING_WELL 62961.31 AREA6.GPJ GZA_CORP.GDT 1/9/23

Depth	Sample Information: No.	Pen./ Rec. (in.)	Depth (Ft.)	Blows (/6")	Test Data	Sample Description & Classification	Stratum Desc.	Remarks	Equipment Installed
92							SAND		
93									
94	18	24/24	94-96	4-5 15-14		Medium dense, gray, fine to coarse SAND, little Silt, wet.		7	
95									
96									
97									
98									
99	19	24/20	99-101	2-9 18-25		Medium dense, gray, fine to coarse SAND, little Silt, wet. Changing at 100.8 feet to: Gray, SILT, wet.			
100							100.8'		
101							SILT		
102									
103							104'		
104	20	24/24	104-106	2-6 19-19		Medium dense, gray and brown, fine to coarse SAND, little Silt, wet with occasional Silt lenses and seams.	SAND	8	
105									
106									
107									
108									
109	21	24/24	109-111	11-23 31-35		Very dense, gray and brown, fine to medium SAND, trace Silt, wet.			
110									
111									
112									
113									
114	22	24/24	114-116	2-3 14-30		Medium dense, gray and brown, fine to coarse SAND, some Silt, wet.		9	
115									
116									
117									
118									
119	23	10/10	119-119.8	23-50/4"		Very dense, gray and brown, fine to medium SAND, some Silt, wet.			
120									
121									
122									
123									
124	24	24/24	124-126	2-14 28-31		Dense, gray and brown, fine to coarse SAND, little Silt, wet.		10	
125									
126									
127									
128									
129	25	24/24	129-131	5-8 20-32		Medium dense, gray and brown, fine to coarse SAND, trace Silt, wet.			
130									
131									
132									
133									
134	26	24/24	134-136	9-28 35-39		Very dense, gray and brown, fine to coarse SAND, little Silt, wet.		11 12	
135									
136									
137									
138									
139	27	22/22	139-140.8	12-29		Very dense, gray and brown, fine SAND and			

REMARKS

7. VAP groundwater sample was collected from approximately 95.0 to 100.0 feet below ground surface and submitted for analytical laboratory testing.
8. VAP groundwater sample was collected from approximately 105.0 to 110.0 feet below ground surface and submitted for analytical laboratory testing.
9. VAP groundwater sample was collected from approximately 115.0 to 120.0 feet below ground surface and submitted for analytical laboratory testing.
10. VAP groundwater sample was collected from approximately 125.0 to 130.0 feet below ground surface and submitted for analytical laboratory testing.
11. Augers advancement slowed at approximately 137.0 feet.
12. VAP groundwater sample was collected from approximately 135.0 to 140.0 feet below ground surface and submitted for analytical laboratory testing.

Stratification lines represent approximate boundary between soil types, transitions may be gradual. Water level readings have been made at times and under conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the time measurements were made.

Boring No.: HS-PMW-RI-109C

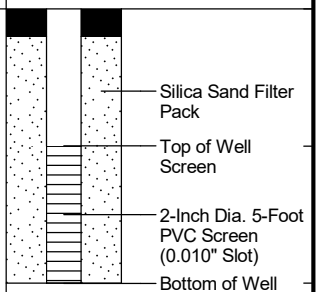
BORING_WELL 62961.31 AREA6.GPJ GZA_CORP.GDT 1/9/23

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Rockford, Michigan

Boring No.: HS-PMW-RI-109C
Page: 4 **of** 4
File No.: 16.0062961.31
Check: J. Groenleer

Depth	Sample Information: No.	Pen./ Rec. (in.)	Depth (Ft.)	Blows (/6")	Test Data	Sample Description & Classification	Stratum Desc.	Remarks	Equipment Installed
141				36-50/4"		Silt, wet to moist.	SAND		
142									
143									
144	28	24/24	144-146	4-11		Dense, gray and brown, fine to medium			
145				24-36		SAND, little Silt, wet.		13	
146									
147									
148									
149	29	24/24	149-151	5-10		Medium dense, gray and brown, fine to			
150				17-19		medium SAND, little Silt, wet. Changing at			
151						150.5 feet to: Medium dense, gray and			
152						brown, fine to medium Silty SAND, wet.			
153									
154	30	24/24	154-156	3-4		Loose, gray and brown, fine to coarse			
155				4-15		SAND, trace Silt, wet. Changing at 155.0			
156						feet to: Loose, gray and brown, fine to		14	
157						coarse SAND, little Silt & Clay, wet to moist.			
158									
159	31	12/12	159-160	50-75/6"		Very dense, gray and brown, fine to coarse			
160						SAND, little Silt & Clay, trace Gravel, moist.			
161									
162									
163									
164	32	11/11	164-164.9	20-50/5"		Very dense, gray and brown, fine to medium			
165						SAND, little Silt, trace Clay, trace Gravel,			
166						moist.			
167									
168									
169	33	6	169-169.5	79-6		Very dense, gray and brown, fine to medium			
170						SAND, little Silt, trace Clay, trace Gravel,		15	
171						moist.			
172									
173									
174	34	7/7	174-174.6	42-50/2"		Hard, gray, Silty CLAY with fine to medium	174.6'	16	
175						Sand embedded, moist.		17	
176						Bottom of Borehole at 174.6 Feet		18	
177									
178									
179									
180									
181									
182									
183									
184									
185									
186									
187									
188									



REMARKS

13. VAP groundwater sample was collected from approximately 145.0 to 150.0 feet below ground surface and submitted for analytical laboratory testing.
14. VAP groundwater sample was collected from approximately 155.0 to 160.0 feet below ground surface and submitted for analytical laboratory testing.
15. A temporary well was set from approximately 165.0 to 170.0 feet below ground surface but did not produce enough volume to collect samples for analytical laboratory testing.
16. Borehole was backfilled with sand from bottom of borehole to approximately 60.0 feet below ground surface and bentonite grout from approximately 60.0 feet below ground surface to grade on 3/1/2022.
17. On 8/17/2022, drilling resumed through the 10-inch casing and an additional split spoon was collected from approximately 174.0 to 174.6 feet below ground surface.
18. Monitoring well installed on 8/17/2022 within the 10-inch casing. Well screen set from approximately 145.0 to 150.0 feet below ground surface.

Stratification lines represent approximate boundary between soil types, transitions may be gradual. Water level readings have been made at times and under conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the time measurements were made.

Boring No.: HS-PMW-RI-109C

BORING_WELL 62961.31 AREA6.GPJ GZA_CORP.GDT 1/9/23

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Rockford, Michigan

Boring No.: HS-PMW-RI-110A
Page: 1 **of** 1
File No.: 16.0062961.41
Check: J. Groenleer

Contractor: Stearns Drilling Company
Foreman: J. Huntoon
Logged by: M. Myers
Date Start/Finish: 4-29-22 / 4-29-22
Boring Location: 576,897.3493 N; 12,796,654.3336 E
GS Elev.: 669.24' **Datum:** NAD83/NAVD88

	Auger/ Casing	Sampler
Type:	Hollow Stem Auger	Split Spoon
O.D. / I.D.:	8.0" / 4.25"	2.0" / 1 3/8"
Hammer Wt.:	140lbs	NA
Hammer Fall:	30.0"	NA
TOC Elev.:	668.79'	NA

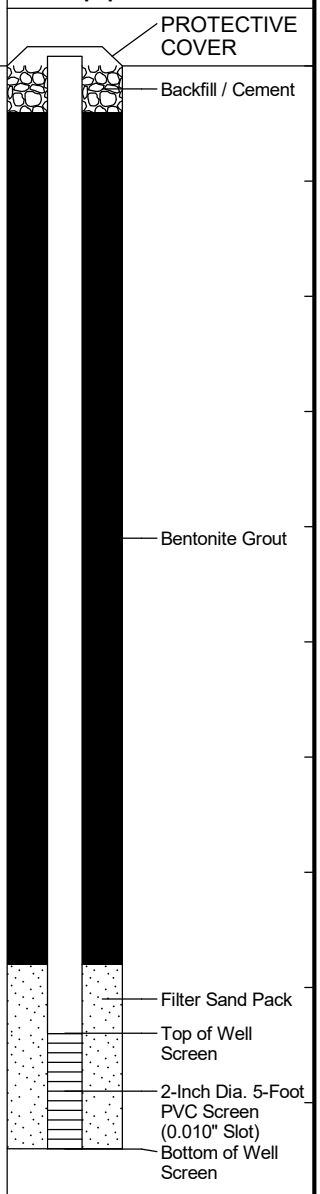
GROUNDWATER READINGS

Date	Time	Depth	Casing	Stab

Surveyed By: EXXEL **Survey Date:** 5/20/2022

Depth	Sample Information: No.	Pen./ Rec. (in.)	Depth (Ft.)	Blows (/6")	Test Data	Sample Description & Classification	Stratum Desc.	Remarks
1–49						See HS-PMW-RI-110 for soil descriptions.		
47–49						Bottom of Borehole at 47.0 Feet		1

Equipment Installed



REMARKS

1. Monitoring well was installed in borehole upon completion. Well screen was set from approximately 42.0 to 47.0 feet below ground surface.

Stratification lines represent approximate boundary between soil types, transitions may be gradual. Water level readings have been made at times and under conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the time measurements were made.

Boring No.: HS-PMW-RI-110A

BORING_WELL 62961.41 AREA 11 AND 12 PMW-RI-110.GPJ GZA_CORP.GDT 11/8/22

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Rockford, Michigan

Boring No.: HS-PMW-RI-110B
Page: 1 **of** 2
File No.: 16.0062961.41
Check: J. Groenleer

Contractor: Stearns Drilling Company
Foreman: D. Krause
Logged by: C. Melby
Date Start/Finish: 9-1-21 / 9-2-21
Boring Location: 576,903.4540 N; 12,796,654.5442 E
GS Elev.: 669.19' **Datum:** NAD83/NAVD88

	Auger/ Casing	Sampler
Type:	Hollow Stem Auger	Split Spoon
O.D. / I.D.:	8.0" / 4.25"	2.0" / 1 3/8"
Hammer Wt.:	140lbs	NA
Hammer Fall:	30.0"	NA
TOC Elev.:	668.95'	NA

GROUNDWATER READINGS

Date	Time	Depth	Casing	Stab

Surveyed By: EXXEL **Survey Date:** 11/23/2021

Depth	Sample Information: No.	Pen./ Rec. (in.)	Depth (Ft.)	Blows (/6")	Test Data	Sample Description & Classification	Stratum Desc.	Remarks	Equipment Installed
1–54						See HS-PMW-RI-110 for soil descriptions.			PROTECTIVE COVER; Backfill / Cement; Bentonite Grout

REMARKS

Stratification lines represent approximate boundary between soil types, transitions may be gradual. Water level readings have been made at times and under conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the time measurements were made.

BORING_WELL 62961.41 AREA 11 AND 12 PMW-RI-110.GPJ GZA_CORP.GDT 11/8/22

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Boring No.: HS-PMW-RI-110B
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File No.: 16.0062961.41
Check: J. Groenleer

Depth	Sample Information: No.	Pen./ Rec. (in.)	Depth (Ft.)	Blows (/6")	Test Data	Sample Description & Classification	Stratum Desc.	Remarks	Equipment Installed
56–118						Bottom of Borehole at 96.0 Feet		1	Filter Sand Pack; Top of Well Screen; 2-Inch Dia. 5-Foot PVC Screen (0.010" Slot); Bottom of Well Screen

REMARKS

1. Monitoring well was installed in borehole upon completion. Well screen was set from approximately 91.0 to 96.0 feet below ground surface.

Stratification lines represent approximate boundary between soil types, transitions may be gradual. Water level readings have been made at times and under conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the time measurements were made.

Boring No.: HS-PMW-RI-110B

BORING_WELL 62961.41 AREA 11 AND 12 PMW-RI-110.GPJ GZA_CORP.GDT 11/8/22

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Rockford, Michigan

Boring No.: HS-PMW-RI-112A
Page: 1 **of** 1
File No.: 16.0062961.41
Check: J. Groenleer

Contractor: Stearns Drilling Company
Foreman: D. Krause
Logged by: C. Melby
Date Start/Finish: 5-2-22 / 5-2-22
Boring Location: 572,436.2457 N; 12,796,783.4927 E
GS Elev.: 619.27' **Datum:** NAD83/NAVD88

	Auger/ Casing	Sampler
Type:	Hollow Stem Auger	Split Spoon
O.D. / I.D.:	8.0" / 4.25"	2.0" / 1 3/8"
Hammer Wt.:	140lbs	NA
Hammer Fall:	30.0"	NA
TOC Elev.:	618.86'	NA

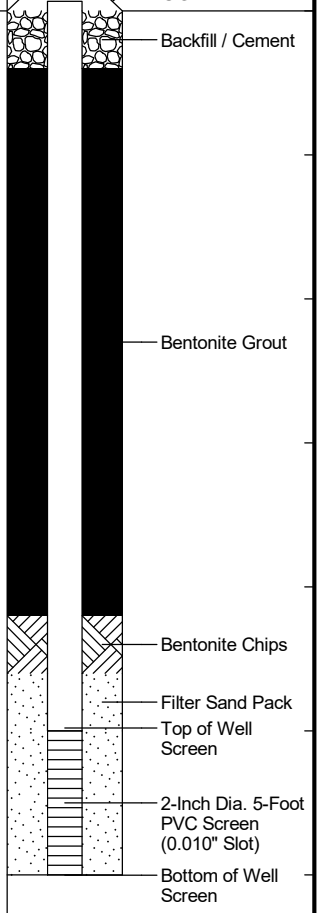
GROUNDWATER READINGS

Date	Time	Depth	Casing	Stab

Surveyed By: EXXEL **Survey Date:** 5/20/2022

Depth	Sample Information: No.	Pen./ Rec. (in.)	Depth (Ft.)	Blows (/6")	Test Data	Sample Description & Classification	Stratum Desc.	Remarks
1–29						See HS-PMW-RI-112 for soil descriptions.		
30						Bottom of Borehole at 30.0 Feet		1
31–39								

Equipment Installed



REMARKS

1. Monitoring well was installed in borehole upon completion. Well screen was set from approximately 25.0 to 30.0 feet below ground surface.

Stratification lines represent approximate boundary between soil types, transitions may be gradual. Water level readings have been made at times and under conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the time measurements were made.

Boring No.: HS-PMW-RI-112A

BORING_WELL 62961.41 AREA 11 AND 12 PMW-RI-110.GPJ GZA_CORP.GDT 11/16/22

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Boring No.: HS-PMW-RI-112B
Page: 1 **of** 2
File No.: 16.0062961.41
Check: J. Groenleer

Contractor: Stearns Drilling Company
Foreman: J. Huntoon
Logged by: C. Melby
Date Start/Finish: 5-2-22 / 5-2-22
Boring Location: 572,436.4113 N; 12,796,777.8857 E
GS Elev.: 619.07' **Datum:** NAD83/NAVD88

	Auger/ Casing	Sampler
Type:	Hollow Stem Auger	Split Spoon
O.D. / I.D.:	8.0" / 4.25"	2.0" / 1 3/8"
Hammer Wt.:	140lbs	NA
Hammer Fall:	30.0"	NA
TOC Elev.:	618.67'	NA

GROUNDWATER READINGS

Date	Time	Depth	Casing	Stab

Surveyed By: EXXEL **Survey Date:** 5/20/2022

Depth	Sample Information: No.	Pen./ Rec. (in.)	Depth (Ft.)	Blows (/6")	Test Data	Sample Description & Classification	Stratum Desc.	Remarks
1–39						See HS-PMW-RI-112 for soil descriptions.		

Equipment Installed



REMARKS

Stratification lines represent approximate boundary between soil types, transitions may be gradual. Water level readings have been made at times and under conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the time measurements were made.

Boring No.: HS-PMW-RI-112B

BORING_WELL 62961.41 AREA 11 AND 12 PMW-RI-110.GPJ GZA_CORP.GDT 11/16/22

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Rockford, Michigan

Boring No.: HS-PMW-RI-112B
Page: 2 **of** 2
File No.: 16.0062961.41
Check: J. Groenleer

Depth	Sample Information: No.	Pen./ Rec. (in.)	Depth (Ft.)	Blows (/6")	Test Data	Sample Description & Classification	Stratum Desc.	Remarks	Equipment Installed
41–86						Bottom of Borehole at 75.0 Feet		1	Filter Sand Pack; Top of Well Screen; 2-Inch Dia. 5-Foot PVC Screen (0.010" Slot); Bottom of Well Screen

REMARKS

1. Monitoring well was installed in borehole upon completion. Well screen was set from approximately 70.0 to 75.0 feet below ground surface.

Stratification lines represent approximate boundary between soil types, transitions may be gradual. Water level readings have been made at times and under conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the time measurements were made.

Boring No.: HS-PMW-RI-112B

BORING_WELL 62961.41 AREA 11 AND 12 PMW-RI-110.GPJ GZA_CORP.GDT 11/16/22

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Perimeter RAP
Rockford, Michigan

Boring No.: HS-PMW-22
Page: 1 **of** 3
File No.: 16.0062961.91
Check: J. Groenleer

Contractor: Stearns Drilling Company
Foreman: J. Huntoon
Logged by: C. Melby
Date Start/Finish: 5-30-23 / 5-31-23
Boring Location: 590,339.7086 N; 12,789,779.0653 E
GS Elev.: 836.97' **Datum:** NAD83/NAVD88

	Auger/ Casing	Sampler
Type:	Hollow Stem Auger	Split Spoon
O.D. / I.D.:	8.0" / 4.25"	2.0" / 1 3/8"
Hammer Wt.:	140lbs	NA
Hammer Fall:	30.0"	NA
TOC Elev.:	839.25'	NA

GROUNDWATER READINGS

Date	Time	Depth	Casing	Stab

Surveyed By: EXXEL **Survey Date:** 8/3/2023

Depth	Sample Information: No.	Pen./ Rec. (in.)	Depth (Ft.)	Blows (/6")	Test Data	Sample Description & Classification	Stratum Desc.	Remarks
1						See HS-PMW-RI-22 VAP boring log for soil and stratum descriptions.		

Equipment Installed



REMARKS

Stratification lines represent approximate boundary between soil types, transitions may be gradual. Water level readings have been made at times and under conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the time measurements were made.

Boring No.: HS-PMW-22

BORING_WELL 62961.91 PERIMETER HS PMW AND WV-PMW.GPJ GZA_CORP.GDT 1/17/24

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Rockford, Michigan

Boring No.: HS-PMW-22
Page: 2 **of** 3
File No.: 16.0062961.91
Check: J. Groenleer

Depth	Sample Information: No.	Pen./ Rec. (in.)	Depth (Ft.)	Blows (/6")	Test Data	Sample Description & Classification	Stratum Desc.	Remarks	Equipment Installed
71–151									Bentonite Grout

REMARKS

Stratification lines represent approximate boundary between soil types, transitions may be gradual. Water level readings have been made at times and under conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the time measurements were made.

Boring No.: HS-PMW-22

BORING_WELL 62961.91 PERIMETER HS PMW AND WV-PMW.GPJ GZA_CORP.GDT 1/17/24

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Boring No.: HS-PMW-22
Page: 3 **of** 3
File No.: 16.0062961.91
Check: J. Groenleer

Depth	Sample Information: No.	Pen./ Rec. (in.)	Depth (Ft.)	Blows (/6")	Test Data	Sample Description & Classification	Stratum Desc.	Remarks	Equipment Installed
153–174									Filter Sand Pack; Top of Well Screen; 2-Inch Dia. 5-Foot PVC Screen (0.010" Slot); Bottom of Well screen
175						Bottom of Borehole at 175.0 Feet		1	
176–232									

REMARKS

1. Monitoring well was installed in borehole upon completion. Well screen was set from approximately 170.0 to 175.0 feet below ground surface.

Stratification lines represent approximate boundary between soil types, transitions may be gradual. Water level readings have been made at times and under conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the time measurements were made.

Boring No.: HS-PMW-22

BORING_WELL 62961.91 PERIMETER HS PMW AND WV-PMW.GPJ GZA_CORP.GDT 1/17/24

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Rockford, Michigan

Boring No.: HS-PMW-RI-101A
Page: 1 **of** 1
File No.: 16.0062961.91
Check: J. Groenleer

Contractor: Stearns Drilling Company
Foreman: J. Huntoon/T. Hawking
Logged by: C. Melby
Date Start/Finish: 5-17-23 / 5-17-23
Boring Location: 592,242.2124 N; 12,785,937.4260 E
GS Elev.: 728.54' **Datum:** NAD83/NAVD88

	Auger/ Casing	Sampler
Type:	Hollow Stem Auger	Split Spoon
O.D. / I.D.:	8.0" / 4.25"	2.0" / 1 3/8"
Hammer Wt.:	140lbs	NA
Hammer Fall:	30.0"	NA
TOC Elev.:	728.35'	NA

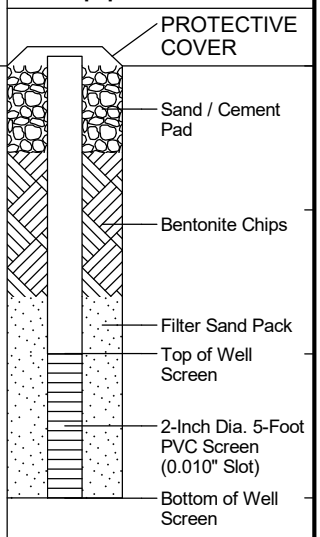
GROUNDWATER READINGS

Date	Time	Depth	Casing	Stab

Surveyed By: EXXEL **Survey Date:** 8/3/2023

Depth	Sample Information: No.	Pen./ Rec. (in.)	Depth (Ft.)	Blows (/6")	Test Data	Sample Description & Classification	Stratum Desc.	Remarks
1–14						See HS-PMW-RI-101 VAP boring log for soil and stratum descriptions.		
15						Bottom of Borehole at 15.0 Feet		1
16–39								

Equipment Installed



REMARKS

1. Monitoring well was installed in borehole upon completion. Well screen was set from approximately 10.0 to 15.0 feet below ground surface.

Stratification lines represent approximate boundary between soil types, transitions may be gradual. Water level readings have been made at times and under conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the time measurements were made.

Boring No.: HS-PMW-RI-101A

BORING_WELL 62961.91 PERIMETER HS PMW AND WV-PMW.GPJ GZA_CORP.GDT 1/17/24

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Rockford, Michigan

Boring No.: HS-PMW-RI-101B
Page: 1 **of** 2
File No.: 16.0062961.91
Check: J. Groenleer

Contractor: Stearns Drilling Company
Foreman: J. Huntoon
Logged by: C. Melby
Date Start/Finish: 5-12-23 / 5-17-23
Boring Location: 592,238.1399 N; 12,785,937.5230 E
GS Elev.: 728.22' **Datum:** NAD83/NAVD88

	Auger/ Casing	Sampler
Type:	Hollow Stem Auger	Split Spoon
O.D. / I.D.:	8.0" / 4.25"	2.0" / 1 3/8"
Hammer Wt.:	140lbs	NA
Hammer Fall:	30.0"	NA
TOC Elev.:	728.14'	NA

GROUNDWATER READINGS

Date	Time	Depth	Casing	Stab

Surveyed By: EXXEL **Survey Date:** 8/3/2023

Depth	Sample Information: No.	Pen./ Rec. (in.)	Depth (Ft.)	Blows (/6")	Test Data	Sample Description & Classification	Stratum Desc.	Remarks	Equipment Installed
1–49						See HS-PMW-RI-101 VAP boring log for soil and stratum descriptions.		1	PROTECTIVE COVER; Sand / Cement Pad; Bentonite Grout

REMARKS

1. 10-inch casing installed from ground surface to approximately 37.0 feet below ground surface and grouted in place.

Stratification lines represent approximate boundary between soil types, transitions may be gradual. Water level readings have been made at times and under conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the time measurements were made.

BORING_WELL_62961.91 PERIMETER HS PMW AND WV-PMW.GPJ GZA_CORP.GDT 2/7/24

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Boring No.: HS-PMW-RI-101B
Page: 2 **of** 2
File No.: 16.0062961.91
Check: J. Groenleer

Depth	Sample Information: No.	Pen./ Rec. (in.)	Depth (Ft.)	Blows (/6")	Test Data	Sample Description & Classification	Stratum Desc.	Remarks	Equipment Installed
51–84									Filter Sand Pack; Top of Well Screen; 2-Inch Dia. 5-Foot PVC Screen (0.010" Slot)
85						Bottom of Borehole at 85.0 Feet		2	Bottom of Well Screen
86–108									

REMARKS

2. Monitoring well was installed in borehole upon completion. Well screen was set from approximately 80.0 to 85.0 feet below ground surface.

Stratification lines represent approximate boundary between soil types, transitions may be gradual. Water level readings have been made at times and under conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the time measurements were made.

BORING_WELL 62961.91 PERIMETER HS PMW AND WV-PMW.GPJ GZA_CORP.GDT 2/7/24

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Rockford, Michigan

Boring No.: HS-PMW-RI-102A
Page: 1 of 1
File No.: 16.0062961.91
Check: J. Groenleer

Contractor: Stearns Drilling Company
Foreman: J. Huntoon
Logged by: N. Kampfschulte
Date Start/Finish: 8-4-22 / 8-4-22
Boring Location: 584,569.9147 N; 12,786,594.6007 E
GS Elev.: 759.33' **Datum:** NAD83/NAVD88

	Auger/ Casing	Sampler
Type:	Hollow Stem Auger	Split Spoon
O.D. / I.D.:	8.0" / 4.25"	2.0" / 1 3/8"
Hammer Wt.:	140lbs	NA
Hammer Fall:	30.0"	NA
TOC Elev.:	761.74'	NA

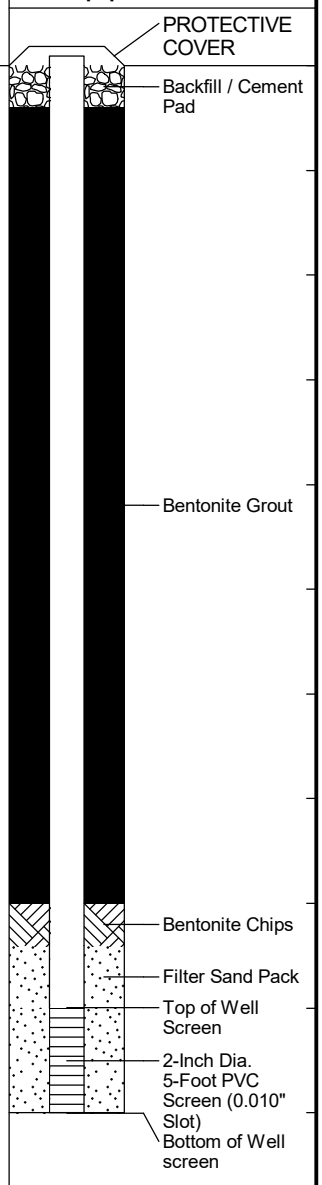
GROUNDWATER READINGS

Date	Time	Depth	Casing	Stab

Surveyed By: EXXEL **Survey Date:** 8/25/2022

Depth	Sample Information: No.	Pen./ Rec. (in.)	Depth (Ft.)	Blows (/6")	Test Data	Sample Description & Classification	Stratum Desc.	Remarks
1–54						See HS-PMW-RI-102 boring log for soil and stratum descriptions.		
50–54						Bottom of Borehole at 50.0 Feet		1

Equipment Installed



REMARKS

1. Monitoring well was installed in borehole upon completion. Well screen was set from approximately 45.0 to 50.0 feet below ground surface.

Stratification lines represent approximate boundary between soil types, transitions may be gradual. Water level readings have been made at times and under conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the time measurements were made.

Boring No.: HS-PMW-RI-102A

BORING_WELL 62961.91 PERIMETER HS PMW AND WV-PMW.GPJ GZA_CORP.GDT 12/26/22

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Boring No.: HS-PMW-RI-102B
Page: 1 **of** 2
File No.: 16.0062961.91
Check: J. Groenleer

Contractor: Stearns Drilling Company
Foreman: J. Huntoon
Logged by: N. Kampfschulte
Date Start/Finish: 8-3-22 / 8-4-22
Boring Location: 584,564.8820 N; 12,786,591.5752 E
GS Elev.: 759.38' **Datum:** NAD83/NAVD88

	Auger/ Casing	Sampler
Type:	Hollow Stem Auger	Split Spoon
O.D. / I.D.:	8.0" / 4.25"	2.0" / 1 3/8"
Hammer Wt.:	140lbs	NA
Hammer Fall:	30.0"	NA
TOC Elev.:	761.48'	NA

GROUNDWATER READINGS

Date	Time	Depth	Casing	Stab

Surveyed By: EXXEL **Survey Date:** 8/25/2022

Depth	Sample Information: No.	Pen./ Rec. (in.)	Depth (Ft.)	Blows (/6")	Test Data	Sample Description & Classification	Stratum Desc.	Remarks	Equipment Installed
1–59						See HS-PMW-RI-102 boring log for soil and stratum descriptions.			PROTECTIVE COVER; Backfill / Cement Pad; Bentonite Grout

REMARKS

Stratification lines represent approximate boundary between soil types, transitions may be gradual. Water level readings have been made at times and under conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the time measurements were made.

Boring No.: HS-PMW-RI-102B

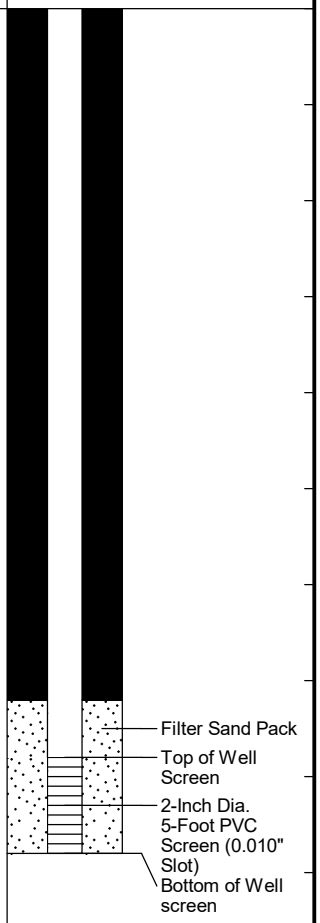
BORING_WELL 62961.91 PERIMETER HS PMW AND WV-PMW.GPJ GZA_CORP.GDT 10/28/22

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Boring No.: HS-PMW-RI-102B
Page: 2 **of** 2
File No.: 16.0062961.91
Check: J. Groenleer

Depth	Sample Information					Sample Description & Classification	Stratum Desc.	Remarks	Equipment Installed
	No.	Pen./ Rec. (in.)	Depth (Ft.)	Blows (/6")	Test Data				
61–103									
104						Bottom of Borehole at 104.0 Feet		1	
105–129									



REMARKS

1. Monitoring well was installed in borehole upon completion. Well screen was set from approximately 99.0 to 104.0 feet below ground surface.

Stratification lines represent approximate boundary between soil types, transitions may be gradual. Water level readings have been made at times and under conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the time measurements were made.

BORING_WELL 62961.91 PERIMETER HS PMW AND WV-PMW.GPJ GZA_CORP.GDT 10/28/22

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Rockford, Michigan

Boring No.: WV-PMW-RI-102C
Page: 1 **of** 3
File No.: 16.0062961.91
Check: J. Groenleer

Contractor: Stearns Drilling Company
Foreman: J. Huntoon
Logged by: N. Kampfschulte
Date Start/Finish: 8-3-22 / 8-3-22
Boring Location: 584,461.0465 N; 12,786,588.8195 E
GS Elev.: 759.27' **Datum:** NAD83/NAVD88

	Auger/ Casing	Sampler
Type:	Hollow Stem Auger	Split Spoon
O.D. / I.D.:	8.0" / 4.25"	2.0" / 1 3/8"
Hammer Wt.:	140lbs	NA
Hammer Fall:	30.0"	NA
TOC Elev.:	761.51'	NA

GROUNDWATER READINGS

Date	Time	Depth	Casing	Stab

Surveyed By: EXXEL **Survey Date:** 8/25/2022

Depth	Sample Information: No.	Pen./ Rec. (in.)	Depth (Ft.)	Blows (/6")	Test Data	Sample Description & Classification	Stratum Desc.	Remarks	Equipment Installed
1–59						See HS-PMW-RI-102 boring log for soil and stratum descriptions.			PROTECTIVE COVER; Backfill/Cement

REMARKS

Stratification lines represent approximate boundary between soil types, transitions may be gradual. Water level readings have been made at times and under conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the time measurements were made.

Boring No.: WV-PMW-RI-102C

BORING_WELL 62961.91 PERIMETER HS PMW AND WV-PMW.GPJ GZA_CORP.GDT 9/20/22

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Boring No.: WV-PMW-RI-102C
Page: 2 **of** 3
File No.: 16.0062961.91
Check: J. Groenleer

Depth	Sample Information					Sample Description & Classification	Stratum Desc.	Remarks	Equipment Installed
	No.	Pen./ Rec. (in.)	Depth (Ft.)	Blows (/6")	Test Data				
61–129									Bentonite Grout

REMARKS

Stratification lines represent approximate boundary between soil types, transitions may be gradual. Water level readings have been made at times and under conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the time measurements were made.

Boring No.: WV-PMW-RI-102C

BORING_WELL 62961.91 PERIMETER HS PMW AND WV-PMW.GPJ GZA_CORP.GDT 9/20/22

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Boring No.: WV-PMW-RI-102C
Page: 3 **of** 3
File No.: 16.0062961.91
Check: J. Groenleer

Depth	Sample Information: No.	Pen./ Rec. (in.)	Depth (Ft.)	Blows (/6")	Test Data	Sample Description & Classification	Stratum Desc.	Remarks	Equipment Installed
131–139									Filter Sand Pack; Top of Well Screen; 2-Inch Dia. 5-Foot PVC Screen (0.010" Slot); Bottom of Well Screen
140						Bottom of Borehole at 139.0 Feet		1	
141–199									

REMARKS

1. Monitoring well was installed in borehole upon completion. Well screen was set from approximately 134.0 to 139.0 feet below ground surface.

Stratification lines represent approximate boundary between soil types, transitions may be gradual. Water level readings have been made at times and under conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the time measurements were made.

Boring No.: WV-PMW-RI-102C

BORING_WELL 62961.91 PERIMETER HS PMW AND WV-PMW.GPJ GZA_CORP.GDT 9/20/22

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Rockford, Michigan

Boring No.: HS-PMW-RI-102D
Page: 1 **of** 3
File No.: 16.0062961.91
Check: J. Groenleer

Contractor: Stearns Drilling Company
Foreman: J. Huntoon
Logged by: C. Melby
Date Start/Finish: 8-2-22 / 8-3-22
Boring Location: 584,556.6010 N; 12,786,585.6787 E
GS Elev.: 759.16' **Datum:** NAD83/NAVD88

	Auger/ Casing	Sampler
Type:	Hollow Stem Auger	Split Spoon
O.D. / I.D.:	8.0" / 4.25"	2.0" / 1 3/8"
Hammer Wt.:	140lbs	NA
Hammer Fall:	30.0"	NA
TOC Elev.:	761.55'	NA

GROUNDWATER READINGS

Date	Time	Depth	Casing	Stab

Surveyed By: EXXEL **Survey Date:** 8/25/2022

Depth	Sample Information: No.	Pen./ Rec. (in.)	Depth (Ft.)	Blows (/6")	Test Data	Sample Description & Classification	Stratum Desc.	Remarks	Equipment Installed
1–59						See HS-PMW-RI-102 boring log for soil and stratum descriptions.			PROTECTIVE COVER; Backfill/Cement

REMARKS

Stratification lines represent approximate boundary between soil types, transitions may be gradual. Water level readings have been made at times and under conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the time measurements were made.

Boring No.: HS-PMW-RI-102D

BORING_WELL 62961.91 PERIMETER HS PMW AND WV-PMW.GPJ GZA_CORP.GDT 10/28/22

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Rockford, Michigan

Boring No.: HS-PMW-RI-102D
Page: 2 **of** 3
File No.: 16.0062961.91
Check: J. Groenleer

Depth	Sample Information					Sample Description & Classification	Stratum Desc.	Remarks	Equipment Installed
	No.	Pen./ Rec. (in.)	Depth (Ft.)	Blows (/6")	Test Data				
61–129									Bentonite Grout

REMARKS

Stratification lines represent approximate boundary between soil types, transitions may be gradual. Water level readings have been made at times and under conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the time measurements were made.

Boring No.: HS-PMW-RI-102D

BORING_WELL 62961.91 PERIMETER HS PMW AND WV-PMW.GPJ GZA_CORP.GDT 10/28/22

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Boring No.: HS-PMW-RI-102D
Page: 3 **of** 3
File No.: 16.0062961.91
Check: J. Groenleer

Depth	Sample Information: No.	Pen./ Rec. (in.)	Depth (Ft.)	Blows (/6")	Test Data	Sample Description & Classification	Stratum Desc.	Remarks	Equipment Installed
131–178									Filter Sand Pack; Top of Well Screen; 2-Inch Dia. 5-Foot PVC Screen (0.010" Slot); Bottom of Well Screen
179						Bottom of Borehole at 179.0 Feet		1	
180–199									

REMARKS

1. Monitoring well was installed in borehole upon completion. Well screen was set from approximately 174.0 to 179.0 feet below ground surface.

Stratification lines represent approximate boundary between soil types, transitions may be gradual. Water level readings have been made at times and under conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the time measurements were made.

Boring No.: HS-PMW-RI-102D

BORING_WELL 62961.91 PERIMETER HS PMW AND WV-PMW.GPJ GZA_CORP.GDT 10/28/22

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Rockford, Michigan

Boring No.: HS-PMW-RI-105A
Page: 1 **of** 1
File No.: 16.0062961.91
Check: J. Groenleer

Contractor: Stearns Drilling Company
Foreman: J. Huntoon
Logged by: C. Melby
Date Start/Finish: 4-13-23 / 4-13-23
Boring Location: 591,935.2754 N; 12,780,567.0819 E
GS Elev.: 744.02' **Datum:** NAD83/NAVD88

	Auger/ Casing	Sampler
Type:	Hollow Stem Auger	Split Spoon
O.D. / I.D.:	8.0" / 4.25"	2.0" / 1 3/8"
Hammer Wt.:	140lbs	NA
Hammer Fall:	30.0"	NA
TOC Elev.:	743.51'	NA

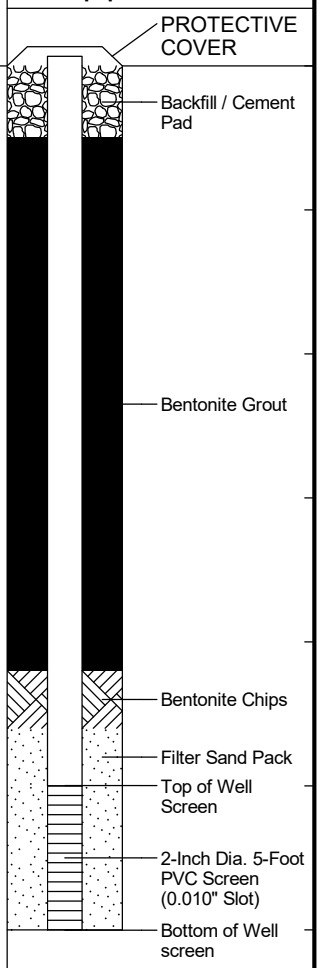
GROUNDWATER READINGS

Date	Time	Depth	Casing	Stab

Surveyed By: EXXEL **Survey Date:** 8/3/2023

Depth	Sample Information: No.	Pen./ Rec. (in.)	Depth (Ft.)	Blows (/6")	Test Data	Sample Description & Classification	Stratum Desc.	Remarks
1–29						See HS-PMW-RI-105B boring log for soil and stratum descriptions.		
30						Bottom of Borehole at 30.0 Feet		1
31–39								

Equipment Installed



REMARKS

1. Monitoring well was installed in borehole upon completion. Well screen was set from approximately 25.0 to 30.0 feet below ground surface.

Stratification lines represent approximate boundary between soil types, transitions may be gradual. Water level readings have been made at times and under conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the time measurements were made.

Boring No.: HS-PMW-RI-105A

BORING_WELL 62961.91 PERIMETER HS PMW AND WV-PMW.GPJ GZA_CORP.GDT 1/17/24

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Perimeter RAP
Rockford, Michigan

Boring No.: HS-PMW-RI-105B
Page: 1 **of** 3
File No.: 16.0062961.91
Check: J. Groenleer

Contractor: Stearns Drilling Company
Foreman: J. Huntoon
Logged by: N. Kampfschulte
Date Start/Finish: 7-26-22 / 8-1-22
Boring Location: 591,939.9400 N; 12,780,567.2500 E
GS Elev.: 743.62' **Datum:** NAD83/NAVD88

	Auger/ Casing	Sampler
Type:	Hollow Stem Auger	Split Spoon
O.D. / I.D.:	8.0" / 4.25"	2.0" / 1 3/8"
Hammer Wt.:	140lbs	NA
Hammer Fall:	30.0"	NA
TOC Elev.:	743.03'	NA

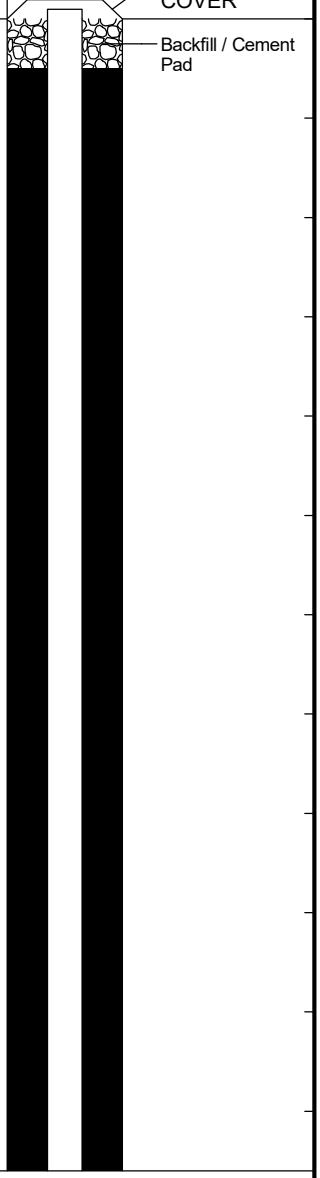
GROUNDWATER READINGS

Date	Time	Depth	Casing	Stab

Surveyed By: EXXEL **Survey Date:** 8/3/2023

Depth	Sample Information No.	Pen./ Rec. (in.)	Depth (Ft.)	Blows (/6")	Test Data	Sample Description & Classification	Stratum Desc.	Remarks
1–57	1	24/24	4-6	2-2 3-4		Loose, brown, fine to medium SAND, moist.	SAND	
	2	24/24	9-11	5-4 3-4		Loose, fine to medium SAND, trace Gravel with layer of light brown, fine Sand, moist.		
	3	24/20	14-16	4-2 1-3		Very loose, light brown, fine to medium SAND, moist.		
	4	24/20	19-21	2-3 4-3		Loose, light brown, fine to medium SAND, moist.		
	5	24/18	24-26	3-4 5-5		Loose, light brown, fine to medium SAND, wet.		1 2
	6	24/12	29-31	3-5 5-6		Loose, light brown, fine to medium SAND, wet.		
	7	24/20	34-36	15-18 25-39		Very stiff, brown, CLAY, trace medium Sand, moist.	34' CLAY	3
	8	24/18	39-41	12-24 29-29		Very stiff, brown, CLAY, trace medium to coarse Sand, moist.		
	9	24/12	44-46	5-18 35-50/5"		Very dense, brown and gray, medium SAND and fine Gravel, moist.	44' SAND	
	10	24/24	49-51	12-22 36-46		Very stiff to hard, brown, CLAY, moist.	49' CLAY	
	11	24/24	54-56	10-15 25-46		Very stiff to hard, brown, CLAY, moist.		

Equipment Installed



REMARKS

1. Groundwater was encountered at approximately 24.0 feet below ground surface.
2. VAP groundwater sample was collected from approximately 25.0 to 30.0 feet below ground surface and submitted for analytical laboratory testing.
3. 10-inch casing installed from ground surface to approximately 35.0 feet below ground surface and grouted in place.

Stratification lines represent approximate boundary between soil types, transitions may be gradual. Water level readings have been made at times and under conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the time measurements were made.

Boring No.: HS-PMW-RI-105B

BORING_WELL 62961.91 PERIMETER HS PMW AND WV-PMW.GPJ GZA_CORP.GDT 1/17/24

GZA GeoEnvironmental, Inc.
Engineers and Scientists

Woverine World Wide, Inc.
Perimeter RAP
Rockford, Michigan

Boring No.: HS-PMW-RI-105B
Page: 2 **of** 3
File No.: 16.0062961.91
Check: J. Groenleer

Depth	Sample Information: No.	Pen./ Rec. (in.)	Depth (Ft.)	Blows (/6")	Test Data	Sample Description & Classification	Stratum Desc.	Remarks	Equipment Installed
59–62	12	24/24	59-61	13-23 26-36		Very stiff to hard, brown, CLAY, trace fine Gravel, trace medium Sand, moist.	CLAY		
63–66	13	24/24	64-66	10-22 36-50/5"		Very stiff, brown, CLAY, moist.			
67–71	14	24/24	69-71	10-29 40-50/5"		Hard, brown, CLAY, trace fine Gravel, moist.			
72–76	15	24/24	74-76	14-23 36-50/5"		Hard, brown, CLAY, trace fine Gravel, trace medium Sand, moist.			Bentonite Grout
77–81	16	24/24	79-81	11-25 40-50/5"		Hard, brown, CLAY, trace fine Gravel, trace medium Sand, moist.			
82–86	17	24/24	84-86	13-30 41-50/5"		Hard, brown, CLAY, moist.			
87–91	18	24/24	89-91	15-31 39-50/5"		Hard, brown, CLAY, moist.			
92–96	19	24/24	94-96	1-1 1-4		Very loose, brown, medium SAND and fine Gravel, wet.	94' SAND	4 5	
97–101	20	24/20	99-101	2-8 18-40		Medium dense, brown, medium SAND and fine Gravel, trace Clay,wet.			
102–106	21	24/24	104-106	3-12 37-50/5"		Dense, brown, medium SAND, trace fine Gravel, wet.		6	
107–111	22	24/24	109-111	WOH-6 23-46		Medium dense, light gray, medium SAND, trace fine Gravel, wet.			
112–116	23	24/24	114-116	6-10 24-50/5.5"		Medium dense, light gray, medium SAND, trace fine Gravel, wet.		7	
117–121	24	24/24	119-121	2-3 7-13		Medium dense, light gray, medium SAND, trace fine Gravel, wet.			
122–125	25	24/24	124-126	3-3 2-13		Loose, light gray, medium SAND, trace fine			

REMARKS

4. Large rock (coarse gravel) lodged in spoon tip.
5. VAP groundwater sample was collected from approximately 95.0 to 100.0 feet below ground surface and submitted for analytical laboratory testing.
6. VAP groundwater sample was collected from approximately 105.0 to 110.0 feet below ground surface and submitted for analytical laboratory testing.
7. VAP groundwater sample was collected from approximately 115.0 to 120.0 feet below ground surface and submitted for analytical laboratory testing.
8. VAP groundwater sample was collected from approximately 125.0 to 130.0 feet below ground surface and submitted for analytical laboratory testing.

Stratification lines represent approximate boundary between soil types, transitions may be gradual. Water level readings have been made at times and under conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the time measurements were made.

Boring No.: HS-PMW-RI-105B

BORING_WELL 62961.91 PERIMETER HS PMW AND WV-PMW.GPJ GZA_CORP.GDT 1/17/24

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Rockford, Michigan

Boring No.: HS-PMW-RI-105B
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File No.: 16.0062961.91
Check: J. Groenleer

Depth	Sample Information: No.	Pen./ Rec. (in.)	Depth (Ft.)	Blows (/6")	Test Data	Sample Description & Classification	Stratum Desc.	Remarks	Equipment Installed
127						Gravel, wet.	SAND	8	
134	26	24/10	134-136	4-4 5-8		Loose, light gray, fine to medium SAND, some fine Gravel, wet.		9	
139	27	24/18	139-141	4-20 35-42		Dense, light gray, fine to medium SAND, trace coarse Gravel, wet.			
144	28	24/12	144-146	4-12 29-50/5"		Medium dense, gray, fine GRAVEL, some fine to medium Sand, trace coarse Gravel, wet.	144' GRAVEL	10	
149	29	16/16	149-150.3	13-31-50/4"		Very dense, gray, fine to medium SAND, some fine Gravel, trace coarse Gravel, wet.	149' SAND	11	Filter Sand Pack Top of Well Screen
154	30	24/0	154-156	6-21-41		Very dense, gray, fine to medium SAND, some fine Gravel, trace coarse Gravel, wet.		12	2-Inch Dia. 5-Foot PVC Screen (0.010" Slot)
158	31	12/12	158-159	44-75		Hard, gray, CLAY, little Sand, little fine Gravel, wet.	158' 159' CLAY	13	Bottom of Well screen
159						Bottom of Borehole at 159.0 Feet			
192									

REMARKS

9. VAP groundwater sample was collected from approximately 135.0 to 140.0 feet below ground surface and submitted for analytical laboratory testing.
10. VAP groundwater sample was collected from approximately 145.0 to 150.0 feet below ground surface and submitted for analytical laboratory testing.
11. VAP groundwater sample was collected from approximately 153.0 to 158.0 feet below ground surface and submitted for analytical laboratory testing.
12. Description based on contents of a sand bailer.
13. Monitoring well was installed in borehole upon completion. Well screen was set from approximately 153.0 to 158.0 feet below ground surface.

Stratification lines represent approximate boundary between soil types, transitions may be gradual. Water level readings have been made at times and under conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the time measurements were made.

Boring No.: HS-PMW-RI-105B

BORING_WELL 62961.91 PERIMETER HS PMW AND WV-PMW.GPJ GZA_CORP.GDT 1/17/24

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Rockford, Michigan

Boring No.: HS-PMW-RI-106A
Page: 1 **of** 1
File No.: 16.0062961.91
Check: J. Groenleer

Contractor: Stearns Drilling Company
Foreman: J. Huntoon
Logged by: C. Melby
Date Start/Finish: 5-18-23 / 5-23-23
Boring Location: 588,417.3251 N; 12,782,126.9637 E
GS Elev.: 761.39' **Datum:** NAD83/NAVD88

	Auger/ Casing	Sampler
Type:	Hollow Stem Auger	Split Spoon
O.D. / I.D.:	8.0" / 4.25"	2.0" / 1 3/8"
Hammer Wt.:	140lbs	NA
Hammer Fall:	30.0"	NA
TOC Elev.:	760.83'	NA

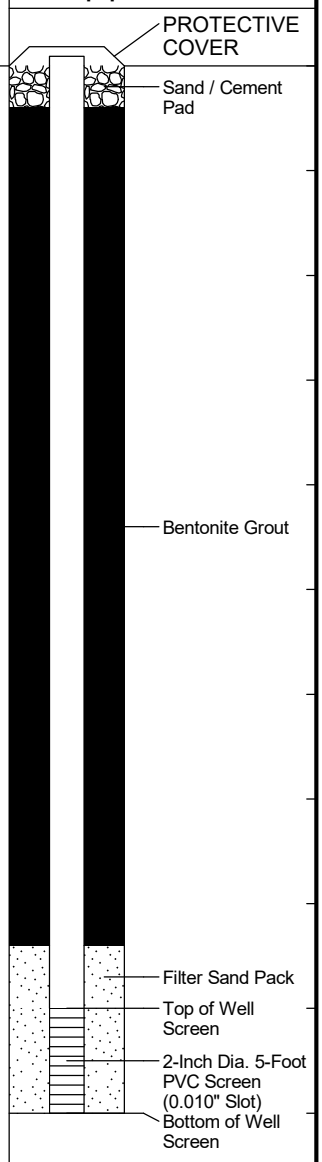
GROUNDWATER READINGS

Date	Time	Depth	Casing	Stab

Surveyed By: EXXEL **Survey Date:** 8/3/2023

Depth	Sample Information: No.	Pen./ Rec. (in.)	Depth (Ft.)	Blows (/6")	Test Data	Sample Description & Classification	Stratum Desc.	Remarks
1–54						See HS-PMW-RI-106B boring log for soil and stratum descriptions.		1
50–54						Bottom of Borehole at 50.0 Feet		2

Equipment Installed



REMARKS

1. 10-inch casing installed from ground surface to approximately 21.0 feet below ground surface and grouted in place.
2. Monitoring well was installed in borehole upon completion. Well screen was set from approximately 45.0 to 50.0 feet below ground surface.

Stratification lines represent approximate boundary between soil types, transitions may be gradual. Water level readings have been made at times and under conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the time measurements were made.

Boring No.: HS-PMW-RI-106A

BORING_WELL 62961.91 PERIMETER HS PMW AND WV-PMW.GPJ GZA_CORP.GDT 1/17/24

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Boring No.: HS-PMW-RI-106B
Page: 1 **of** 4
File No.: 16.0062961.91
Check: J. Groenleer

Contractor: Stearns Drilling Company
Foreman: J. Huntoon
Logged by: C. Melby
Date Start/Finish: 7-11-22 / 7-21-22
Boring Location: 588,421.7658 N; 12,782,121.2407 E
GS Elev.: 760.99' **Datum:** NAD83/NAVD88

	Auger/ Casing	Sampler
Type:	Hollow Stem Auger	Split Spoon
O.D. / I.D.:	8.0" / 4.25"	2.0" / 1 3/8"
Hammer Wt.:	140lbs	NA
Hammer Fall:	30.0"	NA
TOC Elev.:	760.38'	NA

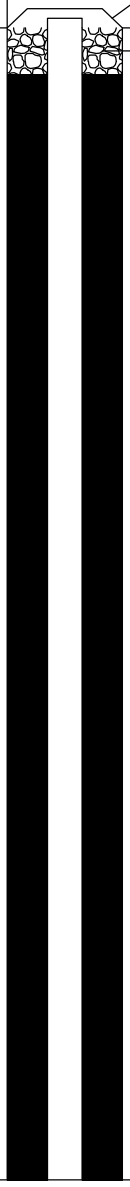
GROUNDWATER READINGS

Date	Time	Depth	Casing	Stab

Surveyed By: EXXEL **Survey Date:** 8/3/2023

Depth	Sample Information No.	Pen./ Rec. (in.)	Depth (Ft.)	Blows (/6")	Test Data	Sample Description & Classification	Stratum Desc.	Remarks
1							SAND	
2								
3								
4	1	24/18	4-6	1-1 2-1		Very loose, brown, fine SAND, little Silt, dry.		
5								
6								
7								
8								
9	2	24/24	9-11	2-3 4-4		Loose, light brown, fine SAND and Silt, dry.		
10								
11								
12								
13								
14	3	24/24	14-16	1-2 1-1		Very loose, light brown, fine SAND and Silt, dry.		1
15								
16								
17								
18								
19	4	24/24	19-21	2-3 6-8		Loose, light brown, fine SAND, little Silt, moist to wet. Changing at 20.0 feet to: Brown, SILT & CLAY, little fine to coarse Sand embedded, moist.	20' SILT & CLAY	
20								
21								
22								
23								
24	5	24/24	24-26	4-7 10-10		Very stiff, gray, Silty CLAY, trace fine to medium Sand embedded, moist.	24' Silty CLAY	
25								
26								
27								
28								
29	6	24/20	29-31	2-7 8-10		Medium dense, light brown, fine to medium SAND, little Silt, dry.	29' SAND	
30								
31								
32								
33								
34	7	24/24	34-36	5-7 10-12		Medium dense, brown, fine to medium SAND, little Silt, moist.		
35								
36								
37								
38								
39	8	24/24	39-41	2-3 6-9		Loose, brown, fine to medium SAND, trace Silt, wet.		2 3
40								
41								
42								
43								
44	9	24/24	44-46	2-4 6-10		Medium dense, brown, fine to medium SAND, trace Silt, wet.		
45								
46								
47								
48								
49	10	24/24	49-51	3-3		Loose, brown, fine to medium SAND, trace		

Equipment Installed



REMARKS

1. A temporary well was initially set from approximately 15.0 to 20.0 feet below ground surface but did not produce. The temporary well was moved to approximately 13.0 to 18.0 feet below ground surface but did not produce.
2. Groundwater was encountered at approximately 39.0 feet below ground surface.
3. VAP groundwater sample was collected from approximately 40.0 to 45.0 feet below ground surface and submitted for analytical laboratory testing.
4. VAP groundwater sample was collected from approximately 50.0 to 55.0 feet below ground surface and submitted for analytical laboratory testing.

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Boring No.: HS-PMW-RI-106B

BORING_WELL 62961.91 PERIMETER HS PMW AND WV-PMW.GPJ GZA_CORP.GDT 1/17/24

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Rockford, Michigan

Boring No.: HS-PMW-RI-106B
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Check: J. Groenleer

Depth	Sample Information: No.	Pen./ Rec. (in.)	Depth (Ft.)	Blows (/6")	Test Data	Sample Description & Classification	Stratum Desc.	Remarks	Equipment Installed
51				5-6		Silt, wet.	SAND	4	
52									
53									
54	11	24/24	54-56	2-3		Loose, brown, fine to medium SAND, trace			
55				5-7		Silt, wet.			
56									
57									
58									
59	12	24/18	59-61	1-1		Very loose, brown, fine to medium SAND,			
60				2-4		trace Silt, wet.		5	
61									
62									
63									
64	13	24/24	64-66	1-2		Loose, brown, fine to medium SAND, trace			
65				3-4		Silt, wet.			
66									
67									
68									
69	14	24/24	69-71	3-5		Medium dense, brown, fine to medium			
70				13-21		SAND, trace Silt, wet. Changing at 70.8 feet	70.8'		
71						to: Medium dense, brown, GRAVEL, some	GRAVEL		
72						Silty Clay, moist to wet.			
73							74'		
74	15	24/12	74-76	4-15		Hard, gray, Silty CLAY and Gravel, some	Silty CLAY	6	
75				17-15		fine to coarse Sand embedded, moist.			
76									
77									
78							79'		
79	16	24/18	79-81	2-3		Medium stiff, gray, Clayey SILT, little fine to	Clayey SILT		
80				3-5		coarse Sand embedded, moist.			
81									
82									
83									
84	17	24/16	84-86	10-12		Hard, gray, Clayey SILT, trace fine to			
85				20-30		medium Sand, moist.			
86									
87									
88									
89	18	24/18	89-91	5-12		Hard, gray, SILT and fine Sand, moist.	89'		
90				21-22			SILT		
91									
92									
93							94'		
94	19	24/24	94-96	12-10		Dense, gray, fine SAND and Silt, moist.	SAND		
95				22-28					
96									
97								7	
98									
99	20	24/24	99-101	3-4		Medium dense, gray, fine to medium SAND,			
100				7-10		some Silt, wet.		8	Bentonite Grout
101									
102									
103									
104	21	24/24	104-106	1-2		Loose, gray, fine to medium SAND, some			
105				3-5		Silt, wet.			
106									
107									
108									

REMARKS

5. VAP groundwater sample was collected from approximately 60.0 to 65.0 feet below ground surface and submitted for analytical laboratory testing.
6. 10-inch casing installed from ground surface to approximately 73.0 feet below ground surface and grouted in place.
7. Drilling rods were observed to be wet at approximately 97.0 feet below ground surface.
8. VAP groundwater sample was collected from approximately 100.0 to 105.0 feet below ground surface and submitted for analytical laboratory testing.

Stratification lines represent approximate boundary between soil types, transitions may be gradual. Water level readings have been made at times and under conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the time measurements were made.

Boring No.: HS-PMW-RI-106B

BORING_WELL 62961.91 PERIMETER HS PMW AND WV-PMW.GPJ GZA_CORP.GDT 1/17/24

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Rockford, Michigan

Boring No.: HS-PMW-RI-106B
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Check: J. Groenleer

Depth	Sample Information: No.	Pen./ Rec. (in.)	Depth (Ft.)	Blows (/6")	Test Data	Sample Description & Classification	Stratum Desc.	Remarks	Equipment Installed
109–110	22	24/24	109-111	2-4 9-14		Medium dense, gray, fine to medium SAND, little Silt, wet with medium to coarse SAND in spoon tip.	SAND	9	
114–115	23	24/24	114-116	4-13 20-25		Dense, gray, fine to medium SAND, little Silt, wet.			
119–120	24	24/24	119-121	4-6 11-16		Medium dense, gray, fine to coarse SAND, trace Silt, wet.		10	
124–125	25	24/24	124-126	4-10 16-21		Medium dense, gray, fine to medium SAND, little Silt, wet.			
129–130	26	24/18	129-131	3-6 6-9		Medium dense, gray, fine to medium SAND, little Silt, wet.		11	
134–135	27	24/16	134-136	2-5 7-11		Medium dense, gray, fine SAND, trace Silt, wet.			
139–140	28	24/18	139-141	2-3 6-9		Medium dense, gray, fine SAND, little Silt, wet.		12	
144–145	29	24/20	144-146	1-2 5-11		Loose, gray, fine SAND, little Silt, wet.			
149–150	30	24/14	149-151	2-3 7-11		Medium dense, gray, fine to medium SAND, little Silt, wet.		13	
154–155	31	24/10	154-156	2-6 10-16		Medium dense, gray, fine to medium SAND, little Silt, wet.			
159–160	32	24/10	159-161	2-6 11-20		Medium dense, gray, fine to medium SAND, little Silt, wet.		14	
164–165	33	24/10	164-166	1-3 4-8		Loose, gray, fine to medium SAND, little Silt, wet.			

REMARKS

9. VAP groundwater sample was collected from approximately 110.0 to 115.0 feet below ground surface and submitted for analytical laboratory testing.
10. VAP groundwater sample was collected from approximately 120.0 to 125.0 feet below ground surface and submitted for analytical laboratory testing.
11. VAP groundwater sample was collected from approximately 130.0 to 135.0 feet below ground surface and submitted for analytical laboratory testing.
12. VAP groundwater sample was collected from approximately 140.0 to 145.0 feet below ground surface and submitted for analytical laboratory testing.
13. VAP groundwater sample was collected from approximately 150.0 to 155.0 feet below ground surface and submitted for analytical laboratory testing.
14. VAP groundwater sample was collected from approximately 160.0 to 165.0 feet below ground surface and submitted for analytical laboratory testing.

Stratification lines represent approximate boundary between soil types, transitions may be gradual. Water level readings have been made at times and under conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the time measurements were made.

Boring No.: HS-PMW-RI-106B

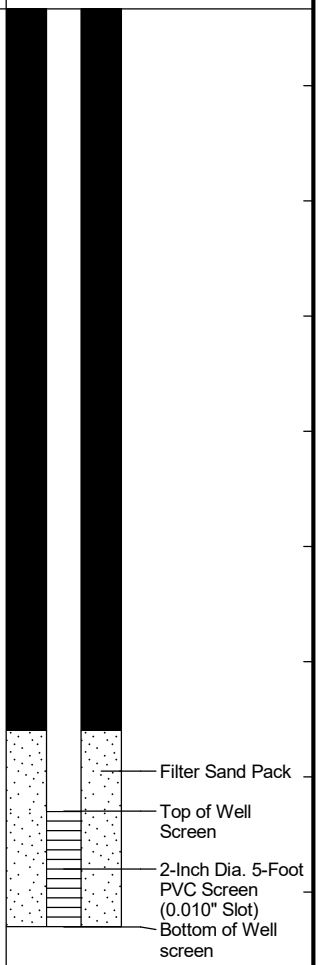
BORING_WELL 62961.91 PERIMETER HS PMW AND WV-PMW.GPJ GZA_CORP.GDT 1/17/24

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Rockford, Michigan

Boring No.: HS-PMW-RI-106B
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File No.: 16.0062961.91
Check: J. Groenleer

Depth	Sample Information: No.	Pen./ Rec. (in.)	Depth (Ft.)	Blows (/6")	Test Data	Sample Description & Classification	Stratum Desc.	Remarks	Equipment Installed
168							SAND		
169	34	24/18	169-171	2-4 9-19		Medium dense, gray, fine to medium SAND, little Silt, wet.		15	
170									
171									
172									
173									
174	35	24/14	174-176	1-3 6-10		Loose, gray, fine to medium SAND, little Silt, wet.			
175									
176									
177									
178									
179	36	24/16	179-181	2-4 5-7		Loose, gray, fine to medium SAND, little Silt, wet.		16	
180									
181									
182									
183									
184	37	24/14	184-186	1-1 2-5		Very loose, gray, fine to medium SAND, little Silt, wet.			
185									
186									
187									
188									
189									
190								17	
191									
192									
193									
194									
195									
196									
197									
198									
199									
200									
201									
202								18	
203									
204									
205									
206									
207									
208							208'		
209	38	0/0	208-208	50/0"		NO RECOVERY. Bottom of Borehole at 208.0 Feet		19 20	
210									
211									
212									
213									
214									
215									
216									
217									
218									
219									
220									
221									
222									
223									
224									



REMARKS

15. VAP groundwater sample was collected from approximately 170.0 to 175.0 feet below ground surface and submitted for analytical laboratory testing.
16. VAP groundwater sample was collected from approximately 180.0 to 185.0 feet below ground surface and submitted for analytical laboratory testing.
17. Augers locked up in formation. Pulled/removed 40.0 feet of augers until they were able to spin again. Drilled until auger refusal at approximately 208.0 feet below ground surface and drove spoon.
18. VAP groundwater sample was collected from approximately 201.5 to 206.5 feet below ground surface and submitted for analytical laboratory testing.
19. Spoon and auger refusal at 208.0 feet. Likely bedrock.
20. Monitoring well was installed in borehole upon completion. Well screen was set from approximately 201.5 to 206.5 feet below ground surface.

Stratification lines represent approximate boundary between soil types, transitions may be gradual. Water level readings have been made at times and under conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the time measurements were made.

Boring No.: HS-PMW-RI-106B

BORING_WELL 62961.91 PERIMETER HS PMW AND WV-PMW.GPJ GZA_CORP.GDT 1/17/24

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Rockford, Michigan

Boring No.: WV-PMW-RI-101A
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File No.: 16.0062961.91
Check: J. Groenleer

Contractor: Stearns Drilling Company
Foreman: J. Huntoon
Logged by: N. Kampfschulte
Date Start/Finish: 8-5-22 / 8-5-22
Boring Location: 597,901.3578 N; 12,795,786.7453 E
GS Elev.: 837.54' **Datum:** NAD83/NAVD88

	Auger/ Casing	Sampler
Type:	Hollow Stem Auger	Split Spoon
O.D. / I.D.:	8.0" / 4.25"	2.0" / 1 3/8"
Hammer Wt.:	140lbs	NA
Hammer Fall:	30.0"	NA
TOC Elev.:	840.39'	NA

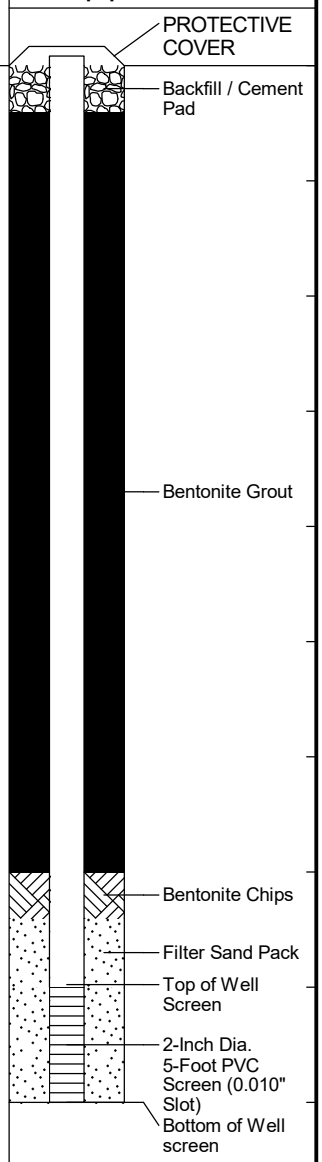
GROUNDWATER READINGS

Date	Time	Depth	Casing	Stab

Surveyed By: EXXEL **Survey Date:** 8/25/2022

Depth	Sample Information: No.	Pen./ Rec. (in.)	Depth (Ft.)	Blows (/6")	Test Data	Sample Description & Classification	Stratum Desc.	Remarks
1–49						See WV-PMW-RI-101B boring log for soil and stratum descriptions.		
45–49						Bottom of Borehole at 45.0 Feet		1

Equipment Installed



REMARKS

1. Monitoring well was installed in borehole upon completion. Well screen was set from approximately 40.0 to 45.0 feet below ground surface.

Stratification lines represent approximate boundary between soil types, transitions may be gradual. Water level readings have been made at times and under conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the time measurements were made.

Boring No.: WV-PMW-RI-101A

BORING_WELL 62961.91 PERIMETER HS PMW AND WV-PMW.GPJ GZA_CORP.GDT 10/28/22

GZA GeoEnvironmental, Inc.
Engineers and Scientists

Woverine World Wide, Inc.
Perimeter RAP
Rockford, Michigan

Boring No.: WV-PMW-RI-101B
Page: 1 of 7
File No.: 16.0062961.91
Check: J. Groenleer

Contractor: Stearns Drilling Company
Foreman: D. Krause
Logged by: C. Melby
Date Start/Finish: 11-8-21 / 12-5-21
Boring Location: 597,896.954 N; 12,795,783.8499 E
GS Elev.: 837.48' **Datum:** NAD83/NAVD88

	Auger/ Casing	Sampler
Type:	Hollow Stem Auger	Split Spoon
O.D. / I.D.:	8.0" / 4.25"	2.0" / 1 3/8"
Hammer Wt.:	140lbs	NA
Hammer Fall:	30.0"	NA
TOC Elev.:	840.39'	NA

GROUNDWATER READINGS

Date	Time	Depth	Casing	Stab
12/3/21	1030	121.0'	-	>14 hrs

Surveyed By: EXXEL **Survey Date:** 3/30/2022

Depth	Sample Information: No.	Pen./ Rec. (in.)	Depth (Ft.)	Blows (/6")	Test Data	Sample Description & Classification	Stratum Desc.	Remarks
1							SAND	
2								
3								
4	1	24/20	4-6	4-6 11-11		Medium dense, brown, fine to medium SAND, some Silt, dry.		
5								
6								
7								
8								
9	2	24/14	9-11	6-5 3-3		Loose, brown, fine to medium SAND and Silt, dry.		
10								
11								
12								
13								
14	3	24/18	14-16	3-3 3-4		Loose, brown, fine to medium SAND, trace Silt, dry.		
15								
16								
17								
18								
19	4	24/18	19-21	2-6 8-8		Medium dense, brown, fine to medium SAND, trace Silt, dry.		
20								
21								
22								
23								
24	5	24/20	24-26	1-1/12"-1		Very loose, brown, fine to medium SAND, trace Silt, dry. Changing at 25.8 feet to: Very loose, brown, fine to medium SAND, trace Silt, moist.		
25								
26								
27								
28								
29	6	24/24	29-31	7-15 24-31		Dense, brown, fine to medium SAND, trace Silt, moist.		
30								
31								
32								
33								
34	7	24/22	34-36	3-11 15-20		Medium dense, brown, fine to medium SAND, trace Silt, moist.		
35								
36								
37								
38								
39	8	24/24	39-41	3-6		Medium dense, brown, fine to medium SAND,		1

Equipment Installed



REMARKS

1. Groundwater was encountered at approximately 39.0 feet below ground surface.
2. VAP groundwater sample was collected from approximately 40.0 to 40.5 feet below ground surface and submitted for analytical laboratory testing.

Stratification lines represent approximate boundary between soil types, transitions may be gradual. Water level readings have been made at times and under conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the time measurements were made.

Boring No.: WV-PMW-RI-101B

BORING_WELL 62961.91 PERIMETER HS PMW AND WV-PMW.GPJ GZA_CORP.GDT 10/28/22

GZA
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Engineers and Scientists

Woverine World Wide, Inc.
Perimeter RAP
Rockford, Michigan

Boring No.: WV-PMW-RI-101B
Page: 2 **of** 7
File No.: 16.0062961.91
Check: J. Groenleer

Depth	Sample Information					Sample Description & Classification	Stratum Desc.	Remarks	Equipment Installed
	No.	Pen./ Rec. (in.)	Depth (Ft.)	Blows (/6")	Test Data				
41				7-5		trace Silt, wet.	SAND	2	
42									
43									
44	9	24/24	44-46	2-3		Loose, gray fine to coarse SAND and			
45				2-7		interbedded medium stiff, Clayey Silt, wet.			
46									
47									
48									
49	10	12/12	49-50	21-70/6"		Very dense, gray, GRAVEL and fine to coarse	49' GRAVEL		
50						Sand, some Silty Clay, moist to wet.			
51								3	
52									
53									
54	11	12/12	54-55	34-70/6"		Hard, gray, Clayey SILT, little fine to coarse	54' Clayey SILT		
55						Sand embedded, moist.			
56									
57									
58									
59	12	18/18	59-60.5	8-23-60/6"		Hard, brown and gray, Silty CLAY, some fine	59' Silty CLAY		
60						to coarse Sand embedded, moist.			
61									
62									
63									
64	13	24/24	64-66	9-25		Hard, brown and gray, Clayey SILT, some fine	64' Clayey SILT		
65				44-54		to medium Sand, moist to wet.			
66									
67									
68									
69	14	24/24	69-71	7-18		Hard, brown and gray, Silty CLAY, little fine to	69' Silty CLAY		
70				28-34		medium Sand embedded, moist.			
71									
72									
73									
74	15	24/24	74-76	6-16		Hard, gray, Silty CLAY, little fine to coarse			
75				24-36		Sand embedded, dry to moist.			
76									
77									
78									
79	16	24/24	79-81	7-14		Hard, gray, Silty CLAY, little fine to coarse			
80				21-26		Sand embedded, occasional Sand lenses, wet.			
81									
82									
83									
84	17	24/24	84-86	6-11		Hard, gray and brown, Silty CLAY, little fine to			
85				16-26		coarse Sand embedded, moist.			
86									

REMARKS

3. 10-inch casing installed from ground surface to approximately 50.5 feet below ground surface and grouted in place.

Stratification lines represent approximate boundary between soil types, transitions may be gradual. Water level readings have been made at times and under conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the time measurements were made.

Boring No.: WV-PMW-RI-101B

BORING_WELL 62961.91 PERIMETER HS PMW AND WV-PMW.GPJ GZA_CORP.GDT 10/28/22

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Engineers and Scientists

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Rockford, Michigan

Boring No.: WV-PMW-RI-101B
Page: 3 **of** 7
File No.: 16.0062961.91
Check: J. Groenleer

Depth	Sample Information					Sample Description & Classification	Stratum Desc.	Remarks	Equipment Installed
	No.	Pen./ Rec. (in.)	Depth (Ft.)	Blows (/6")	Test Data				
87							Silty CLAY		
88									
89	18	24/24	89-91	7-14 22-30		Hard, gray and brown, Silty CLAY, little fine to coarse Sand embedded, moist to dry.			
90									
91									
92									
93									
94	19	24/24	94-96	7-12 16-28		Hard, gray, Silty CLAY, little fine to coarse Sand embedded, moist to dry.			
95									
96									
97									
98									
99	20	24/24	99-101	3-10 44-52		Hard, gray, Silty CLAY, little fine to coarse Sand embedded, moist. Changing at 100.2 feet to: Very dense, gray and brown, fine to medium SAND, little Silt, wet.			
100							100.2' SAND		
101									
102									
103									
104	21	24/24	104-106	4-5 7-29		Hard, gray, Clayey SILT, some fine to coarse Sand embedded, occasional Sand lenses, moist.	104' Clayey SILT		
105									
106									
107									
108									
109	22	24/24	109-111	4-11 17-28		Hard, gray, Silty CLAY, little fine to coarse Sand embedded, moist.	109' Silty CLAY		
110									
111									
112									
113									
114	23	24/24	114-116	8-12 19-31		Hard, brown and gray, Clayey SILT, little fine Sand embedded, wet.	114' Clayey SILT		
115									
116									
117									
118									
119	24	24/24	119-121	9-17 24-33		Hard, brown and gray, Silty CLAY, little fine to coarse Sand embedded, moist.	119' Silty CLAY		
120									
121									
122									
123									
124	25	23/23	124-125.9	16-42 39-50/5"		Hard, brown and gray, Silty CLAY, little fine to coarse Sand embedded, moist.			
125									
126									
127									
128									
129	26	24/24	129-131	8-13 20-31		Hard, brown and gray, Silty CLAY, little fine to coarse Sand, moist.			
130									
131									
132									
133									

REMARKS

Stratification lines represent approximate boundary between soil types, transitions may be gradual. Water level readings have been made at times and under conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the time measurements were made.

Boring No.: WV-PMW-RI-101B

BORING_WELL 62961.91 PERIMETER HS PMW AND WV-PMW.GPJ GZA_CORP.GDT 10/28/22

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Rockford, Michigan

Boring No.: WV-PMW-RI-101B
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File No.: 16.0062961.91
Check: J. Groenleer

Depth	Sample Information: No.	Pen./ Rec. (in.)	Depth (Ft.)	Blows (/6")	Test Data	Sample Description & Classification	Stratum Desc.	Remarks	Equipment Installed
134	27	24/24	134-136	11-20 34-39		Hard, brown and gray, Silty CLAY, little fine to coarse Sand embedded, moist.	Silty CLAY		
139	28	18/18	139-140.5	22-39-70/6"		Hard, brown and gray, Silty CLAY, little fine to coarse Sand embedded, moist.			Bentonite Grout
144	29	24/24	144-146	11-23 33-44		Hard, gray, Silty CLAY, little fine to coarse Sand embedded, moist.			
149	30	24/24	149-151	8-15 24-41		Hard, gray, Silty CLAY, little fine to coarse Sand embedded, moist.			
154	31	24/20	154-156	4-6 11-13		Medium dense, gray, fine to coarse SAND, trace Silt, wet.	154' SAND	4	
159	32	24/24	159-161	18-29 38-40		Very dense, brown and gray, fine to coarse SAND, little Silt, wet. Changing at 160.5 feet to: Hard, gray, Silty CLAY, wet.	160.5'		
161	33	24/6	161-163	20-175/6"		Hard, gray, CLAY & Gravel, some Silt, moist.	CLAY		
163	34	24/18	163-165	15-44-130/6"		Hard, gray, CLAY and fine Sand, wet.			
169	35	24/20	169-171	18-42 70-50/2"		Hard, gray, CLAY and fine Sand, moist, wet.			
174	36	24/24	174-176	19-39 62-92		Hard, gray, fine SAND and Clay, moist to wet.	174' SAND		
179	37	24/24	179-181	12-17		Hard, gray, fine SAND and Clay, moist to wet.			

REMARKS

4. VAP groundwater sample attempted from 155.0 to 160.0 feet below ground surface but temporary well did not produce water.

Stratification lines represent approximate boundary between soil types, transitions may be gradual. Water level readings have been made at times and under conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the time measurements were made.

Boring No.: WV-PMW-RI-101B

BORING_WELL 62961.91 PERIMETER HS PMW AND WV-PMW.GPJ GZA_CORP.GDT 10/28/22

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Boring No.: WV-PMW-RI-101B
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File No.: 16.0062961.91
Check: J. Groenleer

Depth	Sample Information: No.	Pen./ Rec. (in.)	Depth (Ft.)	Blows (/6")	Test Data	Sample Description & Classification	Stratum Desc.	Remarks	Equipment Installed
181				21-43			SAND		
182									
183									
184	38	24/18	184-186	19-62-132/6"		Hard, gray, CLAY and fine Sand, some Silt, trace Gravel, moist.	184' CLAY		
185									
186									
187									
188									
189	39	24/8	189-191	44-137/4"		Hard, gray, CLAY and fine Sand, some Silt, trace Gravel, moist.			
190									
191									
192									
193									
194	40	24/24	194-196	16-27 27-69		Hard, gray, CLAY and fine Sand, some Silt, trace Gravel, moist.			
195									
196									
197									
198									
199	41	24/24	199-201	9-17 30-42		Hard, gray, CLAY, some Silt, little fine Sand, moist.			
200									
201									
202									
203									
204	42	24/18	204-206	7-44-134/6"		Hard, gray, CLAY, little fine Sand interbedded with fine Sand and Silt, moist to wet.			
205									
206									
207									
208									
209	43	24/18	209-211	13-35-102/6"		Hard, gray, CLAY, some Silt, little Sand, moist to wet.			
210									
211									
212									
213									
214	44	24/24	214-216	13-24 32-44		Stiff, gray, Silty CLAY, moist.	214' Silty CLAY		
215									
216									
217									
218									
219	45	24/24	219-221	9-16 27-34		Stiff, gray, Silty CLAY, moist.			
220									
221									
222									
223									
224	46	24/24	224-226	7-11 15-20		Hard, gray, Silty CLAY, moist.			
225									
226									

REMARKS

Stratification lines represent approximate boundary between soil types, transitions may be gradual. Water level readings have been made at times and under conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the time measurements were made.

Boring No.: WV-PMW-RI-101B

BORING_WELL 62961.91 PERIMETER HS PMW AND WV-PMW.GPJ GZA_CORP.GDT 10/28/22

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Rockford, Michigan

Boring No.: WV-PMW-RI-101B
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File No.: 16.0062961.91
Check: J. Groenleer

Depth	Sample Information					Sample Description & Classification	Stratum Desc.	Remarks	Equipment Installed
	No.	Pen./ Rec. (in.)	Depth (Ft.)	Blows (/6")	Test Data				
227							Silty CLAY		
228									
229	47	24/24	229-231	8-11 17-32		Hard, gray, Silty CLAY, moist.			
230									
231									
232									
233									
234	48	24/24	234-236	11-15 23-35		Hard, gray, Silty CLAY, moist.			
235									
236									
237									
238									
239	49	24/24	239-241	14-23 26-38		Hard, gray, Silty CLAY, moist.			
240									
241									
242									
243									
244	50	24/24	244-246	10-17 25-35		Hard, gray, Silty CLAY, moist.			
245									
246									
247									
248									
249	51	24/12	249-251	3-3 7-20		Medium dense, gray, fine to medium SAND, trace Silt, wet.	249' SAND	5	
250									
251									
252									
253									
254	52	21/14	254-255.8	4-15 45-50/3"		Very dense, gray, fine to medium SAND, trace Silt, wet.			
255									
256									
257									
258									
259	53	18/18	259-260.5	9-30-125/6"		Very dense, gray, fine to medium SAND, some Silt, wet.		6	
260									
261									
262									
263									
264	54	21/14	264-265.8	10-14 38-50/3"		Very dense, gray and brown, fine to medium SAND, some Silt, wet.			
265									
266									
267									
268									
269	55	12/12	269-270	22-80/6"		Very dense, gray and brown, fine to medium SAND, some Silt, wet.		7	
270									
271									
272									
273									

REMARKS

5. VAP groundwater sample was collected from approximately 249.0 to 254.0 feet below ground surface and submitted for analytical laboratory testing.
6. VAP groundwater sample was collected from approximately 259.0 to 264.0 feet below ground surface and submitted for analytical laboratory testing.
7. VAP groundwater sample was collected from approximately 269.0 to 274.0 feet below ground surface and submitted for analytical laboratory testing.

Stratification lines represent approximate boundary between soil types, transitions may be gradual. Water level readings have been made at times and under conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the time measurements were made.

Boring No.: WV-PMW-RI-101B

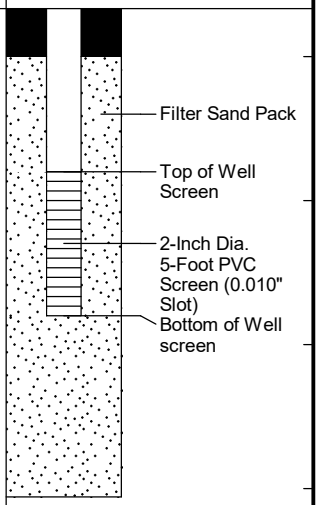
BORING_WELL 62961.91 PERIMETER HS PMW AND WV-PMW.GPJ GZA_CORP.GDT 10/28/22

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Perimeter RAP
Rockford, Michigan

Boring No.: WV-PMW-RI-101B
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File No.: 16.0062961.91
Check: J. Groenleer

Depth	Sample Information					Sample Description & Classification	Stratum Desc.	Remarks	Equipment Installed
	No.	Pen./ Rec. (in.)	Depth (Ft.)	Blows (/6")	Test Data				
274–278	56	18/18	274-275.5	17-75-90/6"		Very dense, gray and brown with trace red, fine to coarse SAND, little Silt, wet.	SAND		
279–283	57	18/18	279-280.5	20-49-66/6"		Very dense, gray and grown with little red, fine to coarse SAND, little Silt, wet.		8	
284–288	58	18/18	284-285.5	10-22-65/6"		Very dense, gray and brown, fine to medium SAND, little Silt, wet. Changing at 284.5 feet to: Hard, gray, Silty CLAY, wet.	284.5' Silty CLAY		
289–290	59	15/15	289-290.3	18-105-133/3"		Hard, gray, Silty CLAY, wet. Changing at 289.5 feet to: Very dense, red, SANSTONE, trace Silt, wet.	289.5' 290.3' SANDSTONE		
291						Bottom of Borehole at 290.3 Feet		9	
292–319									



REMARKS

8. VAP groundwater sample was collected from approximately 279.0 to 284.0 feet below ground surface and submitted for analytical laboratory testing.
9. Monitoring well was installed in borehole upon completion. Well screen was set from approximately 279.0 to 284.0 feet below ground surface.

Stratification lines represent approximate boundary between soil types, transitions may be gradual. Water level readings have been made at times and under conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the time measurements were made.

Boring No.: WV-PMW-RI-101B

BORING_WELL 62961.91 PERIMETER HS PMW AND WV-PMW.GPJ GZA_CORP.GDT 10/28/22

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Woverine World Wide, Inc.
Perimeter RAP
Rockford, Michigan

Boring No.: WV-PMW-RI-102
Page: 1 of 1
File No.: 16.0062961.91
Check: J. Groenleer

Contractor: Stearns Drilling Company
Foreman: J. Huntoon
Logged by: N. Kampfschulte
Date Start/Finish: 8-5-22 / 8-8-22
Boring Location: 596,518.7187 N; 12,794,482.1653 E
GS Elev.: 841.71' **Datum:** NAD83/NAVD88

	Auger/ Casing	Sampler
Type:	Hollow Stem Auger	Split Spoon
O.D. / I.D.:	8.0" / 4.25"	2.0" / 1 3/8"
Hammer Wt.:	140lbs	NA
Hammer Fall:	30.0"	NA
TOC Elev.:	844.05'	NA

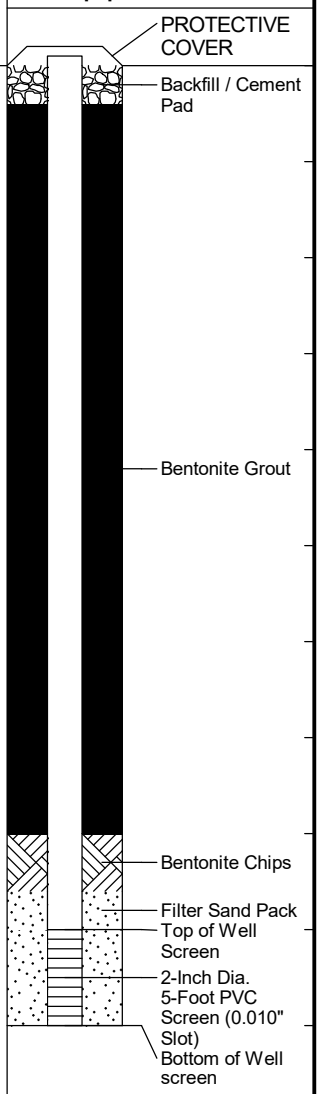
GROUNDWATER READINGS

Date	Time	Depth	Casing	Stab

Surveyed By: EXXEL **Survey Date:** 8/25/2022

Depth	Sample Information: No.	Pen./ Rec. (in.)	Depth (Ft.)	Blows (/6")	Test Data	Sample Description & Classification	Stratum Desc.	Remarks
1–49						See WV-PMW-RI-102 VAP boring log for soil and stratum descriptions.		
50						Bottom of Borehole at 50.0 Feet		1
51–59								

Equipment Installed



REMARKS

1. Monitoring well was installed in borehole upon completion. Well screen was set from approximately 45.0 to 50.0 feet below ground surface.

Stratification lines represent approximate boundary between soil types, transitions may be gradual. Water level readings have been made at times and under conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the time measurements were made.

Boring No.: WV-PMW-RI-102

BORING_WELL 62961.91 PERIMETER HS PMW AND WV-PMW.GPJ GZA_CORP.GDT 10/28/22

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Rockford, Michigan

Boring No.: WV-PMW-RI-104A
Page: 1 **of** 1
File No.: 16.0062961.91
Check: J. Groenleer

Contractor: Stearns Drilling Company
Foreman: J. Huntoon
Logged by: C. Melby
Date Start/Finish: 4-13-23 / 4-14-23
Boring Location: 597,064.3042 N; 12,789,617.8680 E
GS Elev.: 737.05' **Datum:** NAD83/NAVD88

	Auger/ Casing	Sampler
Type:	Hollow Stem Auger	Split Spoon
O.D. / I.D.:	8.0" / 4.25"	2.0" / 1 3/8"
Hammer Wt.:	140lbs	NA
Hammer Fall:	30.0"	NA
TOC Elev.:	736.68'	NA

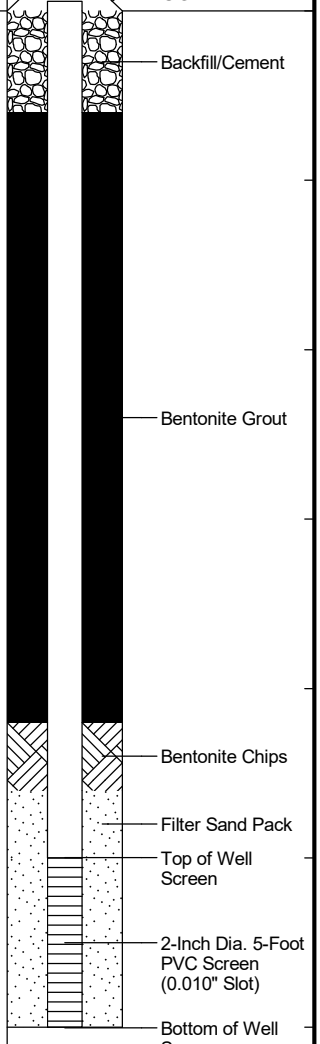
GROUNDWATER READINGS

Date	Time	Depth	Casing	Stab

Surveyed By: EXXEL **Survey Date:** 8/3/2023

Depth	Sample Information: No.	Pen./ Rec. (in.)	Depth (Ft.)	Blows (/6")	Test Data	Sample Description & Classification	Stratum Desc.	Remarks
1–29						See WV-PMW-RI-104B boring log for soil and stratum descriptions.		
30						Bottom of Borehole at 30.0 Feet		1
31–33								

Equipment Installed



REMARKS

1. Monitoring well was installed in borehole upon completion. Well screen was set from approximately 25.0 to 30.0 feet below ground surface.

Stratification lines represent approximate boundary between soil types, transitions may be gradual. Water level readings have been made at times and under conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the time measurements were made.

Boring No.: WV-PMW-RI-104A

BORING_WELL 62961.91 PERIMETER HS PMW AND WV-PMW.GPJ GZA_CORP.GDT 1/17/24

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Rockford, Michigan

Boring No.: WV-PMW-RI-104B
Page: 1 **of** 4
File No.: 16.0062961.91
Check: J. Groenleer

Contractor: Stearns Drilling Company
Foreman: J. Huntoon
Logged by: C. Melby/N. Kamphfschulte
Date Start/Finish: 10-5-22 / 10-11-22
Boring Location: 597,065.3700 N; 12,789,613.9500 E
GS Elev.: 736.96' **Datum:** NAD83/NAVD88

	Auger/ Casing	Sampler
Type:	Hollow Stem Auger	Split Spoon
O.D. / I.D.:	8.0" / 4.25"	2.0" / 1 3/8"
Hammer Wt.:	140lbs	NA
Hammer Fall:	30.0"	NA
TOC Elev.:	736.68'	NA

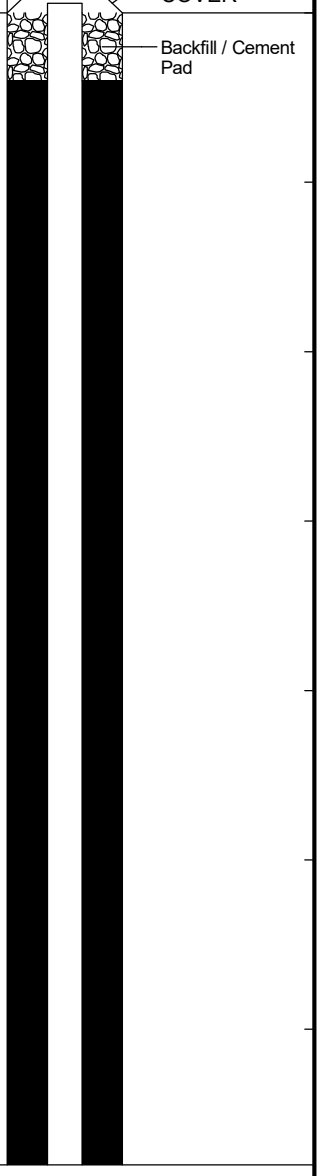
GROUNDWATER READINGS

Date	Time	Depth	Casing	Stab

Surveyed By: EXXEL **Survey Date:** 8/3/2023

Depth	Sample Information: No.	Pen./ Rec. (in.)	Depth (Ft.)	Blows (/6")	Test Data	Sample Description & Classification	Stratum Desc.	Remarks
1–8								
4–7	1	24/24	4-6	2-3 2-3		Loose, brown, fine to medium SAND (FILL), moist Changing at 5.6 feet to: Loose, brown, fine to medium SAND (FILL), little Clayey Silt, moist.	SAND (FILL)	
9–12	2	24/16	9-11	4-3 4-4		Loose, light brown, fine SAND (FILL), some Silt, moist.		
14							14'	
14–17	3	24/6	14-16	3-3 3-3		Loose, brown, fine to coarse SAND and Gravel, little Silt, moist.	SAND	1
19–22	4	24/12	19-21	16-13 8-10		Medium dense, brown, fine to coarse SAND and Gravel, trace Silt, moist.		
24–27	5	24/20	24-26	3-7 9-15		Medium dense, brown, fine to coarse SAND, trace Silt, wet.		2 3
29–32	6	24/18	29-31	2-2 2-3		Loose, brown, fine to coarse SAND, trace Silt, wet.		

Equipment Installed



REMARKS

1. Low recovery due to rock in spoon.
2. Groundwater was encountered at approximately 24.0 feet below ground surface.
3. VAP groundwater sample was collected from approximately 25.0 to 30.0 feet below ground surface and submitted for laboratory analytical testing.

Stratification lines represent approximate boundary between soil types, transitions may be gradual. Water level readings have been made at times and under conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the time measurements were made.

Boring No.: WV-PMW-RI-104B

BORING_WELL 62961.91 PERIMETER HS PMW AND WV-PMW.GPJ GZA_CORP.GDT 1/17/24

GZA GeoEnvironmental, Inc.
Engineers and Scientists

Woverine World Wide, Inc.
Perimeter RAP
Rockford, Michigan

Boring No.: WV-PMW-RI-104B
Page: 2 **of** 4
File No.: 16.0062961.91
Check: J. Groenleer

Depth	Sample Information: No.	Pen./ Rec. (in.)	Depth (Ft.)	Blows (/6")	Test Data	Sample Description & Classification	Stratum Desc.	Remarks	Equipment Installed
35	7	24/24	34-36	5-6 12-13		Medium dense, brown, fine to coarse SAND, wet. Changing at 35.5 feet to: Very stiff, brown, Silty CLAY, wet.	SAND 35.5' Silty CLAY		
36 37 38	8	23/23	36-37.9	6-16 31-50/5"		Hard, brown and gray, Silty CLAY, little fine to medium Sand embedded, moist.		4	
39 40 41 42 43	9	24/24	39-41	19-20 33-39		Hard, gray, Silty CLAY, little fine to coarse Sand embedded, moist.			
44 45 46 47 48	10	18/18	44-45.5	11-19-50/6"		Hard, gray, Silty CLAY, trace fine to medium Sand embedded, moist to dry.			
49 50 51 52 53	11	24/0	49-51	13-20 29-70		NO RECOVERY.			
54 55 56 57 58	12	24/24	54-56	11-27 35-45		Hard, gray, Silty CLAY, trace fine to medium Sand embedded, moist to dry.			
59 60 61 62 63	13	24/24	59-61	11-22 31-43		Hard, gray, Silty CLAY, trace fine to medium Sand embedded, moist to dry.			
64 65 66 67 68	14	24/24	64-66	12-25 36-50		Hard, gray, Silty CLAY, little fine to coarse Sand embedded, moist to dry.			Bentonite Grout
69 70 71 72 73	15	24/24	69-71	3-13 25-37		Hard, gray, Silty CLAY, little fine to coarse Sand embedded with occasional fine Sand and Silt seams and lenses, moist.			

REMARKS

4. 10-inch casing installed from ground surface to approximately 37.0 feet below ground surface and grouted in place.

Stratification lines represent approximate boundary between soil types, transitions may be gradual. Water level readings have been made at times and under conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the time measurements were made.

Boring No.: WV-PMW-RI-104B

BORING_WELL 62961.91 PERIMETER HS PMW AND WV-PMW.GPJ GZA_CORP.GDT 1/17/24

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Rockford, Michigan

Boring No.: WV-PMW-RI-104B
Page: 3 **of** 4
File No.: 16.0062961.91
Check: J. Groenleer

Depth	Sample Information					Sample Description & Classification	Stratum Desc.	Remarks	Equipment Installed
	No.	Pen./ Rec. (in.)	Depth (Ft.)	Blows (/6")	Test Data				
74–75	16	24/24	74-76	10-24 35-50		Hard, gray, Clayey SILT, little fine Sand, moist.	74' Clayey SILT		
79–80	17	24/24	79-81	14-19 24-70		Hard, gray, CLAY & SILT, little fine to medium Sand embedded, moist.	79' CLAY & SILT		
84–85	18	24/24	84-86	9-14 22-23		Hard, gray, CLAY & SILT, little fine to medium Sand embedded, moist.			
89–90	19	6/8	89-89.5	50/6"		Hard, gray, CLAY & SILT, little fine to medium Sand embedded, moist.			
94–95	20	6/6	94-94.5	50/5"		Hard, gray, CLAY & SILT, little fine to medium Sand embedded, dry.			
99–100	21	6/6	99-99.5	100/5"		Hard, gray, CLAY & SILT, little fine to medium Sand embedded, dry.			
104–105	22	12/8	104-105	15-50/6"		Hard, gray, CLAY & SILT, little fine to medium Sand and medium Gravel embedded, dry.			
109–110	23	12/12	109-110	22-50/6"		Hard, gray, CLAY & SILT, little fine to medium Sand and medium Gravel embedded, dry.			
113									

REMARKS

Stratification lines represent approximate boundary between soil types, transitions may be gradual. Water level readings have been made at times and under conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the time measurements were made.

Boring No.: WV-PMW-RI-104B

BORING_WELL 62961.91 PERIMETER HS PMW AND WV-PMW.GPJ GZA_CORP.GDT 1/17/24

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Rockford, Michigan

Boring No.: WV-PMW-RI-104B
Page: 4 **of** 4
File No.: 16.0062961.91
Check: J. Groenleer

Depth	Sample Information: No.	Pen./ Rec. (in.)	Depth (Ft.)	Blows (/6")	Test Data	Sample Description & Classification	Stratum Desc.	Remarks	Equipment Installed
114	24	12/12	114-115	19-50/6"		Hard, gray, CLAY & SILT, little fine to medium Sand and medium Gravel embedded, dry.	CLAY & SILT		
119	25	24/18	119-121	5-1 1-2		Hard, gray, CLAY & SILT, little fine to medium Sand and medium Gravel embedded with seams of fine to medium Silty SAND, trace fine Gravel, wet.		5	
124	26	24/16	124-126	6-12 9-13		Medium dense, gray, fine to medium Silty SAND, trace fine Gravel, wet.	124' Silty SAND		
129	27	12/8	129-130	17-50/5"		Very dense, gray, fine to medium Silty SAND, trace fine Gravel, wet.		6	Filter Sand Pack Top of Well Screen
134	28	9/8	134-134.8	14-50/3"		Very dense, gray, fine to medium Silty SAND, trace fine Gravel, wet.		7	2-Inch Dia. 5-Foot PVC Screen (0.010" Slot) Bottom of Well screen
136	29	16/18	136-137.3	56-47-50/4"		Hard, gray, Silty CLAY and weathered Shale / Bedrock.	136' Silty CLAY 137.3'		
137						Bottom of Borehole at 137.3 Feet		8	

REMARKS

5. VAP groundwater sample was collected from approximately 120.0 to 125.0 feet below ground surface and submitted for laboratory analytical testing.
6. VAP groundwater sample was collected from approximately 130.0 to 135.0 feet below ground surface and submitted for laboratory analytical testing.
7. High blow count due to rock in spoon.
8. Monitoring well was installed in borehole upon completion. Well screen was set from approximately 130.0 to 135.0 feet below ground surface.

Stratification lines represent approximate boundary between soil types, transitions may be gradual. Water level readings have been made at times and under conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the time measurements were made.

Boring No.: WV-PMW-RI-104B

BORING_WELL 62961.91 PERIMETER HS PMW AND WV-PMW.GPJ GZA_CORP.GDT 1/17/24

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Rockford, Michigan

Boring No.: WV-PMW-RI-105A
Page: 1 **of** 1
File No.: 16.0062961.91
Check: J. Groenleer

Contractor: Stearns Drilling Company
Foreman: J. Huntoon
Logged by: C. Melby
Date Start/Finish: 4-13-23 / 4-13-23
Boring Location: 595,033.0494 N; 12,788,585.3417 E
GS Elev.: 738.89' **Datum:** NAD83/NAVD88

	Auger/ Casing	Sampler
Type:	Hollow Stem Auger	Split Spoon
O.D. / I.D.:	8.0" / 4.25"	2.0" / 1 3/8"
Hammer Wt.:	140lbs	NA
Hammer Fall:	30.0"	NA
TOC Elev.:	738.39'	NA

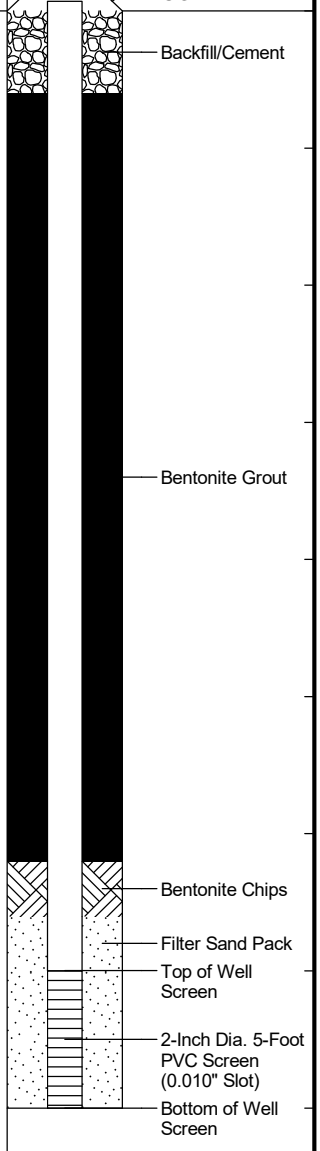
GROUNDWATER READINGS

Date	Time	Depth	Casing	Stab

Surveyed By: EXXEL **Survey Date:** 8/3/2023

Depth	Sample Information: No.	Pen./ Rec. (in.)	Depth (Ft.)	Blows (/6")	Test Data	Sample Description & Classification	Stratum Desc.	Remarks
1–41						See WV-PMW-RI-105B boring log for soil and stratum descriptions.		
40–41						Bottom of Borehole at 40.0 Feet		1

Equipment Installed



REMARKS

1. Monitoring well was installed in borehole upon completion. Well screen was set from appproximately 35.0 to 40.0 feet below ground surface.

Stratification lines represent approximate boundary between soil types, transitions may be gradual. Water level readings have been made at times and under conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the time measurements were made.

Boring No.: WV-PMW-RI-105A

BORING_WELL 62961.91 PERIMETER HS PMW AND WV-PMW.GPJ GZA_CORP.GDT 1/17/24

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Boring No.: WV-PMW-RI-105B
Page: 1 of 3
File No.: 16.0062961.91
Check: J. Groenleer

Contractor: Stearns Drilling Company
Foreman: J. Huntoon
Logged by: C. Melby
Date Start/Finish: 8-30-22 / 9-7-22
Boring Location: 595,036.8600 N; 12,788,585.7700 E
GS Elev.: 739.05' **Datum:** NAD83/NAVD88

	Auger/ Casing	Sampler
Type:	Hollow Stem Auger	Split Spoon
O.D. / I.D.:	8.0" / 4.25"	2.0" / 1 3/8"
Hammer Wt.:	140lbs	NA
Hammer Fall:	30.0"	NA
TOC Elev.:	738.52'	NA

GROUNDWATER READINGS

Date	Time	Depth	Casing	Stab

Surveyed By: EXXEL **Survey Date:** 8/3/2023

Depth	Sample Information No.	Pen./ Rec. (in.)	Depth (Ft.)	Blows (/6")	Test Data	Sample Description & Classification	Stratum Desc.	Remarks
1–8	1	24/24	4-6	1-2 3-4		Soft, brown, CLAY & SILT, some fine to coarse Sand embedded, dry.	CLAY & SILT	
9–13	2	24/24	9-11	4-5 5-5		Medium dense, light brown, fine to medium SAND, little Silt, dry.	9' SAND	
14–18	3	24/24	14-16	2-2 2-1		Loose, light brown, fine to medium SAND, little Silt, dry.		
19–23	4	24/24	19-21	7-9 10-12		Medium dense, light brown, fine to medium SAND, little Silt dry.		
24–28	5	24/24	24-26	9-11 8-6		Medium dense, brown, medium to coarse SAND, trace Silt, wet.		1 2
29–33	6	24/20	29-31	2-3 3-4		Loose, brown, medium to coarse SAND, trace Silt, wet.		
34–38	7	24/20	34-36	5-6 7-5		Medium dense, brown, medium to coarse SAND, trace Silt, wet.		3
39–43	8	24/24	39-41	3-4 7-10		Medium dense, brown, medium to coarse SAND, trace Silt, wet.		
44–47	9	24/24	44-46	5-5 7-7		Medium dense, brown, medium to coarse SAND, trace Silt, wet.		4
48–49	10	24/14	49-51	26-45		Hard, gray, Silty CLAY, some medium to	48' SILTY CLAY	5

Equipment Installed

PROTECTIVE COVER
Backfill/Cement
Bentonite Grout

REMARKS

1. Groundwater was encountered at approximately 24.0 feet below ground surface.
2. VAP groundwater sample was collected from approximately 24.0 to 29.0 feet below ground surface and submitted for analytical laboratory testing.
3. VAP groundwater sample was collected from approximately 34.0 to 39.0 feet below ground surface and submitted for analytical laboratory testing.
4. VAP groundwater sample was collected from approximately 44.0 to 49.0 feet below ground surface and submitted for analytical laboratory testing.
5. Driller noted auger advancement hardened at approximately 48.0 feet. Most likely a strata change.
6. 10-inch casing installed from ground surface to approximately 50.0 feet below ground surface and grouted in place.

Stratification lines represent approximate boundary between soil types, transitions may be gradual. Water level readings have been made at times and under conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the time measurements were made.

Boring No.: WV-PMW-RI-105B

BORING_WELL 62961.91 PERIMETER HS PMW AND WV-PMW.GPJ GZA_CORP.GDT 9/6/23

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Rockford, Michigan

Boring No.: WV-PMW-RI-105B
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File No.: 16.0062961.91
Check: J. Groenleer

Depth	Sample Information: No.	Pen./ Rec. (in.)	Depth (Ft.)	Blows (/6")	Test Data	Sample Description & Classification	Stratum Desc.	Remarks	Equipment Installed
51				46-50		coarse Sand embedded, moist.	SILTY CLAY	6	
54	11	24/24	54-56	10-14 22-29		Hard, gray, Silty CLAY, some fine to coarse Sand embedded, moist.			
59	12	16/16	59-60.3	22-42-50/4"		Hard, gray, Silty CLAY, some fine to coarse Sand embedded, moist. 1" medium Sand seam at bottom of sample.			
64	13	21/21	64-65.8	25-42 55-50/3"		Hard, gray, Silty CLAY, some fine to coarse Sand embedded, moist.	66' GRAVEL	7	
69	14	10/10	69-69.8	16-50/4"		Very dense, gray, GRAVEL and fine to coarse Sand, little Silt, wet.		8	
74	15	17/17	74-75.4	16-35-50/5"		Very dense, gray, GRAVEL and fine to coarse Sand, some Silty Clay, wet.			Filter Sand Pack
79	16	21/21	79-80.8	14-21 30-50/3"		Very dense, gray, GRAVEL and fine to coarse Sand, trace Silt, wet.		9	Top of Well Screen
84	17	17/17	84-85.4	23-39-50/5"		Very dense, gray, GRAVEL and fine to coarse Sand, trace Silt, wet. Changing at 84.8 feet to:	84.8' SILTY CLAY		2-Inch Dia. 5-Foot PVC Screen (0.010" Slot)
86	18	22/22	86-87.8	16-55 54-50/2"		Hard, gray, Silty CLAY, some fine to coarse Sand embedded, moist.		10	Bottom of Well Screen
89	19	24/24	89-91	4-18 27-36		Hard, brown, Silty CLAY, little fine to coarse Sand embedded, moist. Hard, gray, Silty CLAY, little fine to medium Sand embedded, moist.		11	
94	20	24/24	94-96	3-19 34-46		Hard, gray and red, Silty CLAY, trace fine to medium Sand embedded, moist.			
99	21	23/23	99-100.9	18-29 42-50/5"		Hard, gray and red, Silty CLAY, trace fine to coarse Sand embedded, moist.			
104	22	0/0	104-104	50/0"		SPOON REFUSAL. NO RECOVERY.		12	
106	23	6/6	106-106.5	75/6"		Hard, gray, Silty CLAY, little fine to coarse Sand embedded, moist to dry.			
108									

REMARKS

7. Could not advance through boulder/cobble at approximately 66.3 feet below ground surface. Abandonded borehole and moved rig approximately 10.0 feet south redrilled, and installed 10-inch casing to approximately 50.0 feet below ground surface. Original borehole was grouted to surface.
8. VAP groundwater sample was collected from approximately 69.0 to 74.0 feet below ground surface and submitted for analytical laboratory testing.
9. VAP groundwater sample was collected from approximately 79.0 to 84.0 feet below ground surface and submitted for analytical laboratory testing.
10. Monitoring well was installed in borehole upon completion. Well screen was set from approximately 80.0 to 85.0 feet below ground surface on 9/7/2022.
11. On 9/8/2022 drilling resumed at WV-PMW-RI-105 in an offset borehole. 10-inch casing installed from ground surface to approximately 87.0 feet below ground surface and grouted in place.
12. Augers encountered hard material at approximately 104.0 feet below ground surface. Advancement was approximately 1 inch per hour.

Stratification lines represent approximate boundary between soil types, transitions may be gradual. Water level readings have been made at times and under conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the time measurements were made.

Boring No.: WV-PMW-RI-105B

BORING_WELL 62961.91 PERIMETER HS PMW AND WV-PMW.GPJ GZA_CORP.GDT 9/6/23

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Rockford, Michigan

Boring No.: WV-PMW-RI-105B
Page: 3 of 3
File No.: 16.0062961.91
Check: J. Groenleer

Depth	Sample Information: No.	Pen./ Rec. (in.)	Depth (Ft.)	Blows (/6")	Test Data	Sample Description & Classification	Stratum Desc.	Remarks	Equipment Installed
109	24	9/9	109-109.8	50-50/3"		Hard, gray, Silty CLAY, little fine to coarse Sand embedded, moist to dry.	SILTY CLAY		
114	25	4/4	114-114.3	75/4"		Hard, gray, Silty CLAY, little fine to coarse Sand embedded, moist to dry.			
119	26	12/12	119-120	55-75		Hard, gray, Silty CLAY, little fine to coarse Sand embedded, moist to dry.			
124	27	5/5	124-124.4	75/5"		Hard, gray, Silty CLAY, trace fine to coarse Sand embedded, dry.			
129	28	9/9	129-129.8	44-75/3"		Very dense, gray, SHALE.	129' 129.8' SHALE		
130						Bottom of Borehole at 129.75 Feet		13	

REMARKS

13. Offset borehole was backfilled with grout upon completion.

Stratification lines represent approximate boundary between soil types, transitions may be gradual. Water level readings have been made at times and under conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the time measurements were made.

Boring No.: WV-PMW-RI-105B

BORING_WELL 62961.91 PERIMETER HS PMW AND WV-PMW.GPJ GZA_CORP.GDT 9/6/23

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Rockford, Michigan

Boring No.: WV-PMW-RI-106A
Page: 1 of 1
File No.: 16.0062961.91
Check: J. Groenleer

Contractor: Stearns Drilling Company
Foreman: D. Krause
Logged by: C. Melby
Date Start/Finish: 12-10-21 / 12-10-21
Boring Location: 592,656.3129 N; 12,798,281.3486 E
GS Elev.: 887.97' **Datum:** NAD83/NAVD88

	Auger/ Casing	Sampler
Type:	Hollow Stem Auger	Split Spoon
O.D. / I.D.:	8.0" / 4.25"	2.0" / 1 3/8"
Hammer Wt.:	140lbs	NA
Hammer Fall:	30.0"	NA
TOC Elev.:	887.37'	NA

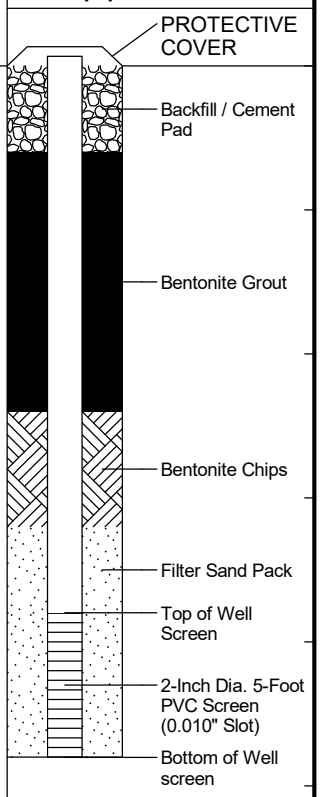
GROUNDWATER READINGS

Date	Time	Depth	Casing	Stab

Surveyed By: EXXEL **Survey Date:** 12/29/2021

Depth	Sample Information: No.	Pen./ Rec. (in.)	Depth (Ft.)	Blows (/6")	Test Data	Sample Description & Classification	Stratum Desc.	Remarks
1–23						See WV-PMW-RI-106D boring log for soil descriptions.		
24						Bottom of Borehole at 24.0 Feet		1
25–39								

Equipment Installed



REMARKS

1. Monitoring well was installed in borehole upon completion. Well screen was set from 19.0 to 24.0 feet below ground surface.

Stratification lines represent approximate boundary between soil types, transitions may be gradual. Water level readings have been made at times and under conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the time measurements were made.

Boring No.: WV-PMW-RI-106A

BORING_WELL 62961.91 PERIMETER HS PMW AND WV-PMW.GPJ GZA_CORP.GDT 2/21/22

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Rockford, Michigan

Boring No.: WV-PMW-RI-106B
Page: 1 **of** 1
File No.: 16.0062961.91
Check: J. Groenleer

Contractor: Stearns Drilling Company
Foreman: D. Krause
Logged by: C. Melby
Date Start/Finish: 12-9-21 / 12-10-21
Boring Location: 592,653.4787 N; 12,798,277.0475 E
GS Elev.: 887.94' **Datum:** NAD83/NAVD88

	Auger/ Casing	Sampler
Type:	Hollow Stem Auger	Split Spoon
O.D. / I.D.:	8.0" / 4.25"	2.0" / 1 3/8"
Hammer Wt.:	140lbs	NA
Hammer Fall:	30.0"	NA
TOC Elev.:	887.59'	NA

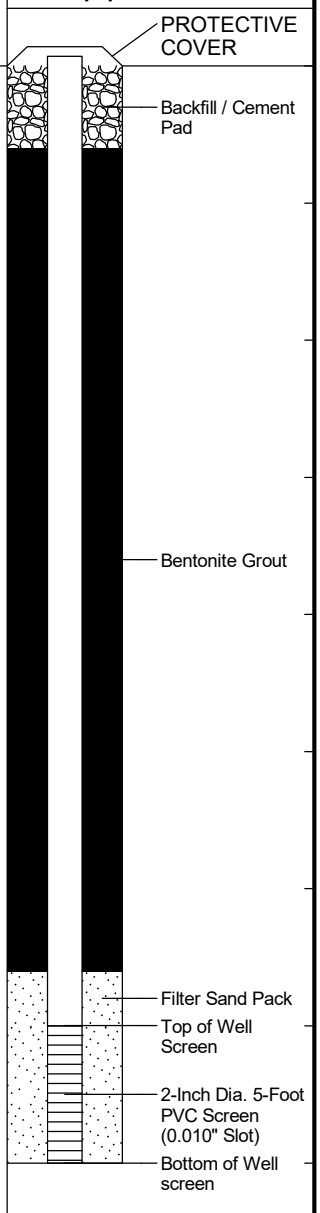
GROUNDWATER READINGS

Date	Time	Depth	Casing	Stab

Surveyed By: EXXEL **Survey Date:** 12/29/2021

Depth	Sample Information: No.	Pen./ Rec. (in.)	Depth (Ft.)	Blows (/6")	Test Data	Sample Description & Classification	Stratum Desc.	Remarks
1–40						See WV-PMW-RI-106D boring log for soil descriptions.		
40						Bottom of Borehole at 40.0 Feet		1

Equipment Installed



REMARKS

1. Monitoring well was installed in borehole upon completion. Well screen was set from 35.0 to 40.0 feet below ground surface.

Stratification lines represent approximate boundary between soil types, transitions may be gradual. Water level readings have been made at times and under conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the time measurements were made.

Boring No.: WV-PMW-RI-106B

BORING_WELL 62961.91 PERIMETER HS PMW AND WV-PMW.GPJ GZA_CORP.GDT 2/21/22

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Perimeter RAP
Rockford, Michigan

Boring No. WV-PMW-RI-106C
Page: 1 **of** 2
File No.: 16.0062961.91
Check: J. Groenleer

Contractor: Stearns Drilling Company
Foreman: D. Krause
Logged by: C. Melby
Date Start/Finish: 12-9-21 / 12-10-21
Boring Location: 592,654.3796 N; 12,798,285.2924 E
GS Elev.: 888.26' **Datum:** NAD83/NAVD88

	Auger/ Casing	Sampler
Type:	Hollow Stem Auger	Split Spoon
O.D. / I.D.:	8.0" / 4.25"	2.0" / 1 3/8"
Hammer Wt.:	140lbs	NA
Hammer Fall:	30.0"	NA
TOC Elev.:	887.79'	NA

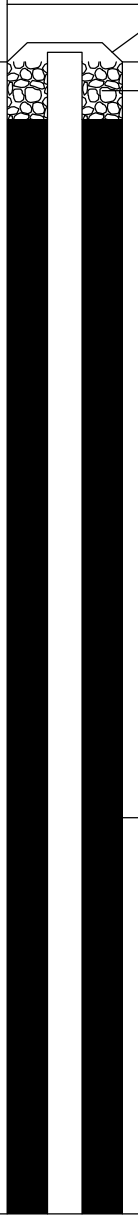
GROUNDWATER READINGS

Date	Time	Depth	Casing	Stab

Surveyed By: EXXEL **Survey Date:** 12/29/2021

Depth	Sample Information: No.	Pen./ Rec. (in.)	Depth (Ft.)	Blows (/6")	Test Data	Sample Description & Classification	Stratum Desc.	Remarks
1–39						See WV-PMW-RI-106D and WV-PMW-RI-106E boring log for soil descriptions.		

Equipment Installed



REMARKS

Stratification lines represent approximate boundary between soil types, transitions may be gradual. Water level readings have been made at times and under conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the time measurements were made.

Boring No.: WV-PMW-RI-106C

BORING_WELL 62961.91 PERIMETER HS PMW AND WV-PMW.GPJ GZA_CORP.GDT 2/18/22

GZA GeoEnvironmental, Inc.
Engineers and Scientists

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Perimeter RAP
Rockford, Michigan

Boring No. WV-PMW-RI-106C
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File No.: 16.0062961.91
Check: J. Groenleer

Depth	Sample Information: No.	Pen./ Rec. (in.)	Depth (Ft.)	Blows (/6")	Test Data	Sample Description & Classification	Stratum Desc.	Remarks	Equipment Installed
41–58									Filter Sand Pack; Top of Well Screen; 2-Inch Dia. 5-Foot PVC Screen (0.010" Slot)
59						Bottom of Borehole at 59.0 Feet		1	Bottom of Well Screen
60–86									

REMARKS

1. Monitoring well was installed in borehole upon completion. Well screen was set from 54.0 to 59.0 feet below ground surface.

Stratification lines represent approximate boundary between soil types, transitions may be gradual. Water level readings have been made at times and under conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the time measurements were made.

Boring No.: WV-PMW-RI-106C

BORING_WELL 62961.91 PERIMETER HS PMW AND WV-PMW.GPJ GZA_CORP.GDT 2/18/22

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Rockford, Michigan

Boring No. WV-PMW-RI-106D
Page: 1 **of** 2
File No.: 16.0062961.91
Check: J. Groenleer

Contractor: Stearns Drilling Company
Foreman: J. Huntoon
Logged by: M. Myers/C. Melby
Date Start/Finish: 5-26-21 / 6-2-21
Boring Location: 592,651.6456 N; 12,798,282.3759 E
GS Elev.: 888.44' **Datum:** NAD83/NAVD88

	Auger/ Casing	Sampler
Type:	Hollow Stem Auger	Split Spoon
O.D. / I.D.:	8.0" / 4.25"	2.0" / 1 3/8"
Hammer Wt.:	140lbs	NA
Hammer Fall:	30.0"	NA
TOC Elev.:	888.18'	NA

GROUNDWATER READINGS

Date	Time	Depth	Casing	Stab
6/11/21	0800	143.0'	170	16 hrs

Surveyed By: EXXEL **Survey Date:** 12/29/2021

Depth	Sample Information: No.	Pen./ Rec. (in.)	Depth (Ft.)	Blows (/6")	Test Data	Sample Description & Classification	Stratum Desc.	Remarks	Equipment Installed
1–4							TOPSOIL		PROTECTIVE COVER
4–5	1	24/18	4-6	2-3 3-4		Dark brown, TOPSOIL, dry. Changing at 4.3 feet to: Loose, light brown and tan, fine to medium SAND, some Silt, dry.	4.3' SAND		Backfill/Cement
6–10	2	24/20	9-11	3-2 4-3		Loose, light brown and tan, fine to medium SAND, some Silt, wet.		1 2	
11–15	3	24/18	14-16	1-2 4-9		Loose, light brown and tan, fine to medium SAND, some Silt, wet.			
16–20	4	24/24	19-21	6-17 19-25		Dense, light brown and tan, fine to medium SAND, some Silt, wet. Changing at 20.7 feet to: Hard, gray, SILT, moist to dry.	20.7' SILT	3	
21–24	5	24/12	24-26	2-9 11-12		Medium dense, light brown, fine to coarse SAND, some Silt, wet.	24' SAND	4	
25–29	6	24/24	29-31	4-12 22-27		Dense, light brown, fine to coarse SAND, some Silt, wet.			
30–34	7	18/18	34-35.5	10-21-50/6"		Vrey dense, brown, fine to medium SAND, trace Silt, wet.		5	Bentonite Grout
35–39	8	17/17	39-40.4	7-23-50/5"		Very dense, brown, fine to medium SAND, trace Silt, wet.			
40–43									

REMARKS

1. Groundwater was encountered at approximately 9.0 feet below ground surface.
2. VAP groundwater sample was collected from approximately 10.0 to 15.0 feet below ground surface and submitted for analytical laboratory testing.
3. VAP groundwater sample was collected from approximately 20.0 to 25.0 feet below ground surface and submitted for analytical laboratory testing.
4. VAP groundwater sample was collected from approximately 25.0 to 30.0 feet below ground surface and submitted for analytical laboratory testing.
5. VAP groundwater sample was collected from approximately 35.0 to 40.0 feet below ground surface and submitted for analytical laboratory testing.

Stratification lines represent approximate boundary between soil types, transitions may be gradual. Water level readings have been made at times and under conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the time measurements were made.

Boring No.: WV-PMW-RI-106D

BORING_WELL 62961.91 PERIMETER HS PMW AND WV-PMW.GPJ GZA_CORP.GDT 2/18/22

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Boring No. WV-PMW-RI-106D
Page: 2 **of** 2
File No.: 16.0062961.91
Check: J. Groenleer

Depth	Sample Information: No.	Pen./ Rec. (in.)	Depth (Ft.)	Blows (/6")	Test Data	Sample Description & Classification	Stratum Desc.	Remarks	Equipment Installed
45	9	23/23	44-45.9	4-15 26-50/5"		Dense, brown, fine to medium SAND, trace Silt, wet.	SAND	6	
50	10	21/21	49-50.8	3-15 28-50/3"		Dense, brown, fine to medium SAND, trace Silt, wet.			
55	11	23/23	54-55.9	8-32 29-35/5"		Very dense, brown, fine to medium SAND, trace Silt, wet. Changing at 55.6 feet to: Very dense, gray, fine SAND and SILT, moist to gray, dry.	55.6' SAND and SILT	7 8	
60	12	18/18	59-60.5	14-13-45		Hard, gray, Silty CLAY, some fine to coarse Sand, embedded, dry to moist.	59' CLAY	9	
65	13	24/24	64-66	2-9 18-31		Medium dense, gray to brown, fine to coarse SAND, trace Silt, wet.	64' SAND	10 11	
70	14	24/16	69-71	7-22 27-31		Dense, gray, fine to coarse SAND, trace Silt, wet.			Filter Sand Pack Top of Well Screen 2-Inch Dia. 5-Foot PVC Screen (0.010" Slot) Bottom of Well Screen
75	15	24/24	74-76	2-9 21-25		Medium dense to dense, gray, fine to coarse SAND, trace Silt, wet. Changing at 75.7 feet to: SILT, some Silty Clay seams, wet.	75.7' SILT	12	
80	16 17	24/18 24/12	76-78 78-80	3-5 9-12 4-5 9-12		Medium dense, gray, SILT, some Clay seams (2-inch), wet. Medium dense, gray, SILT, some Clay seams, wet.		13	
85	18	24/24	84-86	14-22 28-29		Hard, gray, Silty CLAY, wet.	84' CLAY 86'		
90						Bottom of Borehole at 86.0 Feet		14	
95									

REMARKS

6. VAP sample was collected from approximately 45.0 to 50.0 feet below ground surface and submitted for analytical laboratory testing.
7. VAP groundwater sample was collected from approximately 54.0 to 59.0 feet below ground surface and submitted for analytical laboratory testing.
8. Driller noted feeling silt/clay interbedded layers while drilling from 55.0 to 60.0 feet below ground surface.
9. 10-inch casing installed from ground surface to approximately 60 feet below ground surface and grouted in place.
10. Driller noted a change in drilling at approximately 63.0 feet below ground surface.
11. VAP groundwater sample was collected from approximately 65.0 to 70.0 feet below ground surface and submitted for analytical laboratory testing.
12. VAP groundwater sample was collected from approximately 75.0 to 80.0 feet below ground surface and submitted for analytical laboratory testing.
13. Driller noted a change in drilling at approximately 82.0 feet below ground surface.
14. Monitoring well was installed in borehole upon completion. Well screen was set from 70.0 to 75.0 feet below ground surface.

Stratification lines represent approximate boundary between soil types, transitions may be gradual. Water level readings have been made at times and under conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the time measurements were made.

Boring No.: WV-PMW-RI-106D

BORING_WELL 62961.91 PERIMETER HS PMW AND WV-PMW.GPJ GZA_CORP.GDT 2/18/22

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Rockford, Michigan

Boring No.: WV-PMW-RI-106E
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File No.: 16.0062961.91
Check: J. Groenleer

Contractor: Stearns Drilling Company
Foreman: J. Huntoon
Logged by: C. Melby
Date Start/Finish: 6-2-21 / 6-11-21
Boring Location: 592,649.8654 N; 12,798,287.0028 E
GS Elev.: 888.45' **Datum:** NAD83/NAVD88

	Auger/ Casing	Sampler
Type:	Hollow Stem Auger	Split Spoon
O.D. / I.D.:	8.0" / 4.25"	2.0" / 1 3/8"
Hammer Wt.:	140lbs	NA
Hammer Fall:	30.0"	NA
TOC Elev.:	888.94'	NA

GROUNDWATER READINGS

Date	Time	Depth	Casing	Stab

Surveyed By: EXXEL **Survey Date:** 12/29/2021

Depth	Sample Information: No.	Pen./ Rec. (in.)	Depth (Ft.)	Blows (/6")	Test Data	Sample Description & Classification	Stratum Desc.	Remarks	Equipment Installed
1–39						See WV-PMW-RI-106D boring log for soil descriptions from 0.0 to 86.0 feet below ground surface.	See WV-PMW-RI-106D boring log for soil descriptions.		PROTECTIVE COVER; Backfill / Cement

REMARKS

Stratification lines represent approximate boundary between soil types, transitions may be gradual. Water level readings have been made at times and under conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the time measurements were made.

Boring No.: WV-PMW-RI-106E

BORING_WELL 62961.91 PERIMETER HS PMW AND WV-PMW.GPJ GZA_CORP.GDT 2/21/22

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Boring No.: WV-PMW-RI-106E
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File No.: 16.0062961.91
Check: J. Groenleer

Depth	Sample Information					Sample Description & Classification	Stratum Desc.	Remarks	Equipment Installed
	No.	Pen./ Rec. (in.)	Depth (Ft.)	Blows (/6")	Test Data				
41–86							See WV-PMW-RI-106D boring log for soil descriptions.	1	

REMARKS

1. 10-inch casing installed from ground surface to approximately 84 feet below ground surface and grouted in place.

Stratification lines represent approximate boundary between soil types, transitions may be gradual. Water level readings have been made at times and under conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the time measurements were made.

Boring No.: WV-PMW-RI-106E

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Boring No.: WV-PMW-RI-106E
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File No.: 16.0062961.91
Check: J. Groenleer

Depth	Sample Information					Sample Description & Classification	Stratum Desc.	Remarks	Equipment Installed
	No.	Pen./ Rec. (in.)	Depth (Ft.)	Blows (/6")	Test Data				
87–89	1	24/24	89-91	13-23 31-40		Hard, gray, Silty CLAY, little fine to coarse Sand, embedded, moist.	See WV-PMW-RI-106D boring log for soil descriptions. 89' CLAY		Bentonite Grout
89–94	2	24/24	94-96	16-22 28-34		Hard, gray, Silty CLAY, little fine to coarse Sand, embedded, moist.			
94–99	3	24/24	99-101	6-8 15-20		Very stiff, gray, Silty CLAY, little to trace fine to medium Sand, embedded, moist to dry.			
99–104	4	24/24	104-106	14-19 25-31		Hard, gray to black, CLAY, little to trace fine to medium Sand, embedded, turned to black at 105 feet, moist to dry.			
104–109	5	24/24	109-111	5-10 13-17		Very stiff, gray, CLAY, trace fine to medium Sand, embedded, moist to dry.			
109–114	6	24/24	114-116	10-14 21-21		Hard, gray, CLAY, little fine to coarse Sand, embedded, moist to dry.			
114–119	7	24/24	119-121	13-19 23-29		Hard, brown, CLAY, trace fine to coarse Sand, moist to dry.			
119–124	8	24/24	124-126	8-19 24-32		Hard, brown, CLAY, trace fine to coarse Sand, embedded, moist to dry.			
124–129	9	24/24	129-131	22-43 32-44		Hard, brown, CLAY, trace fine to coarse Sand, trace Gravel, embedded, moist to dry.			
129–133									

REMARKS

Stratification lines represent approximate boundary between soil types, transitions may be gradual. Water level readings have been made at times and under conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the time measurements were made.

Boring No.: WV-PMW-RI-106E

BORING_WELL 62961.91 PERIMETER HS PMW AND WV-PMW.GPJ GZA_CORP.GDT 2/21/22

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Boring No.: WV-PMW-RI-106E
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File No.: 16.0062961.91
Check: J. Groenleer

Depth	Sample Information					Sample Description & Classification	Stratum Desc.	Remarks	Equipment Installed
	No.	Pen./ Rec. (in.)	Depth (Ft.)	Blows (/6")	Test Data				
134							CLAY		
135									
136									
137									
138									
139	10	24/24	139-141	15-20 38-44		Hard, brown, CLAY, trace fine to coarse Sand and Gravel, embedded, moist to dry.			
140									
141									
142									
143									
144	11	24/24	144-146	7-17 23-27		Hard, brown, CLAY & SILT, some fine to coarse Sand and Gravel, embedded, moist.	144' CLAY & SILT		
145									
146									
147									
148									
149	12	2/2	149-149.2	55/2"		Hard, brown, Silty CLAY, some fine to coarse Sand, embedded, moist. Rock in spoon tip.	149' CLAY		
150									
151									
152									
153									
154	13	17/17	154-155.4	27-50-50/5"		Hard, gray, Silty CLAY, some fine to coarse Sand, embedded, moist.			
155									
156									
157									
158									
159	14	12/12	159-160	34-50/6"		Hard, gray, Silty CLAY, some fine to coarse Sand, embedded, moist.			
160									
161									
162									
163									
164	15	5/5	164-164.4	57/5"		Hard, gray, Silty CLAY, some fine to coarse Sand, embedded, moist. Changing at 164.2 feet to: Very dense, brown fine to medium SAND, moist.	164.2' SAND		
165									
166									
167									
168									
169	16	4/4	169-169.3	50/4"		Very dense, brown, fine to medium SAND, trace Silt, moist to wet.		2	
170									
171									
172									
173									Filter Sand Pack
174	17	3/3	174-174.3	50/3"		Very dense, brown, fine to medium SAND, trace Silt, moist to wet.			Top of Well Screen
175									
176									
177							177'		2-Inch Dia. 5-Foot PVC Screen (0.010" Slot)
178									
179	18	16/16	179-180.3	25-38-50/4"		Very dense, brown and gray, fine to medium			Bottom of Well Screen

REMARKS

2. VAP groundwater sample was collected from approximately 169.0 to 174.0 feet below ground surface and submitted for analytical laboratory testing.

Stratification lines represent approximate boundary between soil types, transitions may be gradual. Water level readings have been made at times and under conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the time measurements were made.

Boring No.: WV-PMW-RI-106E

BORING_WELL 62961.91 PERIMETER HS PMW AND WV-PMW.GPJ GZA_CORP.GDT 2/21/22

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Boring No.: WV-PMW-RI-106E
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Check: J. Groenleer

Depth	Sample Information: No.	Pen./ Rec. (in.)	Depth (Ft.)	Blows (/6")	Test Data	Sample Description & Classification	Stratum Desc.	Remarks	Equipment Installed
181	19	3/3	181-181.3	50/3"		SAND, trace Silt, wet. Changing at 179.8.0 feet to: Gray, SILT & CLAY, some fine to coarse Sand, embedded, moist.	SILT & CLAY		
182									
183						Hard, gray, SILT & CLAY, little fine to coarse Sand, embedded, moist.			
184	20	7/7	184-184.6	62-100/2"		Hard, gray, SILT & CLAY, little fine to coarse Sand, embedded, moist.			
185									
186									
187									
188									
189	21	23/23	189-190.9	9-22 41-50/5"		Hard, gray, SILT & CLAY, little fine to coarse Sand, embedded, moist.			
190									
191									Bentonite Chips
192									
193									
194	22	22/22	194-195.8	4-5 34-50/4"		Hard, gray, SILT & CLAY, little fine to coarse Sand, embedded, moist.			
195									
196									
197									
198									
199	23	9/9	199-199.8	35-50/4"		Hard, gray, SILT & CLAY, little fine to coarse Sand, embedded, moist.	199.8'		
200						Bottom of Borehole at 199.8 Feet		3	
201									
202									
203									
204									
205									
206									
207									
208									
209									
210									
211									
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213									
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216									
217									
218									
219									
220									
221									
222									
223									
224									
225									
226									

REMARKS

3. Monitoring well was installed in borehole upon completion. Well screen was set from 174.0 to 179.0 feet below ground surface.

Stratification lines represent approximate boundary between soil types, transitions may be gradual. Water level readings have been made at times and under conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the time measurements were made.

Boring No.: WV-PMW-RI-106E

BORING_WELL 62961.91 PERIMETER HS PMW AND WV-PMW.GPJ GZA_CORP.GDT 2/21/22

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Rockford, Michigan

Boring No.: WV-PMW-RI-107
Page: 1 of 5
File No.: 16.0062961.91
Check: J. Groenleer

Contractor: Stearns Drilling Company
Foreman: J. Huntoon
Logged by: C. Melby/M. Myers
Date Start/Finish: 5-12-21 / 5-25-21
Boring Location: 591107.4541 N; 12797804.1132 E
GS Elev.: 840.31' **Datum:** NAD83/NAVD88

	Auger/ Casing	Sampler
Type:	Hollow Stem Auger	Split Spoon
O.D. / I.D.:	8.0" / 4.25"	2.0" / 1 3/8"
Hammer Wt.:	140lbs	NA
Hammer Fall:	30.0"	NA
TOC Elev.:	842.77'	NA

GROUNDWATER READINGS

Date	Time	Depth	Casing	Stab

Surveyed By: EXXEL **Survey Date:** 12/29/2021

Depth	Sample Information: No.	Pen./ Rec. (in.)	Depth (Ft.)	Blows (/6")	Test Data	Sample Description & Classification	Stratum Desc.	Remarks
1							CLAY	
2								
3								
4	1	24/24	4-6	1-1 2-3		Soft, brown, Silty CLAY, occasional fine to medium Sand lenses, dry.		
5								
6								
7								
8								
9	2	24/24	9-11	2-3 3-2		Medium stiff, Silty CLAY, occasional fine to medium Sand lenses, dry.		
10								
11								
12								
13								
14	3	24	14-16	8-11 16-19		Very stiff, brown, Silty CLAY, ocassional fine to medium Sand lenses, dry.		
15								
16								
17								
18								
19	4	24/0	19-21	8-13 15-13		NO RECOVERY.	19' NO RECOVERY	
20								
21								
22								
23								
24	5	24/24	24-26	8-8 13-19		Medium dense, brown, fine to medium SAND, trace Silt, wet. Changing at 24.2 feet to: Very stiff, brown and gray, Silty CLAY, trace fine to coarse Sand embedded, dry.	24' 24.2' SAND CLAY	1
25								
26								
27								
28								
29	6	24/24	29-31	2-6 9-12		Very stiff, gray to brown, Silty CLAY, some fine to coarse Sand embedded, dry to moist.		
30								
31								
32								
33								
34	7	24/24	34-36	4-6 8-11		Stiff, gray and brown, Silty CLAY, some fine to coarse Sand embedded, dry to moist.		
35								
36								
37								
38								
39	8	24/24	39-41	3-4		Stiff, gray, Silty CLAY, some fine to coarse		

Equipment Installed



REMARKS

1. Groundwater was encountered at approximately 24.0 feet below ground surface.

Stratification lines represent approximate boundary between soil types, transitions may be gradual. Water level readings have been made at times and under conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the time measurements were made.

Boring No.: WV-PMW-RI-107

BORING_WELL 62961.91 PERIMETER HS PMW AND WV-PMW.GPJ GZA_CORP.GDT 2/21/22

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Perimeter RAP
Rockford, Michigan

Boring No.: WV-PMW-RI-107
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File No.: 16.0062961.91
Check: J. Groenleer

Depth	Sample Information					Sample Description & Classification	Stratum Desc.	Remarks	Equipment Installed
	No.	Pen./ Rec. (in.)	Depth (Ft.)	Blows (/6")	Test Data				
41				7-9		SAND embedded, dry to moist with occasional fine to medium sand lenses, wet.	CLAY		
42									
43									
44	9	24/24	44-46	6-6		Very stiff, gray, Silty CLAY, some fine to coarse Sand embedded, dry to moist.			
45				10-15					
46									
47									
48									
49	10	24/24	49-51	5-10		Very stiff, gray, Silty CLAY, little fine to coarse Sand embedded, dry to moist.			
50				11-16					
51									
52									
53									
54	11	24/14	54-56	9-10		Very stiff, gray, Silty CLAY, little fine to coarse Sand embedded, dry to moist.			
55				12-13					
56									
57									
58									
59	12	24/24	59-61	6-8		Very stiff, gray, Silty CLAY, little fine to coarse Sand embedded, moist.			
60				9-9					
61									
62									
63									
64	13	24/24	64-66	5-7		Very stiff, gray, Silty CLAY, little fine to coarse Sand embedded, moist.			
65				9-11					
66									
67									
68									
69	14	24/24	69-71	6-11		Very stiff, gray, Silty CLAY, trace fine to medium Sand, moist.			
70				14-18					
71									
72									
73									
74	15	24/24	74-76	6-9		Very stiff, gray, Silty CLAY, trace fine to medium Sand, moist.			
75				14-20					
76									
77									
78									
79	16	24/24	79-81	9-17		Hard, gray, Silty CLAY, trace fine to medium Sand embedded, moist.			
80				20-26					
81									
82									
83									
84	17	24/24	84-86	8-12		Hard, gray, Silty CLAY, trace fine to medium Sand embedded, moist.			
85				19-30					
86									

REMARKS

Stratification lines represent approximate boundary between soil types, transitions may be gradual. Water level readings have been made at times and under conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the time measurements were made.

Boring No.: WV-PMW-RI-107

BORING_WELL 62961.91 PERIMETER HS PMW AND WV-PMW.GPJ GZA_CORP.GDT 2/21/22

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Page: 3 **of** 5
File No.: 16.0062961.91
Check: J. Groenleer

Depth	Sample Information: No.	Pen./ Rec. (in.)	Depth (Ft.)	Blows (/6")	Test Data	Sample Description & Classification	Stratum Desc.	Remarks	Equipment Installed
87							CLAY		
88									
89	18	24/24	89-91	11-17 29-40		Hard, gray, Silty CLAY, some fine to coarse Sand embedded, moist with Sand seam from approximately 90.8 to 91 feet.			
90									
91									
92									
93									Bentonite Grout
94	19	24/24	94-96	20-30 47-56		Hard, gray, Silty CLAY, little fine to coarse Sand embedded, moist.			
95									
96									
97									
98									
99	20	24/24	99-101	15-32 42-55		Hard, gray, Silty CLAY, some fine to coarse Sand embedded, moist.			
100									
101									
102									
103									
104	21	17/17	104-105.4	19-36-50/5"		Hard, gray, Silty CLAY, little fine to coarse Sand embedded, moist with occasional Sand lenses.			
105									
106									
107									
108									
109	22	22/22	109-110.8	24-41 49-50/4"		Hard, gray, Silty CLAY, some fine to coarse Sand embedded, moist.			
110									
111									
112									
113									
114	23	24/24	114-116	22-31 32-44		Hard, gray, Silty CLAY, some fine to coarse Sand embedded, moist.			
115									
116									
117									
118									
119	24	17/17	119-120.4	26-41-50/5"		Very dense, gray and brown, fine SAND and SILT, moist.	119' SAND	2	
120									
121									
122									
123									
124	25	11/11	124-124.9	33-50/5"		Hard, gray and brown, Silty CLAY, some fine Sand seams, moist with some fine to medium Sand embedded.	124' CLAY		
125									
126									
127									
128									
129	26	24/24	129-131	33-30 32-50		Hard, gray, Silty CLAY, some fine Sand seams, some fine to coarse Sand embedded, moist.			
130									
131									
132									
133									

REMARKS

2. Sand would not produce enough water for sample.

Stratification lines represent approximate boundary between soil types, transitions may be gradual. Water level readings have been made at times and under conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the time measurements were made.

Boring No.: WV-PMW-RI-107

BORING_WELL 62961.91 PERIMETER HS PMW AND WV-PMW.GPJ GZA_CORP.GDT 2/21/22

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Rockford, Michigan

Boring No.: WV-PMW-RI-107
Page: 4 **of** 5
File No.: 16.0062961.91
Check: J. Groenleer

Depth	Sample Information					Sample Description & Classification	Stratum Desc.	Remarks	Equipment Installed
	No.	Pen./ Rec. (in.)	Depth (Ft.)	Blows (/6")	Test Data				
134	27	11/11	134-134.9	12-50/5"		Hard, gray, Silty CLAY, some fine to medium Sand embedded, moist.	CLAY		
139	28	11/11	139-139.9	33-50/5"		Hard, gray, Silty CLAY, some fine to medium Sand embedded, moist.			
144	29	8/6	144-144.7	41-50/2"		Very dense, gray, fine SAND and SILT, moist.	144' SAND and SILT		
149	30	11/11	149-149.9	41-50/5"		Hard, gray, Silty CLAY, some fine to medium embedded, occasional Sand lenses.	149' CLAY		
154	31	11/11	154-154.9	30-50/5"		Hard, gray, Silty CLAY, some fine Sand embedded, moist to dry.			
159	32	11/11	159-159.9	36-50/5"		Hard, gray, Silty CLAY, some fine to medium Sand embedded, moist to dry.			
164	33	10/10	164-164.8	42-50/4"		Hard, gray, Silty CLAY, trace fine to medium Sand embedded, moist to dry.			
169	34	8/8	169-169.7	49-50/2"		Hard, gray, Silty CLAY, trace fine to medium SAND embedded, moist to dry. Changing at 169.4 feet to: Hard, gray, SILT, moist.	169.4' SILT		
174	35	17/12	174-175.4	21-53-50/5"		Hard, gray, Silty CLAY, trace fine Sand, dry.	174' CLAY		
179	36	18/14	179-180.5	26-63/6"		Very dense, gray, fine to medium SAND,	179' 179.7' SAND		

REMARKS

Stratification lines represent approximate boundary between soil types, transitions may be gradual. Water level readings have been made at times and under conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the time measurements were made.

Boring No.: WV-PMW-RI-107

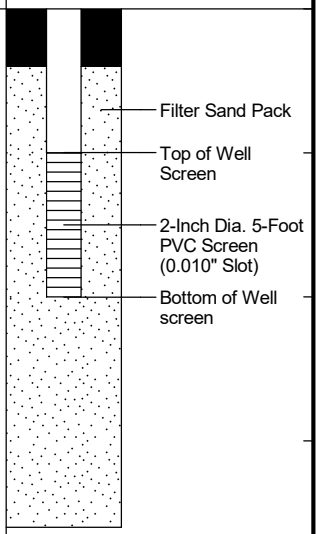
BORING_WELL 62961.91 PERIMETER HS PMW AND WV-PMW.GPJ GZA_CORP.GDT 2/21/22

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Boring No.: WV-PMW-RI-107
Page: 5 **of** 5
File No.: 16.0062961.91
Check: J. Groenleer

Depth	Sample Information: No.	Pen./ Rec. (in.)	Depth (Ft.)	Blows (/6")	Test Data	Sample Description & Classification	Stratum Desc.	Remarks	Equipment Installed
181						some Silt, wet with Sand seams. Changing at 179.7 feet to: Hard, gray, Silty CLAY, some fine to medium Sand, moist.	CLAY		
182									
183									
184	37	18/4	184-185.5	8-50/6"		Very dense, gray, fine SAND, some Silt, wet.	184' SAND	3	
185									
186									
187	38	6/2	187-187.5	80/6"		Very dense, gray, fine SAND, some Silt, wet.			
188									
189	39	24	189-191	32-47-50/5"		Very dense, gray, fine SAND, some Silt, wet.			
190									
191									
192									
193									
194	40	24/24	194-196	18-50/5"		Hard, gray, Clayey SILT, some fine Sand, moist to dry.	194' SILT		
195									
196	41	24/24	196-198	39-50/1"		Hard, gray, CLAY & SILT, <1" fine to medium Sand seams, moist to dry.	196' CLAY & SILT		
197									
198						Bottom of Borehole at 198.0 Feet	198'	4	
199									
200									
201									
202									
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205									
206									
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225									
226									



REMARKS

3. VAP groundwater sample was collected from approximately 185.0 to 190.0 feet below ground surface and submitted for analytical laboratory testing.
4. Monitoring well was installed in borehole upon completion. Well screen was set from 185.0 to 190.0 feet below ground surface.

Stratification lines represent approximate boundary between soil types, transitions may be gradual. Water level readings have been made at times and under conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the time measurements were made.

Boring No.: WV-PMW-RI-107

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Boring No.: WV-PMW-RI-108
Page: 1 **of** 1
File No.: 16.0062961.91
Check: J. Groenleer

Contractor: Stearns Drilling Company
Foreman: T. Hawking
Logged by: C. Melby
Date Start/Finish: 5-10-23 / 5-10-23
Boring Location: 590,028.8208 N; 12,798,918.9444 E
GS Elev.: 797.00' **Datum:** NAD83/NAVD88

	Auger/ Casing	Sampler
Type:	Hollow Stem Auger	Split Spoon
O.D. / I.D.:	8.0" / 4.25"	2.0" / 1 3/8"
Hammer Wt.:	140lbs	NA
Hammer Fall:	30.0"	NA
TOC Elev.:	800.27'	NA

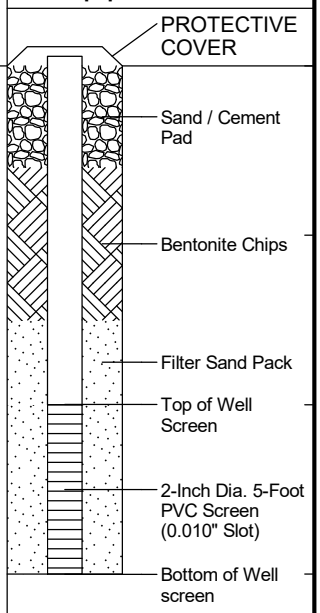
GROUNDWATER READINGS

Date	Time	Depth	Casing	Stab
5/10/23	1415	6.2'	PVC	3 hrs

Surveyed By: EXXEL **Survey Date:** 8/3/2023

Depth	Sample Information: No.	Pen./ Rec. (in.)	Depth (Ft.)	Blows (/6")	Test Data	Sample Description & Classification	Stratum Desc.	Remarks
1–14						See WV-PMW-RI-108 VAP boring log for soil and stratum descriptions.		
15						Bottom of Borehole at 15.0 Feet		1
16–33								

Equipment Installed



REMARKS

1. Monitoring well was installed in borehole upon completion. Well screen was set from approximately 10.0 to 15.0 feet below ground surface.

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Boring No.: WV-PMW-RI-108

BORING_WELL 62961.91 PERIMETER HS PMW AND WV-PMW.GPJ GZA_CORP.GDT 1/17/24

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Boring No.: HS-MW-13A
Page: 1 **of** 2
File No.: 16.0062335.52
Check: JTM/JMG

Contractor: Stearns Drilling Company
Foreman: Jerry Huntoon
Logged by: John Morehouse
Date Start/Finish: 1-14-20 / 1-14-20
Boring Location: 583,050.4937 N; 12,792,154.774 E
GS Elev.: 723.77' **Datum:** NAD83/NAVD88

	Auger/ Casing	Sampler
Type:	Hollow Stem Auger	Split Spoon
O.D. / I.D.:	8.0" / 4.25"	2.0" / 1 3/8"
Hammer Wt.:	140lbs	NA
Hammer Fall:	30"	NA
TOC Elev.:	NA	NA

GROUNDWATER READINGS

Date	Time	Depth	Casing	Stab

Surveyed By: EXXEL **Survey Date:**

Depth	Sample Information: No.	Pen./ Rec. (in.)	Depth (Ft.)	Blows (/6")	Test Data	Sample Description & Classification	Stratum Desc.	Remarks	Equipment Installed
1						See HS-MW-13C for detailed soil descriptions.			PROTECTIVE CASING
2–38									
39									Bentonite/Grout

REMARKS

Stratification lines represent approximate boundary between soil types, transitions may be gradual. Water level readings have been made at times and under conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the time measurements were made.

BORING_WELL 62355.52 HOUSE STREET COMPLETE.GPJ GZA_CORP.GDT 2/18/25

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Boring No.: HS-MW-13A
Page: 2 **of** 2
File No.: 16.0062335.52
Check: JTM/JMG

Depth	Sample Information					Sample Description & Classification	Stratum Desc.	Remarks	Equipment Installed
	No.	Pen./ Rec. (in.)	Depth (Ft.)	Blows (/6")	Test Data				
41–86						Bottom of Borehole at 84.5 Feet		1	Silica Sand Filter Pack; Top of Well Screen; 2-Inch Dia. 5-Foot PVC Screen (0.010" Slot); Bottom of Well Screen

REMARKS

1. Monitoring well HS-MW-13A was installed in borehole upon completion. Well screen set from approximately 79.2 to 84.0 feet below ground surface.

Stratification lines represent approximate boundary between soil types, transitions may be gradual. Water level readings have been made at times and under conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the time measurements were made.

Boring No.: HS-MW-13A

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Boring No.: HS-MW-13B
Page: 1 **of** 4
File No.: 16.0062335.52
Check: JTM/JMG

Contractor: Stearns Drilling Company
Foreman: Jerry Huntoon
Logged by: John Morehouse
Date Start/Finish: 1-13-20 / 1-14-20
Boring Location: 583,056.4659 N; 12,792,155.9077 E
GS Elev.: 723.87' **Datum:** NAD83/NAVD88

	Auger/ Casing	Sampler
Type:	Hollow Stem Auger	Split Spoon
O.D. / I.D.:	8.0" / 4.25"	2.0" / 1 3/8"
Hammer Wt.:	140lbs	NA
Hammer Fall:	30"	NA
TOC Elev.:	NA	NA

GROUNDWATER READINGS

Date	Time	Depth	Casing	Stab

Surveyed By: NA **Survey Date:**

Depth	Sample Information: No.	Pen./ Rec. (in.)	Depth (Ft.)	Blows (/6")	Test Data	Sample Description & Classification	Stratum Desc.	Remarks	Equipment Installed
1						See HS-MW-13C for detailed soil descriptions.			PROTECTIVE CASING
2–39									

REMARKS

Stratification lines represent approximate boundary between soil types, transitions may be gradual. Water level readings have been made at times and under conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the time measurements were made.

BORING_WELL 62355.52 HOUSE STREET COMPLETE.GPJ GZA_CORP.GDT 2/18/25

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Boring No.: HS-MW-13B
Page: 2 **of** 4
File No.: 16.0062335.52
Check: JTM/JMG

Depth	Sample Information					Sample Description & Classification	Stratum Desc.	Remarks	Equipment Installed
	No.	Pen./ Rec. (in.)	Depth (Ft.)	Blows (/6")	Test Data				
41–86									Bentonite/Grout

REMARKS

Stratification lines represent approximate boundary between soil types, transitions may be gradual. Water level readings have been made at times and under conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the time measurements were made.

Boring No.: HS-MW-13B

BORING_WELL 62355.52 HOUSE STREET COMPLETE.GPJ GZA_CORP.GDT 2/18/25

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Boring No.: HS-MW-13B
Page: 3 **of** 4
File No.: 16.0062335.52
Check: JTM/JMG

Depth	Sample Information					Sample Description & Classification	Stratum Desc.	Remarks	Equipment Installed
	No.	Pen./ Rec. (in.)	Depth (Ft.)	Blows (/6")	Test Data				
87									
88									
89									
90									
91									
92									
93									
94									
95									
96									
97									
98									
99									
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130									
131									
132									
133									

REMARKS

Stratification lines represent approximate boundary between soil types, transitions may be gradual. Water level readings have been made at times and under conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the time measurements were made.

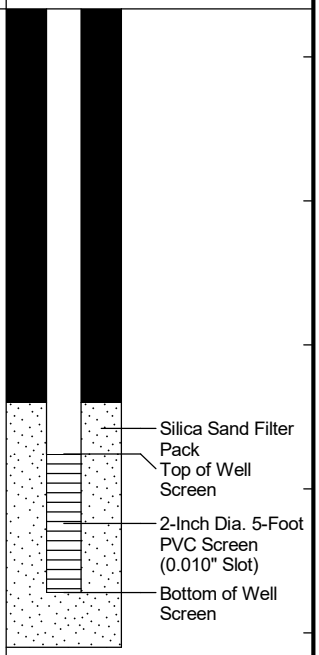
Boring No.: HS-MW-13B

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Boring No.: HS-MW-13B
Page: 4 **of** 4
File No.: 16.0062335.52
Check: JTM/JMG

Depth	Sample Information					Sample Description & Classification	Stratum Desc.	Remarks	Equipment Installed
	No.	Pen./ Rec. (in.)	Depth (Ft.)	Blows (/6")	Test Data				
134–155									
156						Bottom of Borehole at 155.5 Feet		1	
157–179									

REMARKS

1. Monitoring well HS-MW-13B was installed in borehole upon completion. Well screen set from approximately 148.8 to 153.6 feet below ground surface.

Stratification lines represent approximate boundary between soil types, transitions may be gradual. Water level readings have been made at times and under conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the time measurements were made.

BORING_WELL 62355.52 HOUSE STREET COMPLETE.GPJ GZA_CORP.GDT 2/18/25

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Belmont, Michigan

Boring No.: HS-MW-13C
Page: 1 **of** 12
File No.: 16.0062335.52
Check: JTM/JMG

Contractor: Stearns Drilling Company
Foreman: Jerry Huntoon
Logged by: John Morehouse
Date Start/Finish: 12-16-19 / 12-17-19
Boring Location: 583,061.629 N; 12792155.9079 E
GS Elev.: 723.8' **Datum:** NAD83/NAVD88

	Auger/ Casing	Sampler
Type:	Hollow Stem Auger	Split Spoon
O.D. / I.D.:	8.0" / 4.25"	2.0" / 1 3/8"
Hammer Wt.:	140lbs	NA
Hammer Fall:	30"	NA
TOC Elev.:	NA	NA

GROUNDWATER READINGS

Date	Time	Depth	Casing	Stab

Surveyed By: EXXEL **Survey Date:**

Depth	Sample Information: No.	Pen./ Rec. (in.)	Depth (Ft.)	Blows (/6")	Test Data	Sample Description & Classification	Stratum Desc.	Remarks	Equipment Installed
1	1	24/11	0-2	1-2 2-1		Dark brown to dark yellowish brown, fine SAND, some Silt, moist. Changing at 0.2 feet to: Yellowish brown, fine SAND, some Silt, moist. Changing at 0.9 feet to: NO RECOVERY.	SAND 0.9' NO RECOVERY		PROTECTIVE CASING
2	2	24/1	2-4	4-2 3-6		Yellowish brown, fine SAND, little Silt, moist. Changing at 2.1 feet to: NO RECOVERY.	2' 2.1' SAND NO RECOVERY		
3									
4	3	24/11	4-6	2-4 5-7		Light yellowish brown, fine SAND, trace Silt, moist. Changing at 4.9 feet to: NO RECOVERY.	4' SAND 4.9' NO RECOVERY		
5									
6	4	24/13	6-8	5-6 7-8		Dark yellowish brown, fine to medium SAND, trace Silt, moist. Changing at 6.7 feet to: Dark yellowish brown, SILT, thin seams of Silty Clay, moist. Changing at 6.9 feet to: Dark yellowish brown, fine to medium SAND, trace Silt, moist. Changing at 7.1 feet to: NO RECOVERY.	6' SAND 6.7' 6.9' SILT 7.1' SAND NO RECOVERY		
7									
8	5	24/16	8-10	6-4 5-6		Dark yellowish brown, fine to medium SAND, trace Silt, moist. Changing at 9.3 feet to: NO RECOVERY.	8' SAND 9.3' NO RECOVERY		
9									
10	6	24/12	10-12	4-8 8-10		Dark yellowish brown, fine SAND, some Silt, moist. Changing at 10.5 feet to: Yellowish brown, SILT, moist. Changing at 11.6 feet to: Pale brown, fine SAND, trace Silt, moist. Changing at 11.8 feet to: NO RECOVERY.	10' SAND 10.5' SILT 11.6' 11.8' SAND		
11									
12	7	24/17	12-14	6-8 9-11		Pale brown, fine SAND, trace Silt, moist. Changing at 13.4 feet to: NO RECOVERY.	12' NO RECOVERY SAND 13.4' NO RECOVERY		
13									
14	8	24/14	14-16	5-8 10-12		Pale brown, fine SAND, trace Silt, moist. Changing at 15.2 feet to: NO RECOVERY.	14' SAND		

REMARKS

Stratification lines represent approximate boundary between soil types, transitions may be gradual. Water level readings have been made at times and under conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the time measurements were made.

Boring No.: HS-MW-13C

BORING_WELL 62355.52 HOUSE STREET COMPLETE.GPJ GZA_CORP.GDT 2/18/25

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Boring No.: HS-MW-13C
Page: 2 **of** 12
File No.: 16.0062335.52
Check: JTM/JMG

Depth	Sample Information: No.	Pen./ Rec. (in.)	Depth (Ft.)	Blows (/6")	Test Data	Sample Description & Classification	Stratum Desc.	Remarks	Equipment Installed
							15.2' NO RECOVERY		
16	9	24/12	16-18	3-7 7-6		Pale brown, fine SAND, trace Silt, moist. Changing at 17.0 feet to: NO RECOVERY.	16' SAND		
17							17' NO RECOVERY		
18	10	24/17	18-20	5-6 9-10		Pale brown, fine SAND, trace Silt, moist. Changing at 18.5 feet to: Pale brown, fine SAND, trace Silt, very thin lenses of Silt, moist. Changing at 19.4 feet to: NO RECOVERY.	18' SAND		
19							19.4' NO RECOVERY		
20	11	24/17	20-22	7-9 11-11		Pale brown, fine SAND, trace Silt, moist. Changing at 21.2 feet to: Yellowish brown, fine to medium SAND, trace Silt, moist. Changing at 21.4 feet to: NO RECOVERY.	20' SAND		
21							21.4' NO RECOVERY		
22	12	24/18	22-24	5-8 11-14		Yellowish brown, fine SAND, trace Silt, moist. Changing at 23.5 feet to: NO RECOVERY.	22' SAND		
23							23.5' NO RECOVERY		
24	13	24/18	24-26	13-14 12-18		Yellowish brown, fine SAND, trace Silt, grading to fine to medium SAND, trace Silt, moist. Changing at 25.5 feet to: NO RECOVERY.	24' SAND		
25							25.5' NO RECOVERY		
26	14	24/19	26-28	6-15 17-18		Yellowish brown, fine to medium SAND, trace Silt, moist. Changing at 27.6 feet to: NO RECOVERY.	26' SAND		
27							27.6' NO RECOVERY		
28	15	24/16	28-30	10-22 27-34		Yellowish brown, fine to medium SAND, trace Silt, moist. Changing at 28.6 feet to: Yellowish brown, SILT, some fine Sand, moist. Changing at 29.3 feet to: NO RECOVERY.	28' SAND 28.6' SILT		
29							29.3' NO RECOVERY		
30	16	24/20	30-32	15-20 19-20		Brownish yellow, fine to medium SAND, trace Silt, moist. Changing at 30.3 feet to: Light yellowish brown, fine SAND, trace Silt, moist. Changing at 31.3 feet to: Brownish yellow, fine to medium SAND, trace Silt, moist. Changing at 31.7 feet to: NO RECOVERY.	30' SAND		
31							31.7'		
32	17	24/20	32-34	11-14 17-20		Brownish yellow, fine to medium SAND,	32' NO RECOVERY SAND		

REMARKS

Stratification lines represent approximate boundary between soil types, transitions may be gradual. Water level readings have been made at times and under conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the time measurements were made.

Boring No.: HS-MW-13C

BORING_WELL 62355.52 HOUSE STREET COMPLETE.GPJ GZA_CORP.GDT 2/18/25

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Engineers and Scientists

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Boring No.: HS-MW-13C
Page: 3 **of** 12
File No.: 16.0062335.52
Check: JTM/JMG

Depth	Sample Information: No.	Pen./ Rec. (in.)	Depth (Ft.)	Blows (/6")	Test Data	Sample Description & Classification	Stratum Desc.	Remarks	Equipment Installed
33						trace Silt, moist. Changing at 33.2 feet to: Yellowish brown, fine to medium SAND, trace Silt, moist. Changing at 33.5 feet to: Brownish yellow, fine to medium SAND, trace Silt, moist. Changing at 33.7 feet to: NO RECOVERY.	SAND		
34	18	24/23	34-36	13-17 20-24		Brownish yellow, fine SAND, trace Silt, moist. Changing at 35.9 feet to: NO RECOVERY.	33.7' 34' NO RECOVERY SAND		
35							35.9'		
36	19	24/20	36-38	9-18 22-27		Brownish yellow, fine SAND, trace Silt, moist. Changing at 36.7 to: Yellowish brown, fine to medium SAND, trace Silt, moist. Changing at 36.8 feet to: Yellowish brown, SILT, moist. Changing at 37.7 feet to: NO RECOVERY.	36' NO RECOVERY SAND 36.8'		
37							SILT 37.7'		
38	20	24/22	38-40	10-10 14-15		Brownish yellow, fine SAND, trace Silt, moist. Changing at 38.5 feet to: Yellowish brown, fine SAND, some Silt, moist. Changing at 38.8 feet to: Yellowish brown, SILT, moist. Changing at 39.7 feet to: Yellowish brown, fine SAND, trace Silt, moist. Changing at 39.8 feet to: NO RECOVERY.	38' NO RECOVERY SAND 38.8'		
39							SILT 39.7'		
40	21	24/22	40-42	12-8 18-23		Dark yellowish brown, medium to coarse SAND, trace Silt, moist. Changing at 41.8 feet to: NO RECOVERY.	39.8' SAND 40' NO RECOVERY SAND		
41							41.8'		
42	22	24/16	42-44	11-22 23-21		Dark yellowish brown, medium to coarse SAND, trace Silt, moist. Changing at 42.7 feet to: Yellowish brown, fine SAND, trace Silt, moist. Changing at 43.0 feet to: Yellowish brown, fine SAND, trace Silt, thin lenses of coarse SAND, moist. Changing at 43.3 feet to: NO RECOVERY.	42' NO RECOVERY SAND 43.3'		
43							NO RECOVERY 44'		
44	23	24/17	44-46	9-20 22-23		Yellowish brown, fine SAND, some Silt, moist. Changing at 45.4 feet to: NO RECOVERY.	SAND		
45							45.4'		
46	24	24/16	46-48	11-19 20-25		Yellowish brown, fine to coarse SAND, trace Silt, moist. Changing at 46.9 feet to: Brownish yellow, fine SAND, trace Silt, moist. Changing at 47.3 feet to: NO RECOVERY.	NO RECOVERY 46' SAND		
47							47.3'		
48	25	18/18	48-49.5	11-18 20-18		Yellowish brown, fine to medium SAND, trace Gravel, trace Silt, moist. Changing at 48.9 feet to: Dark yellowish brown, coarse SAND, trace Silt, moist. Changing at 49.0 feet to: Yellowish brown, fine to medium SAND, trace Gravel, trace Silt, moist.	NO RECOVERY 48' SAND		
49							49.6'		
							NO RECOVERY 50'		

REMARKS

Stratification lines represent approximate boundary between soil types, transitions may be gradual. Water level readings have been made at times and under conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the time measurements were made.

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51	26	24/16	50-52	11-12 12-11		Changing at 49.2 feet to: Dark yellowish brown, coarse SAND, trace Silt, moist. Changing at 49.3 feet to: Yellowish brown, fine to medium SAND, trace Gravel, trace Silt, moist. Changing at 49.6 feet to: NO RECOVERY.	SAND 51.1' 51.3' SILT NO RECOVERY		
52	27	24/16	52-54	6-5 6-6		Yellowish brown, fine to medium SAND, trace Gravel, trace Silt, moist. Changing at 50.6 feet to: Yellowish brown, fine to medium SAND, trace Silt, moist. Changing at 51.1 feet to: Yellowish brown, SILT, moist. Changing at 51.3 feet to: NO RECOVERY.	52' SAND 53.3' NO RECOVERY		
54	28	24/7	54-56	3-4 8-15		Yellowish brown, fine SAND, trace Silt, wet. Changing at 52.6 feet to: Dark yellowish brown, fine to medium SAND, trace Gravel, trace Silt, wet. Changing at 53.3 feet to: NO RECOVERY.	54' SAND 54.6' NO RECOVERY		
56	29	24/17	56-58	6-10 10-14		Dark yellowish brown, fine to medium SAND, trace Gravel, trace Silt, wet. Changing at 54.6 feet to: NO RECOVERY. Dark yellowish brown, fine to coarse SAND, trace Gravel, trace Silt, wet. Changing at 57.4 feet to: NO RECOVERY.	56' SAND 57.4' NO RECOVERY		
58	30	24/12	58-60	2-5 9-9		Dark yellowish brown, fine to coarse SAND, trace Gravel, trace Silt, wet. Changing at 59.0 feet to: No RECOVERY.	58' SAND 59' NO RECOVERY	1	
60	31	24/1	60-62	1-3 8-10		Yellowish brown, fine SAND, trace Silt, moist. Changing at 60.1 feet to: NO RECOVERY.	60' 60.1' SAND NO RECOVERY		
62	32	24/16	62-64	3-5 17-16		Dark yellowish brown, Silty CLAY, moist. Changing at 62.1 feet to: Dark yellowish brown, fine to coarse SAND, trace Gravel, trace Silt, wet. Changing at 62.3 feet to: Dark yellowish brown, Silty CLAY, moist. Changing at 63.2 feet to: Dark yellowish brown to dark brown, coarse SAND, trace Silt, wet. Changing at 63.3 feet to: NO RECOVERY.	62' Silty CLAY 63.2' 63.3' SAND NO RECOVERY	2	
64	33	24/14	64-66	2-6 10-13		Dark yellowish brown, fine to medium SAND, trace Silt, wet. Changing at 64.4 feet to: Dark yellowish brown, fine to coarse SAND, trace Gravel, trace Silt, wet. Changing at 65.2 feet to: NO RECOVERY.	64' SAND 65.2' NO RECOVERY		
66	34	24/11	66-68	4-10 10-12		Yellowish brown, fine to coarse SAND, some Gravel, trace Silt, wet. Changing at 66.9 feet to: NO RECOVERY.	66' SAND 66.9' NO RECOVERY		
67									

REMARKS

1. Temporary well set at 59.0 to 64.0 feet below ground surface. Groundwater sample submitted for laboratory analysis.
2. Groundwater was encountered at approximately 62.1 feet below ground surface.

Stratification lines represent approximate boundary between soil types, transitions may be gradual. Water level readings have been made at times and under conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the time measurements were made.

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68	35	24/19	68-70	14-16 13-14		Yellowish brown, fine to medium SAND, trace Gravel, trace Silt, wet. Changing at 68.2 feet to: Dark yellowish brown, coarse SAND, trace Silt, wet. Changing at 68.3 feet to: Yellowish brown, fine to medium SAND, trace Gravel, trace Silt, wet. Changing at 69.2 feet to: Dark yellowish brown, Silty CLAY, trace Gravel, moist. Changing at 69.3 feet to: Yellowish brown, fine to medium SAND, trace Gravel, trace Silt, wet. Changing at 69.6 feet to: NO RECOVERY. Dark yellowish brown, GRAVEL, some fine to coarse Sand, trace Silt, wet. Changing at 70.8 feet to: NO RECOVERY. Yellowish brown, fine to medium SAND, trace Gravel, trace Silt, wet. Changing at 72.7 feet to: NO RECOVERY.	NO RECOVERY 68' SAND 69.2' 69.3' Silty CLAY 69.6' SAND 70' NO RECOVERY GRAVEL 70.8' NO RECOVERY 72' SAND 72.7' NO RECOVERY	3	
69									
70	36	24/10	70-72	3-7 12-12					
71									
72	37	24/8	72-74	5-8 16-17					
73									
74	38	24/16	74-76	3-12 19-21		Yellowish brown, fine to medium SAND, trace Silt, wet. Changing at 74.3 feet to: Brown, coarse SAND, some Gravel, trace Silt, wet. Changing at 74.6 feet to: Yellowish brown, SILT, wet. Changing at 75.3 feet to: NO RECOVERY.	74' SAND 74.6' SILT 75.3' NO RECOVERY		
75									
76	39	24/19	76-78	14-16 22-26		Dark yellowish brown, fine to coarse SAND, trace Gravel, trace Silt, wet. Changing at 76.7 feet to: Yellowish brown, SILT, trace fine Sand, trace Gravel, trace Clay, wet. Changing at 77.4 feet to: Brown to yellowish brown, fine SAND, trace Gravel, trace Silt, wet. Changing at 77.6 feet to: NO RECOVERY. Brown to yellowish brown, fine SAND, trace Gravel, trace Silt, wet. Changing at 78.5 feet to: NO RECOVERY.	76' SAND 76.7' SILT 77.4' 77.6' SAND 78' NO RECOVERY SAND 78.5' NO RECOVERY		
77									
78	40	24/6	78-80	7-9 15-19					
79								4	
80	41	24/12	80-82	0-0 9-20		Dark yellowish brown, fine SAND, trace Gravel, trace Silt, wet. Changing at 81.0 feet to: NO RECOVERY.	80' SAND 81' NO RECOVERY		
81									
82	42	24/18	82-84	2-8 16-22		Dark yellowish brown, fine SAND, trace Gravel, trace Silt, wet. Changing at 83.5 feet to: NO RECOVERY.	82' SAND 83.5' NO RECOVERY		
83									
84	43	24/6	84-86	7-13 15-18		Dark yellowish brown, fine to coarse SAND, some Gravel, trace Silt, wet. Changing at 84.5 feet to: NO RECOVERY.	84' SAND 84.5' NO RECOVERY		

REMARKS

3. Temporary well set at 69.0 to 74.0 feet below ground surface. Groundwater sample submitted for laboratory analysis.
4. Temporary well set at 79.0 to 84.0 feet below ground surface. Groundwater sample submitted for laboratory analysis.

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86	44	24/7	86-88	5-10 19-28		Dark yellowish brown, fine to coarse SAND, some Gravel, trace Silt, wet. Changing at 86.6 feet to: NO RECOVERY.	NO RECOVERY 86' SAND 86.6' NO RECOVERY		
87									
88	45	24/19	88-90	11-20 30-45		Dark yellowish brown to yellowish brown, fine to medium SAND, trace Silt, wet. Changing at 89.6 feet to: NO RECOVERY.	88' SAND 89.6'	5	
89									
90	46	24/17	90-92	2-11 23-43		Dark yellowish brown to yellowish brown, fine to medium SAND, trace Silt, wet. Changing at 91.4 feet to: NO RECOVERY.	NO RECOVERY 90' SAND 91.4'		
91									
92	47	24/18	92-94	0-1 6-11		Dark yellowish brown to yellowish brown, fine to medium SAND, trace Silt, wet. Changing at 93.5 feet to: NO RECOVERY.	NO RECOVERY 92' SAND 93.5'		
93									
94	48	24/5	94-96	4-8 16-24		Dark yellowish brown to yellowish brown, fine to medium SAND, trace Silt, wet. Changing at 94.4 feet to: NO RECOVERY.	NO RECOVERY 94' SAND 94.4' NO RECOVERY		
95									
96	49	24/7	96-98	4-13 19-31		Yellowish brown, fine to medium SAND, trace Silt, wet. Changing at 96.6 feet to: NO RECOVERY.	96' SAND 96.6' NO RECOVERY		
97									
98	50	24/8	98-100	2-7 15-22		Yellowish brown, fine to medium SAND, trace Silt, wet. Changing at 98.7 feet to: NO RECOVERY.	98' SAND 98.7' NO RECOVERY	6	Bentonite/Grout
99									
100	51	24/12	100-102	9-15 25-38		Yellowish brown, fine to medium SAND, trace Silt, wet. Changing at 101.0 feet to: NO RECOVERY.	100' SAND 101' NO RECOVERY		
101									
102	52	24/0	102-104	7-24 39-50/4"		NO RECOVERY.			

REMARKS

5. Temporary well set at 89.0 to 94.0 feet below ground surface. Groundwater sample submitted for laboratory analysis.
6. Temporary well set at 99.0 to 104.0 feet below ground surface. Groundwater sample submitted for laboratory analysis.

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103							NO RECOVERY		
104	53	24/12	104-106	11-23 32-45		Yellowish brown, fine to medium SAND, trace Silt, wet. Changing at 105.0 feet to: NO RECOVERY.	104' SAND		
105							105' NO RECOVERY		
106	54	24/16	106-108	5-18 37-50/5"		Yellowish brown, fine to medium SAND, trace Silt, wet. Changing at 107.3 feet to: NO RECOVERY.	106' SAND		
107							107.3' NO RECOVERY		
108	55	24/12	108-110	4-18 48-50/3"		Yellowish brown, fine to medium SAND, trace Silt, wet. Changing at 109.0 feet to: NO RECOVERY.	108' SAND		
109							109' NO RECOVERY	7	
110	56	24/2	110-112	10-22 36-50/5"		Yellowish brown, fine to medium SAND, trace Silt, wet. Changing at 110.2 feet to: NO RECOVERY.	110' 110.2' SAND NO RECOVERY		
111									
112	57	24/14	112-114	13-27 41-50		Yellowish brown, fine to medium SAND, trace Silt, wet. Changing at 113.2 feet to: NO RECOVERY.	112' SAND		
113							113.2' NO RECOVERY		
114	58	24/20	114-116	12-27 35-50		Yellowish brown, fine to medium SAND, trace Silt, wet. Changing at 115.7 feet to: NO RECOVERY.	114' SAND		
115							115.7'		
116	60	24/16	116-118	3-8 22-48		Yellowish brown, fine to medium SAND, trace Silt, wet. Changing at 117.3 feet to: NO RECOVERY.	116 NO RECOVERY SAND		
117							117.3' NO RECOVERY		
118	61	24/0	118-120	5-9 16-27		NO RECOVERY.			
119								8	

REMARKS

7. Temporary well set at 109.0 to 114.0 feet below ground surface. Groundwater sample submitted for laboratory analysis.
8. Temporary well set at 119.0 to 124.0 feet below ground surface. Groundwater sample submitted for laboratory analysis.

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	62	24/0	120-122	5-10 25-32		NO RECOVERY.	NO RECOVERY		
121									
122	63	24/2	122-124	5-11 18-25		Yellowish brown, fine to medium SAND, trace Silt, wet. Changing at 122.2 feet to: NO RECOVERY.	122' 122.2' SAND NO RECOVERY		
123									
124	64	24/0	124-126	5-12 21-25		NO RECOVERY.			
125									
126	65	24/5	126-128	4-9 19-27		Yellowish brown, fine to medium SAND, trace Silt, wet. Changing at 126.4 feet to: NO RECOVERY.	126' SAND 126.4' NO RECOVERY		
127									
128	66	24/12	128-130	15-23 40-47		Yellowish brown, fine to medium SAND, trace Silt, wet. Changing at 129.0 feet to: NO RECOVERY.	128' SAND		
129							129' NO RECOVERY	9	
130	67	24/5	130-132	7-9 19-33		Yellowish brown, fine to medium SAND, trace Silt, wet. Changing at 130.4 feet to: NO RECOVERY.	130' SAND 130.4' NO RECOVERY		
131									
132	68	24/6	132-134	3-9 22-43		Yellowish brown, fine to medium SAND, trace Silt, wet. Changing at 133.1 feet to: NO RECOVERY.	132' SAND		
133							133.1' NO RECOVERY		
134	70	24/0	134-136	2-4 14-25		NO RECOVERY.			
135									
136	71	24/13	136-138	8-25 36-45		Yellowish brown, fine to medium SAND, trace Silt, wet. Changing at 137.1 feet to: NO RECOVERY.	136' SAND		
137							137.1' NO RECOVERY		

REMARKS

9. Temporary well set at 129.0 to 134.0 feet below ground surface. Groundwater sample submitted for laboratory analysis.

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138	72	24/13	138-140	6-5 7-11		Yellowish brown, fine to medium SAND, trace Silt, wet. Changing at 139.1 feet to: NO RECOVERY.	NO RECOVERY 138' SAND 139.1' NO RECOVERY	10	
140	73	24/13	140-142	1-4 9-17		Yellowish brown, fine to medium SAND, trace Silt, wet. Changing at 141.1 feet to: NO RECOVERY.	140' SAND 141.1' NO RECOVERY		
142	74	24/0	142-144	2-8 18-26		NO RECOVERY.			
144	75	24/13	144-146	1-6 13-28		Yellowish brown, fine to medium SAND, trace Silt, wet. Changing at 145.1 feet to: NO RECOVERY.	144' SAND 145.1' NO RECOVERY		
146	76	24/17	146-148	7-13 32-50		Yellowish brown, fine to medium SAND, trace Silt, wet. Changing at 174.4 feet to: NO RECOVERY.	146' SAND 147.4' NO RECOVERY		
148	77	24/14	148-150	6-15 28-50		Yellowish brown, fine to medium SAND, trace Silt, wet. Changing at 149.2 feet to: NO RECOVERY.	148' SAND 149.2' NO RECOVERY	11	
150	78	24/7	150-152	6-15 25-44		Yellowish brown, fine to medium SAND, trace Silt, wet. Changing at 150.6 feet to: NO RECOVERY.	150' SAND 150.6' NO RECOVERY		
152	79	24/11	152-154	14-28 63-50/4"		Yellowish brown, fine to medium SAND, trace Silt, wet. Changing at 152.9 feet to: NO RECOVERY.	152' SAND 152.9' NO RECOVERY		
154	80	24/6	154-156	8-19 32-50		Yellowish brown, fine to medium SAND, trace Silt, wet. Changing at 154.5 feet to: NO RECOVERY.	154' SAND 154.5' NO RECOVERY		

REMARKS

10. Temporary well set at 139.0 to 144.0 feet below ground surface. Groundwater sample submitted for laboratory analysis.
11. Temporary well set at 149.0 to 154.0 feet below ground surface. Groundwater sample submitted for laboratory analysis.

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							NO RECOVERY		
156	81	24/8	156-158	9-18 30-50/2"		Yellowish brown, fine to medium SAND, trace Silt, wet. Changing at 156.7 feet to: NO RECOVERY.	156' SAND 156.7' NO RECOVERY		
157									
158	82	24/2	158-160	3-12 25-37		Yellowish brown, fine to medium SAND, trace Silt, wet. Changing at 158.2 feet to: NO RECOVERY.	158' 158.2' SAND NO RECOVERY		
159								12	
160	83	18/5	160-161.5	15-13-27		Yellowish brown, fine to medium SAND, trace Silt, wet. Changing at 160.4 feet to: NO RECOVERY.	160' SAND 160.4' NO RECOVERY		
161									
162	84	24/8	162-164	6-19 32-32		Yellowish brown, fine to medium SAND, trace Silt, wet. Changing at 162.7 feet to: NO RECOVERY.	162' SAND 162.7' NO RECOVERY		
163									
164	85	24/16	164-166	3-12 28-46		Yellowish brown, fine to medium SAND, trace Silt, wet. Changing at 165.3 feet to: NO RECOVERY.	164' SAND 165.3' NO RECOVERY		
165									
166	86	18/8	166-167.5	8-22-40		Yellowish brown, fine to medium SAND, trace Silt, wet. Changing at 166.7 feet to: NO RECOVERY.	166' SAND 166.7' NO RECOVERY		
167									
168	87	24/10	168-170	5-19 25-42		Yellowish brown, fine to medium SAND, trace Silt, wet. Changing at 168.8 feet to: NO RECOVERY.	168' SAND 168.8' NO RECOVERY		
169								13	
170	88	24/20	170-172	33-30 32-34		Yellowish brown, fine to medium SAND, trace Silt, wet. Changing at 171.3 feet to: Very dark brown, Silty CLAY, moist. Changing at 171.7 feet to: NO RECOVERY.	170' SAND 171.3' 171.6' Silty CLAY 171.7' SAND		
171									
172	89	24/8	172-174	33-43 45-47		Brown, fine to coarse SAND, some Gravel,	NO RECOVERY SAND		

REMARKS

12. Temporary well set at 159.0 to 164.0 feet below ground surface. Groundwater sample submitted for laboratory analysis.
13. Temporary well set at 169.0 to 174.0 feet below ground surface. Groundwater sample submitted for laboratory analysis.

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173						trace Silt, wet. Changing at 172.7 feet to: NO RECOVERY.	172.7' NO RECOVERY		
174	90	24/5	174-176	2-6 27-50/3"		Brown, fine to coarse SAND, some Gravel, trace Silt, wet. Changing at 174.3 feet to: NO RECOVERY.	174' 174.3' SAND NO RECOVERY		
175									
176	91	24/0	176-178	14-50/5"		NO RECOVERY.			
177									
178	92	18/4	178-179.5	6-31-50		Brown, fine to coarse SAND, some Gravel, trace Silt, wet. Changing at 178.3 feet to: NO RECOVERY.	178' 178.3' SAND NO RECOVERY		
179								14	
180	93	12/2	180-181	18-50		Brown, fine to coarse SAND, some Gravel, trace Silt, wet. Changing at 180.2 feet to: NO RECOVERY.	180' 180.2' SAND NO RECOVERY		
181									
182	94	24/7	182-184	13-50/2"		Dark grayish brown, CLAY, some Sand, little Silt, trace Gravel, moist. Changing at 182.6 feet to: NO RECOVERY.	182' CLAY 182.6' NO RECOVERY		
183									
184	95	24/19	184-186	19-43 42-50/5"		Dark yellowish brown, fine to medium SAND, trace Silt, wet. Changing at 184.7 feet to: Dark yellowish brown, fine to coarse SAND, little Gravel, trace Silt, wet. Changing at 184.9 feet to: Grayish brown, GRAVEL, some Sand, trace Silt, wet. Changing at 185.6 feet to: NO RECOVERY.	184' SAND 184.9' GRAVEL 185.6' NO RECOVERY		
185									
186	96	12/6	186-187	23-50		Grayish-brown, GRAVEL, some Sand, trace Silt, wet. Changing at 186.5 feet to: NO RECOVERY.	186' GRAVEL 186.5' NO RECOVERY		
187									
188	97	12/11	188-189	40-50/4"		Dark yellowish brown, fine to medium SAND, trace Gravel, trace Silt, wet. Changing at 188.3 feet to: Brown to dark brown, medium to coarse SAND, trace Gravel, trace Silt, wet. Changing at 188.9 feet to: NO RECOVERY.	188' SAND 188.9' NO RECOVERY 190'		
189								15	

REMARKS

14. Temporary well set at 179.0 to 184.0 feet below ground surface. Groundwater sample submitted for laboratory analysis.
15. Temporary well set at 189.0 to 194.0 feet below ground surface. Groundwater sample submitted for laboratory analysis.

Stratification lines represent approximate boundary between soil types, transitions may be gradual. Water level readings have been made at times and under conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the time measurements were made.

Boring No.: HS-MW-13C

BORING_WELL 62355.52 HOUSE STREET COMPLETE.GPJ GZA_CORP.GDT 2/18/25

GZA GeoEnvironmental, Inc.
Engineers and Scientists

Wolverine World Wide, Inc.
House Street
Belmont, Michigan

Boring No.: HS-MW-13C
Page: 12 **of** 12
File No.: 16.0062335.52
Check: JTM/JMG

Depth	Sample Information: No.	Pen./ Rec. (in.)	Depth (Ft.)	Blows (/6")	Test Data	Sample Description & Classification	Stratum Desc.	Remarks	Equipment Installed
191	98	12/10	190-191	26-50/3"		Dark yellowish-brown, fine to medium SAND, trace Gravel, trace Silt, wet. Changing at 190.6 feet to: Brown, fine to medium SAND, trace Silt, wet. Changing at 190.8 feet to: NO RECOVERY.	SAND 190.8' NO RECOVERY		
192	99	12/12	192-193	25-50/3"		Brown, fine to medium SAND, trace Silt, wet. Changing at 192.6 feet to: NO RECOVERY.			
193									
194	100	12/7	194-195	29-50/2"		Brown, fine to medium SAND, trace Gravel, trace Silt, wet. Changing at 194.6 feet to: Grayish-brown, SILT, little Clay, moist. Changing at 194.7 feet to: NO RECOVERY.	194' SAND 194.6' 194.7' SILT NO RECOVERY		
195									
196	101	6/6	196-196.5	50/3"		Brown, fine to medium SAND, trace Silt, wet. Changing at 196.6 feet to: NO RECOVERY.	196' SAND 196.6' NO RECOVERY		
197									
198	102	12/7	198-199	30-50/3"		Yellowish-brown, fine to medium SAND, trace Gravel, trace Silt, wet. Changing at 198.6 feet to: NO RECOVERY.	198' SAND 198.6' NO RECOVERY		Silica Sand Filter Pack
199									Top of Well Screen
200	103	18/17	200-201.5	37-33-50/2"		Yellowish-brown, fine to medium SAND, trace Gravel, trace Silt, wet. Changing at 201.2 feet to: NO RECOVERY.	200' SAND 201.2' NO RECOVERY		
201									
202	104	12/11	202-203	37-50/2"		Yellowish-brown, fine to medium SAND, trace Gravel, trace Silt, wet. Changing at 202.1 feet to: Grayish-brown, GRAVEL, some coarse Sand, trace Silt, wet. Changing at 202.2 feet to: Brown, SILT, some fine Sand, wet. Changing at 202.3 feet to: Grayish-brown, GRAVEL, some coarse Sand, trace Silt, wet. Changing at 202.5 feet to: Brown, fine SAND, some Silt, moist. Changing at 202.7 feet to: Brown, Silty CLAY, trace Gravel, moist.	202' 202.1' SAND 202.2' GRAVEL 202.3' SILT 202.5' GRAVEL 202.7' SAND Silty CLAY		2-Inch Dia. 5-Foot PVC Screen (0.010" Slot)
203									
204	105	12/11	204-205	37-50/2"					Bottom of Well Screen
205						Dark grayish-brown, Silty CLAY, trace Gravel, moist. Changing at 204.9 feet to: NO RECOVERY. Bottom of Borehole at 205.0 Feet	204.9' 205 NO RECOVERY	16	
206									
207									

REMARKS

16. Monitoring well was installed in borehole upon completion. Well screen set from 199.4 to 204.2 feet below ground surface.

Stratification lines represent approximate boundary between soil types, transitions may be gradual. Water level readings have been made at times and under conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the time measurements were made.

Boring No.: HS-MW-13C

BORING_WELL 62355.52 HOUSE STREET COMPLETE.GPJ GZA_CORP.GDT 2/18/25

GZA
GeoEnvironmental, Inc.
Engineers and Scientists

Wolverine World Wide, Inc.
MDEQ Drilling
Rockford, Michigan

Boring No.: HS-MW-32A
Page: 1 **of** 2
File No.: 16.0062335.52
Check: Lori Powers

Contractor: Stock
Foreman: Ryan
Logged by: JTM
Date Start/Finish: 5-9-19 / 5-9-19
Boring Location: 12784010.1682 N, 591684.339 E
GS Elev.: 724.80' **Datum:** NAD83/NAVD 88

	Auger/ Casing	Sampler
Type:	Sonic	NA
O.D. / I.D.:	NA	NA
Hammer Wt.:	NA	NA
Hammer Fall:	NA	NA
TOC Elev.:		

GROUNDWATER READINGS

Date	Time	Depth	Casing	Stab

Surveyed By: **Survey Date:**

Depth	Sample Information: No.	Pen./ Rec. (in.)	Depth (Ft.)	Blows (/6")	Test Data	Sample Description & Classification	Stratum Desc.	Remarks	Equipment Installed
1						See HS-MW-32D boring log for sample description and classification.			PROTECTIVE CASING
2–44									

REMARKS

Stratification lines represent approximate boundary between soil types, transitions may be gradual. Water level readings have been made at times and under conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the time measurements were made.

Boring No.: HS-MW-32A

BORING_WELL 62335.52 MDEQ WWW.GPJ GZA_CORP.GDT 6/18/25

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Wolverine World Wide, Inc.
MDEQ Drilling
Rockford, Michigan

Boring No.: HS-MW-32A
Page: 2 **of** 2
File No.: 16.0062335.52
Check: Lori Powers

Depth	Sample Information					Sample Description & Classification	Stratum Desc.	Remarks	Equipment Installed
	No.	Pen./ Rec. (in.)	Depth (Ft.)	Blows (/6")	Test Data				
46–64									Top of Well Screen; Bottom of Well Screen
65						Bottom of Borehole at 65.0 Feet		1	

REMARKS

1. Monitoring well was installed in borehole upon completion. Well screen set from 57.8 to 62.4 feet below ground surface.

Stratification lines represent approximate boundary between soil types, transitions may be gradual. Water level readings have been made at times and under conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the time measurements were made.

Boring No.: HS-MW-32A

BORING_WELL 62335.52 MDEQ WWW.GPJ GZA_CORP.GDT 6/18/25

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Engineers and Scientists

Wolverine World Wide, Inc.
MDEQ Drilling
Rockford, Michigan

Boring No.: HS-MW-32B
Page: 1 **of** 2
File No.: 16.0062335.52
Check: Lori Powers

Contractor: Stock
Foreman: Ryan
Logged by: JTM
Date Start/Finish: 5-8-19 / 5-8-19
Boring Location: 12784009.175 N, 591691.2556 E
GS Elev.: 725.10' **Datum:** NAD83/NAVD 88

	Auger/ Casing	Sampler
Type:	Sonic	NA
O.D. / I.D.:	NA	NA
Hammer Wt.:	NA	NA
Hammer Fall:	NA	NA
TOC Elev.:		

GROUNDWATER READINGS

Date	Time	Depth	Casing	Stab

Surveyed By: **Survey Date:**

Depth	Sample Information: No.	Pen./ Rec. (in.)	Depth (Ft.)	Blows (/6")	Test Data	Sample Description & Classification	Stratum Desc.	Remarks	Equipment Installed
1						See HS-MW-32D boring log for sample description and classification.			PROTECTIVE CASING

REMARKS

Stratification lines represent approximate boundary between soil types, transitions may be gradual. Water level readings have been made at times and under conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the time measurements were made.

Boring No.: HS-MW-32B

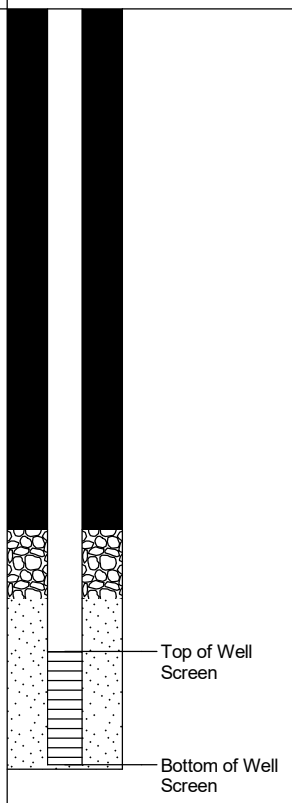
BORING_WELL 62335.52 MDEQ WWW.GPJ GZA_CORP.GDT 6/18/25

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Rockford, Michigan

Boring No.: HS-MW-32B
Page: 2 **of** 2
File No.: 16.0062335.52
Check: Lori Powers

Depth	Sample Information: No.	Pen./ Rec. (in.)	Depth (Ft.)	Blows (/6")	Test Data	Sample Description & Classification	Stratum Desc.	Remarks	Equipment Installed
51–108									
83						Bottom of Borehole at 83.0 Feet		1	



REMARKS

1. Monitoring well was installed in borehole upon completion. Well screen set from 78.2 to 82.8 feet below ground surface.

Stratification lines represent approximate boundary between soil types, transitions may be gradual. Water level readings have been made at times and under conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the time measurements were made.

BORING_WELL 62335.52 MDEQ WWW.GPJ GZA_CORP.GDT 6/18/25

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Wolverine World Wide, Inc.
MDEQ Drilling
Rockford, Michigan

Boring No.: HS-MW-32C
Page: 1 **of** 2
File No.: 16.0062335.52
Check: Lori Powers

Contractor: Stock
Foreman: Ryan
Logged by: JTM
Date Start/Finish: 5-8-19 / 5-8-19
Boring Location: 12784006.1157 N, 591698.5202 E
GS Elev.: 725.10' **Datum:** NAD83/NAVD 88

	Auger/ Casing	Sampler
Type:	Sonic	NA
O.D. / I.D.:	NA	NA
Hammer Wt.:	NA	NA
Hammer Fall:	NA	NA
TOC Elev.:		

GROUNDWATER READINGS

Date	Time	Depth	Casing	Stab

Surveyed By: **Survey Date:**

Depth	Sample Information: No.	Pen./ Rec. (in.)	Depth (Ft.)	Blows (/6")	Test Data	Sample Description & Classification	Stratum Desc.	Remarks	Equipment Installed
1–54						See HS-MW-32D boring log for sample description and classification.			PROTECTIVE CASING

REMARKS

Stratification lines represent approximate boundary between soil types, transitions may be gradual. Water level readings have been made at times and under conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the time measurements were made.

Boring No.: HS-MW-32C

BORING_WELL_62335.52 MDEQ WWW.GPJ GZA_CORP.GDT 6/18/25

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MDEQ Drilling
Rockford, Michigan

Boring No.: HS-MW-32C
Page: 2 **of** 2
File No.: 16.0062335.52
Check: Lori Powers

Depth	Sample Information: No.	Pen./ Rec. (in.)	Depth (Ft.)	Blows (/6")	Test Data	Sample Description & Classification	Stratum Desc.	Remarks	Equipment Installed
56–118						Bottom of Borehole at 112.0 Feet		1	Top of Well Screen; Bottom of Well Screen

REMARKS

1. Monitoring well was installed in borehole upon completion. Well screen set from 107.2 to 111.8 feet below ground surface.

Stratification lines represent approximate boundary between soil types, transitions may be gradual. Water level readings have been made at times and under conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the time measurements were made.

Boring No.: HS-MW-32C

BORING_WELL 62335.52 MDEQ WWW.GPJ GZA_CORP.GDT 6/18/25

GZA GeoEnvironmental, Inc.
Engineers and Scientists

Wolverine World Wide, Inc.
Wolven Avenue Area
Algoma Twp, Kent County, Michigan

Boring No.: WV-MW-4
Page: 1 **of** 6
File No.: 16.0062677.81
Check: M Myers

Contractor: Stearns Drilling Company
Foreman: Jerry Huntoon
Logged by: Anthony Leonido
Date Start/Finish: 3-12-18 / 3-12-18
Boring Location: 12793867.1964 N, 595780.2904 E
GS Elev.: 852.50' **Datum:** NAD83/ NAVD88

	Auger/ Casing	Sampler
Type:	Hollow Stem Auger	Split Spoon
O.D. / I.D.:	12.25" / 4.25"	2.0" / 1 3/8"
Hammer Wt.:	NA	140lbs
Hammer Fall:	NA	30.0"
TOC Elev.:	854.99	NA

GROUNDWATER READINGS

Date	Time	Depth	Casing	Stab
3/16/18	1600	84.0'	Open	

Surveyed By: _____ **Survey Date:** _____

Depth	Sample Information: No.	Pen./ Rec. (in.)	Depth (Ft.)	Blows (/6")	Test Data	Sample Description & Classification	Stratum Desc.	Remarks
1	1	24/24	0-2	1-1 1-1	ND	TOPSOIL. Changing at 0.5 feet to: Very loose, brown and black, fine to medium SAND and SILT, dry.	0.5' TOPSOIL (LOAM) SAND and SILT	
4	2	24/18	4-6	1-1 2-3	0.1	Very loose, brown, fine SAND, little Silt, dry.		1
9	3	24/20	9-11	3-4 6-6	ND	Loose, brown, fine SAND, trace Silt, dry.	9' SAND	
13							13' SAND and SILT	
14	4	24/18	14-16	4-5 5-7	ND	Loose, brown, fine SAND, dry. Changing at 15.0 feet to: Tan, fine SAND and SILT, dry (SM).		
19	5	24/20	19-21	5-10 19-21	ND	Medium dense, brown, SILT, trace fine Sand, dry.	19' SILT	

Equipment Installed

PROTECTIVE CASING
Concrete

REMARKS

1. Field screening of samples for organic vapors was performed with a MiniRae 3000 photoionization detector equipped with a 10.6 eV lamp. Readings above background levels are shown in parts per million per volume (ppmv) of isobutylene. ND indicates nothing detected (<0.1 ppmv).

Stratification lines represent approximate boundary between soil types, transitions may be gradual. Water level readings have been made at times and under conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the time measurements were made.

Boring No.: WV-MW-4

BORING_WELL 6267781 WWW WOLVEN AVENUE.GPJ GZA_CORP.GDT 6/17/25

GZA
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Engineers and Scientists

Wolverine World Wide, Inc.
Wolven Avenue Area
Algoma Twp, Kent County, Michigan

Boring No.: WV-MW-4
Page: 2 **of** 6
File No.: 16.0062677.81
Check: M Myers

Depth	Sample Information: No.	Pen./ Rec. (in.)	Depth (Ft.)	Blows (/6")	Test Data	Sample Description & Classification	Stratum Desc.	Remarks	Equipment Installed
23							SILT		
24	6	24/20	24-26	8-13 13-17	0.1	Medium dense, brown, fine SAND, trace Silt, dry.	24' SAND		
25									
26									
27									
28									
29	7	24/22	29-31	2-5 8-12	ND	Medium dense, brown, fine SAND, trace Silt, dry.			
30									
31									
32									
33									
34	8	24/20	34-36	3-10 14-15	ND	Medium dense, brown, fine SAND, trace Silt, dry.			
35									
36									
37									
38									
39	9	24/24	39-41	5-12 17-21	ND	Medium dense, brown, fine SAND, trace Silt, dry.			
40									
41									
42									
43									
44	10	24/22	44-46	8-21 22-30	ND	Dense, brown, fine SAND and fine GRAVEL, trace Silt.			
45									
46									
47									

REMARKS

Stratification lines represent approximate boundary between soil types, transitions may be gradual. Water level readings have been made at times and under conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the time measurements were made.

Boring No.: WV-MW-4

BORING_WELL 6267781 WWW WOLVEN AVENUE.GPJ GZA_CORP.GDT 6/17/25

GZA GeoEnvironmental, Inc.
Engineers and Scientists

Wolverine World Wide, Inc.
Wolven Avenue Area
Algoma Twp, Kent County, Michigan

Boring No.: WV-MW-4
Page: 3 **of** 6
File No.: 16.0062677.81
Check: M Myers

Depth	Sample Information					Sample Description & Classification	Stratum Desc.	Remarks	Equipment Installed
	No.	Pen./ Rec. (in.)	Depth (Ft.)	Blows (/6")	Test Data				
48							SAND		
49	11	24/21	49-51	3-11 22-28	ND	Dense, brown, fine to medium SAND and SILT, dry.	49' SAND and SILT		
50									
51									
52									
53									
54	12	11/11	54-54.9	16-50/5"	ND	Very dense, brown, fine SAND and SILT, some medium Gravel, dry.		2	
55									
56									
57									
58									
59	13	24/24	59-61	21-30 39-50	ND	Very dense, brown, fine to coarse SAND and SILT, trace medium Gravel, dry (GLACIAL TILL).	59' SAND and SILT (GLACIAL TILL)		Bentonite Grout
60									
61									
62									
63									
64	14	24/24	64-66	11-21 24-27	ND	Hard, gray, Silty CLAY, dry.	64' Silty CLAY		
65									
66									
67									
68									
69	15	24/19	69-71	19-43 38-46	ND	Very dense, gray, fine SAND and SILT with Clay lenses, trace medium Sand, dry (GLACIAL TILL).	69' SAND and SILT (GLACIAL TILL)		
70									
71									
72									
73									

REMARKS

2. Split spoon refusal at approximately 55.0 feet.

Stratification lines represent approximate boundary between soil types, transitions may be gradual. Water level readings have been made at times and under conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the time measurements were made.

Boring No.: WV-MW-4

BORING_WELL 6267781 WWW.WOLVEN AVENUE.GPJ GZA_CORP.GDT 6/17/25

GZA
GeoEnvironmental, Inc.
Engineers and Scientists

Wolverine World Wide, Inc.
Wolven Avenue Area
Algoma Twp, Kent County, Michigan

Boring No.: WV-MW-4
Page: 4 **of** 6
File No.: 16.0062677.81
Check: M Myers

Depth	Sample Information: No.	Pen./ Rec. (in.)	Depth (Ft.)	Blows (/6")	Test Data	Sample Description & Classification	Stratum Desc.	Remarks	Equipment Installed
74	16	24/24	74-76	8-14 24-31	ND	Dense, gray, fine to medium SAND and SILT, some Clay, damp (GLACIAL TILL).	SAND and SILT (GLACIAL TILL)		
75									
76									
77									
78									
79	17	18/18	79-80.5	13-27 37-0	ND	Dense, gray, fine to medium SAND and SILT, some Clay, damp (GLACIAL TILL).			
80									
81								4	
82									
83									
84	18	10/0	84-84.8	28-50/4"		NO RECOVERY.		3	
85									
86									
87									
88									
89	19	24/24	89-91	8-13 19-25	ND	Dense, gray, fine SAND and SILT, some medium Gravel, moist (GLACIAL TILL).			
90									
91									
92									
93									
94	20	24/24	94-96	14-24 28-41	ND	Very dense, gray, fine SAND and SILT, some medium Gravel, moist (GLACIAL TILL).			
95									
96									
97									
98									

REMARKS

4. Split spoon refusal at approximately 80.5 feet.
3. Gravel stuck in tip of split spoon.

Stratification lines represent approximate boundary between soil types, transitions may be gradual. Water level readings have been made at times and under conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the time measurements were made.

Boring No.: WV-MW-4

BORING_WELL 6267781 WWW WOLVEN AVENUE.GPJ GZA_CORP.GDT 6/17/25

GZA GeoEnvironmental, Inc.
Engineers and Scientists

Wolverine World Wide, Inc.
Wolven Avenue Area
Algoma Twp, Kent County, Michigan

Boring No.: WV-MW-4
Page: 5 **of** 6
File No.: 16.0062677.81
Check: M Myers

Depth	Sample Information: No.	Pen./ Rec. (in.)	Depth (Ft.)	Blows (/6")	Test Data	Sample Description & Classification	Stratum Desc.	Remarks	Equipment Installed
100	21	24/24	99-101	19-18 20-31	ND	Dense, gray, fine SAND and SILT, some medium Gravel, dry (GLACIAL TILL).	SAND and SILT (GLACIAL TILL)		
104	22	24/24	104-106	13-20 30-50	ND	Very dense, gray, fine SAND and SILT, some medium Gravel, dry (GLACIAL TILL).			
109	23	24/24	109-111	9-12 24-42	ND	Dense, gray, fine SAND and SILT, some medium Gravel, damp (GLACIAL TILL).			
114	24	24/24	114-116	9-17 28-41	ND	Dense, gray, fine SAND and SILT, some medium Gravel, damp (GLACIAL TILL).			
119	25	24/24	119-121	8-15 31-50	ND	Dense, gray, fine SAND and SILT, some medium Gravel, damp (GLACIAL TILL).			
122									2-Inch PVC Riser
124	26	18/18	124-125.5	9-27-50/6"	10.7	Very dense, gray, fine SAND and SILT,		5	

REMARKS

5. Groundwater was encountered at approximately 123.5 feet below ground surface.

Stratification lines represent approximate boundary between soil types, transitions may be gradual. Water level readings have been made at times and under conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the time measurements were made.

Boring No.: WV-MW-4

BORING_WELL 6267781 WWW WOLVEN AVENUE.GPJ GZA_CORP.GDT 6/17/25

GZA
GeoEnvironmental, Inc.
Engineers and Scientists

Wolverine World Wide, Inc.
Wolven Avenue Area
Algoma Twp, Kent County, Michigan

Boring No.: WV-MW-4
Page: 6 **of** 6
File No.: 16.0062677.81
Check: M Myers

Depth	Sample Information: No.	Pen./ Rec. (in.)	Depth (Ft.)	Blows (/6")	Test Data	Sample Description & Classification	Stratum Desc.	Remarks	Equipment Installed
125						some medium Gravel, damp, with green, fine Sand and Silt lenses and blue, fine Sand and Silt lenses, damp (GLACIAL TILL).	SAND and SILT (GLACIAL TILL)	6	Bentonite
126									
127									
128	27	15/12	128-129.3	15-35-50/3"	5.0	Very dense, brown, fine to medium SAND, trace Silt, wet, with layer of green, fine SAND.	128' SAND		
129									
130									Filter Sand
131									
132									
133							133' Silty SAND and CLAY		2-Inch PVC Well Screen
134	28	12/12	134-135	17-50+	ND	Very dense, red and green, fine Silty SAND, some Silty Clay, wet.			
135						Bottom of Borehole at 135.0 Feet	135'	7	
136									
137									
138									
139									
140									
141									
142									
143									
144									
145									
146									
147									
148									
149									
150									

REMARKS

6. A temporary well screen was set from 125.0 to 130.0 below ground surface. Groundwater sample was collected and submitted for laboratory analytical testing.
7. Monitoring well was installed in the borehole upon completion. Well screen set from 130.0 to 135.0 feet below ground surface.

Stratification lines represent approximate boundary between soil types, transitions may be gradual. Water level readings have been made at times and under conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the time measurements were made.

Boring No.: WV-MW-4

BORING_WELL 6267781 WWW WOLVEN AVENUE.GPJ GZA_CORP.GDT 6/17/25

GZA
GeoEnvironmental, Inc.
Engineers and Scientists

Wolverine World Wide, Inc.
Wolven Avenue Area
Algoma Twp, Kent County, Michigan

Boring No.: MW-WV-5D
Page: 1 **of** 3
File No.: 16.0062677.81
Check: M Myers

Contractor: Stearns Drilling Company
Foreman: Jerry Huntoon
Logged by: Joe Workman
Date Start/Finish: 3-14-18 / 3-14-18
Boring Location: 12795329.7452 N, 597048.7842 E
GS Elev.: 862.00' **Datum:** NAD83/ NAVD88

	Auger/ Casing	Sampler
Type:	Hollow Stem Auger	Split Spoon
O.D. / I.D.:	12.25" / 4.25"	2.0" / 1 3/8"
Hammer Wt.:	NA	140lbs
Hammer Fall:	NA	30.0"
TOC Elev.:	NA	NA

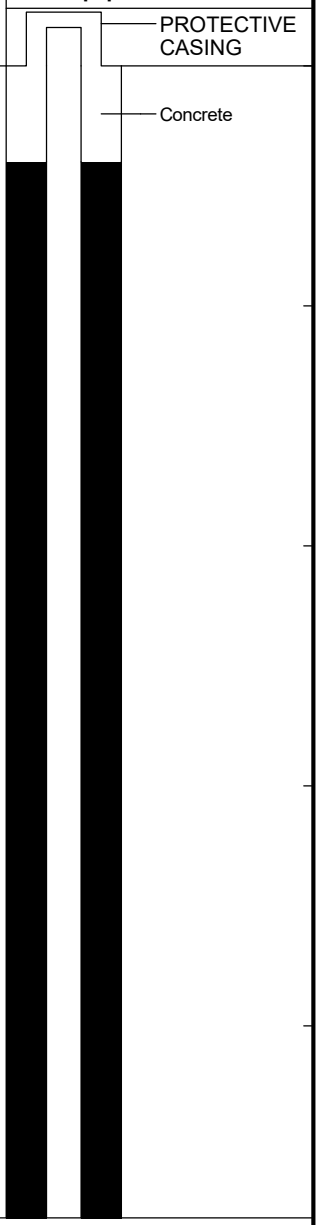
GROUNDWATER READINGS

Date	Time	Depth	Casing	Stab
3/14/18	1005	64.4'	Top of PVC	

Surveyed By: _____ **Survey Date:** _____

Depth	Sample Information No.	Pen./ Rec. (in.)	Depth (Ft.)	Blows (/6")	Test Data	Sample Description & Classification	Stratum Desc.	Remarks
1	1	24/13	0-2	2-3 5-6	9.0	Loose, dark brown, fine to medium SAND, trace Organic Matter (roots), trace Clay, trace Silt, damp. Changing at 1.0 foot to: Brown, fine to medium SAND, trace Silt, damp.	SAND	1
2	2	24/11	2-4	3-4 4-5	3.0	Loose, brown, fine to medium SAND, trace Silt, damp (rock fragment in tip of spoon).		
4	3	24/21	4-6	2-2 3-3	10.0	Loose, tan, fine to medium SAND, trace Silt, damp.		
6	4	24/15	6-8	2-2 3-3	ND	Loose, brown, fine to medium SAND, trace fine to coarse Gravel, moist.		
8	5	24/18	8-10	2-2 3-4	ND	Loose, brown, fine to medium SAND, trace Silt, moist.		
10	6	24/22	10-12	3-2 2-2	3.0	Loose, brown, fine to medium SAND, trace Silt, moist.		
12	7	24/23	12-14	2-1 2-3	ND	Loose, brown, fine to medium SAND, trace Silt, moist.		
14	8	24/24	14-16	2-3 3-3	ND	Loose, tan, fine to medium SAND, trace Silt, moist. Changing at approximately 15.8 feet to: Loose, brown, fine to coarse SAND, trace Silt, moist.		
16	9	24/24	16-18	4-5 8-10	ND	Medium dense, brown, fine to medium SAND, trace Silt, damp.		
18	10	24/22	18-20	5-10 11-11	ND	Medium dense, brown, fine to coarse SAND, trace Silt, damp. Changing at approximately 19.7 feet to: Brown, fine to coarse SAND, trace Silt, damp.		
20	11	24/20	20-22	10-9 13-12	ND	Medium dense, brown, fine to medium SAND, trace Silt, damp. Changing at approximately 21.5 feet to: Medium dense, brown, fine to coarse SAND, trace fine to coarse Gravel, trace Silt, damp with 1.0 inch layer of CLAY and SILT at approximately 21.7 feet.		
22	12	24/20	22-24	4-5 10-9	ND	Medium dense, tan, fine to medium SAND,		

Equipment Installed



REMARKS

1. Field screening of samples for organic vapors was performed with a MiniRae 3000 photoionization detector equipped with a 10.6 eV lamp. Readings above background levels are shown in parts per million by volume (ppmv) of isobutylene. ND indicates nothing detected (<0.1 ppmv).

Stratification lines represent approximate boundary between soil types, transitions may be gradual. Water level readings have been made at times and under conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the time measurements were made.

Boring No.: MW-WV-5D

BORING_WELL 6267781 WWW.WOLVEN AVENUE.GPJ GZA_CORP.GDT 6/17/25

GZA GeoEnvironmental, Inc.
Engineers and Scientists

Wolverine World Wide, Inc.
Wolven Avenue Area
Algoma Twp, Kent County, Michigan

Boring No.: MW-WV-5D
Page: 2 **of** 3
File No.: 16.0062677.81
Check: M Myers

Depth	Sample Information: No.	Pen./ Rec. (in.)	Depth (Ft.)	Blows (/6")	Test Data	Sample Description & Classification	Stratum Desc.	Remarks	Equipment Installed
25	13	24/21	24-26	5-5 9-13	ND	trace Silt, damp. Medium dense, tan, fine to medium SAND, trace Silt, damp.	SAND		
26 27	14	24/18	26-28	3-7 7-7	ND	Loose, brown, fine to coarse SAND, trace Silt, trace fine Gravel, damp. Changing at approximately 27.0 feet to: Medium dense, brown, fine to medium SAND, trace Silt,			
28 29	15	24/19	28-30	2-3 4-4	ND	damp. Loose, brown, fine to coarse SAND, trace fine Gravel, trace Silt, damp.			
30 31	16	24/17	30-32	2-3 4-4	ND	Loose, brown, fine to coarse SAND, trace fine Gravel, trace Silt, damp.			Bentonite Grout
32 33	17	24/19	32-34	2-2 2-2	ND	Loose, brown, fine to coarse SAND, trace fine Gravel, trace Silt, damp.		3	
34 35	18	24/24	34-36	2-3 4-7	ND	Loose, brown, fine to coarse SAND, trace fine Gravel, trace Silt, moist. Changing at approximately 34.2 feet to: Brown, Silty CLAY, little fine to coarse Sand, trace fine	34.2' Silty CLAY		
36 37	19	24/24	36-38	1-4 3-3	ND	Gravel, damp. Medium, brown, CLAY & SILT, some fine Sand, moist. Changing at approximately 36.4 feet to: Brown, fine to medium SAND,	36' CLAY & SILT	4	
38 39	20	24/20	38-40	1-2 5-5	ND	trace Silt, wet. Changing at approximately 36.6 feet to: Brown, CLAY & SILT, some fine to medium Sand, moist. Medium, brown, CLAY & SILT, some fine to			
40 41	21	24/24	40-42	4-9 9-11	ND	medium Sand, moist. Changing at approximately 39.2 feet to: Medium SAND, trace Silt, damp.	40' SAND		
42 43	22	24/22	42-44	10-13 18-19	ND	Medium dense, brown, fine SAND, trace Silt, wet. Medium dense, brown, fine SAND, trace Silt, wet.			
44 45	23	24/24	44-46	6-10 10-13	ND	Medium dense, brown, fine SAND, trace Silt, wet.			
46 47	24	24/20	46-48	5-12 17-22	ND	Medium dense, brown, fine SAND, trace Silt, wet.			
48 49	25	24/22	48-50	7-16 21-22	ND	Medium dense, brown, fine SAND, trace Silt, wet.			
50 51	26	24/24	50-52	10-11 16-21	ND	Medium dense, brown, fine SAND, trace Silt, wet.			

REMARKS

3. Driller noted some clay present in tip of spoon.
4. Groundwater was encountered at approximately 36.4 feet below ground surface.

Stratification lines represent approximate boundary between soil types, transitions may be gradual. Water level readings have been made at times and under conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the time measurements were made.

Boring No.: MW-WV-5D

BORING_WELL 6267781 WWW WOLVEN AVENUE.GPJ GZA_CORP.GDT 6/17/25

GZA GeoEnvironmental, Inc.
Engineers and Scientists

Wolverine World Wide, Inc.
Wolven Avenue Area
Algoma Twp, Kent County, Michigan

Boring No.: MW-WV-5D
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File No.: 16.0062677.81
Check: M Myers

Depth	Sample Information: No.	Pen./ Rec. (in.)	Depth (Ft.)	Blows (/6")	Test Data	Sample Description & Classification	Stratum Desc.	Remarks	Equipment Installed
53	27	24/24	52-54	4-11 14-14	ND	Medium dense, brown, fine SAND, trace Silt, wet.	SAND		
54	28	24/24	54-56	5-8 13-19	ND	Medium dense, brown, fine SAND, trace Silt, wet.			
56	29	24/24	56-58	3-5 13-27	ND	Medium dense, brown, fine SAND, trace Silt, wet.			
58	30	24/21	58-60	9-18 10-16	ND	Medium dense, brown, fine SAND, trace Silt, wet. Changing at approximately 58.5 feet to: Brown, fine to coarse SAND, some fine Gravel, wet.			
60	31	24/24	60-62	12-18 19-12	ND	Dense, brown, medium to coarse SAND, some fine Gravel, trace Silt, wet.			2-Inch PVC Riser
62	32	24/15	62-64	2-3 6-9	ND	Loose, brown, medium to coarse SAND, some fine Gravel, trace Silt, wet.			Bentonite
64	33	24/18	64-66	1-2 5-9	ND	Loose, brown and gray, fine SAND, trace Silt, wet.			
66	34	24/12	66-68	2-4 7-12	ND	Medium dense, brown and gray, fine SAND, trace Silt, wet.			
68	35	24/10	68-70	1-4 7-10	ND	Medium dense, brown and gray, fine SAND, trace Silt, wet.			Filter Sand
70	36	24/15	70-72	2-4 7-14	ND	Medium dense, brown and gray, fine SAND, trace Silt, wet.			2-Inch PVC Well Screen
72	37	24/24	72-74	2-5 10-13	ND	Medium dense, brownish gray, fine SAND, trace Silt, wet. Changing at approximately 73.0 feet to: Brown, CLAY.	73' CLAY		
74	38	24/24	74-76	11-14 26-27	ND	Hard, brown, CLAY. Changing at approximately 75.5 feet to: Gray, CLAY.			
76						Bottom of Borehole at 76.0 Feet	76'	5	
77									
78									
79									

REMARKS

5. Monitoring well was installed in borehole upon completion. Well screen set from 67.0 to 72.0 feet below ground surface.

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Boring No.: MW-WV-5D

BORING_WELL 6267781 WWW WOLVEN AVENUE.GPJ GZA_CORP.GDT 6/17/25

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Wolven Avenue Area
Algoma Twp, Kent County, Michigan

Boring No.: MW-WV-5S
Page: 1 **of** 2
File No.: 16.0062677.81
Check: M Myers

Contractor: Stearns Drilling Company
Foreman: Jerry Huntoon
Logged by: Joe Workman/Anthony Leonido
Date Start/Finish: 3-14-18 / 3-14-18
Boring Location: 12795332.0011 N, 597052.5977 E
GS Elev.: 862.10' **Datum:** NAD83/ NAVD88

	Auger/ Casing	Sampler
Type:	Hollow Stem Auger	Split Spoon
O.D. / I.D.:	12.25" / 4.25"	2.0" / 1 3/8"
Hammer Wt.:	NA	140lbs
Hammer Fall:	NA	30.0"
TOC Elev.:	NA	NA

GROUNDWATER READINGS

Date	Time	Depth	Casing	Stab

Surveyed By: NA **Survey Date:**

Depth	Sample Information: No.	Pen./ Rec. (in.)	Depth (Ft.)	Blows (/6")	Test Data	Sample Description & Classification	Stratum Desc.	Remarks	Equipment Installed
1						See MW-WV5D boring log for soil descriptions.			PROTECTIVE CASING; Concrete; Bentonite Grout
2									
3									
4									
5									
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REMARKS

Stratification lines represent approximate boundary between soil types, transitions may be gradual. Water level readings have been made at times and under conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the time measurements were made.

Boring No.: MW-WV-5S

BORING_WELL 6267781 WWW WOLVEN AVENUE.GPJ GZA_CORP.GDT 6/17/25

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Boring No.: MW-WV-5S
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Check: M Myers

Depth	Sample Information: No.	Pen./ Rec. (in.)	Depth (Ft.)	Blows (/6")	Test Data	Sample Description & Classification	Stratum Desc.	Remarks	Equipment Installed
36–64									2-Inch Riser; Bentonite; Filter Sand; 2-Inch PVC Well Screen
65						Bottom of Borehole at 65.0 Feet		1	
66–75									

REMARKS

1. Monitoring well was installed in borehole upon completion. Well screen set from 60.0 to 65.0 feet below ground surface.

Stratification lines represent approximate boundary between soil types, transitions may be gradual. Water level readings have been made at times and under conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the time measurements were made.

Boring No.: MW-WV-5S

BORING_WELL 6267781 WWW WOLVEN AVENUE.GPJ GZA_CORP.GDT 6/17/25

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Wolven Avenue Area
Algoma Twp, Kent County, Michigan

Boring No.: MW-WV-11D
Page: 1 of 15
File No.: 16.0062677.81
Check: M Myers

Contractor: Stearns Drilling Company
Foreman: Jerry H., Travis & Zach/Gary
Logged by: John Morehouse
Date Start/Finish: 1-3-19 / 1-9-19
Boring Location: 12791204.8969 N, 597100.5862 E
GS Elev.: 733.00' **Datum:** NAD83/ NAVD88

	Auger/ Casing	Sampler
Type:	Hollow Stem Auger	Split Spoon
O.D. / I.D.:	12.25" / 4.25"	2.0" / 1 3/8"
Hammer Wt.:	NA	140lbs
Hammer Fall:	NA	30.0"
TOC Elev.:	735.96	NA

GROUNDWATER READINGS

Date	Time	Depth	Casing	Stab
NM	NM	NM	NM	NM

Surveyed By: _____ **Survey Date:** _____

Depth	Sample Information: No.	Pen./ Rec. (in.)	Depth (Ft.)	Blows (/6")	Test Data	Sample Description & Classification	Stratum Desc.	Remarks	Equipment Installed
1	1	24/20.4	0-2	1-0 1-2	ND	Black, fine to medium-grained SAND, little Silt, slightly cohesive, moist. Changing at 0.7 feet to: Dark yellowish-brown, CLAY & SILT, plastic, cohesive, moist. Changing at 1.7 feet to: NO RECOVERY.	SAND 0.7' CLAY & SILT 1.7' NO RECOVERY	1	PROTECTIVE CASING
2	2	24/24	2-4	2-3 3-5	ND	Dark yellowish-brown, CLAY & SILT, plastic, cohesive, moist. Changing at 2.7 feet to: Mottled, yellowish-brown, CLAY & SILT, little Sand, plastic, cohesive, moist. Changing at 3.5 feet to: Light brownish-gray, SILT, little Clay, moderately plastic, cohesive, moist. Changing at 3.8 feet to: Yellowish-brown, fine to medium grained SAND, little Silt. wet.	2' CLAY & SILT 3.5' SILT 3.8'		
4	3	24/15.6	4-6	1-2 3-3	ND	Yellowish-brown, fine to medium grained SAND, little Silt. wet. Changing at 5.3 feet to: NO RECOVERY.	SAND 5.3' NO RECOVERY	2	
6	4	24/24	6-8	3-2 4-5	ND	Brown, CLAY & SILT, plastic, cohesive, moist. Changing at 6.2 feet to: Yellowish-brown, fine to medium grained SAND, little Silt, wet. Changing at 6.4 feet to: Brown, CLAY & SILT, plastic, cohesive, moist. Changing at 7.5 feet to: Yellowish-brown, CLAY & SILT, plastic, cohesive, moist. Changing at 7.6 feet to: Brown, CLAY & SILT, plastic, cohesive, moist. Changing at 7.8 feet to:	6' 6.2' CLAY & SILT 6.4' SAND CLAY & SILT 7.5' 7.6' SAND 7.8' CLAY & SILT		
8	5	24/16.8	8-10	2-3 3-5	ND	Yellowish-brown, fine to medium grained SAND, little Silt, wet. Changing at 7.9 feet to: Brown, CLAY & SILT, plastic, cohesive, moist. Brown, CLAY & SILT, plastic, cohesive, moist. Changing at 8.5 feet to: Yellowish-brown, fine to medium grained SAND, trace Silt, wet. Changing at 8.6 feet to: Brown, CLAY & SILT, plastic, cohesive, moist. Changing at 9.4 feet to: NO	7.9' SAND CLAY & SILT 8.5' 8.6' SAND CLAY & SILT 9.4' NO RECOVERY 10'		

REMARKS

1. Field screening of samples for organic vapors was performed with a MiniRae 3000 photoionization detector equipped with a 10.6 eV lamp. Readings above background levels are shown in parts per million by volume (ppmv) of isobutylene. ND indicates nothing detected (<0.1 ppmv).
2. Groundwater was encountered at approximately 3.8 feet below ground surface.

Stratification lines represent approximate boundary between soil types, transitions may be gradual. Water level readings have been made at times and under conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the time measurements were made.

Boring No.: MW-WV-11D

BORING_WELL 6267781 WWW.WOLVEN AVENUE.GPJ GZA_CORP.GDT 6/18/25

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Wolven Avenue Area
Algoma Twp, Kent County, Michigan

Boring No.: MW-WV-11D
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File No.: 16.0062677.81
Check: M Myers

Depth	Sample Information: No.	Pen./ Rec. (in.)	Depth (Ft.)	Blows (/6")	Test Data	Sample Description & Classification	Stratum Desc.	Remarks	Equipment Installed
	6	24/24	10-12		ND	RECOVERY. Yellowish-brown, fine to medium grained SAND, trace Silt, wet. Changing at 10.4 feet to: Grayish-brown, CLAY & SILT, plastic, cohesive, moist. Changing at 11.5 feet to: Light brownish-gray, fine grained SAND, some Silt, little Clay, moderately plastic, cohesive, wet. Changing at 11.6 feet to: Grayish-brown, CLAY & SILT, plastic, cohesive, moist.	SAND 10.4' CLAY & SILT 11.5' 11.6' SAND CLAY & SILT		
11									
12	7	24/18	12-14	3-1 2-3	ND	Grayish-brown, CLAY & SILT, plastic, cohesive, moist. Changing at 12.2 feet to: Brown, fine to medium grained SAND, trace Silt, wet. Changing at 12.4 feet to: Grayish-brown, CLAY & SILT, plastic, cohesive, moist. Changing at 13.5 feet to: NO RECOVERY.	12.2' 12.4' SAND CLAY & SILT 13.5' NO RECOVERY		
13									
14	8	24/14.4	14-16	1-2 3-5	ND	Grayish-brown, CLAY & SILT, plastic, cohesive, moist. Changing at 15.2 feet to: NO RECOVERY.	14' CLAY & SILT 15.2' NO RECOVERY		
15									
16	9	24/14.4	16-18	2-4-2	ND	Very dark brown, PEAT, some Silt, little Clay, plastic, cohesive, moist. Changing at 16.4 feet to: Dark yellowish-brown to yellowish-brown, fine to medium grained SAND, trace Silt, moist. Changing at 17.1 feet to: Yellowish-brown to brown, CLAY & SILT, plastic, cohesive, moist. Changing at 17.2 feet to: NO RECOVERY.	16' PEAT 16.4' SAND 17.1' 17.2' CLAY & SILT NO RECOVERY		
17									
18	10	24/13.2	18-20	1-2 3-6	ND	Yellowish-brown to brown, CLAY & SILT, plastic, cohesive, moist. Changing at 18.5 feet to: Dark brown, GRAVEL, some coarse to medium grained Sand, trace Silt, wet. Changing at 18.8 feet to: Yellowish-brown, CLAY & SILT, plastic, cohesive, moist. Changing at 19.1 feet to: NO RECOVERY.	18' CLAY & SILT 18.5' GRAVEL 18.8' CLAY & SILT 19.1' NO RECOVERY		
19									
20	11	24/18	20-22	2-2 3-5	ND	Yellowish-brown, fine grained SAND, trace Silt, wet. Changing at 20.5 feet to: Dark brown to yellowish-brown, medium to coarse grained SAND, some Gravel, trace Silt, wet; occasional very thin seams of Silty Clay, trace Gravel. Changing at 21.5 feet to: NO RECOVERY.	20' SAND 21.5' NO RECOVERY		
21									

REMARKS

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Boring No.: MW-WV-11D

BORING_WELL 6267781 WWW WOLVEN AVENUE.GPJ GZA_CORP.GDT 6/18/25

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Wolverine World Wide, Inc.
Wolven Avenue Area
Algoma Twp, Kent County, Michigan

Boring No.: MW-WV-11D
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File No.: 16.0062677.81
Check: M Myers

Depth	Sample Information: No.	Pen./ Rec. (in.)	Depth (Ft.)	Blows (/6")	Test Data	Sample Description & Classification	Stratum Desc.	Remarks	Equipment Installed
22	12	24/12	22-24	3-5 4-3	ND	Dark brown to yellowish-brown, medium to coarse grained SAND, some Gravel, trace Silt, moist. Changing at 23.0 feet to: NO RECOVERY.	NO RECOVERY 22' SAND 23' NO RECOVERY		
24	13	24/13.2	24-26	1-0 2-3	ND	Yellowish-brown, medium grained SAND, trace Silt, wet. Changing at 24.9 feet to: Dark brown to yellowish-brown, medium to coarse grained SAND, some Gravel, trace Silt, wet. Changing at 25.1 feet to: NO RECOVERY.	24' SAND 25.1' NO RECOVERY		
26	14	24/8.4	26-28	2-4 4-4	ND	Brown, fine to coarse grained SAND, little Gravel, trace Silt, wet. Changing at 26.7 feet to: NO RECOVERY.	26' SAND 26.7' NO RECOVERY		
28	15	24/15.6	28-30	3-4 3-4	ND	Brown, fine to coarse grained SAND, little Gravel, trace Silt, wet. Changing at 29.3 feet to: No RECOVERY.	28' SAND 29.3' NO RECOVERY		
30	16	24/15.6	30-32	2-2 6-5	ND	Brown, fine to coarse grained SAND, little Gravel, trace Silt, wet. Changing at 31.1 feet to: Brown, Silty CLAY, plastic, cohesive, moist. Changing at 31.3 feet to: NO RECOVERY.	30' SAND 31.1' 31.3' CLAY NO RECOVERY		
32	17	24/16.8	32-34	28-18 13-16	ND	Brown, medium to coarse grained SAND, trace Silt, wet. Changing at 32.9 feet to: NO RECOVERY.	32' SAND 32.9' NO RECOVERY		
33									

REMARKS

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Boring No.: MW-WV-11D

BORING_WELL 6267781 WWW WOLVEN AVENUE.GPJ GZA_CORP.GDT 6/18/25

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Wolven Avenue Area
Algoma Twp, Kent County, Michigan

Boring No.: MW-WV-11D
Page: 4 **of** 15
File No.: 16.0062677.81
Check: M Myers

Depth	Sample Information: No.	Pen./ Rec. (in.)	Depth (Ft.)	Blows (/6")	Test Data	Sample Description & Classification	Stratum Desc.	Remarks	Equipment Installed
							NO RECOVERY		
34	18	24/18	34-36	3-4 7-8	ND	Dark gray, Silty CLAY, little Sand, trace Gravel, plastic, cohesive, moist. Changing at 35.5 feet to: No RECOVERY.	34' Silty CLAY		
35							35.5' NO RECOVERY		
36	19	24/22.8	36-38	2-4 6-8	ND	Dark grayish-brown, CLAY & SILT, little Sand, trace Gravel, plastic, cohesive, moist. Changing at 37.9 feet to: NO RECOVERY.	36' CLAY & SILT		
37							37.9'		
38	20	24/24	38-40	2-7 6-5	ND	Dark grayish-brown, CLAY & SILT, little Sand, trace Gravel, plastic, cohesive, moist.	38' NO RECOVERY CLAY & SILT		
39									
40	21	24/21.6	40-42	4-5 7-10	ND	Dark grayish-brown, CLAY & SILT, little Sand, trace Gravel, plastic, cohesive, moist. Changing at 41.8 feet to: No RECOVERY.			
41							41.8'		
42	22	24/22.8	42-44	3-6 8-10	ND	Dark grayish-brown, CLAY & SILT, little Sand, trace Gravel, plastic, cohesive, moist. Changing at 43.9 feet to: NO RECOVERY.	42' NO RECOVERY CLAY & SILT		
43									
44	23	24/24	44-46	3-5 7-10	ND	Dark grayish-brown, CLAY & SILT, little Sand, trace Gravel, plastic, cohesive, moist.	43.9' 44' NO RECOVERY CLAY & SILT		

REMARKS

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Boring No.: MW-WV-11D

BORING_WELL 6267781 WWW WOLVEN AVENUE.GPJ GZA_CORP.GDT 6/18/25

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Boring No.: MW-WV-11D
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File No.: 16.0062677.81
Check: M Myers

Depth	Sample Information: No.	Pen./ Rec. (in.)	Depth (Ft.)	Blows (/6")	Test Data	Sample Description & Classification	Stratum Desc.	Remarks	Equipment Installed
							CLAY & SILT		
46	24	24/21.6	46-48	2-4 5-9	ND	Dark grayish-brown, CLAY & SILT, little Sand, trace Gravel, plastic, cohesive, moist. Changing at 47.8 feet to: NO RECOVERY.			
47							47.8'		
48	25	24/21.6	48-50	8-14 11-15	ND	Dark grayish-brown, CLAY & SILT, little Sand, trace Gravel, plastic, cohesive, moist. Changing at 49.4 feet to: Brown, SILT & CLAY, some Sand, little Gravel, plastic, cohesive, moist. Changing at 49.6 feet to: Dark grayish-brown, CLAY & SILT, little Sand, trace Gravel, plastic, cohesive, moist. Changing at 49.8 feet to: NO RECOVERY.	48' NO RECOVERY CLAY & SILT		
49							49.4' 49.6' SILT & CLAY 49.8' CLAY & SILT		
50	26	24/14.4	50-52	2-2 6-9	ND	Dark grayish-brown, CLAY & SILT, little Sand, trace Gravel, plastic, cohesive, moist. Changing at 51.2 feet to: NO RECOVERY.	50' NO RECOVERY CLAY & SILT		
51							51.2' NO RECOVERY		
52	27	24/21.6	52-54	2-7 11-14	ND	Dark grayish-brown, CLAY & SILT, little Sand, trace Gravel, plastic, cohesive, moist. Changing at 53.8 feet to: NO RECOVERY.	52' CLAY & SILT		
53							53.8'		
54	28	24/18	54-56	4-21-22	ND	Dark grayish-brown, CLAY & SILT, little Sand, trace Gravel, plastic, cohesive, moist. Changing at 55.4 feet to: Brown, fine to medium grained SAND, little Silt, moist to wet. Changing at 55.5 feet to: NO RECOVERY.	54' NO RECOVERY CLAY & SILT		
55							55.4' 55.5' SAND NO RECOVERY		
56	29	24/21.6	56-58	3-9 13-20	ND	Dark grayish-brown, CLAY & SILT, little Sand, trace Gravel, plastic, cohesive, moist. Changing at 57.4 feet to: Dark	56' CLAY & SILT		

REMARKS

Stratification lines represent approximate boundary between soil types, transitions may be gradual. Water level readings have been made at times and under conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the time measurements were made.

Boring No.: MW-WV-11D

BORING_WELL 6267781 WWW.WOLVEN AVENUE.GPJ GZA_CORP.GDT 6/18/25

Depth	Sample Information: No.	Pen./ Rec. (in.)	Depth (Ft.)	Blows (/6")	Test Data	Sample Description & Classification	Stratum Desc.	Remarks	Equipment Installed
57						grayish-brown, fine to medium grained SAND, little Silt, little Clay, slightly plastic, cohesive, moist. Changing at 57.8 feet to: NO RECOVERY.	CLAY & SILT 57.4' SAND 57.8'		
58	30	24/20.4	58-60	4-10 13-16	ND	Dark grayish-brown, CLAY & SILT, little Sand, trace Gravel, plastic, cohesive, moist. Changing at 59.7 feet to: NO RECOVERY.	58' NO RECOVERY CLAY & SILT		
59							59.7'		
60	31	24/14.4	60-62	3-10 24-15	ND	Dark grayish-brown, CLAY & SILT, little Sand, trace Gravel, plastic, cohesive, moist. Changing at 61.2 feet to: NO RECOVERY.	NO RECOVERY 60' CLAY & SILT		
61							61.2' NO RECOVERY		
62	32	24/21.6	62-64	25-8-10	ND	Dark grayish-brown, CLAY & SILT, some Sand, trace Gravel, moderately plastic, cohesive, moist. Changing at 63.8 feet to: NO RECOVERY.	62' SILT & CLAY		
63							63.8'		
64	33	24/22.8	64-66	6-10 15-26	ND	Dark grayish-brown, Silty CLAY, plastic, cohesive, moist. Changing at 65.3 feet to: Dark grayish-brown, medium grained SAND, trace Silt, wet. Changing at 65.9 feet to: NO RECOVERY.	64' NO RECOVERY Silty CLAY		
65							65.3' SAND		
66	34	24/20.4	66-68	27-28 21-30	ND	Dark grayish-brown, fine to medium grained SAND, trace Silt, wet. Changing at 66.1 feet to: Dark grayish-brown, SILT, little fine grained Sand, non-plastic, cohesive, wet. Changing at 66.4 feet to: Dark grayish-brown, SILT & CLAY, some Sand, trace Gravel, moderately plastic, cohesive, moist. Changing at 66.7 feet to: Dark grayish-brown, fine to medium grained SAND, trace Silt, wet. Changing at 67.4 feet to: Dark grayish-brown, SILT, little Clay,	65.9' 66' NO RECOVERY 66.1' SAND 66.4' SILT SILT & CLAY 66.7' SAND		
67							67.4' SILT 67.7'		
68	35	24/21.6	68-70	15-20 25-50	ND		NO RECOVERY 68' 68.2' SAND SILT & CLAY		

REMARKS

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Boring No.: MW-WV-11D

BORING_WELL 6267781 WWW.WOLVEN AVENUE.GPJ GZA_CORP.GDT 6/18/25

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Wolven Avenue Area
Algoma Twp, Kent County, Michigan

Boring No.: MW-WV-11D
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Check: M Myers

Depth	Sample Information: No.	Pen./ Rec. (in.)	Depth (Ft.)	Blows (/6")	Test Data	Sample Description & Classification	Stratum Desc.	Remarks	Equipment Installed
69						plastic, cohesive, moist to wet. Changing at 67.7 feet to: NO RECOVERY. Dark grayish-brown, fine to medium grained SAND, trace Silt. wet. Changing at 68.2 feet to: Dark grayish-brown, SILT & CLAY, some Sand, trace Gravel, moderately plastic, cohesive, moist. Changing at 69.4 feet to: Dark grayish-brown, CLAY & SILT, little Sand, trace Gravel, moderately plastic, cohesive, moist. Changing at 69.6 feet to: Varved, dark grayish-brown, SILT, with alternating layers of Silty Clay, plastic, cohesive, moist. Changing at 69.8 feet to: NO RECOVERY.	SILT & CLAY 69.4' CLAY & SILT 69.6' SILT 69.8' NO RECOVERY 70'		
70	36	24/22.8	70-72	33-48-50/3"	ND		SAND		
71						Brown, fine to medium grained SAND, trace Silt, wet. Changing at 71.4 feet to: Grayish-brown, SILT, trace Clay, trace fine grained Sand, moderately plastic, cohesive, moist to wet. Changing at 71.7 feet to: Brown, fine to medium grained SAND, trace Silt, wet. Changing at 71.9 feet to: NO RECOVERY. Dark grayish-brown, Silty CLAY, plastic, cohesive, moist. Changing at 72.2 feet to: NO RECOVERY.	71.4' SILT 71.7' SAND 71.9' NO RECOVERY 72' Silty CLAY 72.2'		
72	37	24/2.4	72-74	55/3"	ND		NO RECOVERY		
73									
74	38	24/2.4	74-76	57/2"	ND	Dark grayish-brown, SILT & CLAY, some Sand, plastic, cohesive, moist. Changing at 74.2 feet to: NO RECOVERY.	74' SILT & CLAY 74.2' NO RECOVERY		
75									
76	39	24/22.8	76-78	10-22 26-24	ND	Grayish-brown to dark grayish-brown, CLAY & SILT, little Gravel, little Sand, plastic, cohesive, moist. Changing at 77.1 feet to: Varved grayish-brown to dark grayish-brown, SILT, some fine grained Sand, trace Clay, with fine grained SAND, slightly plastic, cohesive, moist. Changing at 77.4 feet o: Dark gray, Silty CLAY, plastic, cohesive, moist. Changing at 77.9 feet to: NO RECOVERY.	76' CLAY & SILT 77.1' SILT 77.4' Silty CLAY 77.9'		
77									
78	40	24/18	78-80	7-11 14-30	ND	Dark gray, Silty CLAY, plastic, cohesive, bedded, moist. Changing at 78.4 feet to: Brown, fine to medium grained SAND, little Silt, moist. Changing 78.8 feet to: Dark gray, Silty CLAY, plastic, cohesive, bedded, moist. Changing at 79.5 feet to: NO RECOVERY.	78' NO RECOVERY Silty CLAY 78.4' SAND 78.8' Silty CLAY 79.5' NO RECOVERY 80'		Bentonite Grout
79									

REMARKS

Stratification lines represent approximate boundary between soil types, transitions may be gradual. Water level readings have been made at times and under conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the time measurements were made.

Boring No.: MW-WV-11D

BORING_WELL 6267781 WWW.WOLVEN AVENUE.GPJ GZA_CORP.GDT 6/18/25

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Wolven Avenue Area
Algoma Twp, Kent County, Michigan

Boring No.: MW-WV-11D
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Depth	Sample Information: No.	Pen./ Rec. (in.)	Depth (Ft.)	Blows (/6")	Test Data	Sample Description & Classification	Stratum Desc.	Remarks	Equipment Installed
	41	24/21.6	80-82	12-25 33-40	ND	Dark gray, Silty CLAY, plastic, cohesive, bedded, moist. Changing at 80.4 feet to: Brown, fine to medium grained SAND, little Silt, wet. Changing at 80.5 feet to: Dark gray, Silty CLAY, plastic, cohesive, bedded, moist. Changing at 80.8 feet to: Brown, fine to medium grained SAND, little Silt, wet. Changing at 81.0 feet to: Dark gray, Silty CLAY, plastic, cohesive, bedded, moist. Changing at 81.4 feet to: Brown, fine to medium grained SAND, little Silt, wet. Changing at 81.6 feet to: Dark gray, Silty CLAY, plastic, cohesive, bedded, moist. Changing at 81.8 feet to: NO RECOVERY. Brown, fine to medium grained SAND, trace Silt, wet. Changing at 83.2 feet to: NO RECOVERY.	Silty CLAY 80.4' 80.5' SAND 80.8' Silty CLAY 81' SAND Silty CLAY 81.4' 81.6' SAND 81.8' Silty CLAY 82' NO RECOVERY SAND 83.2' NO RECOVERY		
81									
82	42	24/14.4	82-84	0-0 2-6	ND				
83									
84	43	24/19.2	84-86	8-16-50/4"	ND	Brown, fine to medium SAND, trace Silt, wet. Changing at 85.4 feet to: Brown, GRAVEL, some coarse Sand, trace Silt, wet. Changing at 85.8 feet to: NO RECOVERY.	84' SAND 85.4' GRAVEL 85.8' 86' NO RECOVERY		
85									
86	44	24/21.6	86-88	49-28 39-50	ND	Brown, fractured COBBLE. Changing at 86.5 feet to: Brown, fine to medium SAND, some Silt, slightly cohesive, moist to wet. Changing at 87.4 feet to: Brown, Silty CLAY, little Sand, trace Gravel, plastic, cohesive, moist. Changing at 87.6 feet to: NO RECOVERY.	Fractured COBBLE 86.5' SAND 87.4' 87.6' Silty CLAY NO RECOVERY		
87									
88	45	24/8.4	88-90	19-39-50/3"	ND	Dark grayish-brown, SILT & CLAY, some Sand, trace Gravel, plastic, cohesive, moist. Changing at 88.7 feet to: NO RECOVERY.	88' SILT & CLAY 88.7' NO RECOVERY		
89									
90	46	24/1.2	90-92	56/4"	ND	Dark grayish-brown, SILT & CLAY, some Sand, trace Gravel, plastic, cohesive, moist. Changing at 90.1 feet to: NO RECOVERY.	90' 90.1' SILT & CLAY NO RECOVERY		
91									

REMARKS

Stratification lines represent approximate boundary between soil types, transitions may be gradual. Water level readings have been made at times and under conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the time measurements were made.

Boring No.: MW-WV-11D

BORING_WELL 6267781 WWW.WOLVEN AVENUE.GPJ GZA_CORP.GDT 6/18/25

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Wolven Avenue Area
Algoma Twp, Kent County, Michigan

Boring No.: MW-WV-11D
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Check: M Myers

Depth	Sample Information: No.	Pen./ Rec. (in.)	Depth (Ft.)	Blows (/6")	Test Data	Sample Description & Classification	Stratum Desc.	Remarks	Equipment Installed
92	47	24/18	92-94	20-50-24	ND	Dark grayish-brown, SILT & CLAY, some Sand, trace Gravel, plastic, cohesive, moist. Changing at 92.7 feet to: Dark brown, GRAVEL, some fine to coarse grained Sand, wet. Changing at 92.9 feet to: Dark grayish-brown, SILT & CLAY, some Sand, trace Gravel, plastic, cohesive, moist. Changing at 93.5 feet to: NO RECOVERY.	NO RECOVERY 92' SILT & CLAY 92.7' 92.9' GRAVEL SILT & CLAY 93.5' NO RECOVERY		
93									
94	48	24/20.4	94-96	14-24 39-44	ND	Dark grayish-brown, SILT & CLAY, some Sand, trace Gravel, plastic, cohesive, moist. Changing at 95.7 feet to: NO RECOVERY.	94' SILT & CLAY 95.7'		
95									
96	49	24/24	96-98	9-27 31-33	ND	Dark grayish-brown to dark gray, SILT & CLAY, some Sand, trace Gravel, moderately plastic, cohesive, moist; very thin Sand, seam at 98.9 feet.	NO RECOVERY 96' SILT & CLAY		
97									
98	50	24/20.4	98-100	8-28-47	ND	Dark grayish-brown to dark gray, SILT & CLAY, some Sand, trace Gravel, moderately plastic, cohesive, moist; very thin Sand, seam at 98.9 feet. Changing at 99.7 feet to: NO RECOVERY.			
99							99.7'		
100	51	24/24	100-102	8-22 29-36	ND	Dark grayish-brown to dark gray, SILT & CLAY, some Sand, trace Gravel, moderately plastic, cohesive, moist.	NO RECOVERY 100' SILT & CLAY		
101									
102	52	24/20.4	102-104	13-31 46-50/5"	ND	Dark grayish-brown to dark gray, SILT & CLAY, some Sand, trace Gravel, moderately plastic, cohesive, moist. Changing at 103.3 feet to: Brown, fine to medium grained SAND, trace Silt, wet. Changing at 103.7 feet to: NO RECOVERY.			
103							103.3'		

REMARKS

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Check: M Myers

Depth	Sample Information: No.	Pen./ Rec. (in.)	Depth (Ft.)	Blows (/6")	Test Data	Sample Description & Classification	Stratum Desc.	Remarks	Equipment Installed
							SAND		
							103.7'		
							NO RECOVERY		
104	53	24/6	104-106	50/5.5"	ND	Dark gray, GRAVEL, some fine to coarse grained SAND, trace Silt, wet. Changing at 104.5 feet to: NO RECOVERY.	104' GRAVEL		
							104.5' NO RECOVERY		
105									
							106'		
106	54	24/13.2	106-108	1-2 6-15	ND	Dark grayish-brown, GRAVEL, some fine to coarse grained Sand, trace Silt, wet. Changing at 107.1 feet to: NO RECOVERY.	GRAVEL		
107							107.1' NO RECOVERY		
							108'		
108	55	24/6	108-110	2-2 6-9	ND	Dark grayish-brown, GRAVEL, some fine to coarse grained Sand, trace Silt, wet. Changing at 108.5 feet to: NO RECOVERY.	GRAVEL		
							108.5' NO RECOVERY		
109									
							110'		
110	56	24/15.6	110-112	14-15	ND	Dark grayish-brown, GRAVEL, some fine to coarse grained Sand, trace Silt, wet. Changing at 111.3 feet to: NO RECOVERY.	GRAVEL		
111							111.3' NO RECOVERY		
							112'		
112	57	24	112-114			No sampling attempts.	NO SAMPLING ATTEMPTS		
113									
114	58	24	114-116			No sampling attempts.			

REMARKS

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Boring No.: MW-WV-11D

BORING_WELL 6267781 WWW WOLVEN AVENUE.GPJ GZA_CORP.GDT 6/18/25

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Algoma Twp, Kent County, Michigan

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Depth	Sample Information: No.	Pen./ Rec. (in.)	Depth (Ft.)	Blows (/6")	Test Data	Sample Description & Classification	Stratum Desc.	Remarks	Equipment Installed
							NO SAMPLING ATTEMPTS		
116	59	24	116-118			No sampling attempts.			
117									
118	60	24	118-120			No sampling attempts.			
119									
120	61	24	120-122			No sampling attempts.			
121									
122	62	24	122-124			No sampling attempts.			
123									
124	63	24	124-126			No sampling attempts.			
125									
126	64	24	126-128			No sampling attempts.			

REMARKS

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Boring No.: MW-WV-11D

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Depth	Sample Information: No.	Pen./ Rec. (in.)	Depth (Ft.)	Blows (/6")	Test Data	Sample Description & Classification	Stratum Desc.	Remarks	Equipment Installed
127							NO SAMPLING ATTEMPTS		
128	65	24	128-130			No sampling attempts.			
129									
130	66	24	130-132			No sampling attempts.			
131									
132	67	24	132-134			No sampling attempts.			
133									
134	68	24	134-136			No sampling attempts.			
135									
136	69	24	136-138			No sampling attempts.			
137									
138	70	24	138-140			No sampling attempts.			

REMARKS

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Boring No.: MW-WV-11D

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Depth	Sample Information: No.	Pen./ Rec. (in.)	Depth (Ft.)	Blows (/6")	Test Data	Sample Description & Classification	Stratum Desc.	Remarks	Equipment Installed
139							NO SAMPLING ATTEMPTS		
140	71	24	140-142			No sampling attempts.			
141									
142	72	24	142-144			No sampling attempts.			
143									
144	73	24	144-146			No sampling attempts.			
145									
146	74	24	146-148			No sampling attempts.			
147									
148	75	24	148-150			No sampling attempts.			
149									

REMARKS

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Boring No.: MW-WV-11D

BORING_WELL 6267781 WWW WOLVEN AVENUE.GPJ GZA_CORP.GDT 6/18/25

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Depth	Sample Information: No.	Pen./ Rec. (in.)	Depth (Ft.)	Blows (/6")	Test Data	Sample Description & Classification	Stratum Desc.	Remarks	Equipment Installed
	76	24	150-152			No sampling attempts.	NO SAMPLING ATTEMPTS		
151									
152	77	24	152-154			No sampling attempts.			
153									
154	78	24	154-156			No sampling attempts.			
155									
156	79	24	156-158			No sampling attempts.			
157									
158	80	24	158-160			No sampling attempts.			
159									Filter Sand
160	81	24	160-162			No sampling attempts.			
161									2-Inch PVC Well Screen

REMARKS

Stratification lines represent approximate boundary between soil types, transitions may be gradual. Water level readings have been made at times and under conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the time measurements were made.

Boring No.: MW-WV-11D

BORING_WELL 6267781 WWW WOLVEN AVENUE.GPJ GZA_CORP.GDT 6/18/25

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Algoma Twp, Kent County, Michigan

Boring No.: MW-WV-11D
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File No.: 16.0062677.81
Check: M Myers

Depth	Sample Information: No.	Pen./ Rec. (in.)	Depth (Ft.)	Blows (/6")	Test Data	Sample Description & Classification	Stratum Desc.	Remarks	Equipment Installed
162	82	24	162-164			No sampling attempts.	NO SAMPLING ATTEMPTS		
163									
164	83	24/9.6	164-166	25-50/3	ND	Dark grayish-brown, SILT, trace fine grained SAND, non-plastic, cohesive, moist.	164' SILT		
165									
166						Bottom of Borehole at 166.0 Feet	166'	3	
167									
168									
169									
170									
171									
172									
173									

REMARKS

3. Monitoring well was installed in borehole upon completion. Well screen set from 158.9 to 163.7 feet below ground surface.

Stratification lines represent approximate boundary between soil types, transitions may be gradual. Water level readings have been made at times and under conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the time measurements were made.

Boring No.: MW-WV-11D

BORING_WELL 6267781 WWW WOLVEN AVENUE.GPJ GZA_CORP.GDT 6/18/25

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Wolven Avenue Area
Algoma Twp, Kent County, Michigan

Boring No.: MW-WV-11S
Page: 1 **of** 1
File No.: 16.0062677.81
Check: M Myers

Contractor: Stearns Drilling Company
Foreman: Jerry H., Travis & Zach/Gary
Logged by: John Morehouse
Date Start/Finish: 1-3-19 / 1-3-19
Boring Location: 12791205.0302 N, 597095.5686 E
GS Elev.: 732.80' **Datum:** NAD83/ NAVD88

	Auger/ Casing	Sampler
Type:	Hollow Stem Auger	Split Spoon
O.D. / I.D.:	12.25" / 4.25"	2.0" / 1 3/8"
Hammer Wt.:	NA	140lbs
Hammer Fall:	NA	30.0"
TOC Elev.:	735.89	NA

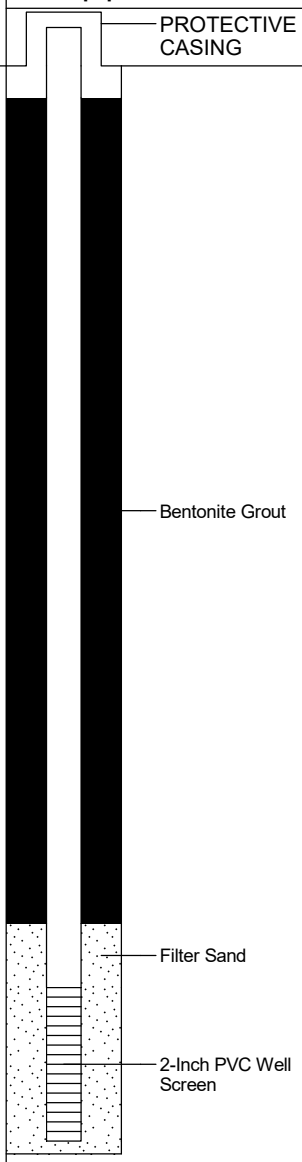
GROUNDWATER READINGS

Date	Time	Depth	Casing	Stab

Surveyed By: _____ **Survey Date:** _____

Depth	Sample Information: No.	Pen./ Rec. (in.)	Depth (Ft.)	Blows (/6")	Test Data	Sample Description & Classification	Stratum Desc.	Remarks
1–34						See boring log PMW-WV-11/MW-WV-11D for soil descriptions.		
34–35						Bottom of Borehole at 34.0 Feet		1

Equipment Installed



REMARKS

1. Monitoring well was installed in borehole upon completion. Well screen set from 28.8 to 33.6 feet below ground surface.

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Boring No.: MW-WV-11S

BORING_WELL 6267781 WWW.WOLVEN AVENUE.GPJ GZA_CORP.GDT 6/18/25

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Wolven Avenue Area
Algoma Twp, Kent County, Michigan

Boring No.: WV-MW-15A
Page: 1 **of** 1
File No.: 16.0062677.81
Check: M Myers

Contractor: Stearns Drilling Company
Foreman: Jerry Huntoon
Logged by: John Morehouse
Date Start/Finish: 8-28-19 / 8-30-19
Boring Location: 12787749.7087 N, 595519.838 E
GS Elev.: 721.50' **Datum:** NAD83/ NAVD88

	Auger/ Casing	Sampler
Type:	Hollow Stem Auger	Split Spoon
O.D. / I.D.:	12.25" / 4.25"	2.0" / 1 3/8"
Hammer Wt.:	NA	140lbs
Hammer Fall:	NA	30.0"
TOC Elev.:	721.25	

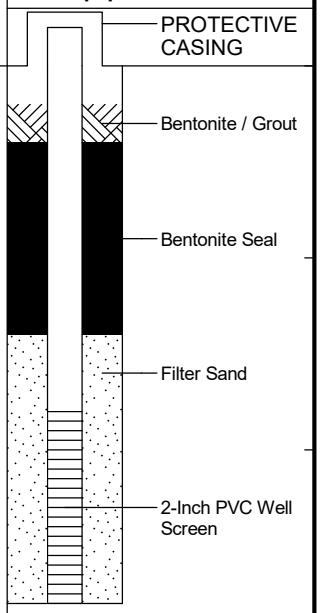
GROUNDWATER READINGS

Date	Time	Depth	Casing	Stab
NM	NM	NM	NM	NM

Surveyed By: _____ **Survey Date:** _____

Depth	Sample Information: No.	Pen./ Rec. (in.)	Depth (Ft.)	Blows (/6")	Test Data	Sample Description & Classification	Stratum Desc.	Remarks
1–13						See MW-WV-15D boring log for soil descriptions.		
14						Bottom of Borehole at 14.0 Feet		1
15–29								

Equipment Installed



REMARKS

1. Monitoring well was installed in borehole upon completion. Well screen set from 9.0 to 14.0 feet below ground surface.

Stratification lines represent approximate boundary between soil types, transitions may be gradual. Water level readings have been made at times and under conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the time measurements were made.

Boring No.: WV-MW-15A

BORING_WELL 6267781 WWW WOLVEN AVENUE.GPJ GZA_CORP.GDT 6/18/25

GZA
GeoEnvironmental, Inc.
Engineers and Scientists

Wolverine World Wide, Inc.
Wolven Avenue Area
Algoma Twp, Kent County, Michigan

Boring No.: WV-MW-15B
Page: 1 **of** 1
File No.: 16.0062677.81
Check: M Myers

Contractor: Stearns Drilling Company
Foreman: Jerry Huntoon
Logged by: John Morehouse
Date Start/Finish: 8-28-19 / 8-30-19
Boring Location: 12787750.2841 N, 595523.7455 E
GS Elev.: 721.40' **Datum:** NAD83/ NAVD88

	Auger/ Casing	Sampler
Type:	Hollow Stem Auger	Split Spoon
O.D. / I.D.:	12.25" / 4.25"	2.0" / 1 3/8"
Hammer Wt.:	NA	140lbs
Hammer Fall:	NA	30.0"
TOC Elev.:	721.07	

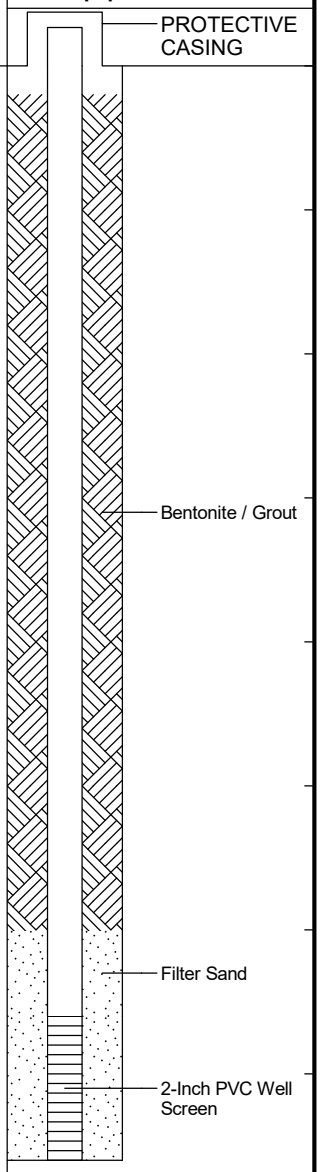
GROUNDWATER READINGS

Date	Time	Depth	Casing	Stab
NM	NM	NM	NM	NM

Surveyed By: _____ **Survey Date:** _____

Depth	Sample Information: No.	Pen./ Rec. (in.)	Depth (Ft.)	Blows (/6")	Test Data	Sample Description & Classification	Stratum Desc.	Remarks
1–37						See MW-WV-15D boring log for soil descriptions.		
38						Bottom of Borehole at 38.0 Feet		1
39								

Equipment Installed



REMARKS

1. Monitoring well was installed in borehole upon completion. Well screen set from 33.0 to 38.0 feet below ground surface.

Stratification lines represent approximate boundary between soil types, transitions may be gradual. Water level readings have been made at times and under conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the time measurements were made.

Boring No.: WV-MW-15B

BORING_WELL_6267781 WWW.WOLVEN AVENUE.GPJ GZA_CORP.GDT 6/18/25

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Wolverine World Wide, Inc.
Wolven Avenue Area
Algoma Twp, Kent County, Michigan

Boring No.: WV-MW-15C
Page: 1 **of** 2
File No.: 16.0062677.81
Check: M Myers

Contractor: Stearns Drilling Company
Foreman: Jerry Huntoon
Logged by: John Morehouse
Date Start/Finish: 8-21-19 / 8-21-19
Boring Location: 12787750.3829 N, 595533.1552 E
GS Elev.: 721.30' **Datum:** NAD83/ NAVD88

	Auger/ Casing	Sampler
Type:	Hollow Stem Auger	Split Spoon
O.D. / I.D.:	12.25" / 4.25"	2.0" / 1 3/8"
Hammer Wt.:	NA	140lbs
Hammer Fall:	NA	30.0"
TOC Elev.:	720.84	

GROUNDWATER READINGS

Date	Time	Depth	Casing	Stab
NM	NM	NM	NM	NM

Surveyed By: **Survey Date:**

Depth	Sample Information: No.	Pen./ Rec. (in.)	Depth (Ft.)	Blows (/6")	Test Data	Sample Description & Classification	Stratum Desc.	Remarks	Equipment Installed
1						See MW-WV-15D boring log for soil descriptions.			PROTECTIVE CASING
2–19									
19									Bentonite / Grout
20–29									

REMARKS

Stratification lines represent approximate boundary between soil types, transitions may be gradual. Water level readings have been made at times and under conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the time measurements were made.

Boring No.: WV-MW-15C

BORING_WELL 6267781 WWW.WOLVEN AVENUE.GPJ GZA_CORP.GDT 6/18/25

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Algoma Twp, Kent County, Michigan

Boring No.: WV-MW-15C
Page: 2 **of** 2
File No.: 16.0062677.81
Check: M Myers

Depth	Sample Information: No.	Pen./ Rec. (in.)	Depth (Ft.)	Blows (/6")	Test Data	Sample Description & Classification	Stratum Desc.	Remarks	Equipment Installed
31–49									Filter Sand; 2-Inch PVC Well Screen
50						Bottom of Borehole at 50.0 Feet		1	
51–64									

REMARKS

1. Monitoring well was installed in borehole upon completion. Well screen set from 37.8 to 42.6 feet below ground surface.

Stratification lines represent approximate boundary between soil types, transitions may be gradual. Water level readings have been made at times and under conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the time measurements were made.

Boring No.: WV-MW-15C

BORING_WELL 6267781 WWW WOLVEN AVENUE.GPJ GZA_CORP.GDT 6/18/25

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Wolverine World Wide, Inc.
Wolven Avenue Area
Algoma Twp, Kent County, Michigan

Boring No.: WV-MW-15D
Page: 1 of 8
File No.: 16.0062677.81
Check: M Myers

Contractor: Stearns Drilling Company
Foreman: Jerry Huntoon
Logged by: John Morehouse
Date Start/Finish: 8-9-19 / 8-19-19
Boring Location: 12787750.7954 N, 595528.0888 E
GS Elev.: 721.30' **Datum:** NAD83/ NAVD88

	Auger/ Casing	Sampler
Type:	Hollow Stem Auger	Split Spoon
O.D. / I.D.:	12.25" / 4.25"	2.0" / 1 3/8"
Hammer Wt.:	NA	140lbs
Hammer Fall:	NA	30.0"
TOC Elev.:	721.09	

GROUNDWATER READINGS

Date	Time	Depth	Casing	Stab
NM	NM	NM	NM	NM

Surveyed By: _____ **Survey Date:** _____

Depth	Sample Information: No.	Pen./ Rec. (in.)	Depth (Ft.)	Blows (/6")	Test Data	Sample Description & Classification	Stratum Desc.	Remarks	Equipment Installed
1	1	24/14	0-2	3-6 6-9		Very dark grayish-brown, SILT, some fine Sand, trace Gravel, moist. Changing at 0.6 feet to: Yellowish-brown, SILT, some Sand, trace Gravel, moist. Changing at 1.2 feet to: NO RECOVERY.	SILT 1.2' NO RECOVERY 2'		PROTECTIVE CASING
2	2	24/14	2-4	7-6 3-5		Yellowish-brown, SILT, some Sand, trace Gravel, moist. Changing at 2.4 feet to: Brownish-yellow, fine to medium SAND, trace Silt, moist. Changing at 2.8 feet to: Dark yellowish-brown, fine to medium SAND, trace Silt, moist. Changing at 3.2 feet to: NO RECOVERY.	SILT 2.4' SAND 3.2' NO RECOVERY 4'		
4	3	24/11	4-6	4-9 8-13		Brown, fine to coarse SAND, trace Gravel, trace Silt, wet. Changing at 4.9 feet to: NO RECOVERY.	SAND 4.9' NO RECOVERY 6'		
6	4	24/11	6-8	3-6 7-6		Brown, fine to coarse SAND, trace Gravel, trace Silt, grading to medium to coarse SAND, trace Gravel, trace Silt, wet. Changing at 6.9 feet to: NO RECOVERY.	SAND 6.9' NO RECOVERY 8'		
8	5	24/4	8-10	2-10 9-4		Brown, medium to coarse SAND, trace Gravel, trace Silt, wet. Changing at 8.3 feet to: NO RECOVERY.	8.3' SAND NO RECOVERY 10'		
10	6	24/12	10-12	2-4 3-4		Brown, medium to coarse SAND, trace Gravel, trace Silt, wet. Changing at 11.0 feet to: NO RECOVERY.	SAND 11' NO RECOVERY 12'		
12	7	24/17	12-14	3-9 8-10		Brown, medium to coarse SAND, trace Gravel, trace Silt, wet. Changing at 12.7 feet to: Dark grayish-brown, SILT & CLAY, moderately plastic, cohesive, moist. Changing at 12.8 feet to: Dark grayish-brown, Silty CLAY, plastic,	SAND 12.7' 12.8' SILT & CLAY Silty CLAY 13.4' NO RECOVERY 14'		
14	8	24/13	14-16	9-12 11-10		cohesive, moist. Changing at 13.4 feet to: NO RECOVERY. Dark grayish-brown, Silty CLAY, plastic, cohesive, moist. Changing at 15.1 feet to: NO RECOVERY.	Silty CLAY 15.1' NO RECOVERY 16'		

REMARKS

Stratification lines represent approximate boundary between soil types, transitions may be gradual. Water level readings have been made at times and under conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the time measurements were made.

Boring No.: WV-MW-15D

BORING_WELL 6267781 WWW.WOLVEN AVENUE.GPJ GZA_CORP.GDT 6/18/25

Depth	Sample Information: No.	Pen./ Rec. (in.)	Depth (Ft.)	Blows (/6")	Test Data	Sample Description & Classification	Stratum Desc.	Remarks	Equipment Installed
17	9	24/17	16-18	3-6 6-6		Dark grayish-brown, Silty CLAY, plastic, cohesive, moist, occasional very thin lenses of fine grained Sand, moist. Changing at 17.4 feet to: NO RECOVERY.	Silty CLAY 17.4' NO RECOVERY		
18	10	24/18	18-20	2-5 6-9		Dark grayish-brown, Silty CLAY, plastic, cohesive, occasional very thin lenses of fine Sand, moist. Changing at 18.6 feet to: Brown, fine SAND, trace Silt, wet. Changing at 18.9 feet to: Dark grayish-brown, Silty CLAY, plastic, cohesive, moist. Changing at 19.5 feet to: NO RECOVERY.	18' Silty CLAY 18.6' 18.9' SAND Silty CLAY 19.5' NO RECOVERY		
20	11	24/23	20-22	4-10 12-15		Dark grayish-brown, Silty CLAY, plastic, cohesive, bedded, occasional very thin lenses of fine Sand, moist. Changing at 21.9 feet to: NO RECOVERY.	20' Silty CLAY 21.9'		
22	12	24/19	22-24	4-9 10-13		Dark grayish-brown, Silty CLAY, plastic, cohesive, bedded, occasional very thin lenses of fine Sand, moist. Changing at 23.6 feet to: NO RECOVERY.	22' NO RECOVERY Silty CLAY 23.6'		
24	13	24/24	24-26	2-13 13-13		Dark grayish-brown, Silty CLAY, plastic, cohesive, bedded, occasional very thin lenses of fine Sand, moist. Changing at 24.5 feet to: Brown, fine SAND, trace Silt, wet. Changing at 24.9 feet to: Dark grayish-brown, Silty CLAY, plastic, cohesive, bedded, moist. Changing at 25.3 feet to: Brown, fine SAND, trace Silt, wet. Changing at 25.6 feet to: Dark grayish-brown, Silty CLAY, plastic, cohesive, bedded, moist.	24' NO RECOVERY Silty CLAY 24.5' SAND 24.9' Silty CLAY 25.3' 25.6' SAND Silty CLAY		
26	14	24/24	26-28	1-8 11-11			26.2' SILT 27.4'		
28	15	24/20	28-30	WOH		Dark grayish-brown, Silty CLAY, plastic, cohesive, bedded, moist. Changing at 26.2 feet to: Brown, SILT, little Sand, cohesive, non-plastic, moist. Changing at 27.4 feet to: Dark grayish-brown, Silty CLAY, plastic, cohesive, bedded, moist.	Silty CLAY 28' SAND / SILT / Silty CLAY	1	
30	16	24/24	30-32	1-2 3-3		Brown, fine SAND, Silt and Silty Clay, moist to wet. Changing at 29.7 feet to: NO RECOVERY.	29.7' 30' NO RECOVERY SAND		
32	17	24/18	32-34	2-6 5-5		Grayish-brown to brown, fine SAND, some Silt, wet. Changing at 30.8 feet to: Grayish-brown to brown, SAND, Silt and Silty Clay, moist to wet. Changing at 30.9 feet to: Grayish-brown to brown, fine SAND, some Silt, wet.	30.8' 30.9' SAND / SILT / Silty CLAY SAND 32.4'		
34	18	24/14	34-36	1-2 4-4		Brown to grayish-brown, fine SAND, little Silt, wet. Changing at 32.4 feet to: Dark grayish-brown, Silty CLAY, plastic, cohesive, moist. Changing at 32.8 feet to: Brown to grayish-brown, fine SAND, little Silt, wet.	Silty CLAY 32.8' SAND 34.2'		
						Brown to grayish-brown, fine SAND, little	34.3' Silty CLAY SAND		

REMARKS

1. Groundwater was encountered at approximately 28.0 feet below ground surface.

Stratification lines represent approximate boundary between soil types, transitions may be gradual. Water level readings have been made at times and under conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the time measurements were made.

BORING_WELL 6267781 WWW.WOLVEN AVENUE.GPJ GZA_CORP.GDT 6/18/25

GZA GeoEnvironmental, Inc.
Engineers and Scientists

Wolverine World Wide, Inc.
Wolven Avenue Area
Algoma Twp, Kent County, Michigan

Boring No.: WV-MW-15D
Page: 3 of 8
File No.: 16.0062677.81
Check: M Myers

Depth	Sample Information: No.	Pen./ Rec. (in.)	Depth (Ft.)	Blows (/6")	Test Data	Sample Description & Classification	Stratum Desc.	Remarks	Equipment Installed
35						Silt, wet. Changing at 34.2 feet to: Dark grayish-brown, Silty CLAY, plastic, cohesive, moist. Changing at 34.3 feet to: Brown to grayish-brown, fine SAND, little Silt, wet.	SAND		
36	19	24/22	36-38	4-10 13-11		Brown to grayish-brown, fine SAND, little Silt, wet. Changing at 36.1 feet to: Dark grayish-brown, fine SAND, litle Silt, wet. Changing at 36.3 feet to: Brown to grayish-brown, fine SAND, little Silt, wet.	36.1' 36.3' Silty CLAY SAND 36.8'		
37							37' SILT SAND 37.5'		
38	20	24/8	38-40	2-5 10-12		Changing at 36.8 feet to: Brown, SILT, cohesive, non-plastic, moist. Changing at 37.0 feet to: Brown to grayish-brown, fine SAND, little Silt, wet. Changing at 37.5 feet to: Brown, SILT, cohesive, non-plastic, moist. Changing at 37.6 feet to: Brown to grayish-brown, fine SAND, little Silt, wet.	37.6' SILT SAND 38.7'		
39							NO RECOVERY		
40	21	24/22	40-42	1-2 6-9		Brown, fine to coarse SAND, trace Gravel, trace Silt, wet. Changing at 38.7 feet to: NO RECOVERY.	40' SAND		
41						Brown, fine to coarse SAND, trace Gravel, trace Silt, wet. Changing at 41.8 feet to: NO RECOVERY.	41.8'		
42	22	24/19	42-44	1-5 7-9		Brown, fine to coarse SAND, trace Gravel, trace Silt, wet. Changing at 40.5 feet to: Dark grayish-brown, Silty CLAY, plastic, cohesive, moist. Changing at 40.6 feet to: Brown, GRAVEL, little Sand, trace Silt, wet.	42' NO RECOVERY SAND 42.5'		
43							42.6' Silty CLAY 42.9' GRAVEL 43' Silty CLAY SAND 43.6'		
44	23	24/22	44-46	4-6 9-12		Changing at 40.9 feet to: Dark grayish-brown, Silty CLAY, plastic, cohesive, moist. Changing at 41.0 feet to: Brown, fine to coarse SAND, trace Gravel, trace Silt, wet. Changing at 41.6 feet to: NO RECOVERY.	44' NO RECOVERY SAND 44.6'		
45							44.7' Silty CLAY SAND 45.4'		
46	24	24/24	46-48	6-14 24-31		Brown, fine to medium SAND, trace Silt, wet. Changing at 44.6 feet to: Dark grayish-brown, Silty CLAY, plastic, cohesive, moist. Changing at 44.7 feet to: Brown, fine to coarse SAND, little Gravel, trace Silt, wet. Changing at 45.4 feet to: Brown, SILT, trace fine Sand, wet.	SILT 45.8' 46' NO RECOVERY GRAVEL		
47							47.3'		
48	25	24/24	48-50	14-30 30-30		Changing at 45.5 feet to: Brown, SILt, moderately cohesive, moist to wet. Changing at 45.8 feet to: NO RECOVERY. Brown, GRAVEL, little Sand, trace Silt, wet. Changing at 47.3 feet to: Dark grayish-brown, Sandy CLAY, moderately cohesive, slightly plastic, moist. Changing at 47.5 feet to: Dark grayish-brown, Silty CLAY, plastic, cohesive, moist. Changing at 47.6 feet to: Dark brown, Silty CLAY, trace Gravel, plastic, cohesive, moist.	47.5' Sandy CLAY Silty CLAY		
49									
50		60				Dark brown, Silty CLAY, trace Gravel, plastic, cohesive, moist. NO SAMPLE COLLECTED.	50' NO SAMPLE COLLECTED		
51									
52									
53									

REMARKS

Stratification lines represent approximate boundary between soil types, transitions may be gradual. Water level readings have been made at times and under conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the time measurements were made.

Boring No.: WV-MW-15D

BORING_WELL 6267781 WWW.WOLVEN AVENUE.GPJ GZA_CORP.GDT 6/18/25

GZA GeoEnvironmental, Inc.
Engineers and Scientists

Wolverine World Wide, Inc.
Wolven Avenue Area
Algoma Twp, Kent County, Michigan

Boring No.: WV-MW-15D
Page: 4 **of** 8
File No.: 16.0062677.81
Check: M Myers

Depth	Sample Information: No.	Pen./ Rec. (in.)	Depth (Ft.)	Blows (/6")	Test Data	Sample Description & Classification	Stratum Desc.	Remarks	Equipment Installed
54							NO SAMPLE COLLECTED		
55	26	12/12	55-56	7-9		Dark grayish-brown, Silty CLAY, plastic, cohesive, bedded, moist.	55' Silty CLAY		
56	27	24/24	56-58	7-18 20-29		Dark grayish-brown, Silty CLAY, plastic, cohesive, bedded, moist. Changing at 57.6 feet to: Dark grayish-brown, Silty CLAY, trace Gravel, plastic, cohesive, some bedding, moist.			
57									
58	28	24/24	58-60	40-39 22-22		Dark grayish-brown, Silty CLAY, trace Gravel, plastic, cohesive, some bedding, moist.			
59									
60	29	24/24	60-62	19-21 30-44		Dark grayish-brown, Silty CLAY, trace Gravel, plastic, cohesive, moist.			
61									
62	30	24/24	62-64	3-11 17-23		Dark grayish-brown, Silty CLAY, trace Gravel, plastic, cohesive, moist.			
63									
64	31	24/24	64-66	12-29 32-50		Dark grayish-brown, Silty CLAY, trace Gravel, plastic, cohesive, moist.			
65									Bentonite / Grout
66	32	24/24	66-68	12-20 26-40		Dark grayish-brown, Silty CLAY, trace Gravel, plastic, cohesive, moist.			
67									
68	33	24/5	68-70	17-50		Dark grayish-brown, Silty CLAY, trace Gravel, plastic, cohesive, moist.	68.4' NO RECOVERY		
69									
70	34	24/24	70-72	9-19 31-42		Dark grayish-brown, Silty CLAY, trace Gravel, plastic, cohesive, moist.	70' Silty CLAY		
71									

REMARKS

Stratification lines represent approximate boundary between soil types, transitions may be gradual. Water level readings have been made at times and under conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the time measurements were made.

BORING_WELL 6267781 WWW.WOLVEN AVENUE.GPJ GZA_CORP.GDT 6/18/25

Depth	Sample Information: No.	Pen./ Rec. (in.)	Depth (Ft.)	Blows (/6")	Test Data	Sample Description & Classification	Stratum Desc.	Remarks	Equipment Installed
	35	10/8	72-72.8	30-50/4"		Dark grayish-brown, Silty CLAY, trace Gravel, plastic, cohesive, moist. Changing at 72.7 feet to: NO RECOVERY.	Silty CLAY 72.7' NO RECOVERY		
73									
74	36	17/12	74-75.4	15-39-50/5"		Dark grayish-brown, Silty CLAY, trace Gravel, plastic, cohesive, moist. Changing at 74.3 feet to: Dark grayish-brown to brown, fine to medium SAND, little to some Silt, slightly cohesive, non-plastic, moist to wet. Changing at 74.6 feet to: Dark grayish-brown, fine SAND, some Silt, little Clay, trace Gravel, non to slightly plastic, cohesive, moist. Changing at 75.0 feet to: NO RECOVERY.	74' 74.3' Silty CLAY SAND		
75							75' NO RECOVERY		
76	37	8/5	76-76.7	30-50/2"			76' SAND 76.4' NO RECOVERY		
77						Dark grayish-brown, fine SAND, some Silt, little Clay, trace Gravel, non to slightly plastic, cohesive, moist. Changing at 76.4 feet to: NO RECOVERY. Dark grayish-brown, fine SAND, some Silt, little Clay, trace Gravel, non to slightly plastic, cohesive, moist. Changing at 78.8 feet to: NO RECOVERY.			
78	38	10/10	78-78.8	20-50/4"			78' SAND 78.8' NO RECOVERY		
79									
80	39	10/8	80-80.8	34-50/4"		Dark grayish-brown, fine SAND, some Silt, little Clay, trace Gravel, non to slightly plastic, cohesive, moist. Changing at 80.7 feet to: NO RECOVERY.	80' SAND 80.7' NO RECOVERY		
81									
82	40	10/8	82-82.8	15-50/4"		Dark grayish-brown, fine SAND, some Silt, little Clay, trace Gravel, non to slightly plastic, cohesive, moist. Changing at 82.7 feet to: NO RECOVERY.	82' SAND 82.7' NO RECOVERY		
83									
84	41	11/12	84-84.9	32-50/5"		Dark grayish-brown, fine SAND, some Silt, little Clay, trace Gravel, non to slightly plastic, cohesive, moist. Changing at 85.0 feet to: NO RECOVERY.	84' SAND 85' NO RECOVERY		
85									
86	42	11/11	86-86.9	31-50/5"		Dark grayish-brown, fine SAND, some Silt, little Clay, trace Gravel, non to slightly plastic, cohesive, moist. Changing at 86.9 feet to: NO RECOVERY.	86' SAND 86.9' NO RECOVERY		
87									
88	43	12/12	88-89	33-50		Dark grayish-brown, fine SAND, some Silt, little Clay, trace Gravel, non to slightly plastic, cohesive, moist. Changing at 88.5 feet to: Dark grayish-brown to dark yellowish-brown, fine to medium SAND, little to some Silt, moist to wet. Changing at 89.0 feet to: NO RECOVERY.	88' SAND 89' NO RECOVERY		
89									
90	44	11/12	90-90.9	38-50/4.5"		Dark grayish-brown, fine SAND, some Silt,	90' SAND		

REMARKS

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Depth	Sample Information: No.	Pen./ Rec. (in.)	Depth (Ft.)	Blows (/6")	Test Data	Sample Description & Classification	Stratum Desc.	Remarks	Equipment Installed
91						little Clay, trace Gravel, non to slightly plastic, cohesive, moist. Changing at 91.0 feet to: NO RECOVERY.	91' SAND NO RECOVERY		
92	45	12/12	92-93	27-50		Dark grayish-brown, fine SAND, some Silt, little Clay, trace Gravel, non to slightly plastic, cohesive, moist. Changing at 93.0 feet to: NO RECOVERY.	92' SAND 93' NO RECOVERY		
93									
94	46	12/12	94-95	27-50		Dark grayish-brown, fine SAND, some Silt, little Clay, trace Gravel, non to slightly plastic, cohesive, moist. Changing at 95.0 feet to: NO RECOVERY.	94' SAND 95' NO RECOVERY		
95									
96	47	17/18	96-97.4	29-47-50/5"		Dark grayish-brown, Silty CLAY, plastic, cohesive, moist. Changing at 97.5 feet to: NO RECOVERY.	96' Silty CLAY 97.5' NO RECOVERY		
97									
98	48	18/18	98-99.5	23-43-50		Brown, fine to medium SAND, little Silt, trace Gravel, moist to wet. Changing at 98.4 feet to: Dark grayish-brown, Silty CLAY, plastic, cohesive, moist.	98' SAND 98.4' Silty CLAY		
99									
100	49	8/7	100-100.7	48-50/2"		Dark grayish-brown, fine to medium SAND, little Silt, trace Gravel, slightly cohesive, moist to wet. Changing at 100.4 feet to: Dark grayish-brown, fine SAND, some Silt, little Clay, trace Gravel, non to slightly plastic, cohesive, moist. Changing at 100.9 feet to: NO RECOVERY.	100' SAND 100.9' NO RECOVERY		
101									
102	50	10/7	102-102.8	37-50/3.5"		Grayish-brown to brown, fine to medium SAND, little Silt, trace Gravel, slightly cohesive, moist to wet. Changing at 102.6 feet to: NO RECOVERY.	102' SAND 102.6' NO RECOVERY		
103									
104	51	10/8	104-104.8	37-50/4"		Dark grayish-brown, fine SAND, some Silt, little Clay, trace Gravel, non to slightly plastic, cohesive, moist. Changing at 104.7 feet to: NO RECOVERY.	104' SAND 104.7' NO RECOVERY		
105									
106	52	9/8	106-106.8	41-50/3"		Dark grayish-brown, fine SAND, some Silt, little Clay, trace Gravel, non to slightly plastic, cohesive, moist. Changing at 106.9 feet to: NO RECOVERY.	106' SAND 106.9' NO RECOVERY		
107									
108	53	11/8	108-108.9	44-50/4.5"		Dark grayish-brown, fine SAND, some Silt, little Clay, trace Gravel, non to slightly plastic, cohesive, moist. Changing at 108.9 feet to: NO RECOVERY.	108' SAND 108.9' NO RECOVERY		
109									

REMARKS

Stratification lines represent approximate boundary between soil types, transitions may be gradual. Water level readings have been made at times and under conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the time measurements were made.

GZA GeoEnvironmental, Inc.
Engineers and Scientists

Wolverine World Wide, Inc.
Wolven Avenue Area
Algoma Twp, Kent County, Michigan

Boring No.: WV-MW-15D
Page: 7 **of** 8
File No.: 16.0062677.81
Check: M Myers

Depth	Sample Information					Sample Description & Classification	Stratum Desc.	Remarks	Equipment Installed
	No.	Pen./ Rec. (in.)	Depth (Ft.)	Blows (/6")	Test Data				
110	54	11/14	110-110.9	38-50/5"		Dark grayish-brown, fine SAND, some Silt, little Clay, trace Gravel, non to slightly plastic, cohesive, moist. Changing at 111.3 to 112.0 feet to: NO RECOVERY.	NO RECOVERY 110' SAND 111.3' NO RECOVERY		
111									
112	55	11/12	112-112.9	31-50/5"		Dark grayish-brown, fine SAND, some Silt, little Clay, trace Gravel, non to slightly plastic, cohesive, moist. Changing at 113.0 feet to: NO RECOVERY.	112' SAND 113' NO RECOVERY		
113									
114	56	17/17	114-115.4	11-36-50/5"		Dark grayish-brown, fine SAND, some Silt, little Clay, trace Gravel, non to slightly plastic, cohesive, moist. Changing at 115.4 feet to: NO RECOVERY.	114' SAND 115.4' NO RECOVERY		
115									
116	57	12/8	116-117	48-50/5.5"		Dark grayish-brown, fine SAND, some Silt, little Clay, trace Gravel, non to slightly plastic, cohesive, moist. Changing at 116.9 feet to: NO RECOVERY.	116' SAND 116.9' NO RECOVERY		
117									
118	58	18/18	118-119.5	26-49-50		Dark grayish-brown, fine SAND, some Silt, little Clay, trace Gravel, non to slightly plastic, cohesive, moist. Changing at 119.5 feet to: NO RECOVERY.	118' SAND 119.5' NO RECOVERY		
119									
120	59	21/22	120-121.8	23-37 40-50/3"		Dark grayish-brown, fine SAND, some Silt, little Clay, trace Gravel, non to slightly plastic, cohesive, moist.	120' SAND		
121									
122	60	5/0	122-122.4	50/5"		NO RECOVERY.	122' NO RECOVERY		
123									
124	61	11/10	124-124.9	33-50/5"		Dark grayish-brown, fine SAND, some Silt, little Clay, trace Gravel, non to slightly plastic, cohesive, moist. Changing at 124.8 feet to: NO RECOVERY.	124' SAND 124.8' NO RECOVERY		
125									
126	62	10/9	126-126.8	48-50/4"		Dark grayish-brown, fine SAND, some Silt, little Clay, trace Gravel, non to slightly plastic, cohesive, moist. Changing at 126.9 feet to: NO RECOVERY.	126' SAND 126.9' NO RECOVERY		
127									
							128'		

REMARKS

Stratification lines represent approximate boundary between soil types, transitions may be gradual. Water level readings have been made at times and under conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the time measurements were made.

Boring No.: WV-MW-15D

BORING_WELL 6267781 WWW.WOLVEN AVENUE.GPJ GZA_CORP.GDT 6/18/25

GZA
GeoEnvironmental, Inc.
Engineers and Scientists

Wolverine World Wide, Inc.
Wolven Avenue Area
Algoma Twp, Kent County, Michigan

Boring No.: WV-MW-15D
Page: 8 **of** 8
File No.: 16.0062677.81
Check: M Myers

Depth	Sample Information: No.	Pen./ Rec. (in.)	Depth (Ft.)	Blows (/6")	Test Data	Sample Description & Classification	Stratum Desc.	Remarks	Equipment Installed
129	63	10/9	128-128.8	40-50/4"		Dark grayish-brown, fine SAND, some Silt, little Clay, trace Gravel, non to slightly plastic, cohesive, moist. Changing at 128.9 feet to: NO RECOVERY.	SAND 128.9' NO RECOVERY		
130	64	11/11	130-130.9	33-50/5"		Dark grayish-brown, fine SAND, some Silt, little Clay, trace Gravel, non to slightly plastic, cohesive, moist. Changing at 131.2 feet to: NO RECOVERY.	130' SAND 131.2' NO RECOVERY		
132	65	9/9	132-132.8	46-50/3"		Brown, fine to medium SAND, little Silt, moist to wet. Changing at 132.6 feet to: Dusky red to dark yellowish-brown to gray, fine to medium SAND, little Silt moist to wet (weathered Sandstone). Changing at 135.4 feet to: NO RECOVERY.	132' SAND 133.4' NO RECOVERY		Filter Sand
134	66	2/2	134-134.2	50/2"		Brown, fine to coarse SAND, little Gravel, trace Silt, wet (weathered Sandstone). Changing at 134.2 feet to: NO RECOVERY.	134' 134.2' SAND NO RECOVERY		
136	67	3/4	136-136.3	50/3"		Dark gray, weathered SHALE, moist.	136' SHALE		2-Inch PVC Well Screen
138						Bottom of Borehole at 138.0 Feet	138'	2	
139									
140									
141									
142									
143									
144									
145									
146									

REMARKS

2. Monitoring well was installed in borehole upon completion. Well screen set from 134.9 to 137.6 feet below ground surface.

Stratification lines represent approximate boundary between soil types, transitions may be gradual. Water level readings have been made at times and under conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the time measurements were made.

Boring No.: WV-MW-15D

BORING_WELL 6267781 WWW WOLVEN AVENUE.GPJ GZA_CORP.GDT 6/18/25

APPENDIX D

GROUNDWATER SAMPLING WORKSHEETS

Well Sampling Worksheet
WWW RAP Field Data
AREA 5 2022-Q2 - HS-PMW-RI-104D
Kent County, MI

Well	HS-PMW-RI-104D / 2 in Diameter PVC
Sample Quarter	2022-Q2
Date	05/23/2022
Weather	Sunny, mid 50s
Sampler Initials	DMW
Purging Device	Bladder-Pump: NA, Peristaltic-Pump: PER-03, Centrifugal-Pump: NA
Meters Used	YSI: J04002649, Turbidimeter: NR, Water-Level-Meter: NR
Reference Measuring Point	PVC
Well Screen (ft bmp)	111.4 - 116.4
Measured Bottom Depth (ft bmp)	116.33
Sample Comment	
Initial Water Level Date/Time	05/23/2022 12:05
Initial Water Level Depth (ft bmp)	7.20
Pump/Tubing Intake Depth (ft bmp)	114.5
Tubing Length (ft)	117.5
Tubing Inner Diameter (in)	0.17
Purging Initiation Date/Time	05/23/2022 12:10
Total Purge Volume (gal)	6
Modified Sample	No
If Modified, Reasoning	
Sample Collection Information	Bottling-Start: 05/23/2022 13:00:00, Bottling-Stop: 05/23/2022 13:01:00, Parameters-Sampled: PFAS

Reading Time	Depth To Water (ft)	Cumulative Drawdown (ft)	Purge Rate (ml/min)	Temperature (deg c)	Specific Conductivity (us/cm)	Dissolved Oxygen (mg/l)	pH (su)	Oxidation-Reduction Potential (mV)	Turbidity (ntu)
12:30	7.28	0.08	400	10.5 +	1,305 +	0.6	7.4	3	<5
12:40	7.28	0.08	400	10.5 +	1,299 +	<0.5	7.4	-50	<5
12:45	7.28	0.08	400	10.6 +	1,299 +	<0.5	7.4	-59	<5
12:50	7.28	0.08	400	10.6 +	1,299 +	<0.5	7.4	-65	<5
12:55	7.29	0.09	400	10.5 +	1,296 +	<0.5	7.4	-68	<5

Notes:

1) Abbreviations include: "deg c" indicates degrees Celsius; "ft" indicates feet; "ft bmp" indicates feet below reference measuring point; "gal" indicates gallons; "in" indicates inches; "mg/l" indicates milligrams per liter; "ml/min" indicates milliliters per minute; "mV" indicates millivolts; "NA" indicates not applicable; "NR" indicates not recorded; "ntu" indicates Nephelometric Turbidity units; "su" indicates standard units; "us/cm" indicates microsiemens per centimeter; and "+" indicates the parameter(s) may be used for stabilization calculations but cannot be used for other purposes.
2) Weather temperature units are in degrees Fahrenheit, unless otherwise noted.
3) Did indicator parameters reach stabilization? Yes
4) Was the two hour time limit reached? No
5) Calculations:
   - Head Above Pump Intake (ft) 107.30
   - Total Drawdown (ft) 0.09
   - Calculated Final Purge Volume (gal) NA
6) If Drawdown Did Not Stabilize or Stabilized Drawdown >0.3 ft, is Total Purge Volume > Calculated Final Purge Volume? NA

Well Sampling Worksheet
WWW RAP Field Data
AREA 5 2022-Q2 - HS-PMW-RI-107A
Kent County, MI

Well	HS-PMW-RI-107A / 2 in Diameter PVC
Sample Quarter	2022-Q2
Date	05/24/2022
Weather	Overcast, 50s
Sampler Initials	MKM
Purging Device	Bladder-Pump: BP-12, Peristaltic-Pump: NA, Centrifugal-Pump: NA
Meters Used	YSI: 19K100063, Turbidimeter: NR, Water-Level-Meter: NR
Reference Measuring Point	PVC
Well Screen (ft bmp)	79.2 - 84.2
Measured Bottom Depth (ft bmp)	84.35
Sample Comment	
Initial Water Level Date/Time	05/24/2022 09:30
Initial Water Level Depth (ft bmp)	48.3
Pump/Tubing Intake Depth (ft bmp)	81.8
Tubing Length (ft)	85
Tubing Inner Diameter (in)	0.25
Purging Initiation Date/Time	05/24/2022 09:35
Total Purge Volume (gal)	10
Modified Sample	No
If Modified, Reasoning	
Sample Collection Information	Bottling-Start: 05/24/2022 11:35:00, Bottling-Stop: 05/24/2022 11:36:00, Parameters-Sampled: PFAS

Reading Time	Depth To Water (ft)	Cumulative Drawdown (ft)	Purge Rate (ml/min)	Temperature (deg c)	Specific Conductivity (us/cm)	Dissolved Oxygen (mg/l)	pH (su)	Oxidation-Reduction Potential (mV)	Turbidity (ntu)
10:15	48.31	0.01	300	10 +	507 +	0.8	7.4	307	14
10:20	48.32	0.02	300	10 +	507 +	0.7	7.5	284	11
10:30	48.32	0.02	300	10 +	509 +	0.5	7.5	248	8
10:35	48.32	0.02	300	10 +	510 +	0.5	7.6	231	7
10:40	48.32	0.02	300	10 +	511 +	<0.5	7.6	221	6
10:45	48.32	0.02	300	10 +	512 +	<0.5	7.6	207	5
10:50	48.32	0.02	300	10 +	512 +	<0.5	7.6	197	<5
10:55	48.32	0.02	300	10 +	512 +	<0.5	7.6	183	<5
11:00	48.35	0.05	300	10 +	512 +	<0.5	7.6	174	<5
11:05	48.35	0.05	300	10 +	513 +	<0.5	7.6	163	<5
11:10	48.35	0.05	300	10 +	514 +	<0.5	7.6	153	<5

Well Sampling Worksheet
WWW RAP Field Data
AREA 5 2022-Q2 - HS-PMW-RI-107A
Kent County, MI

Well	HS-PMW-RI-107A / 2 in Diameter PVC
Sample Quarter	2022-Q2
Date	05/24/2022
Weather	Overcast, 50s
Sampler Initials	MKM
Purging Device	Bladder-Pump: BP-12, Peristaltic-Pump: NA, Centrifugal-Pump: NA
Meters Used	YSI: 19K100063, Turbidimeter: NR, Water-Level-Meter: NR
Reference Measuring Point	PVC
Well Screen (ft bmp)	79.2 - 84.2
Measured Bottom Depth (ft bmp)	84.35
Sample Comment	
Initial Water Level Date/Time	05/24/2022 09:30
Initial Water Level Depth (ft bmp)	48.3
Pump/Tubing Intake Depth (ft bmp)	81.8
Tubing Length (ft)	85
Tubing Inner Diameter (in)	0.25
Purging Initiation Date/Time	05/24/2022 09:35
Total Purge Volume (gal)	10
Modified Sample	No
If Modified, Reasoning	
Sample Collection Information	Bottling-Start: 05/24/2022 11:35:00, Bottling-Stop: 05/24/2022 11:36:00, Parameters-Sampled: PFAS

Reading Time	Depth To Water (ft)	Cumulative Drawdown (ft)	Purge Rate (ml/min)	Temperature (deg c)	Specific Conductivity (us/cm)	Dissolved Oxygen (mg/l)	pH (su)	Oxidation-Reduction Potential (mV)	Turbidity (ntu)
11:20	48.35	0.05	300	10 +	515 +	<0.5	7.6	142	<5
11:25	48.35	0.05	300	10 +	513 +	<0.5	7.6	136	<5
11:35	48.35	0.05	300	10 +	515 +	<0.5	7.6	126	<5

Notes:

1) Abbreviations include: "deg c" indicates degrees Celsius; "ft" indicates feet; "ft bmp" indicates feet below reference measuring point; "gal" indicates gallons; "in" indicates inches; "mg/l" indicates milligrams per liter; "ml/min" indicates milliliters per minute; "mV" indicates millivolts; "NA" indicates not applicable; "NR" indicates not recorded; "ntu" indicates Nephelometric Turbidity units; "su" indicates standard units; "us/cm" indicates microsiemens per centimeter; and "+" indicates the parameter(s) may be used for stabilization calculations but cannot be used for other purposes.
2) Weather temperature units are in degrees Fahrenheit, unless otherwise noted.
3) Did indicator parameters reach stabilization? Yes
4) Was the two hour time limit reached? Yes
5) Calculations:
   - Head Above Pump Intake (ft) 33.50
   - Total Drawdown (ft) 0.05
   - Calculated Final Purge Volume (gal) NA
6) If Drawdown Did Not Stabilize or Stabilized Drawdown >0.3 ft, is Total Purge Volume > Calculated Final Purge Volume? NA

Well Sampling Worksheet
WWW RAP Field Data
AREA 5 2022-Q2 - HS-PMW-RI-107B
Kent County, MI

Well	HS-PMW-RI-107B / 2 in Diameter PVC
Sample Quarter	2022-Q2
Date	05/24/2022
Weather	Partly Cloudy, mid 60s
Sampler Initials	DMW
Purging Device	Bladder-Pump: BP-11, Peristaltic-Pump: NA, Centrifugal-Pump: NA
Meters Used	YSI: 17G101583, Turbidimeter: 19040C075131, Water-Level-Meter: NR
Reference Measuring Point	PVC
Well Screen (ft bmp)	175.2 - 180.2
Measured Bottom Depth (ft bmp)	180.35
Sample Comment	
Initial Water Level Date/Time	05/24/2022 13:25
Initial Water Level Depth (ft bmp)	62.59
Pump/Tubing Intake Depth (ft bmp)	177.85
Tubing Length (ft)	181
Tubing Inner Diameter (in)	0.25
Purging Initiation Date/Time	05/24/2022 13:30
Total Purge Volume (gal)	7
Modified Sample	No
If Modified, Reasoning	
Sample Collection Information	Bottling-Start: 05/24/2022 15:35:00, Bottling-Stop: 05/24/2022 15:36:00, Parameters-Sampled: PFAS

Reading Time	Depth To Water (ft)	Cumulative Drawdown (ft)	Purge Rate (ml/min)	Temperature (deg c)	Specific Conductivity (us/cm)	Dissolved Oxygen (mg/l)	pH (su)	Oxidation-Reduction Potential (mV)	Turbidity (ntu)
14:45	63.03	0.44	350	10 +	1,006 +	<0.5	7.1	336	>999
15:15	63.03	0.44	350	10 +	1,018 +	<0.5	7.4	273	>999
15:25	63.03	0.44	350	10 +	1,012 +	<0.5	7.4	254	>999
15:32	63.03	0.44	350	10 +	1,012 +	<0.5	7.4	241	>999

Notes:

1) Abbreviations include: "deg c" indicates degrees Celsius; "ft" indicates feet; "ft bmp" indicates feet below reference measuring point; "gal" indicates gallons; "in" indicates inches; "mg/l" indicates milligrams per liter; "ml/min" indicates milliliters per minute; "mV" indicates millivolts; "NA" indicates not applicable; "NR" indicates not recorded; "ntu" indicates Nephelometric Turbidity units; "su" indicates standard units; "us/cm" indicates microsiemens per centimeter; and "+" indicates the parameter(s) may be used for stabilization calculations but cannot be used for other purposes.
2) Weather temperature units are in degrees Fahrenheit, unless otherwise noted.
3) Did indicator parameters reach stabilization? No * Turbidity Out of Range
4) Was the two hour time limit reached? Yes
5) Calculations:
   - Head Above Pump Intake (ft) 115.26
   - Total Drawdown (ft) 0.44
   - Calculated Final Purge Volume (gal) 0.54
6) If Drawdown Did Not Stabilize or Stabilized Drawdown >0.3 ft, is Total Purge Volume > Calculated Final Purge Volume? Yes

Well Sampling Worksheet
WWW RAP Field Data
AREA 5 2022-Q2 - HS-PMW-RI-107C
Kent County, MI

Well	HS-PMW-RI-107C / 2 in Diameter PVC
Sample Quarter	2022-Q2
Date	05/24/2022
Weather	Partly Cloudy, mid 60s
Sampler Initials	DMW
Purging Device	Bladder-Pump: BP-11, Peristaltic-Pump: NA, Centrifugal-Pump: NA
Meters Used	YSI: 17G101583, Turbidimeter: 19040C075131, Water-Level-Meter: NR
Reference Measuring Point	PVC
Well Screen (ft bmp)	184.7 - 189.7
Measured Bottom Depth (ft bmp)	189.87
Sample Comment	
Initial Water Level Date/Time	05/24/2022 09:25
Initial Water Level Depth (ft bmp)	62.39
Pump/Tubing Intake Depth (ft bmp)	187.37
Tubing Length (ft)	190
Tubing Inner Diameter (in)	0.25
Purging Initiation Date/Time	05/24/2022 09:30
Total Purge Volume (gal)	13
Modified Sample	No
If Modified, Reasoning	
Sample Collection Information	Bottling-Start: 05/24/2022 10:50:00, Bottling-Stop: 05/24/2022 10:51:00, Parameters-Sampled: PFAS

Reading Time	Depth To Water (ft)	Cumulative Drawdown (ft)	Purge Rate (ml/min)	Temperature (deg c)	Specific Conductivity (us/cm)	Dissolved Oxygen (mg/l)	pH (su)	Oxidation-Reduction Potential (mV)	Turbidity (ntu)
10:10	62.39	0.00	600	10.1 +	1,029 +	1.4	7.1	354	19
10:20	62.39	0.00	600	10.1 +	1,029 +	1.2	7.2	351	7
10:30	62.39	0.00	600	10.1 +	1,031 +	1.2	7.2	347	<5
10:35	62.39	0.00	600	10.2 +	1,031 +	1.1	7.2	347	<5
10:42	62.39	0.00	600	10.1 +	1,032 +	1.1	7.2	345	<5
10:47	62.39	0.00	600	10.1 +	1,033 +	1.0	7.2	344	<5

Notes:

1) Abbreviations include: "deg c" indicates degrees Celsius; "ft" indicates feet; "ft bmp" indicates feet below reference measuring point; "gal" indicates gallons; "in" indicates inches; "mg/l" indicates milligrams per liter; "ml/min" indicates milliliters per minute; "mV" indicates millivolts; "NA" indicates not applicable; "NR" indicates not recorded; "ntu" indicates Nephelometric Turbidity units; "su" indicates standard units; "us/cm" indicates microsiemens per centimeter; and "+" indicates the parameter(s) may be used for stabilization calculations but cannot be used for other purposes.
2) Weather temperature units are in degrees Fahrenheit, unless otherwise noted.
3) Did indicator parameters reach stabilization? Yes
4) Was the two hour time limit reached? No
5) Calculations:
   - Head Above Pump Intake (ft) 124.98
   - Total Drawdown (ft) 0.00
   - Calculated Final Purge Volume (gal) NA
6) If Drawdown Did Not Stabilize or Stabilized Drawdown >0.3 ft, is Total Purge Volume > Calculated Final Purge Volume? NA

Well Sampling Worksheet
WWW RAP Field Data
AREA 5 2022-Q2 - HS-PMW-RI-107D
Kent County, MI

Well	HS-PMW-RI-107D / 2 in Diameter PVC
Sample Quarter	2022-Q2
Date	05/24/2022
Weather	Mostly sunny
Sampler Initials	MKM
Purging Device	Bladder-Pump: BP#10, Peristaltic-Pump: NA, Centrifugal-Pump: NA
Meters Used	YSI: 19K10006B, Turbidimeter: GZA-TM-01, Water-Level-Meter:
Reference Measuring Point	PVC
Well Screen (ft bmp)	198.7 - 203.7
Measured Bottom Depth (ft bmp)	204.33
Sample Comment	At 13:50 YSI had not been connected yet for initial measurements.
Initial Water Level Date/Time	05/24/2022 13:30
Initial Water Level Depth (ft bmp)	62.76
Pump/Tubing Intake Depth (ft bmp)	199.2
Tubing Length (ft)	205
Tubing Inner Diameter (in)	0.25
Purging Initiation Date/Time	05/24/2022 13:30
Total Purge Volume (gal)	15
Modified Sample	No
If Modified, Reasoning	
Sample Collection Information	Bottling-Start: 05/24/2022 15:20:00, Bottling-Stop: 05/24/2022 15:30:00, Parameters-Sampled: PFAS

Reading Time	Depth To Water (ft)	Cumulative Drawdown (ft)	Purge Rate (ml/min)	Temperature (deg c)	Specific Conductivity (us/cm)	Dissolved Oxygen (mg/l)	pH (su)	Oxidation-Reduction Potential (mV)	Turbidity (ntu)
13:50	62.85	0.09	550	NR	NR	NR	NR	NR	NR
14:10	62.85	0.09	550	10.2 +	1,239 +	0.9	7.1	24	104
14:25	62.85	0.09	550	10.3 +	1,231 +	0.6	7.2	12	NR
14:35	62.85	0.09	550	10.1 +	1,230 +	<0.5	7.1	10	205
14:45	62.85	0.09	550	10.2 +	1,223 +	<0.5	7.1	6	78
14:55	62.85	0.09	550	10.1 +	1,223 +	<0.5	7.1	3	67
15:10	62.85	0.09	550	10.2 +	1,220 +	<0.5	7.1	1	48
15:15	62.85	0.09	550	10.2 +	1,221 +	<0.5	7.1	0	46
15:20	62.85	0.09	550	10.1 +	1,222 +	<0.5	7.1	0	43

Notes:

1) Abbreviations include: "deg c" indicates degrees Celsius; "ft" indicates feet; "ft bmp" indicates feet below reference measuring point; "gal" indicates gallons; "in" indicates inches; "mg/l" indicates milligrams per liter; "ml/min" indicates milliliters per minute; "mV" indicates millivolts; "NA" indicates not applicable; "NR" indicates not recorded; "ntu" indicates Nephelometric Turbidity units; "su" indicates standard units; "us/cm" indicates microsiemens per centimeter; and "+" indicates the parameter(s) may be used for stabilization calculations but cannot be used for other purposes.
2) Weather temperature units are in degrees Fahrenheit, unless otherwise noted.
3) Did indicator parameters reach stabilization? Yes
4) Was the two hour time limit reached? No
5) Calculations:
   - Head Above Pump Intake (ft) 136.44
   - Total Drawdown (ft) 0.09
   - Calculated Final Purge Volume (gal) NA
6) If Drawdown Did Not Stabilize or Stabilized Drawdown >0.3 ft, is Total Purge Volume > Calculated Final Purge Volume? NA

Well Sampling Worksheet
WWW RAP Field Data
AREA 5 2022-Q4 - AREA5-RI-8A
Kent County, MI

Well	AREA5-RI-8A / 2 in Diameter PVC
Sample Quarter	2022-Q4
Date	12/01/2022
Weather	Sunny, Mid 20°F
Sampler Initials	NCK
Purging Device	Bladder-Pump: NA, Peristaltic-Pump: BP-10, Centrifugal-Pump: NA
Meters Used	YSI: Pro Plus: 17G101583, Turbidimeter: Agile Rental 1, Water-Level-Meter: WLM-2
Reference Measuring Point	PVC
Well Screen (ft bmp)	85.1 - 90.1
Measured Bottom Depth (ft bmp)	89
Sample Comment	Last 3 readings are not 5 minutes apart per Standard Operating Procedure (SOP). GZA does not believe this impacts data quality.
Initial Water Level Date/Time	12/01/2022 11:00
Initial Water Level Depth (ft bmp)	81.22
Pump/Tubing Intake Depth (ft bmp)	87.6
Tubing Length (ft)	90
Tubing Inner Diameter (in)	0.25
Purging Initiation Date/Time	12/01/2022 11:05
Total Purge Volume (gal)	5.2
Modified Sample	No
If Modified, Reasoning	
Sample Collection Information	Bottling-Start: 12/01/2022 12:10:00, Bottling-Stop: 12/01/2022 12:12:00, Parameters-Sampled: PFAS

Reading Time	Depth To Water (ft)	Cumulative Drawdown (ft)	Purge Rate (ml/min)	Temperature (deg c)	Specific Conductivity (us/cm)	Dissolved Oxygen (mg/l)	pH (su)	Oxidation-Reduction Potential (mV)	Turbidity (ntu)
11:45	82.32	1.10	350	10 +	441 +	9.4	7.2	271	<5
11:55	82.32	1.10	350	10 +	443 +	9.3	7.2	275	<5
12:10	82.32	1.10	350	10 +	444 +	9.4	7.3	281	<5

Notes:

1) Abbreviations include: "deg c" indicates degrees Celsius; "ft" indicates feet; "ft bmp" indicates feet below reference measuring point; "gal" indicates gallons; "in" indicates inches; "mg/l" indicates milligrams per liter; "ml/min" indicates milliliters per minute; "mV" indicates millivolts; "NA" indicates not applicable; "NR" indicates not recorded; "ntu" indicates Nephelometric Turbidity units; "su" indicates standard units; "us/cm" indicates microsiemens per centimeter; and "+" indicates the parameter(s) may be used for stabilization calculations but cannot be used for other purposes.
2) Weather temperature units are in degrees Fahrenheit, unless otherwise noted.
3) Did indicator parameters reach stabilization? Yes
4) Was the two hour time limit reached? No
5) Calculations:
   - Head Above Pump Intake (ft) 6.38
   - Total Drawdown (ft) 1.10
   - Calculated Final Purge Volume (gal) 0.41
6) If Drawdown Did Not Stabilize or Stabilized Drawdown >0.3 ft, is Total Purge Volume > Calculated Final Purge Volume? Yes

Well Sampling Worksheet
WWW RAP Field Data
AREA 5 2022-Q4 - AREA5-RI-8B
Kent County, MI

Well	AREA5-RI-8B / 2 in Diameter PVC
Sample Quarter	2022-Q4
Date	12/01/2022
Weather	Partly Cloudy, Cold
Sampler Initials	JET
Purging Device	Bladder-Pump: NA, Peristaltic-Pump: BP-11, Centrifugal-Pump: NA
Meters Used	YSI: Agile Rental 1, Turbidimeter: Agile Rental 1, Water-Level-Meter: GeoTech Rental
Reference Measuring Point	PVC
Well Screen (ft bmp)	156.5 - 161.5
Measured Bottom Depth (ft bmp)	NR
Sample Comment	Last 3 readings are not 5 minutes apart per Standard Operating Procedure (SOP). GZA does not believe this impacts data quality.
Initial Water Level Date/Time	12/01/2022 09:30
Initial Water Level Depth (ft bmp)	80.93
Pump/Tubing Intake Depth (ft bmp)	159
Tubing Length (ft)	162
Tubing Inner Diameter (in)	0.25
Purging Initiation Date/Time	12/01/2022 09:30
Total Purge Volume (gal)	11.1
Modified Sample	No
If Modified, Reasoning	
Sample Collection Information	Bottling-Start: 12/01/2022 11:30:00, Bottling-Stop: 12/01/2022 11:30:00, Parameters-Sampled: PFAS

Reading Time	Depth To Water (ft)	Cumulative Drawdown (ft)	Purge Rate (ml/min)	Temperature (deg c)	Specific Conductivity (us/cm)	Dissolved Oxygen (mg/l)	pH (su)	Oxidation-Reduction Potential (mV)	Turbidity (ntu)
10:00	80.85	-0.08	350	5 +	678 +	<0.5	7.1	-46	142
10:20	80.85	-0.08	350	10 +	752 +	<0.5	7.1	-52	36
10:30	80.85	-0.08	350	10 +	752 +	<0.5	7.1	-54	50
10:40	80.85	-0.08	350	10 +	752 +	<0.5	7.1	-55	39
10:50	80.85	-0.08	350	10 +	752 +	<0.5	7.1	-55	30
11:00	80.85	-0.08	350	10 +	752 +	<0.5	7.1	-56	29
11:20	80.85	-0.08	350	10 +	752 +	<0.5	7.1	-57	24
11:33	80.85	-0.08	350	10 +	752 +	<0.5	7.1	-56	20

Notes:

1) Abbreviations include: "deg c" indicates degrees Celsius; "ft" indicates feet; "ft bmp" indicates feet below reference measuring point; "gal" indicates gallons; "in" indicates inches; "mg/l" indicates milligrams per liter; "ml/min" indicates milliliters per minute; "mV" indicates millivolts; "NA" indicates not applicable; "NR" indicates not recorded; "ntu" indicates Nephelometric Turbidity units; "su" indicates standard units; "us/cm" indicates microsiemens per centimeter; and "+" indicates the parameter(s) may be used for stabilization calculations but cannot be used for other purposes.
2) Weather temperature units are in degrees Fahrenheit, unless otherwise noted.
3) Did indicator parameters reach stabilization? No
4) Was the two hour time limit reached? Yes
5) Calculations:
   - Head Above Pump Intake (ft) 78.07
   - Total Drawdown (ft) -0.08
   - Calculated Final Purge Volume (gal) NA
6) If Drawdown Did Not Stabilize or Stabilized Drawdown >0.3 ft, is Total Purge Volume > Calculated Final Purge Volume? NA

Well Sampling Worksheet
WWW RAP Field Data
AREA 5 2022-Q4 - AREA5-RI-8C
Kent County, MI

Well	AREA5-RI-8C / 2 in Diameter PVC
Sample Quarter	2022-Q4
Date	12/01/2022
Weather	Partly Cloudy, Cold
Sampler Initials	NCK
Purging Device	Bladder-Pump: NA, Peristaltic-Pump: BP-12, Centrifugal-Pump: NA
Meters Used	YSI: Pro Plus: 17G101583, Turbidimeter: Agile Rental 1, Water-Level-Meter: WLM-2
Reference Measuring Point	PVC
Well Screen (ft bmp)	174.4 - 179.4
Measured Bottom Depth (ft bmp)	177
Sample Comment	Last 3 readings are not 5 minutes apart per Standard Operating Procedure (SOP). GZA does not believe this impacts data quality.
Initial Water Level Date/Time	12/01/2022 09:30
Initial Water Level Depth (ft bmp)	84.98
Pump/Tubing Intake Depth (ft bmp)	176.9
Tubing Length (ft)	180
Tubing Inner Diameter (in)	0.25
Purging Initiation Date/Time	12/01/2022 09:35
Total Purge Volume (gal)	6.5
Modified Sample	No
If Modified, Reasoning	
Sample Collection Information	Bottling-Start: 12/01/2022 10:45:00, Bottling-Stop: 12/01/2022 10:50:00, Parameters-Sampled: PFAS

Reading Time	Depth To Water (ft)	Cumulative Drawdown (ft)	Purge Rate (ml/min)	Temperature (deg c)	Specific Conductivity (us/cm)	Dissolved Oxygen (mg/l)	pH (su)	Oxidation-Reduction Potential (mV)	Turbidity (ntu)
10:05	85.10	0.12	350	10 +	667 +	1.8	7.2	207	5
10:15	85.10	0.12	350	9 +	667 +	1.8	7.2	203	5
10:25	85.10	0.12	350	10 +	667 +	1.8	7.2	202	<5
10:36	85.10	0.12	350	10 +	666 +	1.8	7.2	198	<5
10:45	85.10	0.12	350	10 +	668 +	1.8	7.2	196	<5

Notes:

1) Abbreviations include: "deg c" indicates degrees Celsius; "ft" indicates feet; "ft bmp" indicates feet below reference measuring point; "gal" indicates gallons; "in" indicates inches; "mg/l" indicates milligrams per liter; "ml/min" indicates milliliters per minute; "mV" indicates millivolts; "NA" indicates not applicable; "NR" indicates not recorded; "ntu" indicates Nephelometric Turbidity units; "su" indicates standard units; "us/cm" indicates microsiemens per centimeter; and "+" indicates the parameter(s) may be used for stabilization calculations but cannot be used for other purposes.
2) Weather temperature units are in degrees Fahrenheit, unless otherwise noted.
3) Did indicator parameters reach stabilization? Yes
4) Was the two hour time limit reached? No
5) Calculations:
   - Head Above Pump Intake (ft) 91.92
   - Total Drawdown (ft) 0.12
   - Calculated Final Purge Volume (gal) NA
6) If Drawdown Did Not Stabilize or Stabilized Drawdown >0.3 ft, is Total Purge Volume > Calculated Final Purge Volume? NA

Well Sampling Worksheet
WWW RAP Field Data
PERIMETER 2022-Q4 - HS-PMW-RI-102A
Kent County, MI

Well	HS-PMW-RI-102A / 2 in Diameter PVC
Sample Quarter	2022-Q4
Date	10/12/2022
Weather	Overcast, 50s, Rain
Sampler Initials	GRT
Purging Device	Bladder-Pump: BP-10, Peristaltic-Pump: NA, Centrifugal-Pump: NA
Meters Used	YSI: ProQuatro (22F1018885), Turbidimeter: Agile Rental (09080C037700), Water-Level-Meter: NR
Reference Measuring Point	PVC
Well Screen (ft bmp)	47.5 - 52.5
Measured Bottom Depth (ft bmp)	52.5
Sample Comment	Last 3 readings are not 5 minutes apart per the Standard Operating Procedure (SOP). GZA does not believe this impacts data quality.
Initial Water Level Date/Time	10/12/2022 14:25
Initial Water Level Depth (ft bmp)	43.68
Pump/Tubing Intake Depth (ft bmp)	50
Tubing Length (ft)	53
Tubing Inner Diameter (in)	0.25
Purging Initiation Date/Time	10/12/2022 14:25
Total Purge Volume (gal)	6
Modified Sample	No
If Modified, Reasoning	
Sample Collection Information	Bottling-Start: 10/12/2022 16:15:00, Bottling-Stop: 10/12/2022 16:19:00, Parameters-Sampled: PFAS

Reading Time	Depth To Water (ft)	Cumulative Drawdown (ft)	Purge Rate (ml/min)	Temperature (deg c)	Specific Conductivity (us/cm)	Dissolved Oxygen (mg/l)	pH (su)	Oxidation-Reduction Potential (mV)	Turbidity (ntu)
14:35	43.68	0.00	320	11 +	522 +	9.8	7.5	264	154 +
14:45	43.68	0.00	320	11 +	526 +	9.9	7.5	273	126 +
14:55	43.68	0.00	320	11 +	529 +	10.0	7.5	286	51 +
15:05	43.69	0.01	320	11 +	531 +	10.0	7.5	292	27 +
15:15	43.69	0.01	320	12 +	532 +	9.9	7.5	299	16 +
15:25	43.69	0.01	320	12 +	531 +	8.7	7.5	302	14 +
15:35	43.69	0.01	320	12 +	534 +	9.6	7.5	306	10 +
15:45	43.69	0.01	320	12 +	532 +	8.7	7.5	308	8 +

Well Sampling Worksheet
WWW RAP Field Data
PERIMETER 2022-Q4 - HS-PMW-RI-102A
Kent County, MI

Well	HS-PMW-RI-102A / 2 in Diameter PVC
Sample Quarter	2022-Q4
Date	10/12/2022
Weather	Overcast, 50s, Rain
Sampler Initials	GRT
Purging Device	Bladder-Pump: BP-10, Peristaltic-Pump: NA, Centrifugal-Pump: NA
Meters Used	YSI: ProQuatro (22F1018885), Turbidimeter: Agile Rental (09080C037700), Water-Level-Meter: NR
Reference Measuring Point	PVC
Well Screen (ft bmp)	47.5 - 52.5
Measured Bottom Depth (ft bmp)	52.5
Sample Comment	Last 3 readings are not 5 minutes apart per the Standard Operating Procedure (SOP). GZA does not believe this impacts data quality.
Initial Water Level Date/Time	10/12/2022 14:25
Initial Water Level Depth (ft bmp)	43.68
Pump/Tubing Intake Depth (ft bmp)	50
Tubing Length (ft)	53
Tubing Inner Diameter (in)	0.25
Purging Initiation Date/Time	10/12/2022 14:25
Total Purge Volume (gal)	6
Modified Sample	No
If Modified, Reasoning	
Sample Collection Information	Bottling-Start: 10/12/2022 16:15:00, Bottling-Stop: 10/12/2022 16:19:00, Parameters-Sampled: PFAS

Reading Time	Depth To Water (ft)	Cumulative Drawdown (ft)	Purge Rate (ml/min)	Temperature (deg c)	Specific Conductivity (us/cm)	Dissolved Oxygen (mg/l)	pH (su)	Oxidation-Reduction Potential (mV)	Turbidity (ntu)
15:55	43.69	0.01	320	11 +	532 +	9.5	7.5	311	7 +
16:05	43.69	0.01	320	11 +	532 +	9.6	7.5	313	7 +
16:15	43.69	0.01	320	12 +	533 +	9.6	7.5	314	7 +

Notes:

1) Abbreviations include: "deg c" indicates degrees Celsius; "ft" indicates feet; "ft bmp" indicates feet below reference measuring point; "gal" indicates gallons; "in" indicates inches; "mg/l" indicates milligrams per liter; "ml/min" indicates milliliters per minute; "mV" indicates millivolts; "NA" indicates not applicable; "NR" indicates not recorded; "ntu" indicates Nephelometric Turbidity units; "su" indicates standard units; "us/cm" indicates microsiemens per centimeter; and "+" indicates the parameter(s) may be used for stabilization calculations but cannot be used for other purposes.
2) Weather temperature units are in degrees Fahrenheit, unless otherwise noted.
3) Did indicator parameters reach stabilization? Yes
4) Was the two hour time limit reached? No
5) Calculations:
   - Head Above Pump Intake (ft) 6.32
   - Total Drawdown (ft) 0.01
   - Calculated Final Purge Volume (gal) NA
6) If Drawdown Did Not Stabilize or Stabilized Drawdown >0.3 ft, is Total Purge Volume > Calculated Final Purge Volume? NA

Well Sampling Worksheet
WWW RAP Field Data
PERIMETER 2022-Q4 - HS-PMW-RI-102B
Kent County, MI

Well	HS-PMW-RI-102B / 2 in Diameter PVC
Sample Quarter	2022-Q4
Date	10/12/2022
Weather	Overcast, 50s/60s, Rain
Sampler Initials	GRT
Purging Device	Bladder-Pump: BP-11, Peristaltic-Pump: NA, Centrifugal-Pump: NA
Meters Used	YSI: ProQuatro (22F1018885), Turbidimeter: Agile Rental (09080C037700), Water-Level-Meter: NR
Reference Measuring Point	PVC
Well Screen (ft bmp)	101.5 - 106.5
Measured Bottom Depth (ft bmp)	106.5
Sample Comment	Water level was not recorded at 5 minute intervals per the Standard Operating Procedure (SOP). Based on readings collected, GZA does not believe this impacts data quality. Last 3 readings are not 5 minutes apart per SOP. GZA does not believe this impacts data quality.
Initial Water Level Date/Time	10/12/2022 09:52
Initial Water Level Depth (ft bmp)	43.43
Pump/Tubing Intake Depth (ft bmp)	104
Tubing Length (ft)	107
Tubing Inner Diameter (in)	0.25
Purging Initiation Date/Time	10/12/2022 09:52
Total Purge Volume (gal)	5
Modified Sample	No
If Modified, Reasoning	
Sample Collection Information	Bottling-Start: 10/12/2022 11:50:00, Bottling-Stop: 10/12/2022 11:50:00, Parameters-Sampled: PFAS

Reading Time	Depth To Water (ft)	Cumulative Drawdown (ft)	Purge Rate (ml/min)	Temperature (deg c)	Specific Conductivity (us/cm)	Dissolved Oxygen (mg/l)	pH (su)	Oxidation-Reduction Potential (mV)	Turbidity (ntu)
10:15	NR	NR	340	11 +	452 +	2.6	7.8	103	355 +
10:25	NR	NR	340	11 +	450 +	2.4	7.8	109	161 +
10:35	NR	NR	340	11 +	451 +	2.5	7.8	118	78 +
10:45	NR	NR	340	12 +	451 +	2.5	7.8	125	54 +
10:55	43.50	0.07	340	11 +	449 +	2.4	7.8	132	38 +
11:05	NR	NR	340	11 +	448 +	2.4	7.8	146	26 +
11:15	43.50	0.07	340	11 +	448 +	2.4	7.8	150	20 +

Well Sampling Worksheet
WWW RAP Field Data
PERIMETER 2022-Q4 - HS-PMW-RI-102B
Kent County, MI

Well	HS-PMW-RI-102B / 2 in Diameter PVC
Sample Quarter	2022-Q4
Date	10/12/2022
Weather	Overcast, 50s/60s, Rain
Sampler Initials	GRT
Purging Device	Bladder-Pump: BP-11, Peristaltic-Pump: NA, Centrifugal-Pump: NA
Meters Used	YSI: ProQuatro (22F1018885), Turbidimeter: Agile Rental (09080C037700), Water-Level-Meter: NR
Reference Measuring Point	PVC
Well Screen (ft bmp)	101.5 - 106.5
Measured Bottom Depth (ft bmp)	106.5
Sample Comment	Water level was not recorded at 5 minute intervals per the Standard Operating Procedure (SOP). Based on readings collected, GZA does not believe this impacts data quality. Last 3 readings are not 5 minutes apart per SOP. GZA does not believe this impacts data quality.
Initial Water Level Date/Time	10/12/2022 09:52
Initial Water Level Depth (ft bmp)	43.43
Pump/Tubing Intake Depth (ft bmp)	104
Tubing Length (ft)	107
Tubing Inner Diameter (in)	0.25
Purging Initiation Date/Time	10/12/2022 09:52
Total Purge Volume (gal)	5
Modified Sample	No
If Modified, Reasoning	
Sample Collection Information	Bottling-Start: 10/12/2022 11:50:00, Bottling-Stop: 10/12/2022 11:50:00, Parameters-Sampled: PFAS

Reading Time	Depth To Water (ft)	Cumulative Drawdown (ft)	Purge Rate (ml/min)	Temperature (deg c)	Specific Conductivity (us/cm)	Dissolved Oxygen (mg/l)	pH (su)	Oxidation-Reduction Potential (mV)	Turbidity (ntu)
11:25	NR	NR	340	12 +	450 +	2.4	7.8	158	17 +
11:35	NR	NR	340	11 +	447 +	2.4	7.8	158	16 +
11:45	43.50	0.07	340	11 +	448 +	2.5	7.8	164	16 +

Notes:

1) Abbreviations include: "deg c" indicates degrees Celsius; "ft" indicates feet; "ft bmp" indicates feet below reference measuring point; "gal" indicates gallons; "in" indicates inches; "mg/l" indicates milligrams per liter; "ml/min" indicates milliliters per minute; "mV" indicates millivolts; "NA" indicates not applicable; "NR" indicates not recorded; "ntu" indicates Nephelometric Turbidity units; "su" indicates standard units; "us/cm" indicates microsiemens per centimeter; and "+" indicates the parameter(s) may be used for stabilization calculations but cannot be used for other purposes.
2) Weather temperature units are in degrees Fahrenheit, unless otherwise noted.
3) Did indicator parameters reach stabilization? Yes
4) Was the two hour time limit reached? No
5) Calculations:
   - Head Above Pump Intake (ft) 60.57
   - Total Drawdown (ft) 0.07
   - Calculated Final Purge Volume (gal) NA
6) If Drawdown Did Not Stabilize or Stabilized Drawdown >0.3 ft, is Total Purge Volume > Calculated Final Purge Volume? NA

Well Sampling Worksheet
WWW RAP Field Data
PERIMETER 2022-Q4 - HS-PMW-RI-102C
Kent County, MI

Well	HS-PMW-RI-102C / 2 in Diameter PVC
Sample Quarter	2022-Q4
Date	10/12/2022
Weather	Cloudy, Rain on and off, 60s
Sampler Initials	CBM
Purging Device	Bladder-Pump: BP-12, Peristaltic-Pump: NA, Centrifugal-Pump: NA
Meters Used	YSI: ProPlus (17G101583), Turbidimeter: Agile Rental (19040015131), Water-Level-Meter: NR
Reference Measuring Point	PVC
Well Screen (ft bmp)	136.5 - 141.5
Measured Bottom Depth (ft bmp)	141.5
Sample Comment	Pump malfunctioned between 14:50 and 15:35 readings with a temperature of 12.3°C. Water was observed to be brown at 15:35, light brown at 15:41, and clear at 15:50. MS/MSD Collected. Last 3 readings are not 5 minutes apart per the Standard Operating Procedure (SOP). GZA does not believe this impacts data quality.
Initial Water Level Date/Time	10/12/2022 14:30
Initial Water Level Depth (ft bmp)	43.47
Pump/Tubing Intake Depth (ft bmp)	139
Tubing Length (ft)	142
Tubing Inner Diameter (in)	0.25
Purging Initiation Date/Time	10/12/2022 14:30
Total Purge Volume (gal)	6.5
Modified Sample	No
If Modified, Reasoning	
Sample Collection Information	Bottling-Start: 10/12/2022 16:10:00, Bottling-Stop: 10/12/2022 16:13:00, Parameters-Sampled: PFAS

Reading Time	Depth To Water (ft)	Cumulative Drawdown (ft)	Purge Rate (ml/min)	Temperature (deg c)	Specific Conductivity (us/cm)	Dissolved Oxygen (mg/l)	pH (su)	Oxidation-Reduction Potential (mV)	Turbidity (ntu)
14:50	43.50	0.03	300	11 +	544 +	0.7	7.4	-71	807
15:35	43.50	0.03	400	11 +	542 +	0.9	7.4	-61	NR
15:41	43.50	0.03	400	11 +	539 +	0.5	7.4	-79	NR
15:50	43.50	0.03	400	11 +	543 +	<0.5	7.5	-77	43
15:57	43.50	0.03	400	11 +	539 +	<0.5	7.4	-87	23
16:00	43.50	0.03	400	11 +	537 +	<0.5	7.5	-91	21
16:03	43.50	0.03	400	11 +	537 +	<0.5	7.5	-91	18
16:06	43.50	0.03	400	11 +	538 +	<0.5	7.5	-93	19
16:09	43.50	0.03	400	11 +	537 +	<0.5	7.5	-95	18

Notes:

1) Abbreviations include: "deg c" indicates degrees Celsius; "ft" indicates feet; "ft bmp" indicates feet below reference measuring point; "gal" indicates gallons; "in" indicates inches; "mg/l" indicates milligrams per liter; "ml/min" indicates milliliters per minute; "mV" indicates millivolts; "NA" indicates not applicable; "NR" indicates not recorded; "ntu" indicates Nephelometric Turbidity units; "su" indicates standard units; "us/cm" indicates microsiemens per centimeter; and "+" indicates the parameter(s) may be used for stabilization calculations but cannot be used for other purposes.
2) Weather temperature units are in degrees Fahrenheit, unless otherwise noted.
3) Did indicator parameters reach stabilization? Yes
4) Was the two hour time limit reached? No
5) Calculations:
   - Head Above Pump Intake (ft) 95.53
   - Total Drawdown (ft) 0.03
   - Calculated Final Purge Volume (gal) NA
6) If Drawdown Did Not Stabilize or Stabilized Drawdown >0.3 ft, is Total Purge Volume > Calculated Final Purge Volume? NA

Well Sampling Worksheet
WWW RAP Field Data
PERIMETER 2022-Q4 - HS-PMW-RI-102D
Kent County, MI

Well	HS-PMW-RI-102D / 2 in Diameter PVC
Sample Quarter	2022-Q4
Date	10/12/2022
Weather	Cloudy, Rain on and off, 60s
Sampler Initials	CBM
Purging Device	Bladder-Pump: BP-10, Peristaltic-Pump: NA, Centrifugal-Pump: NA
Meters Used	YSI: ProPlus (17G101583), Turbidimeter: Agile Rental (19040015131), Water-Level-Meter: NR
Reference Measuring Point	PVC
Well Screen (ft bmp)	176.5 - 181.5
Measured Bottom Depth (ft bmp)	181.5
Sample Comment	Water was noted in the air line at 10:30. Duplicate Collected. Last 3 readings are not 5 minutes apart per the Standard Operating Procedure (SOP). GZA does not believe this impacts data quality.
Initial Water Level Date/Time	10/12/2022 09:54
Initial Water Level Depth (ft bmp)	43.52
Pump/Tubing Intake Depth (ft bmp)	179
Tubing Length (ft)	182
Tubing Inner Diameter (in)	0.25
Purging Initiation Date/Time	10/12/2022 09:54
Total Purge Volume (gal)	5.7
Modified Sample	No
If Modified, Reasoning	
Sample Collection Information	Bottling-Start: 10/12/2022 11:40:00, Bottling-Stop: 10/12/2022 11:45:00, Parameters-Sampled: PFAS

Reading Time	Depth To Water (ft)	Cumulative Drawdown (ft)	Purge Rate (ml/min)	Temperature (deg c)	Specific Conductivity (us/cm)	Dissolved Oxygen (mg/l)	pH (su)	Oxidation-Reduction Potential (mV)	Turbidity (ntu)
10:13	43.60	0.08	480	11 +	661 +	0.8	7.4	-97	>999
10:30	43.57	0.05	310	11 +	654 +	0.7	7.6	-103	211
10:40	43.57	0.05	310	11 +	656 +	0.8	7.5	-103	86
10:50	43.57	0.05	310	11 +	655 +	0.7	7.5	-105	64
11:00	43.57	0.05	310	11 +	653 +	0.7	7.6	-109	39
11:20	43.62	0.10	310	11 +	650 +	0.5	7.6	-114	25
11:30	43.61	0.09	310	11 +	649 +	0.5	7.6	-117	21
11:33	43.61	0.09	310	11 +	650 +	0.5	7.6	-117	19
11:36	43.61	0.09	310	11 +	648 +	0.5	7.6	-118	18

Notes:

1) Abbreviations include: "deg c" indicates degrees Celsius; "ft" indicates feet; "ft bmp" indicates feet below reference measuring point; "gal" indicates gallons; "in" indicates inches; "mg/l" indicates milligrams per liter; "ml/min" indicates milliliters per minute; "mV" indicates millivolts; "NA" indicates not applicable; "NR" indicates not recorded; "ntu" indicates Nephelometric Turbidity units; "su" indicates standard units; "us/cm" indicates microsiemens per centimeter; and "+" indicates the parameter(s) may be used for stabilization calculations but cannot be used for other purposes.
2) Weather temperature units are in degrees Fahrenheit, unless otherwise noted.
3) Did indicator parameters reach stabilization? Yes
4) Was the two hour time limit reached? No
5) Calculations:
   - Head Above Pump Intake (ft): 135.48
   - Total Drawdown (ft): 0.09
   - Calculated Final Purge Volume (gal): NA
6) If Drawdown Did Not Stabilize or Stabilized Drawdown >0.3 ft, is Total Purge Volume > Calculated Final Purge Volume? NA

Well Sampling Worksheet
WWW RAP Field Data
AREA 6 2021-Q3 - HS-PMW-RI-108A
Kent County, MI

Well	HS-PMW-RI-108A / 2 in Diameter PVC
Sample Quarter	2021-Q3
Date	09/16/2021
Weather	Sunny, 75
Sampler Initials	AGB
Purging Device	Bladder-Pump: BP-12, Peristaltic-Pump: NA, Centrifugal-Pump: NA
Meters Used	YSI: 201C101901, Turbidimeter: 19040C075131, Water-Level-Meter: NR
Reference Measuring Point	PVC
Well Screen (ft bmp)	65.2 - 70.2
Measured Bottom Depth (ft bmp)	70.2
Sample Comment	
Initial Water Level Date/Time	09/16/2021 15:30
Initial Water Level Depth (ft bmp)	19.3
Pump/Tubing Intake Depth (ft bmp)	67.5
Tubing Length (ft)	70.7
Tubing Inner Diameter (in)	0.25
Purging Initiation Date/Time	09/16/2021 15:30
Total Purge Volume (gal)	15
Modified Sample	Yes
If Modified, Reasoning	2 hour limit reached
Sample Collection Information	Bottling-Start: 09/16/2021 17:35:00, Bottling-Stop: 09/16/2021 17:35:00, Parameters-Sampled: PFAS

Reading Time	Depth To Water (ft)	Cumulative Drawdown (ft)	Purge Rate (ml/min)	Temperature (deg c)	Specific Conductivity (us/cm)	Dissolved Oxygen (mg/l)	pH (su)	Oxidation-Reduction Potential (mV)	Turbidity (ntu)
15:45	19.30	0.00	475	12 +	759 +	<0.5	7.8	-107	>999
16:10	19.30	0.00	475	12 +	835 +	<0.5	7.8	-122	>999
16:20	19.30	0.00	475	12 +	845 +	<0.5	7.7	-120	>999
16:25	19.30	0.00	475	12 +	862 +	<0.5	7.8	-124	632
16:30	19.30	0.00	475	12 +	878 +	<0.5	7.8	-128	487
16:45	19.30	0.00	475	12 +	911 +	<0.5	7.9	-134	449
16:50	19.30	0.00	475	12 +	913 +	<0.5	8.0	-135	389
16:55	19.30	0.00	475	12 +	924 +	<0.5	8.0	-136	345
17:00	19.30	0.00	475	12 +	924 +	<0.5	8.0	-136	329
17:05	19.30	0.00	475	12 +	930 +	<0.5	7.9	-137	271
17:10	19.30	0.00	475	12 +	931 +	<0.5	7.9	-138	235

Well Sampling Worksheet
WWW RAP Field Data
AREA 6 2021-Q3 - HS-PMW-RI-108A
Kent County, MI

Well	HS-PMW-RI-108A / 2 in Diameter PVC
Sample Quarter	2021-Q3
Date	09/16/2021
Weather	Sunny, 75
Sampler Initials	AGB
Purging Device	Bladder-Pump: BP-12, Peristaltic-Pump: NA, Centrifugal-Pump: NA
Meters Used	YSI: 201C101901, Turbidimeter: 19040C075131, Water-Level-Meter: NR
Reference Measuring Point	PVC
Well Screen (ft bmp)	65.2 - 70.2
Measured Bottom Depth (ft bmp)	70.2
Sample Comment	
Initial Water Level Date/Time	09/16/2021 15:30
Initial Water Level Depth (ft bmp)	19.3
Pump/Tubing Intake Depth (ft bmp)	67.5
Tubing Length (ft)	70.7
Tubing Inner Diameter (in)	0.25
Purging Initiation Date/Time	09/16/2021 15:30
Total Purge Volume (gal)	15
Modified Sample	Yes
If Modified, Reasoning	2 hour limit reached
Sample Collection Information	Bottling-Start: 09/16/2021 17:35:00, Bottling-Stop: 09/16/2021 17:35:00, Parameters-Sampled: PFAS

Reading Time	Depth To Water (ft)	Cumulative Drawdown (ft)	Purge Rate (ml/min)	Temperature (deg c)	Specific Conductivity (us/cm)	Dissolved Oxygen (mg/l)	pH (su)	Oxidation-Reduction Potential (mV)	Turbidity (ntu)
17:20	19.30	0.00	475	12 +	945 +	<0.5	7.9	-140	209
17:25	19.30	0.00	475	12 +	934 +	<0.5	7.9	-140	160
17:30	19.30	0.00	475	12 +	947 +	<0.5	7.9	-142	149

Notes:

1) Abbreviations include: "deg c" indicates degrees Celsius; "ft" indicates feet; "ft bmp" indicates feet below reference measuring point; "gal" indicates gallons; "in" indicates inches; "mg/l" indicates milligrams per liter; "ml/min" indicates milliliters per minute; "mV" indicates millivolts; "NA" indicates not applicable; "NR" indicates not recorded; "ntu" indicates Nephelometric Turbidity units; "su" indicates standard units; "us/cm" indicates microsiemens per centimeter; and "+" indicates the parameter(s) may be used for stabilization calculations but cannot be used for other purposes.
2) Weather temperature units are in degrees Fahrenheit, unless otherwise noted.
3) Did indicator parameters reach stabilization? No
4) Was the two hour time limit reached? Yes
5) Calculations:
   - Head Above Pump Intake (ft) 48.20
   - Total Drawdown (ft) 0.00
   - Calculated Final Purge Volume (gal) NA
6) If Drawdown Did Not Stabilize or Stabilized Drawdown >0.3 ft, is Total Purge Volume > Calculated Final Purge Volume? NA

Well Sampling Worksheet
WWW RAP Field Data
AREA 6 2021-Q3 - HS-PMW-RI-108B
Kent County, MI

Well	HS-PMW-RI-108B / 2 in Diameter PVC
Sample Quarter	2021-Q3
Date	09/16/2021
Weather	Sunny, 80s
Sampler Initials	AGB
Purging Device	Bladder-Pump: GZA-BPC-02, Peristaltic-Pump: NA, Centrifugal-Pump: NA
Meters Used	YSI: NR, Turbidimeter: NR, Water-Level-Meter: NR
Reference Measuring Point	PVC
Well Screen (ft bmp)	131.6 - 136.6
Measured Bottom Depth (ft bmp)	136.6
Sample Comment	Purged for almost 2 hours with visibly high turbidity. Drawdown stabilized at approximately 11 feet of cumulative drawdown.
Initial Water Level Date/Time	09/16/2021 15:30
Initial Water Level Depth (ft bmp)	81.8
Pump/Tubing Intake Depth (ft bmp)	134.1
Tubing Length (ft)	137.1
Tubing Inner Diameter (in)	0.25
Purging Initiation Date/Time	09/16/2021 15:30
Total Purge Volume (gal)	4
Modified Sample	Yes
If Modified, Reasoning	2 hour time limit was reached and drawdown was greater than 0.3 ft
Sample Collection Information	Bottling-Start: 09/16/2021 17:30:00, Bottling-Stop: 09/16/2021 17:35:00, Parameters-Sampled: PFAS

Reading Time	Depth To Water (ft)	Cumulative Drawdown (ft)	Purge Rate (ml/min)	Temperature (deg c)	Specific Conductivity (us/cm)	Dissolved Oxygen (mg/l)	pH (su)	Oxidation-Reduction Potential (mV)	Turbidity (ntu)
17:20	93.40	11.60	250	12 +	861 +	0.8	8.0	-109	>999
17:25	93.40	11.60	250	12 +	859 +	0.8	8.0	-109	>999

Notes:

1) Abbreviations include: "deg c" indicates degrees Celsius; "ft" indicates feet; "ft bmp" indicates feet below reference measuring point; "gal" indicates gallons; "in" indicates inches; "mg/l" indicates milligrams per liter; "ml/min" indicates milliliters per minute; "mV" indicates millivolts; "NA" indicates not applicable; "NR" indicates not recorded; "ntu" indicates Nephelometric Turbidity units; "su" indicates standard units; "us/cm" indicates microsiemens per centimeter; and "+" indicates the parameter(s) may be used for stabilization calculations but cannot be used for other purposes.
2) Weather temperature units are in degrees Fahrenheit, unless otherwise noted.
3) Did indicator parameters reach stabilization? Yes * Turbidity Out of Range
4) Was the two hour time limit reached? Yes
5) Calculations:
   - Head Above Pump Intake (ft) 52.30
   - Total Drawdown (ft) 11.60
   - Calculated Final Purge Volume (gal) 2.21
6) If Drawdown Did Not Stabilize or Stabilized Drawdown >0.3 ft, is Total Purge Volume > Calculated Final Purge Volume? Yes

Well Sampling Worksheet
WWW RAP Field Data
AREA 6 2021-Q3 - HS-PMW-RI-108D
Kent County, MI

Well	HS-PMW-RI-108D / 2 in Diameter PVC
Sample Quarter	2021-Q3
Date	09/17/2021
Weather	Sunny, 60s
Sampler Initials	CBM
Purging Device	Bladder-Pump: GZA-BPC-04, Peristaltic-Pump: NA, Centrifugal-Pump: NA
Meters Used	YSI: NR, Turbidimeter: NR, Water-Level-Meter: NR
Reference Measuring Point	PVC
Well Screen (ft bmp)	223.0 - 228.0
Measured Bottom Depth (ft bmp)	NR
Sample Comment	Water reached flow through cell at 11:25. Nitrogen cylinder was changed at 13:04. Field Blank was collected at 13:20.
Initial Water Level Date/Time	09/17/2021 10:55
Initial Water Level Depth (ft bmp)	77.54
Pump/Tubing Intake Depth (ft bmp)	225.5
Tubing Length (ft)	228.5
Tubing Inner Diameter (in)	0.25
Purging Initiation Date/Time	09/17/2021 10:57
Total Purge Volume (gal)	10
Modified Sample	No
If Modified, Reasoning	
Sample Collection Information	Bottling-Start: 09/17/2021 13:22:00, Bottling-Stop: 09/17/2021 13:25:00, Parameters-Sampled: PFAS

Reading Time	Depth To Water (ft)	Cumulative Drawdown (ft)	Purge Rate (ml/min)	Temperature (deg c)	Specific Conductivity (us/cm)	Dissolved Oxygen (mg/l)	pH (su)	Oxidation-Reduction Potential (mV)	Turbidity (ntu)
11:33	79.61	2.07	300	12 +	552 +	5.2	7.6	-43	>999
12:58	79.21	1.67	300	13 +	584 +	1.0	8.1	-92	21
13:01	79.02	1.48	300	14 +	578 +	<0.5	7.9	-92	18
13:04	78.62	1.08	300	15 +	586 +	<0.5	7.8	-93	31
13:09	79.18	1.64	300	12 +	588 +	<0.5	7.7	-84	25
13:12	79.69	2.15	300	12 +	584 +	<0.5	7.7	-78	23

Well Sampling Worksheet
WWW RAP Field Data
AREA 6 2021-Q3 - HS-PMW-RI-108D
Kent County, MI

Well	HS-PMW-RI-108D / 2 in Diameter PVC
Sample Quarter	2021-Q3
Date	09/17/2021
Weather	Sunny, 60s
Sampler Initials	CBM
Purging Device	Bladder-Pump: GZA-BPC-04, Peristaltic-Pump: NA, Centrifugal-Pump: NA
Meters Used	YSI: NR, Turbidimeter: NR, Water-Level-Meter: NR
Reference Measuring Point	PVC
Well Screen (ft bmp)	223.0 - 228.0
Measured Bottom Depth (ft bmp)	NR
Sample Comment	Water reached flow through cell at 11:25. Nitrogen cylinder was changed at 13:04. Field Blank was collected at 13:20.
Initial Water Level Date/Time	09/17/2021 10:55
Initial Water Level Depth (ft bmp)	77.54
Pump/Tubing Intake Depth (ft bmp)	225.5
Tubing Length (ft)	228.5
Tubing Inner Diameter (in)	0.25
Purging Initiation Date/Time	09/17/2021 10:57
Total Purge Volume (gal)	10
Modified Sample	No
If Modified, Reasoning	
Sample Collection Information	Bottling-Start: 09/17/2021 13:22:00, Bottling-Stop: 09/17/2021 13:25:00, Parameters-Sampled: PFAS

Reading Time	Depth To Water (ft)	Cumulative Drawdown (ft)	Purge Rate (ml/min)	Temperature (deg c)	Specific Conductivity (us/cm)	Dissolved Oxygen (mg/l)	pH (su)	Oxidation-Reduction Potential (mV)	Turbidity (ntu)
13:15	79.53	1.99	300	12 +	592 +	<0.5	7.8	-73	24
13:18	79.61	2.07	300	12 +	592 +	<0.5	7.8	-76	23
13:21	79.58	2.04	300	12 +	586 +	<0.5	7.8	-83	23

Notes:

1) Abbreviations include: "deg c" indicates degrees Celsius; "ft" indicates feet; "ft bmp" indicates feet below reference measuring point; "gal" indicates gallons; "in" indicates inches; "mg/l" indicates milligrams per liter; "ml/min" indicates milliliters per minute; "mV" indicates millivolts; "NA" indicates not applicable; "NR" indicates not recorded; "ntu" indicates Nephelometric Turbidity units; "su" indicates standard units; "us/cm" indicates microsiemens per centimeter; and "+" indicates the parameter(s) may be used for stabilization calculations but cannot be used for other purposes.
2) Weather temperature units are in degrees Fahrenheit, unless otherwise noted.
3) Did indicator parameters reach stabilization? No
4) Was the two hour time limit reached? Yes
5) Calculations:
   - Head Above Pump Intake (ft) 147.96
   - Total Drawdown (ft) 2.04
   - Calculated Final Purge Volume (gal) 0.92
6) If Drawdown Did Not Stabilize or Stabilized Drawdown >0.3 ft, is Total Purge Volume > Calculated Final Purge Volume? Yes

Well Sampling Worksheet
WWW RAP Field Data
AREA 11/12 2022-Q2 - HS-PMW-RI-112A
Kent County, MI

Well	HS-PMW-RI-112A / 2 in Diameter PVC
Sample Quarter	2022-Q2
Date	05/23/2022
Weather	Mostly sunny, 60
Sampler Initials	MKM
Purging Device	Bladder-Pump: NA, Peristaltic-Pump: GZA-PER-01, Centrifugal-Pump: NA
Meters Used	YSI: 19K100063, Turbidimeter: NR, Water-Level-Meter: NR
Reference Measuring Point	PVC
Well Screen (ft bmp)	24.3 - 29.3
Measured Bottom Depth (ft bmp)	29.3
Sample Comment	
Initial Water Level Date/Time	05/23/2022 14:45
Initial Water Level Depth (ft bmp)	8.02
Pump/Tubing Intake Depth (ft bmp)	27
Tubing Length (ft)	29
Tubing Inner Diameter (in)	0.17
Purging Initiation Date/Time	05/23/2022 15:25
Total Purge Volume (gal)	2.5
Modified Sample	No
If Modified, Reasoning	
Sample Collection Information	Bottling-Start: 05/23/2022 15:25:00, Bottling-Stop: 05/23/2022 15:30:00, Parameters-Sampled: PFAS

Reading Time	Depth To Water (ft)	Cumulative Drawdown (ft)	Purge Rate (ml/min)	Temperature (deg c)	Specific Conductivity (us/cm)	Dissolved Oxygen (mg/l)	pH (su)	Oxidation-Reduction Potential (mV)	Turbidity (ntu)
15:10	8.05	0.03	300	10 +	762 +	7.7	7.3	303	8
15:15	8.05	0.03	300	10 +	761 +	7.7	7.3	298	5
15:20	8.05	0.03	300	10 +	762 +	7.6	7.4	293	5
15:25	8.05	0.03	300	11 +	760 +	7.4	7.3	289	5

Notes:

1) Abbreviations include: "deg c" indicates degrees Celsius; "ft" indicates feet; "ft bmp" indicates feet below reference measuring point; "gal" indicates gallons; "in" indicates inches; "mg/l" indicates milligrams per liter; "ml/min" indicates milliliters per minute; "mV" indicates millivolts; "NA" indicates not applicable; "NR" indicates not recorded; "ntu" indicates Nephelometric Turbidity units; "su" indicates standard units; "us/cm" indicates microsiemens per centimeter; and "+" indicates the parameter(s) may be used for stabilization calculations but cannot be used for other purposes.
2) Weather temperature units are in degrees Fahrenheit, unless otherwise noted.
3) Did indicator parameters reach stabilization? Yes
4) Was the two hour time limit reached? No
5) Calculations:
   - Head Above Pump Intake (ft) 18.98
   - Total Drawdown (ft) 0.03
   - Calculated Final Purge Volume (gal) NA
6) If Drawdown Did Not Stabilize or Stabilized Drawdown >0.3 ft, is Total Purge Volume > Calculated Final Purge Volume? NA

Well Sampling Worksheet
WWW RAP Field Data
AREA 11/12 2022-Q2 - HS-PMW-RI-112B
Kent County, MI

Well	HS-PMW-RI-112B / 2 in Diameter PVC
Sample Quarter	2022-Q2
Date	05/23/2022
Weather	Sunny, mid 50s
Sampler Initials	DW
Purging Device	Bladder-Pump: NA, Peristaltic-Pump: GZA-PER-03, Centrifugal-Pump: NA
Meters Used	YSI: J04002649, Turbidimeter: NR, Water-Level-Meter: NR
Reference Measuring Point	PVC
Well Screen (ft bmp)	69.4 - 74.4
Measured Bottom Depth (ft bmp)	74.4
Sample Comment	ORP is considered stable within the last three readings when rounded to the nearest whole number.
Initial Water Level Date/Time	05/23/2022 14:50
Initial Water Level Depth (ft bmp)	7.79
Pump/Tubing Intake Depth (ft bmp)	71.91
Tubing Length (ft)	73.91
Tubing Inner Diameter (in)	0.17
Purging Initiation Date/Time	05/23/2022 14:50
Total Purge Volume (gal)	7
Modified Sample	No
If Modified, Reasoning	
Sample Collection Information	Bottling-Start: 05/23/2022 16:00:00, Bottling-Stop: 05/23/2022 16:02:00, Parameters-Sampled: PFAS

Reading Time	Depth To Water (ft)	Cumulative Drawdown (ft)	Purge Rate (ml/min)	Temperature (deg c)	Specific Conductivity (us/cm)	Dissolved Oxygen (mg/l)	pH (su)	Oxidation-Reduction Potential (mV)	Turbidity (ntu)
15:10	7.86	0.07	400	11 +	1,472 +	1.0	7.3	131	45
15:15	7.86	0.07	400	11 +	1,469 +	0.7	7.3	97	27
15:20	7.86	0.07	400	11 +	1,470 +	0.7	7.3	74	13
15:25	7.86	0.07	400	11 +	1,470 +	0.6	7.3	56	8
15:30	7.86	0.07	400	11 +	1,471 +	0.6	7.3	35	6
15:35	7.86	0.07	400	11 +	1,470 +	0.5	7.3	23	<5
15:40	7.86	0.07	400	11 +	1,473 +	0.5	7.2	7	<5

Well Sampling Worksheet
WWW RAP Field Data
AREA 11/12 2022-Q2 - HS-PMW-RI-112B
Kent County, MI

Well	HS-PMW-RI-112B / 2 in Diameter PVC
Sample Quarter	2022-Q2
Date	05/23/2022
Weather	Sunny, mid 50s
Sampler Initials	DW
Purging Device	Bladder-Pump: NA, Peristaltic-Pump: GZA-PER-03, Centrifugal-Pump: NA
Meters Used	YSI: J04002649, Turbidimeter: NR, Water-Level-Meter: NR
Reference Measuring Point	PVC
Well Screen (ft bmp)	69.4 - 74.4
Measured Bottom Depth (ft bmp)	74.4
Sample Comment	ORP is considered stable within the last three readings when rounded to the nearest whole number.
Initial Water Level Date/Time	05/23/2022 14:50
Initial Water Level Depth (ft bmp)	7.79
Pump/Tubing Intake Depth (ft bmp)	71.91
Tubing Length (ft)	73.91
Tubing Inner Diameter (in)	0.17
Purging Initiation Date/Time	05/23/2022 14:50
Total Purge Volume (gal)	7
Modified Sample	No
If Modified, Reasoning	
Sample Collection Information	Bottling-Start: 05/23/2022 16:00:00, Bottling-Stop: 05/23/2022 16:02:00, Parameters-Sampled: PFAS

Reading Time	Depth To Water (ft)	Cumulative Drawdown (ft)	Purge Rate (ml/min)	Temperature (deg c)	Specific Conductivity (us/cm)	Dissolved Oxygen (mg/l)	pH (su)	Oxidation-Reduction Potential (mV)	Turbidity (ntu)
15:45	7.86	0.07	400	11 +	1,467 +	0.5	7.3	-1	<5
15:50	7.86	0.07	400	11 +	1,467 +	0.5	7.3	-5	<5
15:55	7.86	0.07	400	11 +	1,463 +	0.5	7.3	-11	<5

Notes:

1) Abbreviations include: "deg c" indicates degrees Celsius; "ft" indicates feet; "ft bmp" indicates feet below reference measuring point; "gal" indicates gallons; "in" indicates inches; "mg/l" indicates milligrams per liter; "ml/min" indicates milliliters per minute; "mV" indicates millivolts; "NA" indicates not applicable; "NR" indicates not recorded; "ntu" indicates Nephelometric Turbidity units; "su" indicates standard units; "us/cm" indicates microsiemens per centimeter; and "+" indicates the parameter(s) may be used for stabilization calculations but cannot be used for other purposes.
2) Weather temperature units are in degrees Fahrenheit, unless otherwise noted.
3) Did indicator parameters reach stabilization? Yes
4) Was the two hour time limit reached? No
5) Calculations:
   - Head Above Pump Intake (ft): 64.12
   - Total Drawdown (ft): 0.07
   - Calculated Final Purge Volume (gal): NA
6) If Drawdown Did Not Stabilize or Stabilized Drawdown >0.3 ft, is Total Purge Volume > Calculated Final Purge Volume? NA

Well Sampling Worksheet
WWW RAP Field Data
PERIMETER 2022-Q4 - WV-PMW-RI-101A
Kent County, MI

Well	WV-PMW-RI-101A / 2 in Diameter PVC
Sample Quarter	2022-Q4
Date	10/13/2022
Weather	Overcast, 40s to 60s
Sampler Initials	GRT
Purging Device	Bladder-Pump: BP-10, Peristaltic-Pump: NA, Centrifugal-Pump: NA
Meters Used	YSI: ProQuatro (22F101885), Turbidimeter: Agile Rental (09080C037700), Water-Level-Meter: NR
Reference Measuring Point	PVC
Well Screen (ft bmp)	42.6 - 47.6
Measured Bottom Depth (ft bmp)	47.5
Sample Comment	Water level was not recorded at 5 minute intervals per the Standard Operating Procedure (SOP). Based on readings collected, GZA does not believe this impacts data quality. Last 3 readings are not 5 minutes apart per SOP. GZA does not believe this impacts data quality.
Initial Water Level Date/Time	10/13/2022 13:02
Initial Water Level Depth (ft bmp)	39.28
Pump/Tubing Intake Depth (ft bmp)	45
Tubing Length (ft)	48
Tubing Inner Diameter (in)	0.25
Purging Initiation Date/Time	10/13/2022 13:02
Total Purge Volume (gal)	3
Modified Sample	No
If Modified, Reasoning	
Sample Collection Information	Bottling-Start: 10/13/2022 14:45:00, Bottling-Stop: 10/13/2022 14:45:00, Parameters-Sampled: PFAS

Reading Time	Depth To Water (ft)	Cumulative Drawdown (ft)	Purge Rate (ml/min)	Temperature (deg c)	Specific Conductivity (us/cm)	Dissolved Oxygen (mg/l)	pH (su)	Oxidation-Reduction Potential (mV)	Turbidity (ntu)
13:10	39.28	0.00	500	11 +	847 +	12.7	6.9	171	21
13:20	NR	NR	480	10 +	861 +	9.9	7.0	188	10
13:30	39.29	0.01	260	10 +	832 +	9.2	7.0	202	8
13:40	NR	NR	300	10 +	852 +	9.3	7.0	215	<5
13:50	NR	NR	300	10 +	852 +	9.2	7.1	231	<5
14:00	NR	NR	300	10 +	852 +	9.1	7.1	236	<5
14:10	NR	NR	300	10 +	848 +	9.3	7.1	244	<5

Well Sampling Worksheet
WWW RAP Field Data
PERIMETER 2022-Q4 - WV-PMW-RI-101A
Kent County, MI

Well	WV-PMW-RI-101A / 2 in Diameter PVC
Sample Quarter	2022-Q4
Date	10/13/2022
Weather	Overcast, 40s to 60s
Sampler Initials	GRT
Purging Device	Bladder-Pump: BP-10, Peristaltic-Pump: NA, Centrifugal-Pump: NA
Meters Used	YSI: ProQuatro (22F101885), Turbidimeter: Agile Rental (09080C037700), Water-Level-Meter: NR
Reference Measuring Point	PVC
Well Screen (ft bmp)	42.6 - 47.6
Measured Bottom Depth (ft bmp)	47.5
Sample Comment	Water level was not recorded at 5 minute intervals per the Standard Operating Procedure (SOP). Based on readings collected, GZA does not believe this impacts data quality. Last 3 readings are not 5 minutes apart per SOP. GZA does not believe this impacts data quality.
Initial Water Level Date/Time	10/13/2022 13:02
Initial Water Level Depth (ft bmp)	39.28
Pump/Tubing Intake Depth (ft bmp)	45
Tubing Length (ft)	48
Tubing Inner Diameter (in)	0.25
Purging Initiation Date/Time	10/13/2022 13:02
Total Purge Volume (gal)	3
Modified Sample	No
If Modified, Reasoning	
Sample Collection Information	Bottling-Start: 10/13/2022 14:45:00, Bottling-Stop: 10/13/2022 14:45:00, Parameters-Sampled: PFAS

Reading Time	Depth To Water (ft)	Cumulative Drawdown (ft)	Purge Rate (ml/min)	Temperature (deg c)	Specific Conductivity (us/cm)	Dissolved Oxygen (mg/l)	pH (su)	Oxidation-Reduction Potential (mV)	Turbidity (ntu)
14:20	NR	NR	300	10 +	853 +	9.2	7.1	250	<5
14:30	NR	NR	300	10 +	848 +	9.0	7.1	256	<5
14:40	39.29	0.01	300	10 +	851 +	9.3	7.1	260	<5

Notes:

1) Abbreviations include: "deg c" indicates degrees Celsius; "ft" indicates feet; "ft bmp" indicates feet below reference measuring point; "gal" indicates gallons; "in" indicates inches; "mg/l" indicates milligrams per liter; "ml/min" indicates milliliters per minute; "mV" indicates millivolts; "NA" indicates not applicable; "NR" indicates not recorded; "ntu" indicates Nephelometric Turbidity units; "su" indicates standard units; "us/cm" indicates microsiemens per centimeter; and "+" indicates the parameter(s) may be used for stabilization calculations but cannot be used for other purposes.
2) Weather temperature units are in degrees Fahrenheit, unless otherwise noted.
3) Did indicator parameters reach stabilization? Yes
4) Was the two hour time limit reached? No
5) Calculations:
   - Head Above Pump Intake (ft) 5.72
   - Total Drawdown (ft) 0.01
   - Calculated Final Purge Volume (gal) NA
6) If Drawdown Did Not Stabilize or Stabilized Drawdown >0.3 ft, is Total Purge Volume > Calculated Final Purge Volume? NA

Well Sampling Worksheet
WWW RAP Field Data
PERIMETER 2022-Q4 - WV-PMW-RI-101B
Kent County, MI

Well	WV-PMW-RI-101B / 2 in Diameter PVC
Sample Quarter	2022-Q4
Date	10/13/2022
Weather	Partly Cloudy, 60s
Sampler Initials	CBM
Purging Device	Bladder-Pump: BP-12, Peristaltic-Pump: NA, Centrifugal-Pump: NA
Meters Used	YSI: ProPlus (17G101583), Turbidimeter: Agile Rental (19040C075131), Water-Level-Meter: NR
Reference Measuring Point	PVC
Well Screen (ft bmp)	281.5 - 286.5
Measured Bottom Depth (ft bmp)	286.5
Sample Comment	Ran out of nitrogen and control box stopped working after 13:42 reading. Collected FB-10/13 at 14:35. Depth to water was not stable per the Standard Operating Procedure (SOP). GZA does not believe this impacts data quality because the water level was recovering after initial drawdown. Last 3 readings are not 5 minutes apart per SOP. GZA does not believe this impacts data quality.
Initial Water Level Date/Time	10/13/2022 12:15
Initial Water Level Depth (ft bmp)	114.02
Pump/Tubing Intake Depth (ft bmp)	284
Tubing Length (ft)	290
Tubing Inner Diameter (in)	0.25
Purging Initiation Date/Time	10/13/2022 12:57
Total Purge Volume (gal)	4
Modified Sample	No
If Modified, Reasoning	
Sample Collection Information	Bottling-Start: 10/13/2022 14:25:00, Bottling-Stop: 10/13/2022 14:27:00, Parameters-Sampled: PFAS

Reading Time	Depth To Water (ft)	Cumulative Drawdown (ft)	Purge Rate (ml/min)	Temperature (deg c)	Specific Conductivity (us/cm)	Dissolved Oxygen (mg/l)	pH (su)	Oxidation-Reduction Potential (mV)	Turbidity (ntu)
13:07	114.49	0.47	300	10 +	499 +	1.0	7.8	-47	>999
13:42	114.44	0.42	300	10 +	507 +	<0.5	7.8	-82	408
13:55	114.31	0.29	300	10 +	506 +	<0.5	7.8	-84	62
14:02	114.26	0.24	300	10 +	506 +	<0.5	7.8	-85	29
14:10	114.24	0.22	300	10 +	506 +	<0.5	7.8	-84	18
14:13	114.24	0.22	300	10 +	506 +	<0.5	7.8	-84	16
14:16	114.23	0.21	300	10 +	507 +	<0.5	7.8	-84	14

Well Sampling Worksheet
WWW RAP Field Data
PERIMETER 2022-Q4 - WV-PMW-RI-101B
Kent County, MI

Well	WV-PMW-RI-101B / 2 in Diameter PVC
Sample Quarter	2022-Q4
Date	10/13/2022
Weather	Partly Cloudy, 60s
Sampler Initials	CBM
Purging Device	Bladder-Pump: BP-12, Peristaltic-Pump: NA, Centrifugal-Pump: NA
Meters Used	YSI: ProPlus (17G101583), Turbidimeter: Agile Rental (19040C075131), Water-Level-Meter: NR
Reference Measuring Point	PVC
Well Screen (ft bmp)	281.5 - 286.5
Measured Bottom Depth (ft bmp)	286.5
Sample Comment	Ran out of nitrogen and control box stopped working after 13:42 reading. Collected FB-10/13 at 14:35. Depth to water was not stable per the Standard Operating Procedure (SOP). GZA does not believe this impacts data quality because the water level was recovering after initial drawdown. Last 3 readings are not 5 minutes apart per SOP. GZA does not believe this impacts data quality.
Initial Water Level Date/Time	10/13/2022 12:15
Initial Water Level Depth (ft bmp)	114.02
Pump/Tubing Intake Depth (ft bmp)	284
Tubing Length (ft)	290
Tubing Inner Diameter (in)	0.25
Purging Initiation Date/Time	10/13/2022 12:57
Total Purge Volume (gal)	4
Modified Sample	No
If Modified, Reasoning	
Sample Collection Information	Bottling-Start: 10/13/2022 14:25:00, Bottling-Stop: 10/13/2022 14:27:00, Parameters-Sampled: PFAS

Reading Time	Depth To Water (ft)	Cumulative Drawdown (ft)	Purge Rate (ml/min)	Temperature (deg c)	Specific Conductivity (us/cm)	Dissolved Oxygen (mg/l)	pH (su)	Oxidation-Reduction Potential (mV)	Turbidity (ntu)
14:19	114.22	0.20	300	10 +	507 +	<0.5	7.8	-83	12
14:22	114.22	0.20	300	10 +	507 +	<0.5	7.8	-83	12
14:25	114.21	0.19	300	10 +	507 +	<0.5	7.8	-83	12

Notes:

1) Abbreviations include: "deg c" indicates degrees Celsius; "ft" indicates feet; "ft bmp" indicates feet below reference measuring point; "gal" indicates gallons; "in" indicates inches; "mg/l" indicates milligrams per liter; "ml/min" indicates milliliters per minute; "mV" indicates millivolts; "NA" indicates not applicable; "NR" indicates not recorded; "ntu" indicates Nephelometric Turbidity units; "su" indicates standard units; "us/cm" indicates microsiemens per centimeter; and "+" indicates the parameter(s) may be used for stabilization calculations but cannot be used for other purposes.
2) Weather temperature units are in degrees Fahrenheit, unless otherwise noted.
3) Did indicator parameters reach stabilization? Yes
4) Was the two hour time limit reached? No
5) Calculations:
   - Head Above Pump Intake (ft) 169.98
   - Total Drawdown (ft) 0.19
   - Calculated Final Purge Volume (gal) NA
6) If Drawdown Did Not Stabilize or Stabilized Drawdown >0.3 ft, is Total Purge Volume > Calculated Final Purge Volume? NA

Well Sampling Worksheet
WWW RAP Field Data
PERIMETER 2022-Q4 - WV-PMW-RI-102
Kent County, MI

Well	WV-PMW-RI-102 / 2 in Diameter PVC
Sample Quarter	2022-Q4
Date	10/18/2022
Weather	Cloudy/Rainy
Sampler Initials	JET
Purging Device	Bladder-Pump: GZA-BP-01, Peristaltic-Pump: NA, Centrifugal-Pump: NA
Meters Used	YSI: Quatro 22F101885, Turbidimeter: 19040C076131, Water-Level-Meter: NR
Reference Measuring Point	PVC
Well Screen (ft bmp)	47.2 - 52.2
Measured Bottom Depth (ft bmp)	52
Sample Comment	Switched gas tank at 11:20. Field Blank collected at 12:05.
Initial Water Level Date/Time	10/18/2022 10:20
Initial Water Level Depth (ft bmp)	46.27
Pump/Tubing Intake Depth (ft bmp)	49.5
Tubing Length (ft)	52
Tubing Inner Diameter (in)	0.25
Purging Initiation Date/Time	10/18/2022 10:20
Total Purge Volume (gal)	8
Modified Sample	No
If Modified, Reasoning	
Sample Collection Information	Bottling-Start: 10/18/2022 12:10:00, Bottling-Stop: 10/18/2022 12:15:00, Parameters-Sampled: PFAS

Reading Time	Depth To Water (ft)	Cumulative Drawdown (ft)	Purge Rate (ml/min)	Temperature (deg c)	Specific Conductivity (us/cm)	Dissolved Oxygen (mg/l)	pH (su)	Oxidation-Reduction Potential (mV)	Turbidity (ntu)
10:40	46.30	0.03	300	9 +	639 +	10.3	7.5	168	131
11:00	46.30	0.03	300	10 +	637 +	10.2	7.5	198	36
11:20	46.30	0.03	300	10 +	639 +	10.2	7.5	201	30
11:40	46.30	0.03	300	10 +	639 +	10.2	7.5	211	5
11:50	46.30	0.03	300	10 +	639 +	10.2	7.5	215	<5
11:55	46.30	0.03	300	10 +	639 +	10.2	7.5	217	<5
12:00	46.30	0.03	300	10 +	639 +	10.2	7.5	219	<5

Notes:

1) Abbreviations include: "deg c" indicates degrees Celsius; "ft" indicates feet; "ft bmp" indicates feet below reference measuring point; "gal" indicates gallons; "in" indicates inches; "mg/l" indicates milligrams per liter; "ml/min" indicates milliliters per minute; "mV" indicates millivolts; "NA" indicates not applicable; "NR" indicates not recorded; "ntu" indicates Nephelometric Turbidity units; "su" indicates standard units; "us/cm" indicates microsiemens per centimeter; and "+" indicates the parameter(s) may be used for stabilization calculations but cannot be used for other purposes.
2) Weather temperature units are in degrees Fahrenheit, unless otherwise noted.
3) Did indicator parameters reach stabilization? Yes
4) Was the two hour time limit reached? No
5) Calculations:
   - Head Above Pump Intake (ft) 3.23
   - Total Drawdown (ft) 0.03
   - Calculated Final Purge Volume (gal) NA
6) If Drawdown Did Not Stabilize or Stabilized Drawdown >0.3 ft, is Total Purge Volume > Calculated Final Purge Volume? NA

Well Sampling Worksheet
WWW RAP Field Data
PERIMETER 2022-Q1 - WV-PMW-RI-106A
Kent County, MI

Well	WV-PMW-RI-106A / 2 in Diameter PVC
Sample Quarter	2022-Q1
Date	01/18/2022
Weather	28F Overcast
Sampler Initials	DMG
Purging Device	Bladder-Pump: NA, Peristaltic-Pump: GZA-PER-1, Centrifugal-Pump: NA
Meters Used	YSI: Professional Plus 17G101583, Turbidimeter: GZA-TM-04, Water-Level-Meter: NR
Reference Measuring Point	PVC
Well Screen (ft bmp)	18.5 - 23.5
Measured Bottom Depth (ft bmp)	23.55
Sample Comment	Last 3 readings are not 5 minutes apart per the standard operating procedure (SOP); GZA does not believe this impacts data quality.
Initial Water Level Date/Time	01/18/2022 10:50
Initial Water Level Depth (ft bmp)	8.29
Pump/Tubing Intake Depth (ft bmp)	21.5
Tubing Length (ft)	24
Tubing Inner Diameter (in)	0.17
Purging Initiation Date/Time	01/18/2022 10:50
Total Purge Volume (gal)	2.2
Modified Sample	No
If Modified, Reasoning	
Sample Collection Information	Bottling-Start: 01/18/2022 11:20:00, Bottling-Stop: 01/18/2022 11:24:00, Parameters-Sampled: PFAS

Reading Time	Depth To Water (ft)	Cumulative Drawdown (ft)	Purge Rate (ml/min)	Temperature (deg c)	Specific Conductivity (us/cm)	Dissolved Oxygen (mg/l)	pH (su)	Oxidation-Reduction Potential (mV)	Turbidity (ntu)
10:53	8.55	0.26	355	9 +	537 +	1.7	8.3	181	40 +
10:56	8.57	0.28	355	9 +	535 +	1.6	8.2	179	33 +
10:59	8.57	0.28	355	9 +	532 +	1.5	8.0	188	19 +
11:02	8.57	0.28	355	9 +	531 +	1.5	8.0	191	12 +
11:05	8.57	0.28	355	9 +	532 +	1.5	7.9	196	8 +
11:08	8.57	0.28	355	9 +	528 +	1.4	7.9	197	7 +
11:11	8.57	0.28	355	9 +	527 +	1.4	7.9	198	6 +
11:14	8.57	0.28	355	9 +	524 +	1.4	7.9	199	6 +

Notes:

1) Abbreviations include: "deg c" indicates degrees Celsius; "ft" indicates feet; "ft bmp" indicates feet below reference measuring point; "gal" indicates gallons; "in" indicates inches; "mg/l" indicates milligrams per liter; "ml/min" indicates milliliters per minute; "mV" indicates millivolts; "NA" indicates not applicable; "NR" indicates not recorded; "ntu" indicates Nephelometric Turbidity units; "su" indicates standard units; "us/cm" indicates microsiemens per centimeter; and "+" indicates the parameter(s) may be used for stabilization calculations but cannot be used for other purposes.
2) Weather temperature units are in degrees Fahrenheit, unless otherwise noted.
3) Did indicator parameters reach stabilization? Yes
4) Was the two hour time limit reached? No
5) Calculations:
   - Head Above Pump Intake (ft) 13.21
   - Total Drawdown (ft) 0.28
   - Calculated Final Purge Volume (gal) NA
6) If Drawdown Did Not Stabilize or Stabilized Drawdown >0.3 ft, is Total Purge Volume > Calculated Final Purge Volume? NA

Well Sampling Worksheet
WWW RAP Field Data
PERIMETER 2022-Q1 - WV-PMW-RI-106B
Kent County, MI

Well	WV-PMW-RI-106B / 2 in Diameter PVC
Sample Quarter	2022-Q1
Date	01/17/2022
Weather	Overcast/Snowing, 28°
Sampler Initials	MKM
Purging Device	Bladder-Pump: NA, Peristaltic-Pump: GZA-PER-01, Centrifugal-Pump: NA
Meters Used	YSI: ProPlus 17G101583, Turbidimeter: GZA-TM-01, Water-Level-Meter: NR
Reference Measuring Point	PVC
Well Screen (ft bmp)	34.0 - 39.0
Measured Bottom Depth (ft bmp)	39.75
Sample Comment	Last 3 readings are not 5 minutes apart per the standard operating procedure (SOP); GZA does not believe this impacts data quality.
Initial Water Level Date/Time	01/17/2022 15:35
Initial Water Level Depth (ft bmp)	7.85
Pump/Tubing Intake Depth (ft bmp)	37.5
Tubing Length (ft)	40
Tubing Inner Diameter (in)	0.17
Purging Initiation Date/Time	01/17/2022 15:35
Total Purge Volume (gal)	5
Modified Sample	No
If Modified, Reasoning	
Sample Collection Information	Bottling-Start: 01/17/2022 16:30:00, Bottling-Stop: 01/17/2022 16:35:00, Parameters-Sampled: PFAS

Reading Time	Depth To Water (ft)	Cumulative Drawdown (ft)	Purge Rate (ml/min)	Temperature (deg c)	Specific Conductivity (us/cm)	Dissolved Oxygen (mg/l)	pH (su)	Oxidation-Reduction Potential (mV)	Turbidity (ntu)
15:50	7.87	0.02	390	8 +	471 +	7.9	7.9	287	61
15:55	7.87	0.02	390	8 +	480 +	7.6	7.9	288	75
16:00	7.87	0.02	390	9 +	486 +	7.5	7.9	290	69
16:03	7.87	0.02	390	9 +	488 +	7.4	7.9	290	53
16:06	7.87	0.02	390	8 +	490 +	7.4	7.9	291	48
16:09	7.87	0.02	390	8 +	491 +	7.4	7.9	292	40
16:12	7.87	0.02	390	9 +	492 +	7.3	7.9	292	29
16:20	7.87	0.02	390	8 +	492 +	7.3	7.9	294	17
16:23	7.87	0.02	390	8 +	493 +	7.3	7.9	295	16
16:26	7.87	0.02	390	8 +	493 +	7.3	7.9	295	16

Notes:

1) Abbreviations include: "deg c" indicates degrees Celsius; "ft" indicates feet; "ft bmp" indicates feet below reference measuring point; "gal" indicates gallons; "in" indicates inches; "mg/l" indicates milligrams per liter; "ml/min" indicates milliliters per minute; "mV" indicates millivolts; "NA" indicates not applicable; "NR" indicates not recorded; "ntu" indicates Nephelometric Turbidity units; "su" indicates standard units; "us/cm" indicates microsiemens per centimeter; and "+" indicates the parameter(s) may be used for stabilization calculations but cannot be used for other purposes.
2) Weather temperature units are in degrees Fahrenheit, unless otherwise noted.
3) Did indicator parameters reach stabilization? Yes
4) Was the two hour time limit reached? No
5) Calculations:
   - Head Above Pump Intake (ft) 29.65
   - Total Drawdown (ft) 0.02
   - Calculated Final Purge Volume (gal) NA
6) If Drawdown Did Not Stabilize or Stabilized Drawdown >0.3 ft, is Total Purge Volume > Calculated Final Purge Volume? NA

Well Sampling Worksheet
WWW RAP Field Data
PERIMETER 2022-Q1 - WV-PMW-RI-106C
Kent County, MI

Well	WV-PMW-RI-106C / 2 in Diameter PVC
Sample Quarter	2022-Q1
Date	01/17/2022
Weather	Overcast, 25°
Sampler Initials	DMG
Purging Device	Bladder-Pump: NA, Peristaltic-Pump: GZA-PER-03, Centrifugal-Pump: NA
Meters Used	YSI: ProQuatro 20K101901, Turbidimeter: GZA-TM-04, Water-Level-Meter: NR
Reference Measuring Point	PVC
Well Screen (ft bmp)	53.9 - 58.9
Measured Bottom Depth (ft bmp)	59
Sample Comment	Last 3 readings are not 5 minutes apart per the standard operating procedure (SOP); GZA does not believe this impacts data quality.
Initial Water Level Date/Time	01/17/2022 15:35
Initial Water Level Depth (ft bmp)	8.10
Pump/Tubing Intake Depth (ft bmp)	56.5
Tubing Length (ft)	59
Tubing Inner Diameter (in)	0.17
Purging Initiation Date/Time	01/17/2022 15:35
Total Purge Volume (gal)	3
Modified Sample	No
If Modified, Reasoning	
Sample Collection Information	Bottling-Start: 01/17/2022 16:10:00, Bottling-Stop: 01/17/2022 16:14:00, Parameters-Sampled: PFAS

Reading Time	Depth To Water (ft)	Cumulative Drawdown (ft)	Purge Rate (ml/min)	Temperature (deg c)	Specific Conductivity (us/cm)	Dissolved Oxygen (mg/l)	pH (su)	Oxidation-Reduction Potential (mV)	Turbidity (ntu)
15:40	8.27	0.17	355	9 +	2,180 +	0.5	8.6	233	11
15:43	8.27	0.17	355	9 +	2,165 +	<0.5	8.5	228	13
15:46	8.27	0.17	355	9 +	2,143 +	<0.5	8.3	225	9
15:49	8.27	0.17	355	9 +	2,141 +	<0.5	8.2	223	8
15:52	8.27	0.17	355	9 +	2,145 +	<0.5	8.3	218	6
15:55	8.27	0.17	355	9 +	2,153 +	<0.5	8.4	213	5
15:58	8.27	0.17	355	9 +	2,165 +	<0.5	8.5	208	6
16:01	8.27	0.17	355	9 +	2,169 +	<0.5	8.5	205	6
16:04	8.27	0.17	355	9 +	2,185 +	<0.5	8.6	200	5
16:07	8.27	0.17	355	9 +	2,194 +	<0.5	8.7	195	5

Notes:

1) Abbreviations include: "deg c" indicates degrees Celsius; "ft" indicates feet; "ft bmp" indicates feet below reference measuring point; "gal" indicates gallons; "in" indicates inches; "mg/l" indicates milligrams per liter; "ml/min" indicates milliliters per minute; "mV" indicates millivolts; "NA" indicates not applicable; "NR" indicates not recorded; "ntu" indicates Nephelometric Turbidity units; "su" indicates standard units; "us/cm" indicates microsiemens per centimeter; and "+" indicates the parameter(s) may be used for stabilization calculations but cannot be used for other purposes.
2) Weather temperature units are in degrees Fahrenheit, unless otherwise noted.
3) Did indicator parameters reach stabilization? Yes
4) Was the two hour time limit reached? No
5) Calculations:
   - Head Above Pump Intake (ft): 48.40
   - Total Drawdown (ft): 0.17
   - Calculated Final Purge Volume (gal): NA
6) If Drawdown Did Not Stabilize or Stabilized Drawdown >0.3 ft, is Total Purge Volume > Calculated Final Purge Volume? NA

Well Sampling Worksheet
WWW RAP Field Data
PERIMETER 2022-Q1 - WV-PMW-RI-106D
Kent County, MI

Well	WV-PMW-RI-106D / 2 in Diameter PVC
Sample Quarter	2022-Q1
Date	01/18/2022
Weather	Overcast, 28°
Sampler Initials	DMG
Purging Device	Bladder-Pump: NA, Peristaltic-Pump: GZA-PER-01, Centrifugal-Pump: NA
Meters Used	YSI: ProPlus 17G10585, Turbidimeter: GZA-TM-04, Water-Level-Meter: NR
Reference Measuring Point	PVC
Well Screen (ft bmp)	70.2 - 75.2
Measured Bottom Depth (ft bmp)	75.15
Sample Comment	Last 3 water level readings were not the same per Standard Operating Procedure (SOP). Drawdown was stabilizing. GZA does not believe this impacts data quality.
Initial Water Level Date/Time	01/18/2022 09:45
Initial Water Level Depth (ft bmp)	17.12
Pump/Tubing Intake Depth (ft bmp)	72.7
Tubing Length (ft)	75
Tubing Inner Diameter (in)	0.17
Purging Initiation Date/Time	01/18/2022 09:45
Total Purge Volume (gal)	3
Modified Sample	No
If Modified, Reasoning	
Sample Collection Information	Bottling-Start: 01/18/2022 10:15:00, Bottling-Stop: 01/18/2022 10:17:00, Parameters-Sampled: PFAS

Reading Time	Depth To Water (ft)	Cumulative Drawdown (ft)	Purge Rate (ml/min)	Temperature (deg c)	Specific Conductivity (us/cm)	Dissolved Oxygen (mg/l)	pH (su)	Oxidation-Reduction Potential (mV)	Turbidity (ntu)
09:48	17.19	0.07	355	9 +	327 +	3.0	9.6	172	<5 +
09:51	17.20	0.08	355	9 +	326 +	2.7	9.6	166	<5 +
09:54	17.21	0.09	355	9 +	327 +	2.6	9.7	155	<5 +
09:57	17.21	0.09	355	9 +	327 +	2.5	9.7	150	<5 +
10:05	17.23	0.11	355	9 +	327 +	2.3	9.7	140	<5 +
10:10	17.25	0.13	355	9 +	327 +	2.3	9.7	132	<5 +
10:15	17.25	0.13	355	9 +	327 +	2.3	9.7	131	<5 +

Notes:

1) Abbreviations include: "deg c" indicates degrees Celsius; "ft" indicates feet; "ft bmp" indicates feet below reference measuring point; "gal" indicates gallons; "in" indicates inches; "mg/l" indicates milligrams per liter; "ml/min" indicates milliliters per minute; "mV" indicates millivolts; "NA" indicates not applicable; "NR" indicates not recorded; "ntu" indicates Nephelometric Turbidity units; "su" indicates standard units; "us/cm" indicates microsiemens per centimeter; and "+" indicates the parameter(s) may be used for stabilization calculations but cannot be used for other purposes.
2) Weather temperature units are in degrees Fahrenheit, unless otherwise noted.
3) Did indicator parameters reach stabilization? Yes
4) Was the two hour time limit reached? No
5) Calculations:
   - Head Above Pump Intake (ft) 55.58
   - Total Drawdown (ft) 0.13
   - Calculated Final Purge Volume (gal) NA
6) If Drawdown Did Not Stabilize or Stabilized Drawdown >0.3 ft, is Total Purge Volume > Calculated Final Purge Volume? NA

Well Sampling Worksheet
WWW RAP Field Data
PERIMETER 2022-Q1 - WV-PMW-RI-106E
Kent County, MI

Well	WV-PMW-RI-106E / 2 in Diameter PVC
Sample Quarter	2022-Q1
Date	01/18/2022
Weather	Overcast, 30°
Sampler Initials	MKM
Purging Device	Bladder-Pump: BP-12, Peristaltic-Pump: NA, Centrifugal-Pump: NA
Meters Used	YSI: Pro Quatro 20K101901, Turbidimeter: GZA-TM-01, Water-Level-Meter: NR
Reference Measuring Point	PVC
Well Screen (ft bmp)	176.0 - 181.0
Measured Bottom Depth (ft bmp)	181
Sample Comment	10:05 - Cannot purge any slower than 150 mL/min. Last 3 readings are not 5 minutes apart per the Standard Operating Procedure (SOP); GZA does not believe this impacts data quality.
Initial Water Level Date/Time	01/18/2022 09:45
Initial Water Level Depth (ft bmp)	141.02
Pump/Tubing Intake Depth (ft bmp)	177.5
Tubing Length (ft)	180
Tubing Inner Diameter (in)	0.25
Purging Initiation Date/Time	01/18/2022 09:45
Total Purge Volume (gal)	5
Modified Sample	No
If Modified, Reasoning	
Sample Collection Information	Bottling-Start: 01/18/2022 11:45:00, Bottling-Stop: 01/18/2022 11:50:00, Parameters-Sampled: PFAS

Reading Time	Depth To Water (ft)	Cumulative Drawdown (ft)	Purge Rate (ml/min)	Temperature (deg c)	Specific Conductivity (us/cm)	Dissolved Oxygen (mg/l)	pH (su)	Oxidation-Reduction Potential (mV)	Turbidity (ntu)
10:00	149.50	8.48	240	9 +	878 +	2.5	8.1	127	>999
10:05	151.20	10.18	150	8 +	869 +	1.6	7.9	131	>999
10:15	152.35	11.33	150	8 +	866 +	1.8	7.9	139	807
10:25	153.35	12.33	150	8 +	884 +	1.4	8.0	132	574
10:28	153.70	12.68	150	8 +	875 +	1.3	8.0	127	521
10:45	154.70	13.68	150	8 +	810 +	1.2	8.0	96	363
11:00	155.80	14.78	150	8 +	750 +	1.0	8.7	32	217
11:03	155.90	14.88	150	8 +	745 +	0.9	7.9	24	203
11:06	155.90	14.88	150	8 +	740 +	0.9	7.9	15	198

Well Sampling Worksheet
WWW RAP Field Data
PERIMETER 2022-Q1 - WV-PMW-RI-106E
Kent County, MI

Well	WV-PMW-RI-106E / 2 in Diameter PVC
Sample Quarter	2022-Q1
Date	01/18/2022
Weather	Overcast, 30°
Sampler Initials	MKM
Purging Device	Bladder-Pump: BP-12, Peristaltic-Pump: NA, Centrifugal-Pump: NA
Meters Used	YSI: Pro Quatro 20K101901, Turbidimeter: GZA-TM-01, Water-Level-Meter: NR
Reference Measuring Point	PVC
Well Screen (ft bmp)	176.0 - 181.0
Measured Bottom Depth (ft bmp)	181
Sample Comment	10:05 - Cannot purge any slower than 150 mL/min. Last 3 readings are not 5 minutes apart per the Standard Operating Procedure (SOP); GZA does not believe this impacts data quality.
Initial Water Level Date/Time	01/18/2022 09:45
Initial Water Level Depth (ft bmp)	141.02
Pump/Tubing Intake Depth (ft bmp)	177.5
Tubing Length (ft)	180
Tubing Inner Diameter (in)	0.25
Purging Initiation Date/Time	01/18/2022 09:45
Total Purge Volume (gal)	5
Modified Sample	No
If Modified, Reasoning	
Sample Collection Information	Bottling-Start: 01/18/2022 11:45:00, Bottling-Stop: 01/18/2022 11:50:00, Parameters-Sampled: PFAS

Reading Time	Depth To Water (ft)	Cumulative Drawdown (ft)	Purge Rate (ml/min)	Temperature (deg c)	Specific Conductivity (us/cm)	Dissolved Oxygen (mg/l)	pH (su)	Oxidation-Reduction Potential (mV)	Turbidity (ntu)
11:20	156.40	15.38	150	8 +	710 +	0.8	7.8	-30	153
11:30	156.65	15.63	150	8 +	694 +	0.7	7.8	-46	108
11:45	NR	NR	150	8 +	690 +	0.6	7.8	-61	116

Notes:

1) Abbreviations include: "deg c" indicates degrees Celsius; "ft" indicates feet; "ft bmp" indicates feet below reference measuring point; "gal" indicates gallons; "in" indicates inches; "mg/l" indicates milligrams per liter; "ml/min" indicates milliliters per minute; "mV" indicates millivolts; "NA" indicates not applicable; "NR" indicates not recorded; "ntu" indicates Nephelometric Turbidity units; "su" indicates standard units; "us/cm" indicates microsiemens per centimeter; and "+" indicates the parameter(s) may be used for stabilization calculations but cannot be used for other purposes.
2) Weather temperature units are in degrees Fahrenheit, unless otherwise noted.
3) Did indicator parameters reach stabilization? No
4) Was the two hour time limit reached? Yes
5) Calculations:
   - Head Above Pump Intake (ft) 36.48
   - Total Drawdown (ft) 15.63
   - Calculated Final Purge Volume (gal) 2.97
6) If Drawdown Did Not Stabilize or Stabilized Drawdown >0.3 ft, is Total Purge Volume > Calculated Final Purge Volume? Yes

Well Sampling Worksheet
WWW RAP Field Data
PERIMETER 2022-Q1 - WV-PMW-RI-107
Kent County, MI

Well	WV-PMW-RI-107 / 2 in Diameter PVC
Sample Quarter	2022-Q1
Date	01/20/2022
Weather	Overcast, Snow Flurries, 17°
Sampler Initials	DMG
Purging Device	Bladder-Pump: BP-12, Peristaltic-Pump: NA, Centrifugal-Pump: NA
Meters Used	YSI: Pro Quatro 20K101901, Turbidimeter: GZA-TM-01, Water-Level-Meter: NR
Reference Measuring Point	PVC
Well Screen (ft bmp)	189.5 - 194.5
Measured Bottom Depth (ft bmp)	194.5
Sample Comment	13:10 - Pumped 30 minutes before starting readings because water was observed to be turbid.
Initial Water Level Date/Time	01/20/2022 13:10
Initial Water Level Depth (ft bmp)	99.95
Pump/Tubing Intake Depth (ft bmp)	192
Tubing Length (ft)	194
Tubing Inner Diameter (in)	0.25
Purging Initiation Date/Time	01/20/2022 13:10
Total Purge Volume (gal)	15
Modified Sample	No
If Modified, Reasoning	
Sample Collection Information	Bottling-Start: 01/20/2022 15:10:00, Bottling-Stop: 01/20/2022 15:11:00, Parameters-Sampled: PFAS

Reading Time	Depth To Water (ft)	Cumulative Drawdown (ft)	Purge Rate (ml/min)	Temperature (deg c)	Specific Conductivity (us/cm)	Dissolved Oxygen (mg/l)	pH (su)	Oxidation-Reduction Potential (mV)	Turbidity (ntu)
13:48	103.80	3.85	500	8 +	369 +	<0.5	7.7	-35	643
13:55	103.82	3.87	500	8 +	370 +	<0.5	7.7	-99	473
14:00	103.82	3.87	500	8 +	369 +	<0.5	7.7	-104	411
14:15	103.82	3.87	500	8 +	369 +	<0.5	7.7	-109	283
14:20	103.82	3.87	500	8 +	369 +	<0.5	7.7	-111	243
14:25	103.82	3.87	500	8 +	369 +	<0.5	7.7	-113	200
14:30	103.83	3.88	500	8 +	369 +	<0.5	7.7	-114	194
14:35	103.83	3.88	500	8 +	369 +	<0.5	7.7	-115	160
14:40	103.83	3.88	500	8 +	368 +	<0.5	7.7	-116	162
14:45	103.83	3.88	500	8 +	368 +	<0.5	7.7	-116	140

Well Sampling Worksheet
WWW RAP Field Data
PERIMETER 2022-Q1 - WV-PMW-RI-107
Kent County, MI

Well	WV-PMW-RI-107 / 2 in Diameter PVC
Sample Quarter	2022-Q1
Date	01/20/2022
Weather	Overcast, Snow Flurries, 17°
Sampler Initials	DMG
Purging Device	Bladder-Pump: BP-12, Peristaltic-Pump: NA, Centrifugal-Pump: NA
Meters Used	YSI: Pro Quatro 20K101901, Turbidimeter: GZA-TM-01, Water-Level-Meter: NR
Reference Measuring Point	PVC
Well Screen (ft bmp)	189.5 - 194.5
Measured Bottom Depth (ft bmp)	194.5
Sample Comment	13:10 - Pumped 30 minutes before starting readings because water was observed to be turbid.
Initial Water Level Date/Time	01/20/2022 13:10
Initial Water Level Depth (ft bmp)	99.95
Pump/Tubing Intake Depth (ft bmp)	192
Tubing Length (ft)	194
Tubing Inner Diameter (in)	0.25
Purging Initiation Date/Time	01/20/2022 13:10
Total Purge Volume (gal)	15
Modified Sample	No
If Modified, Reasoning	
Sample Collection Information	Bottling-Start: 01/20/2022 15:10:00, Bottling-Stop: 01/20/2022 15:11:00, Parameters-Sampled: PFAS

Reading Time	Depth To Water (ft)	Cumulative Drawdown (ft)	Purge Rate (ml/min)	Temperature (deg c)	Specific Conductivity (us/cm)	Dissolved Oxygen (mg/l)	pH (su)	Oxidation-Reduction Potential (mV)	Turbidity (ntu)
14:50	103.83	3.88	500	8 +	369 +	<0.5	7.7	-118	122
14:55	103.83	3.88	500	8 +	369 +	<0.5	7.7	-118	130
15:00	103.83	3.88	500	8 +	369 +	<0.5	7.7	-118	140

Notes:

1) Abbreviations include: "deg c" indicates degrees Celsius; "ft" indicates feet; "ft bmp" indicates feet below reference measuring point; "gal" indicates gallons; "in" indicates inches; "mg/l" indicates milligrams per liter; "ml/min" indicates milliliters per minute; "mV" indicates millivolts; "NA" indicates not applicable; "NR" indicates not recorded; "ntu" indicates Nephelometric Turbidity units; "su" indicates standard units; "us/cm" indicates microsiemens per centimeter; and "+" indicates the parameter(s) may be used for stabilization calculations but cannot be used for other purposes.
2) Weather temperature units are in degrees Fahrenheit, unless otherwise noted.
3) Did indicator parameters reach stabilization? Yes
4) Was the two hour time limit reached? Yes
5) Calculations:
   - Head Above Pump Intake (ft) 92.05
   - Total Drawdown (ft) 3.88
   - Calculated Final Purge Volume (gal) 1.13
6) If Drawdown Did Not Stabilize or Stabilized Drawdown >0.3 ft, is Total Purge Volume > Calculated Final Purge Volume? Yes

Well Sampling Worksheet
WWW RAP Field Data
AREA 5 2021-Q3 - AREA5-RI-8A
Kent County, MI

Well	AREA5-RI-8A / 2 in Diameter PVC
Sample Quarter	2021-Q3
Date	09/14/2021
Weather	70F Partly Cloudy
Sampler Initials	MKM
Purging Device	Bladder-Pump: BPC-2, Peristaltic-Pump: NA, Centrifugal-Pump: NA
Meters Used	YSI: 20K101901, Turbidimeter: 19040L075731, Water-Level-Meter: NR
Reference Measuring Point	PVC
Well Screen (ft bmp)	85.1 - 90.1
Measured Bottom Depth (ft bmp)	90.55
Sample Comment	Well stopped producing at 11:20 and at 12:35. Field staff surged the well at 12:35 due to the high turbidity of the purge water.
Initial Water Level Date/Time	09/14/2021 10:40
Initial Water Level Depth (ft bmp)	79.37
Pump/Tubing Intake Depth (ft bmp)	86.5
Tubing Length (ft)	91
Tubing Inner Diameter (in)	0.25
Purging Initiation Date/Time	09/14/2021 10:45
Total Purge Volume (gal)	11
Modified Sample	No
If Modified, Reasoning	
Sample Collection Information	Bottling-Start: 09/14/2021 12:45:00, Bottling-Stop: 09/14/2021 12:50:00, Parameters-Sampled: PFAS

Reading Time	Depth To Water (ft)	Cumulative Drawdown (ft)	Purge Rate (ml/min)	Temperature (deg c)	Specific Conductivity (us/cm)	Dissolved Oxygen (mg/l)	pH (su)	Oxidation-Reduction Potential (mV)	Turbidity (ntu)
11:15	79.37	0.00	350	15 +	746 +	9.0	7.4	245	781
11:20	79.39	0.02	350	16 +	744 +	8.3	7.5	251	NR
11:30	NR	NR	350	NR	NR	NR	NR	NR	NR
12:10	79.39	0.02	350	15 +	726 +	8.2	7.4	237	605
12:15	79.39	0.02	350	15 +	714 +	8.3	7.4	263	372
12:20	79.39	0.02	350	15 +	713 +	8.2	7.4	268	283
12:25	79.39	0.02	350	15 +	715 +	8.2	7.4	274	228
12:30	79.39	0.02	350	15 +	721 +	7.9	7.4	280	NR
12:35	NR	NR	350	NR	NR	NR	NR	NR	NR
12:40	NR	NR	350	15 +	713 +	8.3	7.3	298	NR
12:45	NR	NR	NR	15 +	733 +	8.3	7.3	302	>999

Notes:

1) Abbreviations include: "deg c" indicates degrees Celsius; "ft" indicates feet; "ft bmp" indicates feet below reference measuring point; "gal" indicates gallons; "in" indicates inches; "mg/l" indicates milligrams per liter; "ml/min" indicates milliliters per minute; "mV" indicates millivolts; "NA" indicates not applicable; "NR" indicates not recorded; "ntu" indicates Nephelometric Turbidity units; "su" indicates standard units; "us/cm" indicates microsiemens per centimeter; and "+" indicates the parameter(s) may be used for stabilization calculations but cannot be used for other purposes.
2) Weather temperature units are in degrees Fahrenheit, unless otherwise noted.
3) Did indicator parameters reach stabilization? No
4) Was the two hour time limit reached? Yes
5) Calculations:
   - Head Above Pump Intake (ft) 7.13
   - Total Drawdown (ft) 0.02
   - Calculated Final Purge Volume (gal) NA
6) If Drawdown Did Not Stabilize or Stabilized Drawdown >0.3 ft, is Total Purge Volume > Calculated Final Purge Volume? NA

Well Sampling Worksheet
WWW RAP Field Data
AREA 5 2021-Q3 - AREA5-RI-8B
Kent County, MI

Well	AREA5-RI-8B / 2 in Diameter PVC
Sample Quarter	2021-Q3
Date	09/15/2021
Weather	60F Partly Cloudy
Sampler Initials	MKM
Purging Device	Bladder-Pump: BP-12, Peristaltic-Pump: NA, Centrifugal-Pump: NA
Meters Used	YSI: 08B100087, Turbidimeter: TM-01, Water-Level-Meter: NR
Reference Measuring Point	PVC
Well Screen (ft bmp)	156.5 - 161.5
Measured Bottom Depth (ft bmp)	161.65
Sample Comment	
Initial Water Level Date/Time	09/15/2021 10:05
Initial Water Level Depth (ft bmp)	79.16
Pump/Tubing Intake Depth (ft bmp)	159.1
Tubing Length (ft)	162
Tubing Inner Diameter (in)	0.25
Purging Initiation Date/Time	09/15/2021 10:10
Total Purge Volume (gal)	4
Modified Sample	No
If Modified, Reasoning	
Sample Collection Information	Bottling-Start: 09/15/2021 11:10:00, Bottling-Stop: 09/15/2021 11:15:00, Parameters-Sampled: PFAS

Reading Time	Depth To Water (ft)	Cumulative Drawdown (ft)	Purge Rate (ml/min)	Temperature (deg c)	Specific Conductivity (us/cm)	Dissolved Oxygen (mg/l)	pH (su)	Oxidation-Reduction Potential (mV)	Turbidity (ntu)
10:55	79.22	0.06	250	14 +	770 +	0.7	7.1	-20	254
11:00	79.22	0.06	250	13 +	760 +	0.6	7.1	-16	255
11:05	79.22	0.06	250	13 +	757 +	0.6	7.1	-17	258

Notes:

1) Abbreviations include: "deg c" indicates degrees Celsius; "ft" indicates feet; "ft bmp" indicates feet below reference measuring point; "gal" indicates gallons; "in" indicates inches; "mg/l" indicates milligrams per liter; "ml/min" indicates milliliters per minute; "mV" indicates millivolts; "NA" indicates not applicable; "NR" indicates not recorded; "ntu" indicates Nephelometric Turbidity units; "su" indicates standard units; "us/cm" indicates microsiemens per centimeter; and "+" indicates the parameter(s) may be used for stabilization calculations but cannot be used for other purposes.
2) Weather temperature units are in degrees Fahrenheit, unless otherwise noted.
3) Did indicator parameters reach stabilization? Yes
4) Was the two hour time limit reached? No
5) Calculations:
   - Head Above Pump Intake (ft) 79.94
   - Total Drawdown (ft) 0.06
   - Calculated Final Purge Volume (gal) NA
6) If Drawdown Did Not Stabilize or Stabilized Drawdown >0.3 ft, is Total Purge Volume > Calculated Final Purge Volume? NA

Well Sampling Worksheet
WWW RAP Field Data
AREA 5 2021-Q3 - AREA5-RI-8C
Kent County, MI

Well	AREA5-RI-8C / 2 in Diameter PVC
Sample Quarter	2021-Q3
Date	09/15/2021
Weather	60F Sunny
Sampler Initials	AB
Purging Device	Bladder-Pump: BP-11, Peristaltic-Pump: NA, Centrifugal-Pump: NA
Meters Used	YSI: 20K101901, Turbidimeter: 19040C075131, Water-Level-Meter: NR
Reference Measuring Point	PVC
Well Screen (ft bmp)	174.4 - 179.4
Measured Bottom Depth (ft bmp)	179.7
Sample Comment	ORP did not stabilize per the Standard Operating Procedure (SOP).
Initial Water Level Date/Time	09/15/2021 10:25
Initial Water Level Depth (ft bmp)	83.35
Pump/Tubing Intake Depth (ft bmp)	177.2
Tubing Length (ft)	180
Tubing Inner Diameter (in)	0.25
Purging Initiation Date/Time	09/15/2021 10:30
Total Purge Volume (gal)	7.4
Modified Sample	No
If Modified, Reasoning	
Sample Collection Information	Bottling-Start: 09/15/2021 11:45:00, Bottling-Stop: 09/15/2021 11:50:00, Parameters-Sampled: PFAS

Reading Time	Depth To Water (ft)	Cumulative Drawdown (ft)	Purge Rate (ml/min)	Temperature (deg c)	Specific Conductivity (us/cm)	Dissolved Oxygen (mg/l)	pH (su)	Oxidation-Reduction Potential (mV)	Turbidity (ntu)
11:30	83.40	0.05	350	12 +	945 +	1.5	7.4	97 +	262
11:35	83.40	0.05	350	12 +	948 +	1.5	7.4	80 +	205
11:40	83.40	0.05	350	12 +	949 +	1.5	7.4	95 +	190

Notes:

1) Abbreviations include: "deg c" indicates degrees Celsius; "ft" indicates feet; "ft bmp" indicates feet below reference measuring point; "gal" indicates gallons; "in" indicates inches; "mg/l" indicates milligrams per liter; "ml/min" indicates milliliters per minute; "mV" indicates millivolts; "NA" indicates not applicable; "NR" indicates not recorded; "ntu" indicates Nephelometric Turbidity units; "su" indicates standard units; "us/cm" indicates microsiemens per centimeter; and "+" indicates the parameter(s) may be used for stabilization calculations but cannot be used for other purposes.
2) Weather temperature units are in degrees Fahrenheit, unless otherwise noted.
3) Did indicator parameters reach stabilization? No
4) Was the two hour time limit reached? No
5) Calculations:
   - Head Above Pump Intake (ft) 93.85
   - Total Drawdown (ft) 0.05
   - Calculated Final Purge Volume (gal) NA
6) If Drawdown Did Not Stabilize or Stabilized Drawdown >0.3 ft, is Total Purge Volume > Calculated Final Purge Volume? NA

Well Sampling Worksheet
WWW RAP Field Data
AREA 5 2022-Q1 - AREA5-RI-3A
Kent County, MI

Well	AREA5-RI-3A / 2 in Diameter PVC
Sample Quarter	2022-Q1
Date	01/17/2022
Weather	Overcast 25
Sampler Initials	DG
Purging Device	Bladder-Pump: BP-11, Peristaltic-Pump: NA, Centrifugal-Pump: NA
Meters Used	YSI: NR, Turbidimeter: NR, Water-Level-Meter: NR
Reference Measuring Point	PVC
Well Screen (ft bmp)	61.8 - 66.8
Measured Bottom Depth (ft bmp)	66.76
Sample Comment	Depth to water did not stabilize. DUP Collected
Initial Water Level Date/Time	01/17/2022 10:25
Initial Water Level Depth (ft bmp)	32.73
Pump/Tubing Intake Depth (ft bmp)	64
Tubing Length (ft)	67
Tubing Inner Diameter (in)	0.25
Purging Initiation Date/Time	01/17/2022 10:30
Total Purge Volume (gal)	2.5
Modified Sample	No
If Modified, Reasoning	
Sample Collection Information	Bottling-Start: 01/17/2022 10:55:00, Bottling-Stop: 01/17/2022 11:00:00, Parameters-Sampled: PFAS

Reading Time	Depth To Water (ft)	Cumulative Drawdown (ft)	Purge Rate (ml/min)	Temperature (deg c)	Specific Conductivity (us/cm)	Dissolved Oxygen (mg/l)	pH (su)	Oxidation-Reduction Potential (mV)	Turbidity (ntu)
10:35	33.73 +	1.00	470	10 +	618 +	2.4	7.4	240	78
10:38	33.8 +	1.07	470	10 +	619 +	1.9	7.4	243	74
10:41	33.84 +	1.11	470	10 +	619 +	2.2	7.4	246	79
10:44	33.84 +	1.11	470	10 +	618 +	2.2	7.5	247	80
10:47	33.85 +	1.12	470	10 +	619 +	2.3	7.5	248	74
10:50	33.87 +	1.14	470	10 +	620 +	2.3	7.5	250	72

Notes:

1) Abbreviations include: "deg c" indicates degrees Celsius; "ft" indicates feet; "ft bmp" indicates feet below reference measuring point; "gal" indicates gallons; "in" indicates inches; "mg/l" indicates milligrams per liter; "ml/min" indicates milliliters per minute; "mV" indicates millivolts; "NA" indicates not applicable; "NR" indicates not recorded; "ntu" indicates Nephelometric Turbidity units; "su" indicates standard units; "us/cm" indicates microsiemens per centimeter; and "+" indicates the parameter(s) may be used for stabilization calculations but cannot be used for other purposes.
2) Weather temperature units are in degrees Fahrenheit, unless otherwise noted.
3) Did indicator parameters reach stabilization? No
4) Was the two hour time limit reached? No
5) Calculations:
   - Head Above Pump Intake (ft): 31.27
   - Total Drawdown (ft): 1.14
   - Calculated Final Purge Volume (gal): 0.36
6) If Drawdown Did Not Stabilize or Stabilized Drawdown >0.3 ft, is Total Purge Volume > Calculated Final Purge Volume? Yes

Well Sampling Worksheet
WWW RAP Field Data
AREA 5 2022-Q1 - AREA5-RI-3B
Kent County, MI

Well	AREA5-RI-3B / 2 in Diameter PVC
Sample Quarter	2022-Q1
Date	01/17/2022
Weather	Overcast, 28
Sampler Initials	MKM
Purging Device	Bladder-Pump: BP-12, Peristaltic-Pump: NA, Centrifugal-Pump: NA
Meters Used	YSI: NR, Turbidimeter: NR, Water-Level-Meter: NR
Reference Measuring Point	PVC
Well Screen (ft bmp)	109.0 - 114.0
Expected Well Bottom Depth (ft bmp)	114
Measured Bottom Depth (ft bmp)	114
Sample Comment	Turbidity did not stabilize per the Standard Operating Procedure (SOP).
Initial Water Level Date/Time	01/17/2022 10:00
Initial Water Level Depth (ft bmp)	34.25
Pump/Tubing Intake Depth (ft bmp)	111.5
Tubing Length (ft)	114
Tubing Inner Diameter (in)	0.25
Purging Initiation Date/Time	01/17/2022 10:05
Total Purge Volume (gal)	7.85
Modified Sample	No
If Modified, Reasoning	
Sample Collection Information	Bottling-Start: 01/17/2022 11:15:00, Bottling-Stop: 01/17/2022 11:20:00, Parameters-Sampled: PFAS

Reading Time	Depth To Water (ft)	Cumulative Drawdown (ft)	Purge Rate (ml/min)	Temperature (deg c)	Specific Conductivity (us/cm)	Dissolved Oxygen (mg/l)	pH (su)	Oxidation-Reduction Potential (mV)	Turbidity (ntu)
10:40	36.30	2.05	450	9.8 +	2,128 +	3.0	7.0	-5	703 +
10:45	36.30	2.05	450	10 +	2,145 +	2.8	7.0	-9	147 +
10:50	36.40	2.15	450	9.9 +	2,147 +	1.7	7.0	-12	71 +
10:53	36.35	2.10	450	9.9 +	2,141 +	1.7	7.0	-12	68 +
10:56	36.30	2.05	450	10 +	2,154 +	1.6	7.0	-16	39 +
11:00	36.30	2.05	450	9.9 +	2,151 +	1.6	7.0	-12	19 +
11:03	36.30	2.05	450	9.9 +	2,142 +	1.5	7.0	-16	15 +

Well Sampling Worksheet
WWW RAP Field Data
AREA 5 2022-Q1 - AREA5-RI-3B
Kent County, MI

Well	AREA5-RI-3B / 2 in Diameter PVC
Sample Quarter	2022-Q1
Date	01/17/2022
Weather	Overcast, 28
Sampler Initials	MKM
Purging Device	Bladder-Pump: BP-12, Peristaltic-Pump: NA, Centrifugal-Pump: NA
Meters Used	YSI: NR, Turbidimeter: NR, Water-Level-Meter: NR
Reference Measuring Point	PVC
Well Screen (ft bmp)	109.0 - 114.0
Expected Well Bottom Depth (ft bmp)	114
Measured Bottom Depth (ft bmp)	114
Sample Comment	Turbidity did not stabilize per the Standard Operating Procedure (SOP).
Initial Water Level Date/Time	01/17/2022 10:00
Initial Water Level Depth (ft bmp)	34.25
Pump/Tubing Intake Depth (ft bmp)	111.5
Tubing Length (ft)	114
Tubing Inner Diameter (in)	0.25
Purging Initiation Date/Time	01/17/2022 10:05
Total Purge Volume (gal)	7.85
Modified Sample	No
If Modified, Reasoning	
Sample Collection Information	Bottling-Start: 01/17/2022 11:15:00, Bottling-Stop: 01/17/2022 11:20:00, Parameters-Sampled: PFAS

Reading Time	Depth To Water (ft)	Cumulative Drawdown (ft)	Purge Rate (ml/min)	Temperature (deg c)	Specific Conductivity (us/cm)	Dissolved Oxygen (mg/l)	pH (su)	Oxidation-Reduction Potential (mV)	Turbidity (ntu)
11:06	36.30	2.05	450	10 +	2,143 +	1.4	7.0	-20	13.4 +
11:09	36.30	2.05	450	10 +	2,147 +	1.4	7.0	-22	11.3 +
11:11	36.30	2.05	450	9.9 +	2,145 +	1.4	7.0	-24	10 +

Notes:

1) Abbreviations include: "deg c" indicates degrees Celsius; "ft" indicates feet; "ft bmp" indicates feet below reference measuring point; "gal" indicates gallons; "in" indicates inches; "mg/l" indicates milligrams per liter; "ml/min" indicates milliliters per minute; "mV" indicates millivolts; "NA" indicates not applicable; "NR" indicates not recorded; "ntu" indicates Nephelometric Turbidity units; "su" indicates standard units; "us/cm" indicates microsiemens per centimeter; and "+" indicates the parameter(s) may be used for stabilization calculations but cannot be used for other purposes.
2) Weather temperature units are in degrees Fahrenheit, unless otherwise noted.
3) Did indicator parameters reach stabilization? No
4) Was the two hour time limit reached? No
5) Calculations:
   - Head Above Pump Intake (ft) 77.25
   - Total Drawdown (ft) 2.05
   - Calculated Final Purge Volume (gal) 0.62
6) If Drawdown Did Not Stabilize or Stabilized Drawdown >0.3 ft, is Total Purge Volume > Calculated Final Purge Volume? Yes

Well Sampling Worksheet
WWW RAP Field Data
AREA 5 2022-Q1 - AREA5-RI-11A
Kent County, MI

Well	AREA5-RI-11A / 2 in Diameter PVC
Sample Quarter	2022-Q1
Date	01/19/2022
Weather	Overcast, 30s
Sampler Initials	DG
Purging Device	Bladder-Pump: BP-11, Peristaltic-Pump: NA, Centrifugal-Pump: NA
Meters Used	YSI: NR, Turbidimeter: NR, Water-Level-Meter: NR
Reference Measuring Point	PVC
Well Screen (ft bmp)	110.0 - 115.0
Measured Bottom Depth (ft bmp)	115
Sample Comment	
Initial Water Level Date/Time	01/19/2022 09:50
Initial Water Level Depth (ft bmp)	96.02
Pump/Tubing Intake Depth (ft bmp)	112.5
Tubing Length (ft)	115
Tubing Inner Diameter (in)	0.25
Purging Initiation Date/Time	01/19/2022 09:55
Total Purge Volume (gal)	8
Modified Sample	No
If Modified, Reasoning	
Sample Collection Information	Bottling-Start: 01/19/2022 10:55:00, Bottling-Stop: 01/19/2022 10:56:00, Parameters-Sampled: PFAS

Reading Time	Depth To Water (ft)	Cumulative Drawdown (ft)	Purge Rate (ml/min)	Temperature (deg c)	Specific Conductivity (us/cm)	Dissolved Oxygen (mg/l)	pH (su)	Oxidation-Reduction Potential (mV)	Turbidity (ntu)
09:58	96.02	0.00	500	9 +	628 +	2.2	7.4	-2	67
10:01	96.02	0.00	500	9 +	630 +	1.7	7.4	-21	54
10:06	96.02	0.00	500	9 +	634 +	1.4	7.5	-32	44
10:11	96.02	0.00	500	9 +	638 +	1.1	7.5	-39	28
10:16	96.02	0.00	500	9 +	642 +	1.0	7.5	-44	25
10:21	96.02	0.00	500	9 +	644 +	0.9	7.5	-53	18
10:26	96.02	0.00	500	9 +	643 +	0.9	7.5	-52	14
10:31	96.02	0.00	500	9 +	633 +	0.9	7.5	-51	13
10:36	96.02	0.00	500	9 +	642 +	0.8	7.5	-53	11

Well Sampling Worksheet
WWW RAP Field Data
AREA 5 2022-Q1 - AREA5-RI-11A
Kent County, MI

Well	AREA5-RI-11A / 2 in Diameter PVC
Sample Quarter	2022-Q1
Date	01/19/2022
Weather	Overcast, 30s
Sampler Initials	DG
Purging Device	Bladder-Pump: BP-11, Peristaltic-Pump: NA, Centrifugal-Pump: NA
Meters Used	YSI: NR, Turbidimeter: NR, Water-Level-Meter: NR
Reference Measuring Point	PVC
Well Screen (ft bmp)	110.0 - 115.0
Measured Bottom Depth (ft bmp)	115
Sample Comment	
Initial Water Level Date/Time	01/19/2022 09:50
Initial Water Level Depth (ft bmp)	96.02
Pump/Tubing Intake Depth (ft bmp)	112.5
Tubing Length (ft)	115
Tubing Inner Diameter (in)	0.25
Purging Initiation Date/Time	01/19/2022 09:55
Total Purge Volume (gal)	8
Modified Sample	No
If Modified, Reasoning	
Sample Collection Information	Bottling-Start: 01/19/2022 10:55:00, Bottling-Stop: 01/19/2022 10:56:00, Parameters-Sampled: PFAS

Reading Time	Depth To Water (ft)	Cumulative Drawdown (ft)	Purge Rate (ml/min)	Temperature (deg c)	Specific Conductivity (us/cm)	Dissolved Oxygen (mg/l)	pH (su)	Oxidation-Reduction Potential (mV)	Turbidity (ntu)
10:41	96.02	0.00	500	9 +	642 +	0.8	7.5	-56	9
10:46	96.02	0.00	500	9 +	642 +	0.8	7.6	-56	8
10:51	96.02	0.00	500	9 +	641 +	0.8	7.6	-55	7

Notes:

1) Abbreviations include: "deg c" indicates degrees Celsius; "ft" indicates feet; "ft bmp" indicates feet below reference measuring point; "gal" indicates gallons; "in" indicates inches; "mg/l" indicates milligrams per liter; "ml/min" indicates milliliters per minute; "mV" indicates millivolts; "NA" indicates not applicable; "NR" indicates not recorded; "ntu" indicates Nephelometric Turbidity units; "su" indicates standard units; "us/cm" indicates microsiemens per centimeter; and "+" indicates the parameter(s) may be used for stabilization calculations but cannot be used for other purposes.
2) Weather temperature units are in degrees Fahrenheit, unless otherwise noted.
3) Did indicator parameters reach stabilization? Yes
4) Was the two hour time limit reached? No
5) Calculations:
   - Head Above Pump Intake (ft): 16.48
   - Total Drawdown (ft): 0.00
   - Calculated Final Purge Volume (gal): NA
6) If Drawdown Did Not Stabilize or Stabilized Drawdown >0.3 ft, is Total Purge Volume > Calculated Final Purge Volume? NA

Well Sampling Worksheet
WWW RAP Field Data
AREA 5 2022-Q1 - AREA5-RI-11B
Kent County, MI

Well	AREA5-RI-11B / 2 in Diameter PVC
Sample Quarter	2022-Q1
Date	01/18/2022
Weather	Overcast, 32
Sampler Initials	DG
Purging Device	Bladder-Pump: BP-11, Peristaltic-Pump: NA, Centrifugal-Pump: NA
Meters Used	YSI: NR, Turbidimeter: NR, Water-Level-Meter: NR
Reference Measuring Point	PVC
Well Screen (ft bmp)	140.0 - 145.0
Measured Bottom Depth (ft bmp)	145
Sample Comment	Turbidity did not stabilize per the Standard Operating Procedure (SOP).
Initial Water Level Date/Time	01/18/2022 13:55
Initial Water Level Depth (ft bmp)	95.57
Pump/Tubing Intake Depth (ft bmp)	142.5
Tubing Length (ft)	145
Tubing Inner Diameter (in)	0.25
Purging Initiation Date/Time	01/18/2022 14:00
Total Purge Volume (gal)	4.6
Modified Sample	No
If Modified, Reasoning	
Sample Collection Information	Bottling-Start: 01/18/2022 14:35:00, Bottling-Stop: 01/18/2022 14:36:00, Parameters-Sampled: PFAS

Reading Time	Depth To Water (ft)	Cumulative Drawdown (ft)	Purge Rate (ml/min)	Temperature (deg c)	Specific Conductivity (us/cm)	Dissolved Oxygen (mg/l)	pH (su)	Oxidation-Reduction Potential (mV)	Turbidity (ntu)
14:03	95.57	0.00	450	9 +	568 +	0.8	7.6	138	43 +
14:06	95.57	0.00	450	9 +	569 +	0.8	7.6	122	33 +
14:09	95.57	0.00	450	9 +	573 +	0.8	7.6	111	30 +
14:12	95.57	0.00	450	9 +	574 +	0.8	7.6	104	21 +
14:15	95.57	0.00	450	9 +	575 +	0.7	7.5	90	18 +
14:20	95.57	0.00	450	9 +	576 +	0.7	7.5	80	17 +
14:25	95.57	0.00	450	9 +	577 +	0.7	7.5	70	10 +
14:30	95.57	0.00	450	9 +	578 +	0.7	7.5	65	9 +
14:35	95.57	0.00	450	9 +	578 +	0.7	7.5	65	7 +

Notes:

1) Abbreviations include: "deg c" indicates degrees Celsius; "ft" indicates feet; "ft bmp" indicates feet below reference measuring point; "gal" indicates gallons; "in" indicates inches; "mg/l" indicates milligrams per liter; "ml/min" indicates milliliters per minute; "mV" indicates millivolts; "NA" indicates not applicable; "NR" indicates not recorded; "ntu" indicates Nephelometric Turbidity units; "su" indicates standard units; "us/cm" indicates microsiemens per centimeter; and "+" indicates the parameter(s) may be used for stabilization calculations but cannot be used for other purposes.
2) Weather temperature units are in degrees Fahrenheit, unless otherwise noted.
3) Did indicator parameters reach stabilization? No
4) Was the two hour time limit reached? No
5) Calculations:
   - Head Above Pump Intake (ft) 46.93
   - Total Drawdown (ft) 0.00
   - Calculated Final Purge Volume (gal) NA
6) If Drawdown Did Not Stabilize or Stabilized Drawdown >0.3 ft, is Total Purge Volume > Calculated Final Purge Volume? NA

Well Sampling Worksheet
WWW RAP Field Data
AREA 5 2022-Q1 - AREA5-RI-11C
Kent County, MI

Well	AREA5-RI-11C / 2 in Diameter PVC
Sample Quarter	2022-Q1
Date	01/18/2022
Weather	Overcast, 32
Sampler Initials	MKM
Purging Device	Bladder-Pump: BP-10, Peristaltic-Pump: NA, Centrifugal-Pump: NA
Meters Used	YSI: NR, Turbidimeter: NR, Water-Level-Meter: NR
Reference Measuring Point	PVC
Well Screen (ft bmp)	232.5 - 237.5
Measured Bottom Depth (ft bmp)	237.5
Sample Comment	Turbidity did not stabilize per the Standard Operating Procedure (SOP). Pump suctioned up mud and silt at 14:30. YSI shut off at 15:06 and was turned back on. Last 3 reading are not 5 minutes apart per SOP. GZ
Initial Water Level Date/Time	01/18/2022 13:50
Initial Water Level Depth (ft bmp)	105.85
Pump/Tubing Intake Depth (ft bmp)	235
Tubing Length (ft)	238
Tubing Inner Diameter (in)	0.25
Purging Initiation Date/Time	01/18/2022 13:55
Total Purge Volume (gal)	10.7
Modified Sample	No
If Modified, Reasoning	
Sample Collection Information	Bottling-Start: 01/18/2022 15:30:00, Bottling-Stop: 01/18/2022 15:35:00, Parameters-Sampled: PFAS

Reading Time	Depth To Water (ft)	Cumulative Drawdown (ft)	Purge Rate (ml/min)	Temperature (deg c)	Specific Conductivity (us/cm)	Dissolved Oxygen (mg/l)	pH (su)	Oxidation-Reduction Potential (mV)	Turbidity (ntu)
14:30	105.85	0.00	425	8.5 +	1,233 +	<0.5	7.1	169	211 +
14:35	105.85	0.00	425	8.5 +	1,233 +	<0.5	7.1	143	136 +
14:40	105.85	0.00	425	8.7 +	1,234 +	<0.5	7.2	124	70.9 +
14:43	105.90	0.05	425	8.7 +	1,232 +	<0.5	7.2	121	52 +
14:46	105.90	0.05	425	8.7 +	1,231 +	<0.5	7.2	117	40.5 +
14:50	105.90	0.05	425	8.6 +	1,232 +	<0.5	7.2	111	28.7 +
15:00	105.90	0.05	425	8.7 +	1,236 +	<0.5	7.1	99	27.1 +
15:03	105.90	0.05	425	8.7 +	1,233 +	<0.5	7.1	97	20.1 +
15:06	105.90	0.05	425	8.6 +	1,236 +	<0.5	7.2	93	14.7 +

Well Sampling Worksheet
WWW RAP Field Data
AREA 5 2022-Q1 - AREA5-RI-11C
Kent County, MI

Well	AREA5-RI-11C / 2 in Diameter PVC
Sample Quarter	2022-Q1
Date	01/18/2022
Weather	Overcast, 32
Sampler Initials	MKM
Purging Device	Bladder-Pump: BP-10, Peristaltic-Pump: NA, Centrifugal-Pump: NA
Meters Used	YSI: NR, Turbidimeter: NR, Water-Level-Meter: NR
Reference Measuring Point	PVC
Well Screen (ft bmp)	232.5 - 237.5
Measured Bottom Depth (ft bmp)	237.5
Sample Comment	Turbidity did not stabilize per the Standard Operating Procedure (SOP). Pump suctioned up mud and silt at 14:30. YSI shut off at 15:06 and was turned back on. Last 3 reading are not 5 minutes apart per SOP. GZ
Initial Water Level Date/Time	01/18/2022 13:50
Initial Water Level Depth (ft bmp)	105.85
Pump/Tubing Intake Depth (ft bmp)	235
Tubing Length (ft)	238
Tubing Inner Diameter (in)	0.25
Purging Initiation Date/Time	01/18/2022 13:55
Total Purge Volume (gal)	10.7
Modified Sample	No
If Modified, Reasoning	
Sample Collection Information	Bottling-Start: 01/18/2022 15:30:00, Bottling-Stop: 01/18/2022 15:35:00, Parameters-Sampled: PFAS

Reading Time	Depth To Water (ft)	Cumulative Drawdown (ft)	Purge Rate (ml/min)	Temperature (deg c)	Specific Conductivity (us/cm)	Dissolved Oxygen (mg/l)	pH (su)	Oxidation-Reduction Potential (mV)	Turbidity (ntu)
15:20	105.90	0.05	425	8.5 +	1,237 +	<0.5	7.2	79	10 +
15:23	105.90	0.05	425	8.6 +	1,233 +	<0.5	7.2	79	9 +
15:26	105.90	0.05	425	8.7 +	1,232 +	<0.5	7.2	78	<5 +

Notes:

1) Abbreviations include: "deg c" indicates degrees Celsius; "ft" indicates feet; "ft bmp" indicates feet below reference measuring point; "gal" indicates gallons; "in" indicates inches; "mg/l" indicates milligrams per liter; "ml/min" indicates milliliters per minute; "mV" indicates millivolts; "NA" indicates not applicable; "NR" indicates not recorded; "ntu" indicates Nephelometric Turbidity units; "su" indicates standard units; "us/cm" indicates microsiemens per centimeter; and "+" indicates the parameter(s) may be used for stabilization calculations but cannot be used for other purposes.
2) Weather temperature units are in degrees Fahrenheit, unless otherwise noted.
3) Did indicator parameters reach stabilization? No
4) Was the two hour time limit reached? No
5) Calculations:
   - Head Above Pump Intake (ft) 129.15
   - Total Drawdown (ft) 0.05
   - Calculated Final Purge Volume (gal) NA
6) If Drawdown Did Not Stabilize or Stabilized Drawdown >0.3 ft, is Total Purge Volume > Calculated Final Purge Volume? NA

Well Sampling Worksheet
WWW RAP Field Data
AREA 5 2022-Q1 - AREA5-RI-11D
Kent County, MI

Well	AREA5-RI-11D / 2 in Diameter PVC
Sample Quarter	2022-Q1
Date	01/19/2022
Weather	Overcast and windy, 30s
Sampler Initials	MKM
Purging Device	Bladder-Pump: BPC-04, Peristaltic-Pump: NA, Centrifugal-Pump: NA
Meters Used	YSI: NR, Turbidimeter: NR, Water-Level-Meter: NR
Reference Measuring Point	PVC
Well Screen (ft bmp)	262.0 - 267.0
Measured Bottom Depth (ft bmp)	267
Sample Comment	
Initial Water Level Date/Time	01/19/2022 09:40
Initial Water Level Depth (ft bmp)	107.45
Pump/Tubing Intake Depth (ft bmp)	264.5
Tubing Length (ft)	267
Tubing Inner Diameter (in)	0.25
Purging Initiation Date/Time	01/19/2022 09:45
Total Purge Volume (gal)	10.2
Modified Sample	Yes
If Modified, Reasoning	Drawdown was greater than 0.3 ft
Sample Collection Information	Bottling-Start: 01/19/2022 11:35:00, Bottling-Stop: 01/19/2022 11:40:00, Parameters-Sampled: PFAS

Reading Time	Depth To Water (ft)	Cumulative Drawdown (ft)	Purge Rate (ml/min)	Temperature (deg c)	Specific Conductivity (us/cm)	Dissolved Oxygen (mg/l)	pH (su)	Oxidation-Reduction Potential (mV)	Turbidity (ntu)
10:20	107.70	0.25	350	8.5 +	1,530 +	<0.5	7.0	-36	237
10:45	107.80	0.35	350	8.3 +	1,487 +	0.8	7.1	-19	105
11:00	107.80	0.35	350	8.4 +	1,458 +	0.6	7.1	-20	57
11:05	107.80	0.35	350	8.4 +	1,460 +	0.5	7.1	-20	37
11:15	107.80	0.35	350	8.6 +	1,442 +	<0.5	7.1	-21	28
11:18	107.80	0.35	350	8.3 +	1,443 +	<0.5	7.1	-22	22
11:25	107.80	0.35	350	8.4 +	1,434 +	<0.5	7.1	-23	15
11:28	107.80	0.35	350	8.3 +	1,432 +	<0.5	7.1	-24	15
11:31	107.80	0.35	350	8.4 +	1,433 +	<0.5	7.1	-25	15

Notes:

1) Abbreviations include: "deg c" indicates degrees Celsius; "ft" indicates feet; "ft bmp" indicates feet below reference measuring point; "gal" indicates gallons; "in" indicates inches; "mg/l" indicates milligrams per liter; "ml/min" indicates milliliters per minute; "mV" indicates millivolts; "NA" indicates not applicable; "NR" indicates not recorded; "ntu" indicates Nephelometric Turbidity units; "su" indicates standard units; "us/cm" indicates microsiemens per centimeter; and "+" indicates the parameter(s) may be used for stabilization calculations but cannot be used for other purposes.
2) Weather temperature units are in degrees Fahrenheit, unless otherwise noted.
3) Did indicator parameters reach stabilization? Yes
4) Was the two hour time limit reached? No
5) Calculations:
   - Head Above Pump Intake (ft) 157.05
   - Total Drawdown (ft) 0.35
   - Calculated Final Purge Volume (gal) 0.75
6) If Drawdown Did Not Stabilize or Stabilized Drawdown >0.3 ft, is Total Purge Volume > Calculated Final Purge Volume? Yes

Well Sampling Worksheet
WWW RAP Field Data
AREA 5 2022-Q2 - AREA5-RI-9A
Kent County, MI

Well	AREA5-RI-9A / 2 in Diameter PVC
Sample Quarter	2022-Q2
Date	05/25/2022
Weather	Rain 65F
Sampler Initials	AG
Purging Device	Bladder-Pump: GZA-BP-11, Peristaltic-Pump: NA, Centrifugal-Pump: NA
Meters Used	YSI: 17G101583, Turbidimeter: NR, Water-Level-Meter: NR
Reference Measuring Point	PVC
Well Screen (ft bmp)	98.5 - 103.5
Measured Bottom Depth (ft bmp)	103.5
Sample Comment	
Initial Water Level Date/Time	05/25/2022 13:20
Initial Water Level Depth (ft bmp)	95.30
Pump/Tubing Intake Depth (ft bmp)	101
Tubing Length (ft)	104
Tubing Inner Diameter (in)	0.25
Purging Initiation Date/Time	05/25/2022 13:25
Total Purge Volume (gal)	5
Modified Sample	
If Modified, Reasoning	
Sample Collection Information	Bottling-Start: 05/25/2022 15:35:00, Bottling-Stop: 05/25/2022 15:40:00, Parameters-Sampled: PFAS

Reading Time	Depth To Water (ft)	Cumulative Drawdown (ft)	Purge Rate (ml/min)	Temperature (deg c)	Specific Conductivity (us/cm)	Dissolved Oxygen (mg/l)	pH (su)	Oxidation-Reduction Potential (mV)	Turbidity (ntu)
14:25	95.95	0.65	280	11 +	587 +	3.3	7.5	215	250
14:30	95.95	0.65	280	11 +	590 +	2.6	7.4	201	113
14:35	95.95	0.65	280	11 +	590 +	2.5	7.4	197	95
14:40	95.95	0.65	280	11 +	591 +	2.4	7.4	193	71
14:45	95.95	0.65	280	11 +	590 +	2.4	7.4	190	60
14:50	95.95	0.65	280	11 +	591 +	2.3	7.4	187	50
14:55	95.95	0.65	280	11 +	589 +	2.1	7.4	182	38
15:00	95.95	0.65	280	11 +	592 +	2.2	7.4	180	27
15:05	95.95	0.65	280	11 +	592 +	2.2	7.4	177	28
15:10	95.95	0.65	280	11 +	590 +	2.2	7.4	173	25

Well Sampling Worksheet
WWW RAP Field Data
AREA 5 2022-Q2 - AREA5-RI-9A
Kent County, MI

Well	AREA5-RI-9A / 2 in Diameter PVC
Sample Quarter	2022-Q2
Date	05/25/2022
Weather	Rain 65F
Sampler Initials	AG
Purging Device	Bladder-Pump: GZA-BP-11, Peristaltic-Pump: NA, Centrifugal-Pump: NA
Meters Used	YSI: 17G101583, Turbidimeter: NR, Water-Level-Meter: NR
Reference Measuring Point	PVC
Well Screen (ft bmp)	98.5 - 103.5
Measured Bottom Depth (ft bmp)	103.5
Sample Comment	
Initial Water Level Date/Time	05/25/2022 13:20
Initial Water Level Depth (ft bmp)	95.30
Pump/Tubing Intake Depth (ft bmp)	101
Tubing Length (ft)	104
Tubing Inner Diameter (in)	0.25
Purging Initiation Date/Time	05/25/2022 13:25
Total Purge Volume (gal)	5
Modified Sample	
If Modified, Reasoning	
Sample Collection Information	Bottling-Start: 05/25/2022 15:35:00, Bottling-Stop: 05/25/2022 15:40:00, Parameters-Sampled: PFAS

Reading Time	Depth To Water (ft)	Cumulative Drawdown (ft)	Purge Rate (ml/min)	Temperature (deg c)	Specific Conductivity (us/cm)	Dissolved Oxygen (mg/l)	pH (su)	Oxidation-Reduction Potential (mV)	Turbidity (ntu)
15:15	95.95	0.65	280	11 +	591 +	2.1	7.4	169	20
15:20	95.95	0.65	280	11 +	591 +	2.0	7.4	167	15
15:25	95.95	0.65	280	11 +	591 +	2.0	7.4	164	12

Notes:

1) Abbreviations include: "deg c" indicates degrees Celsius; "ft" indicates feet; "ft bmp" indicates feet below reference measuring point; "gal" indicates gallons; "in" indicates inches; "mg/l" indicates milligrams per liter; "ml/min" indicates milliliters per minute; "mV" indicates millivolts; "NA" indicates not applicable; "NR" indicates not recorded; "ntu" indicates Nephelometric Turbidity units; "su" indicates standard units; "us/cm" indicates microsiemens per centimeter; and "+" indicates the parameter(s) may be used for stabilization calculations but cannot be used for other purposes.
2) Weather temperature units are in degrees Fahrenheit, unless otherwise noted.
3) Did indicator parameters reach stabilization? No
4) Was the two hour time limit reached? Yes
5) Calculations:
   - Head Above Pump Intake (ft) 5.70
   - Total Drawdown (ft) 0.65
   - Calculated Final Purge Volume (gal) 0.37
6) If Drawdown Did Not Stabilize or Stabilized Drawdown >0.3 ft, is Total Purge Volume > Calculated Final Purge Volume? Yes

Well Sampling Worksheet
WWW RAP Field Data
AREA 5 2022-Q2 - AREA5-RI-9B
Kent County, MI

Well	AREA5-RI-9B / 2 in Diameter PVC
Sample Quarter	2022-Q2
Date	05/25/2022
Weather	Rainy Mid 60s
Sampler Initials	DW
Purging Device	Bladder-Pump: GZA-BP-12, Peristaltic-Pump: NA, Centrifugal-Pump: NA
Meters Used	YSI: 19K100063, Turbidimeter: NR, Water-Level-Meter: NR
Reference Measuring Point	PVC
Well Screen (ft bmp)	151.6 - 156.6
Measured Bottom Depth (ft bmp)	156.4
Sample Comment	
Initial Water Level Date/Time	05/25/2022 15:25
Initial Water Level Depth (ft bmp)	109.83
Pump/Tubing Intake Depth (ft bmp)	153.9
Tubing Length (ft)	157
Tubing Inner Diameter (in)	0.25
Purging Initiation Date/Time	05/25/2022 15:30
Total Purge Volume (gal)	10
Modified Sample	No
If Modified, Reasoning	
Sample Collection Information	Bottling-Start: 05/25/2022 17:15:00, Bottling-Stop: 05/25/2022 17:16:00, Parameters-Sampled: PFAS

Reading Time	Depth To Water (ft)	Cumulative Drawdown (ft)	Purge Rate (ml/min)	Temperature (deg c)	Specific Conductivity (us/cm)	Dissolved Oxygen (mg/l)	pH (su)	Oxidation-Reduction Potential (mV)	Turbidity (ntu)
16:00	109.83	0.00	350	11 +	774 +	1.2	7.8	188	763
16:10	109.83	0.00	350	11 +	774 +	0.6	7.7	9	332
16:22	109.83	0.00	350	11 +	774 +	0.6	7.6	-17	129
16:30	109.83	0.00	350	11 +	777 +	0.5	7.6	-25	84
16:40	109.83	0.00	350	11 +	776 +	<0.5	7.6	-29	60
16:50	109.83	0.00	350	11 +	775 +	<0.5	7.6	-33	51
17:00	109.83	0.00	350	11 +	775 +	<0.5	7.6	-37	50
17:05	109.83	0.00	350	11 +	777 +	<0.5	7.6	-45	48
17:10	109.83	0.00	350	11 +	776 +	<0.5	7.6	-40	48

Notes:

1) Abbreviations include: "deg c" indicates degrees Celsius; "ft" indicates feet; "ft bmp" indicates feet below reference measuring point; "gal" indicates gallons; "in" indicates inches; "mg/l" indicates milligrams per liter; "ml/min" indicates milliliters per minute; "mV" indicates millivolts; "NA" indicates not applicable; "NR" indicates not recorded; "ntu" indicates Nephelometric Turbidity units; "su" indicates standard units; "us/cm" indicates microsiemens per centimeter; and "+" indicates the parameter(s) may be used for stabilization calculations but cannot be used for other purposes.
2) Weather temperature units are in degrees Fahrenheit, unless otherwise noted.
3) Did indicator parameters reach stabilization? Yes
4) Was the two hour time limit reached? No
5) Calculations:
   - Head Above Pump Intake (ft) 44.07
   - Total Drawdown (ft) 0.00
   - Calculated Final Purge Volume (gal) NA
6) If Drawdown Did Not Stabilize or Stabilized Drawdown >0.3 ft, is Total Purge Volume > Calculated Final Purge Volume? NA

Well Sampling Worksheet
WWW RAP Field Data
AREA 5 2022-Q2 - AREA5-RI-9C
Kent County, MI

Well	AREA5-RI-9C / 2 in Diameter PVC
Sample Quarter	2022-Q2
Date	05/24/2022
Weather	low 60s and Rainy
Sampler Initials	DW
Purging Device	Bladder-Pump: GZA-BP-12, Peristaltic-Pump: NA, Centrifugal-Pump: NA
Meters Used	YSI: 19K10063, Turbidimeter: NR, Water-Level-Meter: NR
Reference Measuring Point	PVC
Well Screen (ft bmp)	221.9 - 226.9
Measured Bottom Depth (ft bmp)	226.86
Sample Comment	
Initial Water Level Date/Time	05/24/2022 11:35
Initial Water Level Depth (ft bmp)	110.00
Pump/Tubing Intake Depth (ft bmp)	224.3
Tubing Length (ft)	227
Tubing Inner Diameter (in)	0.25
Purging Initiation Date/Time	05/24/2022 11:40
Total Purge Volume (gal)	10
Modified Sample	No
If Modified, Reasoning	
Sample Collection Information	Bottling-Start: 05/24/2022 13:40:00, Bottling-Stop: 05/24/2022 13:41:00, Parameters-Sampled: PFAS

Reading Time	Depth To Water (ft)	Cumulative Drawdown (ft)	Purge Rate (ml/min)	Temperature (deg c)	Specific Conductivity (us/cm)	Dissolved Oxygen (mg/l)	pH (su)	Oxidation-Reduction Potential (mV)	Turbidity (ntu)
12:15	110.32	0.32	250	11 +	1,120 +	1.8	7.3	-62	>999
12:25	110.32	0.32	250	11 +	1,126 +	1.6	7.3	-61	802
12:35	110.32	0.32	250	11 +	1,132 +	1.4	7.4	-61	604
12:45	110.32	0.32	250	11 +	1,134 +	1.2	7.4	-62	544
12:55	110.32	0.32	250	11 +	1,136 +	1.1	7.4	-61	600
13:05	110.32	0.32	250	11 +	1,138 +	1.1	7.4	-60	454
13:15	110.32	0.32	250	11 +	1,142 +	1.1	7.4	-60	481
13:25	110.32	0.32	250	11 +	1,144 +	0.9	7.4	-60	462
13:35	110.32	0.32	250	11 +	1,147 +	1.5	7.4	-57	414

Notes:

1) Abbreviations include: "deg c" indicates degrees Celsius; "ft" indicates feet; "ft bmp" indicates feet below reference measuring point; "gal" indicates gallons; "in" indicates inches; "mg/l" indicates milligrams per liter; "ml/min" indicates milliliters per minute; "mV" indicates millivolts; "NA" indicates not applicable; "NR" indicates not recorded; "ntu" indicates Nephelometric Turbidity units; "su" indicates standard units; "us/cm" indicates microsiemens per centimeter; and "+" indicates the parameter(s) may be used for stabilization calculations but cannot be used for other purposes.
2) Weather temperature units are in degrees Fahrenheit, unless otherwise noted.
3) Did indicator parameters reach stabilization? No
4) Was the two hour time limit reached? Yes
5) Calculations:
   - Head Above Pump Intake (ft) 114.30
   - Total Drawdown (ft) 0.32
   - Calculated Final Purge Volume (gal) 0.64
6) If Drawdown Did Not Stabilize or Stabilized Drawdown >0.3 ft, is Total Purge Volume > Calculated Final Purge Volume? Yes

Well Sampling Worksheet
WWW RAP Field Data
AREA 5 2022-Q2 - HS-PMW-RI-103A
Kent County, MI

Well	HS-PMW-RI-103A / 2 in Diameter PVC
Sample Quarter	2022-Q2
Date	05/26/2022
Weather	Cloudy 74
Sampler Initials	AG
Purging Device	Bladder-Pump: BP-11, Peristaltic-Pump: NA, Centrifugal-Pump: NA
Meters Used	YSI: 17G101583, Turbidimeter: NR, Water-Level-Meter: NR
Reference Measuring Point	PVC
Well Screen (ft bmp)	89.6 - 94.6
Measured Bottom Depth (ft bmp)	94.6
Sample Comment	
Initial Water Level Date/Time	05/26/2022 11:15
Initial Water Level Depth (ft bmp)	74.96
Pump/Tubing Intake Depth (ft bmp)	87.5
Tubing Length (ft)	95
Tubing Inner Diameter (in)	0.25
Purging Initiation Date/Time	05/26/2022 11:20
Total Purge Volume (gal)	5
Modified Sample	No
If Modified, Reasoning	
Sample Collection Information	Bottling-Start: 05/26/2022 12:35:00, Bottling-Stop: 05/26/2022 12:40:00, Parameters-Sampled: PFAS

Reading Time	Depth To Water (ft)	Cumulative Drawdown (ft)	Purge Rate (ml/min)	Temperature (deg c)	Specific Conductivity (us/cm)	Dissolved Oxygen (mg/l)	pH (su)	Oxidation-Reduction Potential (mV)	Turbidity (ntu)
11:40	74.96	0.00	350	10.5 +	708 +	1.5	7.3	26	67
11:45	74.96	0.00	350	10.5 +	711 +	1.3	7.3	6	39
11:50	74.96	0.00	350	10 +	710 +	1.2	7.3	-2	23
11:55	74.96	0.00	350	10 +	708 +	1.2	7.3	-8	22
12:00	74.96	0.00	350	10 +	709 +	1.2	7.3	-12	18
12:05	74.96	0.00	350	10 +	711 +	1.0	7.3	-16	16
12:10	74.96	0.00	350	10 +	709 +	1.0	7.3	-18	12
12:15	74.96	0.00	350	11 +	708 +	1.0	7.3	-20	12

Well Sampling Worksheet
WWW RAP Field Data
AREA 5 2022-Q2 - HS-PMW-RI-103A
Kent County, MI

Well	HS-PMW-RI-103A / 2 in Diameter PVC
Sample Quarter	2022-Q2
Date	05/26/2022
Weather	Cloudy 74
Sampler Initials	AG
Purging Device	Bladder-Pump: BP-11, Peristaltic-Pump: NA, Centrifugal-Pump: NA
Meters Used	YSI: 17G101583, Turbidimeter: NR, Water-Level-Meter: NR
Reference Measuring Point	PVC
Well Screen (ft bmp)	89.6 - 94.6
Measured Bottom Depth (ft bmp)	94.6
Sample Comment	
Initial Water Level Date/Time	05/26/2022 11:15
Initial Water Level Depth (ft bmp)	74.96
Pump/Tubing Intake Depth (ft bmp)	87.5
Tubing Length (ft)	95
Tubing Inner Diameter (in)	0.25
Purging Initiation Date/Time	05/26/2022 11:20
Total Purge Volume (gal)	5
Modified Sample	No
If Modified, Reasoning	
Sample Collection Information	Bottling-Start: 05/26/2022 12:35:00, Bottling-Stop: 05/26/2022 12:40:00, Parameters-Sampled: PFAS

Reading Time	Depth To Water (ft)	Cumulative Drawdown (ft)	Purge Rate (ml/min)	Temperature (deg c)	Specific Conductivity (us/cm)	Dissolved Oxygen (mg/l)	pH (su)	Oxidation-Reduction Potential (mV)	Turbidity (ntu)
12:20	74.96	0.00	350	11 +	705 +	1.0	7.3	-23	8
12:25	74.96	0.00	350	11 +	705 +	1.0	7.3	-23	8
12:30	74.96	0.00	350	11 +	707 +	1.0	7.3	-23	8

Notes:

1) Abbreviations include: "deg c" indicates degrees Celsius; "ft" indicates feet; "ft bmp" indicates feet below reference measuring point; "gal" indicates gallons; "in" indicates inches; "mg/l" indicates milligrams per liter; "ml/min" indicates milliliters per minute; "mV" indicates millivolts; "NA" indicates not applicable; "NR" indicates not recorded; "ntu" indicates Nephelometric Turbidity units; "su" indicates standard units; "us/cm" indicates microsiemens per centimeter; and "+" indicates the parameter(s) may be used for stabilization calculations but cannot be used for other purposes.
2) Weather temperature units are in degrees Fahrenheit, unless otherwise noted.
3) Did indicator parameters reach stabilization? Yes
4) Was the two hour time limit reached? No
5) Calculations:
   - Head Above Pump Intake (ft) 12.54
   - Total Drawdown (ft) 0.00
   - Calculated Final Purge Volume (gal) NA
6) If Drawdown Did Not Stabilize or Stabilized Drawdown >0.3 ft, is Total Purge Volume > Calculated Final Purge Volume? NA

Well Sampling Worksheet
WWW RAP Field Data
AREA 5 2022-Q2 - HS-PMW-RI-103B
Kent County, MI

Well	HS-PMW-RI-103B / 2 in Diameter PVC
Sample Quarter	2022-Q2
Date	05/26/2022
Weather	Rainy, Upper 60s
Sampler Initials	DW
Purging Device	Bladder-Pump: BP-10, Peristaltic-Pump: NA, Centrifugal-Pump: NA
Meters Used	YSI: 19K100083, Turbidimeter: NR, Water-Level-Meter: NR
Reference Measuring Point	PVC
Well Screen (ft bmp)	108.7 - 113.7
Measured Bottom Depth (ft bmp)	113.76
Sample Comment	
Initial Water Level Date/Time	05/26/2022 11:35
Initial Water Level Depth (ft bmp)	76.44
Pump/Tubing Intake Depth (ft bmp)	111.26
Tubing Length (ft)	114
Tubing Inner Diameter (in)	0.25
Purging Initiation Date/Time	05/26/2022 11:40
Total Purge Volume (gal)	13
Modified Sample	No
If Modified, Reasoning	
Sample Collection Information	Bottling-Start: 05/26/2022 13:30:00, Bottling-Stop: 05/26/2022 13:31:00, Parameters-Sampled: PFAS

Reading Time	Depth To Water (ft)	Cumulative Drawdown (ft)	Purge Rate (ml/min)	Temperature (deg c)	Specific Conductivity (us/cm)	Dissolved Oxygen (mg/l)	pH (su)	Oxidation-Reduction Potential (mV)	Turbidity (ntu)
12:05	76.95	0.51	500	11 +	707 +	0.8	7.4	242	33
12:15	76.91	0.47	450	10 +	704 +	0.5	7.5	231	22
12:25	76.91	0.47	450	10 +	704 +	0.5	7.5	221	13
12:35	76.88	0.44	450	10 +	703 +	0.4	7.6	214	19
12:45	76.95	0.51	450	10 +	702 +	<0.5	7.6	210	19
12:55	76.95	0.51	450	10 +	701 +	<0.5	7.6	201	8
13:05	76.95	0.51	450	10 +	700 +	<0.5	7.6	195	8
13:15	76.95	0.51	450	10 +	700 +	<0.5	7.6	190	5
13:20	76.95	0.51	450	10 +	701 +	<0.5	7.6	186	5
13:25	76.95	0.51	450	10 +	701 +	<0.5	7.6	184	6

Notes:

1) Abbreviations include: "deg c" indicates degrees Celsius; "ft" indicates feet; "ft bmp" indicates feet below reference measuring point; "gal" indicates gallons; "in" indicates inches; "mg/l" indicates milligrams per liter; "ml/min" indicates milliliters per minute; "mV" indicates millivolts; "NA" indicates not applicable; "NR" indicates not recorded; "ntu" indicates Nephelometric Turbidity units; "su" indicates standard units; "us/cm" indicates microsiemens per centimeter; and "+" indicates the parameter(s) may be used for stabilization calculations but cannot be used for other purposes.
2) Weather temperature units are in degrees Fahrenheit, unless otherwise noted.
3) Did indicator parameters reach stabilization? Yes
4) Was the two hour time limit reached? No
5) Calculations:
   - Head Above Pump Intake (ft) 34.82
   - Total Drawdown (ft) 0.51
   - Calculated Final Purge Volume (gal) 0.38
6) If Drawdown Did Not Stabilize or Stabilized Drawdown >0.3 ft, is Total Purge Volume > Calculated Final Purge Volume? Yes

Well Sampling Worksheet
WWW RAP Field Data
AREA 5 2022-Q2 - HS-PMW-RI-104A
Kent County, MI

Well	HS-PMW-RI-104A / 2 in Diameter PVC
Sample Quarter	2022-Q2
Date	05/23/2022
Weather	Sunny, mid 50s
Sampler Initials	MKM
Purging Device	Bladder-Pump: NA, Peristaltic-Pump: PER-02, Centrifugal-Pump: NA
Meters Used	YSI: 19K100063, Turbidimeter: NR, Water-Level-Meter: NR
Reference Measuring Point	PVC
Well Screen (ft bmp)	14.6 - 19.6
Measured Bottom Depth (ft bmp)	19.62
Sample Comment	Last 3 mreadings are not 5 minutes apart per Stnadard Operating Procedure (SOP). GZA does not believe this impaces data quality.
Initial Water Level Date/Time	05/23/2022 10:35
Initial Water Level Depth (ft bmp)	13.18
Pump/Tubing Intake Depth (ft bmp)	17.5
Tubing Length (ft)	20.5
Tubing Inner Diameter (in)	0.17
Purging Initiation Date/Time	05/23/2022 10:40
Total Purge Volume (gal)	5
Modified Sample	No
If Modified, Reasoning	
Sample Collection Information	Bottling-Start: 05/23/2022 11:40:00, Bottling-Stop: 05/23/2022 11:45:00, Parameters-Sampled: PFAS

Reading Time	Depth To Water (ft)	Cumulative Drawdown (ft)	Purge Rate (ml/min)	Temperature (deg c)	Specific Conductivity (us/cm)	Dissolved Oxygen (mg/l)	pH (su)	Oxidation-Reduction Potential (mV)	Turbidity (ntu)
11:00	13.18	0.00	250	10 +	661 +	6.5	7.3	192	<5
11:05	13.18	0.00	250	10 +	658 +	6.6	7.2	204	<5
11:10	13.18	0.00	250	10 +	655 +	6.8	7.3	215	<5
11:15	13.18	0.00	250	10.1 +	655 +	6.7	7.3	223	<5
11:20	13.18	0.00	250	10 +	654 +	6.8	7.3	229	<5
11:25	13.18	0.00	250	10.1 +	651 +	6.8	7.3	235	<5
11:30	13.18	0.00	250	9.8 +	661 +	6.9	7.3	241	<5
11:33	13.18	0.00	250	9.8 +	661 +	7.1	7.3	247	<5
11:36	13.18	0.00	250	9.8 +	664 +	7.1	7.3	249	<5

Notes:

1) Abbreviations include: "deg c" indicates degrees Celsius; "ft" indicates feet; "ft bmp" indicates feet below reference measuring point; "gal" indicates gallons; "in" indicates inches; "mg/l" indicates milligrams per liter; "ml/min" indicates milliliters per minute; "mV" indicates millivolts; "NA" indicates not applicable; "NR" indicates not recorded; "ntu" indicates Nephelometric Turbidity units; "su" indicates standard units; "us/cm" indicates microsiemens per centimeter; and "+" indicates the parameter(s) may be used for stabilization calculations but cannot be used for other purposes.
2) Weather temperature units are in degrees Fahrenheit, unless otherwise noted.
3) Did indicator parameters reach stabilization? Yes
4) Was the two hour time limit reached? No
5) Calculations:
   - Head Above Pump Intake (ft) 4.32
   - Total Drawdown (ft) 0.00
   - Calculated Final Purge Volume (gal) NA
6) If Drawdown Did Not Stabilize or Stabilized Drawdown >0.3 ft, is Total Purge Volume > Calculated Final Purge Volume? NA

Well Sampling Worksheet
WWW RAP Field Data
AREA 5 2022-Q2 - HS-PMW-RI-104B
Kent County, MI

Well	HS-PMW-RI-104B / 2 in Diameter PVC
Sample Quarter	2022-Q2
Date	05/23/2022
Weather	Mostly sunny, mid 50s
Sampler Initials	MKM
Purging Device	Bladder-Pump: NA, Peristaltic-Pump: PER-02, Centrifugal-Pump: NA
Meters Used	YSI: 19K100063, Turbidimeter: NR, Water-Level-Meter: NR
Reference Measuring Point	PVC
Well Screen (ft bmp)	45.4 - 50.4
Measured Bottom Depth (ft bmp)	50.41
Sample Comment	YSI turned off briefly at 12:30.
Initial Water Level Date/Time	05/23/2022 11:55
Initial Water Level Depth (ft bmp)	13.26
Pump/Tubing Intake Depth (ft bmp)	47.5
Tubing Length (ft)	50.5
Tubing Inner Diameter (in)	0.17
Purging Initiation Date/Time	05/23/2022 12:00
Total Purge Volume (gal)	3.5
Modified Sample	No
If Modified, Reasoning	
Sample Collection Information	Bottling-Start: 05/23/2022 12:40:00, Bottling-Stop: 05/23/2022 12:41:00, Parameters-Sampled: PFAS

Reading Time	Depth To Water (ft)	Cumulative Drawdown (ft)	Purge Rate (ml/min)	Temperature (deg c)	Specific Conductivity (us/cm)	Dissolved Oxygen (mg/l)	pH (su)	Oxidation-Reduction Potential (mV)	Turbidity (ntu)
12:15	13.28	0.02	250	10.9 +	609 +	1.3	7.5	263	10
12:20	13.29	0.03	250	10.8 +	609 +	0.8	7.5	250	<5
12:30	13.29	0.03	250	11.2 +	609 +	0.8	7.5	232	<5
12:33	13.29	0.03	250	10.9 +	609 +	0.8	7.5	230	<5
12:38	13.29	0.03	250	11.1 +	609 +	0.8	7.5	227	<5

Notes:

1) Abbreviations include: "deg c" indicates degrees Celsius; "ft" indicates feet; "ft bmp" indicates feet below reference measuring point; "gal" indicates gallons; "in" indicates inches; "mg/l" indicates milligrams per liter; "ml/min" indicates milliliters per minute; "mV" indicates millivolts; "NA" indicates not applicable; "NR" indicates not recorded; "ntu" indicates Nephelometric Turbidity units; "su" indicates standard units; "us/cm" indicates microsiemens per centimeter; and "+" indicates the parameter(s) may be used for stabilization calculations but cannot be used for other purposes.
2) Weather temperature units are in degrees Fahrenheit, unless otherwise noted.
3) Did indicator parameters reach stabilization? Yes
4) Was the two hour time limit reached? No
5) Calculations:
   - Head Above Pump Intake (ft) 34.24
   - Total Drawdown (ft) 0.03
   - Calculated Final Purge Volume (gal) NA
6) If Drawdown Did Not Stabilize or Stabilized Drawdown >0.3 ft, is Total Purge Volume > Calculated Final Purge Volume? NA

Well Sampling Worksheet
WWW RAP Field Data
AREA 5 2022-Q2 - HS-PMW-RI-104C
Kent County, MI

Well	HS-PMW-RI-104C / 2 in Diameter PVC
Sample Quarter	2022-Q2
Date	05/23/2022
Weather	Sunny, mid 50s
Sampler Initials	DMW
Purging Device	Bladder-Pump: NA, Peristaltic-Pump: PER-03, Centrifugal-Pump: NA
Meters Used	YSI: J04002649, Turbidimeter: NR, Water-Level-Meter: NR
Reference Measuring Point	PVC
Well Screen (ft bmp)	74.3 - 79.3
Measured Bottom Depth (ft bmp)	79.35
Sample Comment	Turbidity did not stabilize per the Standard Operating Procedure (SOP)
Initial Water Level Date/Time	05/23/2022 10:40
Initial Water Level Depth (ft bmp)	13.31
Pump/Tubing Intake Depth (ft bmp)	76.85
Tubing Length (ft)	80.5
Tubing Inner Diameter (in)	0.17
Purging Initiation Date/Time	05/23/2022 10:45
Total Purge Volume (gal)	5
Modified Sample	No
If Modified, Reasoning	
Sample Collection Information	Bottling-Start: 05/23/2022 11:40:00, Bottling-Stop: 05/23/2022 11:44:00, Parameters-Sampled: PFAS

Reading Time	Depth To Water (ft)	Cumulative Drawdown (ft)	Purge Rate (ml/min)	Temperature (deg c)	Specific Conductivity (us/cm)	Dissolved Oxygen (mg/l)	pH (su)	Oxidation-Reduction Potential (mV)	Turbidity (ntu)
11:05	13.33	0.02	425	10.5 +	1,270 +	4.5	7.3	-23	17.9 +
11:15	13.33	0.02	425	10.5 +	1,267 +	4.1	7.3	-47	8.78 +
11:20	13.33	0.02	425	10.5 +	1,270 +	4.3	7.3	-54	7.09 +
11:25	13.33	0.02	425	10.4 +	1,275 +	4.7	7.3	-60	6.94 +
11:30	13.33	0.02	425	10.4 +	1,273 +	4.6	7.3	-61	<5 +
11:35	13.33	0.02	425	10.4 +	1,273 +	4.5	7.3	-62	<5 +

Notes:

1) Abbreviations include: "deg c" indicates degrees Celsius; "ft" indicates feet; "ft bmp" indicates feet below reference measuring point; "gal" indicates gallons; "in" indicates inches; "mg/l" indicates milligrams per liter; "ml/min" indicates milliliters per minute; "mV" indicates millivolts; "NA" indicates not applicable; "NR" indicates not recorded; "ntu" indicates Nephelometric Turbidity units; "su" indicates standard units; "us/cm" indicates microsiemens per centimeter; and "+" indicates the parameter(s) may be used for stabilization calculations but cannot be used for other purposes.
2) Weather temperature units are in degrees Fahrenheit, unless otherwise noted.
3) Did indicator parameters reach stabilization? No
4) Was the two hour time limit reached? No
5) Calculations:
   - Head Above Pump Intake (ft): 63.54
   - Total Drawdown (ft): 0.02
   - Calculated Final Purge Volume (gal): NA
6) If Drawdown Did Not Stabilize or Stabilized Drawdown >0.3 ft, is Total Purge Volume > Calculated Final Purge Volume? NA

Well Sampling Worksheet
WWW RAP Field Data
AREA 11/12 2022-Q4 - HS-PMW-RI-112B
Kent County, MI

Well	HS-PMW-RI-112B / 2 in Diameter PVC
Sample Quarter	2022-Q4
Date	10/05/2022
Weather	Sunny
Sampler Initials	NCK
Purging Device	Bladder-Pump: NA, Peristaltic-Pump: PER-3, Centrifugal-Pump: NA
Meters Used	YSI: ProQuatro (22F101885), Turbidimeter: Agile Rental (09080C031700), Water-Level-Meter: NR
Reference Measuring Point	PVC
Well Screen (ft bmp)	69.4 - 74.4
Measured Bottom Depth (ft bmp)	NR
Sample Comment	
Initial Water Level Date/Time	10/05/2022 15:10
Initial Water Level Depth (ft bmp)	9.68
Pump/Tubing Intake Depth (ft bmp)	71.9
Tubing Length (ft)	75
Tubing Inner Diameter (in)	0.17
Purging Initiation Date/Time	10/05/2022 15:10
Total Purge Volume (gal)	8
Modified Sample	No
If Modified, Reasoning	
Sample Collection Information	Bottling-Start: 10/05/2022 16:30:00, Bottling-Stop: 10/05/2022 16:35:00, Parameters-Sampled: PFAS

Reading Time	Depth To Water (ft)	Cumulative Drawdown (ft)	Purge Rate (ml/min)	Temperature (deg c)	Specific Conductivity (us/cm)	Dissolved Oxygen (mg/l)	pH (su)	Oxidation-Reduction Potential (mV)	Turbidity (ntu)
15:40	9.70	0.02	350	13 +	1,338 +	<0.5	7.6	-54	39
15:50	9.70	0.02	350	13 +	1,338 +	<0.5	7.6	-56	21
16:00	9.70	0.02	350	13 +	1,339 +	<0.5	7.6	-58	11
16:10	9.70	0.02	350	13 +	1,339 +	<0.5	7.6	-59	5
16:15	9.70	0.02	350	13 +	1,343 +	<0.5	7.6	-60	6
16:20	9.70	0.02	350	13 +	1,344 +	<0.5	7.6	-60	<5
16:25	9.70	0.02	350	13 +	1,342 +	<0.5	7.6	-60	<5
16:30	9.70	0.02	350	13 +	1,341 +	<0.5	7.6	-61	<5

Notes:

1) Abbreviations include: "deg c" indicates degrees Celsius; "ft" indicates feet; "ft bmp" indicates feet below reference measuring point; "gal" indicates gallons; "in" indicates inches; "mg/l" indicates milligrams per liter; "ml/min" indicates milliliters per minute; "mV" indicates millivolts; "NA" indicates not applicable; "NR" indicates not recorded; "ntu" indicates Nephelometric Turbidity units; "su" indicates standard units; "us/cm" indicates microsiemens per centimeter; and "+" indicates the parameter(s) may be used for stabilization calculations but cannot be used for other purposes.
2) Weather temperature units are in degrees Fahrenheit, unless otherwise noted.
3) Did indicator parameters reach stabilization? Yes
4) Was the two hour time limit reached? No
5) Calculations:
   - Head Above Pump Intake (ft) 62.22
   - Total Drawdown (ft) 0.02
   - Calculated Final Purge Volume (gal) NA
6) If Drawdown Did Not Stabilize or Stabilized Drawdown >0.3 ft, is Total Purge Volume > Calculated Final Purge Volume? NA

Well Sampling Worksheet
WWW RAP Field Data
AREA 6 2022-Q4 - HS-MW-13A
Kent County, MI

Well	HS-MW-13A / 2 in Diameter PVC
Sample Quarter	2022-Q4
Date	10/14/2022
Weather	Cloudy, rain off and on, 40s to 50
Sampler Initials	GRT
Purging Device	Bladder-Pump: BP-12, Peristaltic-Pump: NA, Centrifugal-Pump: NA
Meters Used	YSI: ProQuatro (22F101885), Turbidimeter: Agile Rental (09080C037700), Water-Level-Meter: NR
Reference Measuring Point	PVC
Well Screen (ft bmp)	81.7 - 86.5
Measured Bottom Depth (ft bmp)	NR
Sample Comment	Last 3 readings are not 5 minutes apart per the Standard Operating Procedure (SOP). GZA does not believe this impacts data quality.
Initial Water Level Date/Time	10/14/2022 10:03
Initial Water Level Depth (ft bmp)	58.51
Pump/Tubing Intake Depth (ft bmp)	84
Tubing Length (ft)	86
Tubing Inner Diameter (in)	0.25
Purging Initiation Date/Time	10/14/2022 10:03
Total Purge Volume (gal)	7
Modified Sample	No
If Modified, Reasoning	
Sample Collection Information	Bottling-Start: 10/14/2022 11:29:00, Bottling-Stop: 10/14/2022 11:32:00, Parameters-Sampled: PFAS

Reading Time	Depth To Water (ft)	Cumulative Drawdown (ft)	Purge Rate (ml/min)	Temperature (deg c)	Specific Conductivity (us/cm)	Dissolved Oxygen (mg/l)	pH (su)	Oxidation-Reduction Potential (mV)	Turbidity (ntu)
10:25	58.51	0.00	350	10 +	571 +	6.0	7.5	262	11
10:35	58.51	0.00	350	10 +	572 +	5.7	7.6	265	16
10:45	58.51	0.00	350	10 +	573 +	5.7	7.6	268	5
10:55	58.51	0.00	350	10 +	573 +	5.6	7.6	272	6
11:05	58.50	-0.01	350	10 +	573 +	5.6	7.6	275	<5
11:15	58.50	-0.01	350	10 +	574 +	5.6	7.6	279	<5
11:25	58.50	-0.01	350	10 +	574 +	5.5	7.6	281	<5

Notes:

1) Abbreviations include: "deg c" indicates degrees Celsius; "ft" indicates feet; "ft bmp" indicates feet below reference measuring point; "gal" indicates gallons; "in" indicates inches; "mg/l" indicates milligrams per liter; "ml/min" indicates milliliters per minute; "mV" indicates millivolts; "NA" indicates not applicable; "NR" indicates not recorded; "ntu" indicates Nephelometric Turbidity units; "su" indicates standard units; "us/cm" indicates microsiemens per centimeter; and "+" indicates the parameter(s) may be used for stabilization calculations but cannot be used for other purposes.
2) Weather temperature units are in degrees Fahrenheit, unless otherwise noted.
3) Did indicator parameters reach stabilization? Yes
4) Was the two hour time limit reached? No
5) Calculations:
   - Head Above Pump Intake (ft) 25.49
   - Total Drawdown (ft) -0.01
   - Calculated Final Purge Volume (gal) NA
6) If Drawdown Did Not Stabilize or Stabilized Drawdown >0.3 ft, is Total Purge Volume > Calculated Final Purge Volume? NA

Well Sampling Worksheet
WWW RAP Field Data
AREA 6 2022-Q4 - HS-MW-13B
Kent County, MI

Well	HS-MW-13B / 2 in Diameter PVC
Sample Quarter	2022-Q4
Date	10/14/2022
Weather	Partly Cloudy, 40s-50s
Sampler Initials	JET
Purging Device	Bladder-Pump: BP-10, Peristaltic-Pump: NA, Centrifugal-Pump: NA
Meters Used	YSI: ProQuatro (22F101885), Turbidimeter: Agile Rental (09080C037700), Water-Level-Meter: NR
Reference Measuring Point	PVC
Well Screen (ft bmp)	151.2 - 156.0
Measured Bottom Depth (ft bmp)	NR
Sample Comment	AECOM Collected Split Sample. YSI turned off at 1525.
Initial Water Level Date/Time	10/14/2022 14:05
Initial Water Level Depth (ft bmp)	58.52
Pump/Tubing Intake Depth (ft bmp)	153.6
Tubing Length (ft)	155
Tubing Inner Diameter (in)	0.25
Purging Initiation Date/Time	10/14/2022 14:05
Total Purge Volume (gal)	5
Modified Sample	No
If Modified, Reasoning	
Sample Collection Information	Bottling-Start: 10/14/2022 15:50:00, Bottling-Stop: 10/14/2022 15:55:00, Parameters-Sampled: PFAS

Reading Time	Depth To Water (ft)	Cumulative Drawdown (ft)	Purge Rate (ml/min)	Temperature (deg c)	Specific Conductivity (us/cm)	Dissolved Oxygen (mg/l)	pH (su)	Oxidation-Reduction Potential (mV)	Turbidity (ntu)
14:35	58.54	0.02	350	10 +	868 +	6.0	7.7	196	10
14:45	58.54	0.02	350	10 +	867 +	6.1	7.7	206	7
14:55	58.54	0.02	350	10 +	865 +	6.2	7.7	219	<5
15:15	58.54	0.02	350	10 +	864 +	6.3	7.7	201	<5
15:25	58.54	0.02	350	10 +	864 +	6.3	7.7	217	<5
15:35	58.54	0.02	350	10 +	864 +	6.3	7.7	232	<5
15:40	58.54	0.02	350	10 +	864 +	6.2	7.7	237	<5
15:45	58.54	0.02	350	10 +	864 +	6.3	7.7	241	<5

Notes:

1) Abbreviations include: "deg c" indicates degrees Celsius; "ft" indicates feet; "ft bmp" indicates feet below reference measuring point; "gal" indicates gallons; "in" indicates inches; "mg/l" indicates milligrams per liter; "ml/min" indicates milliliters per minute; "mV" indicates millivolts; "NA" indicates not applicable; "NR" indicates not recorded; "ntu" indicates Nephelometric Turbidity units; "su" indicates standard units; "us/cm" indicates microsiemens per centimeter; and "+" indicates the parameter(s) may be used for stabilization calculations but cannot be used for other purposes.
2) Weather temperature units are in degrees Fahrenheit, unless otherwise noted.
3) Did indicator parameters reach stabilization? Yes
4) Was the two hour time limit reached? No
5) Calculations:
   - Head Above Pump Intake (ft) 95.08
   - Total Drawdown (ft) 0.02
   - Calculated Final Purge Volume (gal) NA
6) If Drawdown Did Not Stabilize or Stabilized Drawdown >0.3 ft, is Total Purge Volume > Calculated Final Purge Volume? NA

Well Sampling Worksheet
WWW RAP Field Data
AREA 6 2022-Q4 - HS-MW-13C
Kent County, MI

Well	HS-MW-13C / 2 in Diameter PVC
Sample Quarter	2022-Q4
Date	10/14/2022
Weather	Cloudy with rain off and on, 40s-50s
Sampler Initials	CBM
Purging Device	Bladder-Pump: BP-11, Peristaltic-Pump: NA, Centrifugal-Pump: NA
Meters Used	YSI: ProPlus (17G101583), Turbidimeter: Agile Rental (19040C075131), Water-Level-Meter: NR
Reference Measuring Point	PVC
Well Screen (ft bmp)	201.7 - 206.5
Expected Well Bottom Depth (ft bmp)	206.5
Measured Bottom Depth (ft bmp)	NR
Sample Comment	Water level dropping at 10:50, adjusted refill time. Water was observed in the air line. At 11:25 the pump was observed to not stay on consistently. The control box needs to be reset occasionally. Water level was not stable per the Standard Operating Procedure (SOP) but variability was improving. Last 3 readings are not 5 minutes apart per SOP. GZA does not believe this impacts data quality.
Initial Water Level Date/Time	10/14/2022 09:58
Initial Water Level Depth (ft bmp)	57.89
Pump/Tubing Intake Depth (ft bmp)	204
Tubing Length (ft)	207.5
Tubing Inner Diameter (in)	0.25
Purging Initiation Date/Time	10/14/2022 09:58
Total Purge Volume (gal)	4
Modified Sample	No
If Modified, Reasoning	
Sample Collection Information	Bottling-Start: 10/14/2022 11:30:00, Bottling-Stop: 10/14/2022 11:34:00, Parameters-Sampled: PFAS

Reading Time	Depth To Water (ft)	Cumulative Drawdown (ft)	Purge Rate (ml/min)	Temperature (deg c)	Specific Conductivity (us/cm)	Dissolved Oxygen (mg/l)	pH (su)	Oxidation-Reduction Potential (mV)	Turbidity (ntu)
10:30	58.21 +	0.32	350	10 +	1,634 +	<0.5	7.5	-25	>999
10:42	58.29 +	0.40	300	10 +	1,623 +	<0.5	7.5	-38	263
10:50	58.29 +	0.40	300	10 +	1,630 +	<0.5	7.5	-42	518
11:10	58.65 +	0.76	350	10 +	1,635 +	<0.5	7.5	-41	450
11:15	58.70 +	0.81	350	10 +	1,640 +	<0.5	7.5	-44	>999
11:25	58.65 +	0.76	350	10 +	1,645 +	<0.5	7.5	-43	>999
11:28	58.64 +	0.75	350	10 +	1,645 +	<0.5	7.5	-44	>999

Notes:

1) Abbreviations include: "deg c" indicates degrees Celsius; "ft" indicates feet; "ft bmp" indicates feet below reference measuring point; "gal" indicates gallons; "in" indicates inches; "mg/l" indicates milligrams per liter; "ml/min" indicates milliliters per minute; "mV" indicates millivolts; "NA" indicates not applicable; "NR" indicates not recorded; "ntu" indicates Nephelometric Turbidity units; "su" indicates standard units; "us/cm" indicates microsiemens per centimeter; and "+" indicates the parameter(s) may be used for stabilization calculations but cannot be used for other purposes.
2) Weather temperature units are in degrees Fahrenheit, unless otherwise noted.
3) Did indicator parameters reach stabilization? No * Turbidity Out of Range
4) Was the two hour time limit reached? No
5) Calculations:
   - Head Above Pump Intake (ft) 146.11
   - Total Drawdown (ft) 0.75
   - Calculated Final Purge Volume (gal) 0.66
6) If Drawdown Did Not Stabilize or Stabilized Drawdown >0.3 ft, is Total Purge Volume > Calculated Final Purge Volume? Yes

Well Sampling Worksheet
WWW RAP Field Data
AREA 6 2022-Q4 - HS-PMW-RI-108A
Kent County, MI

Well	HS-PMW-RI-108A / 2 in Diameter PVC
Sample Quarter	2022-Q4
Date	10/05/2022
Weather	Sunny/Partly Cloudy
Sampler Initials	JET
Purging Device	Bladder-Pump: NA, Peristaltic-Pump: PER-3, Centrifugal-Pump: NA
Meters Used	YSI: ProQuatro (22F101885), Turbidimeter: Agile Rental (09080C037700), Water-Level-Meter: NR
Reference Measuring Point	PVC
Well Screen (ft bmp)	65.2 - 70.2
Measured Bottom Depth (ft bmp)	71.1
Sample Comment	Water level was not stable per the Standard Operating Procedure (SOP). Last 3 readings are not 5 minutes apart per SOP; GZA does not believe this impacts data quality.
Initial Water Level Date/Time	10/05/2022 10:50
Initial Water Level Depth (ft bmp)	16.82
Pump/Tubing Intake Depth (ft bmp)	68.5
Tubing Length (ft)	71
Tubing Inner Diameter (in)	0.17
Purging Initiation Date/Time	10/05/2022 10:50
Total Purge Volume (gal)	4
Modified Sample	No
If Modified, Reasoning	
Sample Collection Information	Bottling-Start: 10/05/2022 11:50:00, Bottling-Stop: 10/05/2022 11:55:00, Parameters-Sampled: PFAS

Reading Time	Depth To Water (ft)	Cumulative Drawdown (ft)	Purge Rate (ml/min)	Temperature (deg c)	Specific Conductivity (us/cm)	Dissolved Oxygen (mg/l)	pH (su)	Oxidation-Reduction Potential (mV)	Turbidity (ntu)
11:10	16.98 +	0.16	250	12 +	626 +	<0.5	8.0	-113	58
11:20	16.98 +	0.16	250	12 +	636 +	<0.5	8.1	-119	37
11:25	16.98 +	0.16	250	12 +	641 +	<0.5	8.1	-122	32
11:30	16.98 +	0.16	250	12 +	642 +	<0.5	8.1	-126	26
11:40	16.98 +	0.16	250	12 +	647 +	<0.5	8.1	-130	28
11:50	17.02 +	0.20	250	12 +	647 +	<0.5	8.1	-133	29

Notes:

1) Abbreviations include: "deg c" indicates degrees Celsius; "ft" indicates feet; "ft bmp" indicates feet below reference measuring point; "gal" indicates gallons; "in" indicates inches; "mg/l" indicates milligrams per liter; "ml/min" indicates milliliters per minute; "mV" indicates millivolts; "NA" indicates not applicable; "NR" indicates not recorded; "ntu" indicates Nephelometric Turbidity units; "su" indicates standard units; "us/cm" indicates microsiemens per centimeter; and "+" indicates the parameter(s) may be used for stabilization calculations but cannot be used for other purposes.
2) Weather temperature units are in degrees Fahrenheit, unless otherwise noted.
3) Did indicator parameters reach stabilization? No
4) Was the two hour time limit reached? No
5) Calculations:
   - Head Above Pump Intake (ft) 51.68
   - Total Drawdown (ft) 0.20
   - Calculated Final Purge Volume (gal) 0.12
6) If Drawdown Did Not Stabilize or Stabilized Drawdown >0.3 ft, is Total Purge Volume > Calculated Final Purge Volume? Yes

Well Sampling Worksheet
WWW RAP Field Data
AREA 6 2022-Q4 - HS-PMW-RI-108B
Kent County, MI

Well	HS-PMW-RI-108B / 2 in Diameter PVC
Sample Quarter	2022-Q4
Date	10/05/2022
Weather	Sunny, 60°F
Sampler Initials	JET/MKM
Purging Device	Bladder-Pump: BP-12, Peristaltic-Pump: NA, Centrifugal-Pump: NA
Meters Used	YSI: ProQuatro (22F101885), Turbidimeter: Agile Rental (09080C037700), Water-Level-Meter: NR
Reference Measuring Point	PVC
Well Screen (ft bmp)	131.6 - 136.6
Measured Bottom Depth (ft bmp)	137.5
Sample Comment	Very turbid for 1 hour +. Last 3 readings are not 5 minutes apart per the Standard Operating Procedure (SOP). GZA does not believe this impacts data quality.
Initial Water Level Date/Time	10/05/2022 11:00
Initial Water Level Depth (ft bmp)	76.68
Pump/Tubing Intake Depth (ft bmp)	135
Tubing Length (ft)	140
Tubing Inner Diameter (in)	0.25
Purging Initiation Date/Time	10/05/2022 11:00
Total Purge Volume (gal)	10
Modified Sample	No
If Modified, Reasoning	
Sample Collection Information	Bottling-Start: 10/05/2022 13:00:00, Bottling-Stop: 10/05/2022 13:05:00, Parameters-Sampled: PFAS

Reading Time	Depth To Water (ft)	Cumulative Drawdown (ft)	Purge Rate (ml/min)	Temperature (deg c)	Specific Conductivity (us/cm)	Dissolved Oxygen (mg/l)	pH (su)	Oxidation-Reduction Potential (mV)	Turbidity (ntu)
12:10	84.62	7.94	300	12 +	777 +	<0.5	8.4	-135	>999
12:30	84.85	8.17	300	12 +	733 +	<0.5	8.3	-131	>999
12:50	85.62	8.94	300	12 +	720 +	<0.5	8.3	-138	929

Notes:

1) Abbreviations include: "deg c" indicates degrees Celsius; "ft" indicates feet; "ft bmp" indicates feet below reference measuring point; "gal" indicates gallons; "in" indicates inches; "mg/l" indicates milligrams per liter; "ml/min" indicates milliliters per minute; "mV" indicates millivolts; "NA" indicates not applicable; "NR" indicates not recorded; "ntu" indicates Nephelometric Turbidity units; "su" indicates standard units; "us/cm" indicates microsiemens per centimeter; and "+" indicates the parameter(s) may be used for stabilization calculations but cannot be used for other purposes.
2) Weather temperature units are in degrees Fahrenheit, unless otherwise noted.
3) Did indicator parameters reach stabilization? No
4) Was the two hour time limit reached? Yes
5) Calculations:
   - Head Above Pump Intake (ft) 58.32
   - Total Drawdown (ft) 8.94
   - Calculated Final Purge Volume (gal) 1.79
6) If Drawdown Did Not Stabilize or Stabilized Drawdown >0.3 ft, is Total Purge Volume > Calculated Final Purge Volume? Yes

Well Sampling Worksheet
WWW RAP Field Data
AREA 6 2022-Q4 - HS-PMW-RI-108D
Kent County, MI

Well	HS-PMW-RI-108D / 2 in Diameter PVC
Sample Quarter	2022-Q4
Date	10/05/2022
Weather	Sunny
Sampler Initials	NCK
Purging Device	Bladder-Pump: LIV-BP-2, Peristaltic-Pump: NA, Centrifugal-Pump: NA
Meters Used	YSI: ProPlus (17G101583), Turbidimeter: Agile Rental (19040075131), Water-Level-Meter: NR
Reference Measuring Point	PVC
Well Screen (ft bmp)	223.0 - 228.0
Measured Bottom Depth (ft bmp)	NR
Sample Comment	Last 3 readings are not 5 minutes apart per the Standard Operating Procedure (SOP). GZA does not believe this impacts data quality.
Initial Water Level Date/Time	10/05/2022 09:40
Initial Water Level Depth (ft bmp)	76.94
Pump/Tubing Intake Depth (ft bmp)	225.5
Tubing Length (ft)	230
Tubing Inner Diameter (in)	0.25
Purging Initiation Date/Time	10/05/2022 09:40
Total Purge Volume (gal)	13
Modified Sample	No
If Modified, Reasoning	
Sample Collection Information	Bottling-Start: 10/05/2022 11:35:00, Bottling-Stop: 10/05/2022 11:40:00, Parameters-Sampled: PFAS

Reading Time	Depth To Water (ft)	Cumulative Drawdown (ft)	Purge Rate (ml/min)	Temperature (deg c)	Specific Conductivity (us/cm)	Dissolved Oxygen (mg/l)	pH (su)	Oxidation-Reduction Potential (mV)	Turbidity (ntu)
09:50	77.94	1.00	450	NR	NR	NR	NR	NR	NR
10:00	77.90	0.96	440	11 +	636 +	1.0	7.2	-61	43
10:10	77.90	0.96	440	11 +	637 +	<0.5	7.3	-92	25
10:20	77.90	0.96	440	11 +	638 +	<0.5	7.4	-102	10
10:30	77.85	0.91	440	11 +	638 +	<0.5	7.4	-105	18
10:40	77.85	0.91	440	11 +	639 +	<0.5	7.5	-108	23
10:50	77.85	0.91	440	11 +	639 +	<0.5	7.5	-109	12
11:00	77.85	0.91	440	11 +	639 +	<0.5	7.5	-110	10
11:10	77.85	0.91	440	11 +	639 +	<0.5	7.5	-111	12

Well Sampling Worksheet
WWW RAP Field Data
AREA 6 2022-Q4 - HS-PMW-RI-108D
Kent County, MI

Well	HS-PMW-RI-108D / 2 in Diameter PVC
Sample Quarter	2022-Q4
Date	10/05/2022
Weather	Sunny
Sampler Initials	NCK
Purging Device	Bladder-Pump: LIV-BP-2, Peristaltic-Pump: NA, Centrifugal-Pump: NA
Meters Used	YSI: ProPlus (17G101583), Turbidimeter: Agile Rental (19040075131), Water-Level-Meter: NR
Reference Measuring Point	PVC
Well Screen (ft bmp)	223.0 - 228.0
Measured Bottom Depth (ft bmp)	NR
Sample Comment	Last 3 readings are not 5 minutes apart per the Standard Operating Procedure (SOP). GZA does not believe this impacts data quality.
Initial Water Level Date/Time	10/05/2022 09:40
Initial Water Level Depth (ft bmp)	76.94
Pump/Tubing Intake Depth (ft bmp)	225.5
Tubing Length (ft)	230
Tubing Inner Diameter (in)	0.25
Purging Initiation Date/Time	10/05/2022 09:40
Total Purge Volume (gal)	13
Modified Sample	No
If Modified, Reasoning	
Sample Collection Information	Bottling-Start: 10/05/2022 11:35:00, Bottling-Stop: 10/05/2022 11:40:00, Parameters-Sampled: PFAS

Reading Time	Depth To Water (ft)	Cumulative Drawdown (ft)	Purge Rate (ml/min)	Temperature (deg c)	Specific Conductivity (us/cm)	Dissolved Oxygen (mg/l)	pH (su)	Oxidation-Reduction Potential (mV)	Turbidity (ntu)
11:20	77.85	0.91	440	11 +	640 +	<0.5	7.5	-112	8
11:30	77.85	0.91	440	11 +	640 +	<0.5	7.5	-112	7
11:35	77.85	0.91	440	11 +	640 +	<0.5	7.5	-112	7

Notes:

1) Abbreviations include: "deg c" indicates degrees Celsius; "ft" indicates feet; "ft bmp" indicates feet below reference measuring point; "gal" indicates gallons; "in" indicates inches; "mg/l" indicates milligrams per liter; "ml/min" indicates milliliters per minute; "mV" indicates millivolts; "NA" indicates not applicable; "NR" indicates not recorded; "ntu" indicates Nephelometric Turbidity units; "su" indicates standard units; "us/cm" indicates microsiemens per centimeter; and "+" indicates the parameter(s) may be used for stabilization calculations but cannot be used for other purposes.
2) Weather temperature units are in degrees Fahrenheit, unless otherwise noted.
3) Did indicator parameters reach stabilization? Yes
4) Was the two hour time limit reached? No
5) Calculations:
   - Head Above Pump Intake (ft) 148.56
   - Total Drawdown (ft) 0.91
   - Calculated Final Purge Volume (gal) 0.74
6) If Drawdown Did Not Stabilize or Stabilized Drawdown >0.3 ft, is Total Purge Volume > Calculated Final Purge Volume? Yes

Well Sampling Worksheet
WWW RAP Field Data
AREA 6 2022-Q4 - HS-PMW-RI-109A
Kent County, MI

Well	HS-PMW-RI-109A / 2 in Diameter PVC
Sample Quarter	2022-Q4
Date	10/07/2022
Weather	10/4 - Sunny; 10/7 - Cloudy, 50s
Sampler Initials	JET/DMW
Purging Device	Bladder-Pump: NA, Peristaltic-Pump: PER-3, Centrifugal-Pump: NA
Meters Used	YSI: ProPlus (17G101583), Turbidimeter: Agile Rental (19040075131), Water-Level-Meter: NR
Reference Measuring Point	PVC
Well Screen (ft bmp)	13.6 - 18.6
Measured Bottom Depth (ft bmp)	NR
Sample Comment	Initial tubing depth was 16.5 ft bmp and was lowered to the bottom of the well after drawdown was observed on 10/4/2022. Well purged dry 10/4/2022 at 13:47 and was sampled on 10/7/2022 following recharge and equilibration. Initial water level on 10/7/2022 was 10.70 feet bmp. 2.3 gallons purged 10/4/2022 and 0.5 gallons purged 10/7/2022.
Initial Water Level Date/Time	10/04/2022 12:10; 10/7/2022 15:25
Initial Water Level Depth (ft bmp)	10/04/2022 - 9.94; 10/07/2022 - 10.7
Pump/Tubing Intake Depth (ft bmp)	10/04/2022 - 18.6; 10/07/2022 - 17.6
Tubing Length (ft)	22
Tubing Inner Diameter (in)	0.17
Purging Initiation Date/Time	10/04/2022 12:10
Total Purge Volume (gal)	2.8
Modified Sample	Yes
If Modified, Reasoning	Well purged dry 10/4/2022.
Sample Collection Information	Bottling-Start: 10/07/2022 16:05:00, Bottling-Stop: 10/07/2022 16:07:00, Parameters-Sampled: PFAS

Reading Time	Depth To Water (ft)	Cumulative Drawdown (ft)	Purge Rate (ml/min)	Temperature (deg c)	Specific Conductivity (us/cm)	Dissolved Oxygen (mg/l)	pH (su)	Oxidation-Reduction Potential (mV)	Turbidity (ntu)
13:20	12.39 +	2.45	100	15 +	699 +	5.6	7.3	174	<5
13:25	12.52 +	2.58	100	15 +	700 +	5.7	7.3	175	12
13:30	12.70 +	2.76	100	15 +	699 +	5.6	7.3	165	59
13:40	12.97 +	3.03	100	15 +	704 +	5.9	7.3	136	246
16:05	11.52 +	0.82	50	NR	NR	NR	NR	NR	NR

Notes:

1) Abbreviations include: "deg c" indicates degrees Celsius; "ft" indicates feet; "ft bmp" indicates feet below reference measuring point; "gal" indicates gallons; "in" indicates inches; "mg/l" indicates milligrams per liter; "ml/min" indicates milliliters per minute; "mV" indicates millivolts; "NA" indicates not applicable; "NR" indicates not recorded; "ntu" indicates Nephelometric Turbidity units; "su" indicates standard units; "us/cm" indicates microsiemens per centimeter; and "+" indicates the parameter(s) may be used for stabilization calculations but cannot be used for other purposes.
2) Weather temperature units are in degrees Fahrenheit, unless otherwise noted.
3) Did indicator parameters reach stabilization? No
4) Was the two hour time limit reached? No
5) Calculations:
   - Head Above Pump Intake (ft): 6.90
   - Total Drawdown (ft): Pumped Dry
   - Calculated Final Purge Volume (gal): 0.16
6) If Drawdown Did Not Stabilize or Stabilized Drawdown >0.3 ft, is Total Purge Volume > Calculated Final Purge Volume? Yes

Well Sampling Worksheet
WWW RAP Field Data
AREA 6 2022-Q4 - HS-PMW-RI-109B
Kent County, MI

Well	HS-PMW-RI-109B / 2 in Diameter PVC
Sample Quarter	2022-Q4
Date	10/04/2022
Weather	Sunny 60s
Sampler Initials	DMW
Purging Device	Bladder-Pump: BP-LIV-1, Peristaltic-Pump: NA, Centrifugal-Pump: NA
Meters Used	YSI: ProPlus (17G101583), Turbidimeter: Agile Rental (19040075131), Water-Level-Meter: NR
Reference Measuring Point	PVC
Well Screen (ft bmp)	124.6 - 129.6
Measured Bottom Depth (ft bmp)	129.47
Sample Comment	Last 3 readings are not 5 minutes apart per the Standard Operating Procedure (SOP). GZA does not believe this impacts data quality.
Initial Water Level Date/Time	10/04/2022 14:35
Initial Water Level Depth (ft bmp)	64.64
Pump/Tubing Intake Depth (ft bmp)	127.1
Tubing Length (ft)	130
Tubing Inner Diameter (in)	0.25
Purging Initiation Date/Time	10/04/2022 14:35
Total Purge Volume (gal)	20
Modified Sample	No
If Modified, Reasoning	
Sample Collection Information	Bottling-Start: 10/04/2022 16:40:00, Bottling-Stop: 10/04/2022 16:42:00, Parameters-Sampled: PFAS

Reading Time	Depth To Water (ft)	Cumulative Drawdown (ft)	Purge Rate (ml/min)	Temperature (deg c)	Specific Conductivity (us/cm)	Dissolved Oxygen (mg/l)	pH (su)	Oxidation-Reduction Potential (mV)	Turbidity (ntu)
15:00	NR	NR	700	11 +	889 +	2.7	7.1	118	60
15:15	64.64	0.00	700	11 +	892 +	2.7	7.1	111	17
15:25	64.64	0.00	700	11 +	909 +	2.8	7.1	106	17
15:35	64.64	0.00	700	11 +	889 +	2.7	7.1	108	17
15:45	64.64	0.00	700	11 +	890 +	2.6	7.1	106	14
16:00	64.64	0.00	700	11 +	890 +	2.7	7.1	113	12
16:10	64.64	0.00	700	11 +	890 +	2.6	7.1	114	11
16:25	64.64	0.00	700	11 +	891 +	2.5	7.1	115	12
16:35	64.64	0.00	700	11 +	892 +	2.8	7.1	119	10

Notes:

1) Abbreviations include: "deg c" indicates degrees Celsius; "ft" indicates feet; "ft bmp" indicates feet below reference measuring point; "gal" indicates gallons; "in" indicates inches; "mg/l" indicates milligrams per liter; "ml/min" indicates milliliters per minute; "mV" indicates millivolts; "NA" indicates not applicable; "NR" indicates not recorded; "ntu" indicates Nephelometric Turbidity units; "su" indicates standard units; "us/cm" indicates microsiemens per centimeter; and "+" indicates the parameter(s) may be used for stabilization calculations but cannot be used for other purposes.
2) Weather temperature units are in degrees Fahrenheit, unless otherwise noted.
3) Did indicator parameters reach stabilization? No
4) Was the two hour time limit reached? Yes
5) Calculations:
   - Head Above Pump Intake (ft) 62.46
   - Total Drawdown (ft) 0.00
   - Calculated Final Purge Volume (gal) NA
6) If Drawdown Did Not Stabilize or Stabilized Drawdown >0.3 ft, is Total Purge Volume > Calculated Final Purge Volume? NA

Well Sampling Worksheet
WWW RAP Field Data
AREA 6 2022-Q4 - HS-PMW-RI-109C
Kent County, MI

Well	HS-PMW-RI-109C / 2 in Diameter PVC
Sample Quarter	2022-Q4
Date	10/04/2022
Weather	10/4 - Sunny
Sampler Initials	JET
Purging Device	Bladder-Pump: BP-04, Peristaltic-Pump: NA, Centrifugal-Pump: NA
Meters Used	YSI: ProQuatro (22F101885), Turbidimeter: Agile Rental (09080C037700), Water-Level-Meter: NR
Reference Measuring Point	PVC
Well Screen (ft bmp)	143.7 - 148.7
Measured Bottom Depth (ft bmp)	148.75
Sample Comment	Ran out of nitrogen at approximately 15:55. No turbidity reading for 15:55 and no readings for 16:00 while switching compressed gas canisters. Last 3 readings are not 5 minutes apart per the Standard Operating Procedure (SOP). GZA does not believe this impacts data quality.
Initial Water Level Date/Time	10/04/2022 14:45
Initial Water Level Depth (ft bmp)	64.33
Pump/Tubing Intake Depth (ft bmp)	145.25
Tubing Length (ft)	160
Tubing Inner Diameter (in)	0.25
Purging Initiation Date/Time	10/04/2022 14:45
Total Purge Volume (gal)	7
Modified Sample	No
If Modified, Reasoning	
Sample Collection Information	Bottling-Start: 10/04/2022 16:45:00, Bottling-Stop: 10/04/2022 16:46:00, Parameters-Sampled: PFAS

Reading Time	Depth To Water (ft)	Cumulative Drawdown (ft)	Purge Rate (ml/min)	Temperature (deg c)	Specific Conductivity (us/cm)	Dissolved Oxygen (mg/l)	pH (su)	Oxidation-Reduction Potential (mV)	Turbidity (ntu)
15:20	67.20	2.87	250	13 +	456 +	<0.5	7.7	63	933
15:25	67.08	2.75	250	13 +	456 +	<0.5	7.7	7	394
15:30	67.05	2.72	250	12 +	456 +	<0.5	7.7	-8	350
15:35	67.05	2.72	250	12 +	455 +	<0.5	7.7	-13	266
15:40	67.10	2.77	250	12 +	455 +	<0.5	7.7	-21	255
15:45	67.18	2.85	250	12 +	456 +	<0.5	7.7	-26	268
15:50	67.18	2.85	250	12 +	456 +	<0.5	7.7	-32	278
15:55	66.40	2.07	250	13 +	457 +	<0.5	7.7	-33	NR
16:00	NR	NR	NR	NR	NR	NR	NR	NR	NR
16:15	66.50	2.17	250	12 +	456 +	<0.5	7.7	-33	420

Well Sampling Worksheet
WWW RAP Field Data
AREA 6 2022-Q4 - HS-PMW-RI-109C
Kent County, MI

Well	HS-PMW-RI-109C / 2 in Diameter PVC
Sample Quarter	2022-Q4
Date	10/04/2022
Weather	10/4 - Sunny
Sampler Initials	JET
Purging Device	Bladder-Pump: BP-04, Peristaltic-Pump: NA, Centrifugal-Pump: NA
Meters Used	YSI: ProQuatro (22F101885), Turbidimeter: Agile Rental (09080C037700), Water-Level-Meter: NR
Reference Measuring Point	PVC
Well Screen (ft bmp)	143.7 - 148.7
Measured Bottom Depth (ft bmp)	148.75
Sample Comment	Ran out of nitrogen at approximately 15:55. No turbidity reading for 15:55 and no readings for 16:00 while switching compressed gas canisters. Last 3 readings are not 5 minutes apart per the Standard Operating Procedure (SOP). GZA does not believe this impacts data quality.
Initial Water Level Date/Time	10/04/2022 14:45
Initial Water Level Depth (ft bmp)	64.33
Pump/Tubing Intake Depth (ft bmp)	145.25
Tubing Length (ft)	160
Tubing Inner Diameter (in)	0.25
Purging Initiation Date/Time	10/04/2022 14:45
Total Purge Volume (gal)	7
Modified Sample	No
If Modified, Reasoning	
Sample Collection Information	Bottling-Start: 10/04/2022 16:45:00, Bottling-Stop: 10/04/2022 16:46:00, Parameters-Sampled: PFAS

Reading Time	Depth To Water (ft)	Cumulative Drawdown (ft)	Purge Rate (ml/min)	Temperature (deg c)	Specific Conductivity (us/cm)	Dissolved Oxygen (mg/l)	pH (su)	Oxidation-Reduction Potential (mV)	Turbidity (ntu)
16:20	66.30	1.97	250	12 +	455 +	<0.5	7.7	-41	279
16:30	66.58	2.25	250	12 +	456 +	<0.5	7.7	-47	246
16:45	66.80	2.47	250	12 +	460 +	<0.5	7.7	-55	279

Notes:

1) Abbreviations include: "deg c" indicates degrees Celsius; "ft" indicates feet; "ft bmp" indicates feet below reference measuring point; "gal" indicates gallons; "in" indicates inches; "mg/l" indicates milligrams per liter; "ml/min" indicates milliliters per minute; "mV" indicates millivolts; "NA" indicates not applicable; "NR" indicates not recorded; "ntu" indicates Nephelometric Turbidity units; "su" indicates standard units; "us/cm" indicates microsiemens per centimeter; and "+" indicates the parameter(s) may be used for stabilization calculations but cannot be used for other purposes.
2) Weather temperature units are in degrees Fahrenheit, unless otherwise noted.
3) Did indicator parameters reach stabilization? No
4) Was the two hour time limit reached? Yes
5) Calculations:
   - Head Above Pump Intake (ft) 80.92
   - Total Drawdown (ft) 2.47
   - Calculated Final Purge Volume (gal) 0.81
6) If Drawdown Did Not Stabilize or Stabilized Drawdown >0.3 ft, is Total Purge Volume > Calculated Final Purge Volume? Yes

Well Sampling Worksheet
WWW RAP Field Data
AREA 11/12 2022-Q4 - HS-PMW-RI-111A
Kent County, MI

Well	HS-PMW-RI-111A / 2 in Diameter PVC
Sample Quarter	2022-Q4
Date	10/07/2022
Weather	Overcast, 50s
Sampler Initials	MKM
Purging Device	Bladder-Pump: NA, Peristaltic-Pump: PER-3, Centrifugal-Pump: NA
Meters Used	YSI: ProQuatro (22F101885), Turbidimeter: Agile Rental (09080C031700), Water-Level-Meter: NR
Reference Measuring Point	PVC
Well Screen (ft bmp)	12.9 - 17.9
Measured Bottom Depth (ft bmp)	17.88
Sample Comment	Air bubbles noted on DO probe at 13:55. No readings from 14:05-14:20 because YSI tuned off. Collected MS/MSD.
Initial Water Level Date/Time	10/07/2022 13:15
Initial Water Level Depth (ft bmp)	8.78
Pump/Tubing Intake Depth (ft bmp)	15.4
Tubing Length (ft)	17
Tubing Inner Diameter (in)	0.17
Purging Initiation Date/Time	10/07/2022 13:15
Total Purge Volume (gal)	7
Modified Sample	No
If Modified, Reasoning	
Sample Collection Information	Bottling-Start: 10/07/2022 14:35:00, Bottling-Stop: 10/07/2022 14:45:00, Parameters-Sampled: PFAS

Reading Time	Depth To Water (ft)	Cumulative Drawdown (ft)	Purge Rate (ml/min)	Temperature (deg c)	Specific Conductivity (us/cm)	Dissolved Oxygen (mg/l)	pH (su)	Oxidation-Reduction Potential (mV)	Turbidity (ntu)
13:30	8.82	0.04	350	14 +	679 +	7.3	7.2	217	<5
13:40	8.82	0.04	350	14 +	678 +	8.2	7.2	234	<5
13:50	8.82	0.04	350	14 +	679 +	5.9	7.2	241	<5
13:55	8.82	0.04	350	14 +	678 +	6.4	7.2	247	<5
14:00	8.82	0.04	350	14 +	678 +	7.1	7.2	252	<5
14:05	8.82	0.04	350	14 +	678 +	5.8	7.2	255	<5
14:25	8.82	0.04	350	14 +	678 +	5.8	7.2	239	<5
14:30	8.82	0.04	350	14 +	678 +	5.7	7.2	248	<5
14:35	8.82	0.04	350	14 +	677 +	5.7	7.2	247	<5

Notes:

1) Abbreviations include: "deg c" indicates degrees Celsius; "ft" indicates feet; "ft bmp" indicates feet below reference measuring point; "gal" indicates gallons; "in" indicates inches; "mg/l" indicates milligrams per liter; "ml/min" indicates milliliters per minute; "mV" indicates millivolts; "NA" indicates not applicable; "NR" indicates not recorded; "ntu" indicates Nephelometric Turbidity units; "su" indicates standard units; "us/cm" indicates microsiemens per centimeter; and "+" indicates the parameter(s) may be used for stabilization calculations but cannot be used for other purposes.
2) Weather temperature units are in degrees Fahrenheit, unless otherwise noted.
3) Did indicator parameters reach stabilization? Yes
4) Was the two hour time limit reached? No
5) Calculations:
   - Head Above Pump Intake (ft) 6.62
   - Total Drawdown (ft) 0.04
   - Calculated Final Purge Volume (gal) NA
6) If Drawdown Did Not Stabilize or Stabilized Drawdown >0.3 ft, is Total Purge Volume > Calculated Final Purge Volume? NA

Well Sampling Worksheet
WWW RAP Field Data
AREA 11/12 2022-Q4 - HS-PMW-RI-111B
Kent County, MI

Well	HS-PMW-RI-111B / 2 in Diameter PVC
Sample Quarter	2022-Q4
Date	10/07/2022
Weather	Overcast, 50s
Sampler Initials	DMW
Purging Device	Bladder-Pump: NA, Peristaltic-Pump: PER-1, Centrifugal-Pump: NA
Meters Used	YSI: ProPlus (17G101583), Turbidimeter: Agile Rental (19040C075131), Water-Level-Meter: NR
Reference Measuring Point	PVC
Well Screen (ft bmp)	47.9 - 52.9
Measured Bottom Depth (ft bmp)	52.59
Sample Comment	
Initial Water Level Date/Time	10/07/2022 13:15
Initial Water Level Depth (ft bmp)	9.14
Pump/Tubing Intake Depth (ft bmp)	50.09
Tubing Length (ft)	53
Tubing Inner Diameter (in)	0.17
Purging Initiation Date/Time	10/07/2022 13:15
Total Purge Volume (gal)	5
Modified Sample	No
If Modified, Reasoning	
Sample Collection Information	Bottling-Start: 10/07/2022 14:00:00, Bottling-Stop: 10/07/2022 14:02:00, Parameters-Sampled: PFAS

Reading Time	Depth To Water (ft)	Cumulative Drawdown (ft)	Purge Rate (ml/min)	Temperature (deg c)	Specific Conductivity (us/cm)	Dissolved Oxygen (mg/l)	pH (su)	Oxidation-Reduction Potential (mV)	Turbidity (ntu)
13:35	9.14	0.00	400	12 +	797 +	6.5	7.3	187	6
13:40	9.14	0.00	400	12 +	797 +	6.4	7.3	188	7
13:45	9.14	0.00	400	12 +	797 +	6.4	7.3	190	<5
13:50	9.14	0.00	400	12 +	797 +	6.4	7.3	191	<5
13:55	9.14	0.00	400	12 +	797 +	6.4	7.3	192	<5

Notes:

1) Abbreviations include: "deg c" indicates degrees Celsius; "ft" indicates feet; "ft bmp" indicates feet below reference measuring point; "gal" indicates gallons; "in" indicates inches; "mg/l" indicates milligrams per liter; "ml/min" indicates milliliters per minute; "mV" indicates millivolts; "NA" indicates not applicable; "NR" indicates not recorded; "ntu" indicates Nephelometric Turbidity units; "su" indicates standard units; "us/cm" indicates microsiemens per centimeter; and "+" indicates the parameter(s) may be used for stabilization calculations but cannot be used for other purposes.
2) Weather temperature units are in degrees Fahrenheit, unless otherwise noted.
3) Did indicator parameters reach stabilization? Yes
4) Was the two hour time limit reached? No
5) Calculations:
   - Head Above Pump Intake (ft): 40.95
   - Total Drawdown (ft): 0.00
   - Calculated Final Purge Volume (gal): NA
6) If Drawdown Did Not Stabilize or Stabilized Drawdown >0.3 ft, is Total Purge Volume > Calculated Final Purge Volume? NA

Well Sampling Worksheet
WWW RAP Field Data
AREA 11/12 2022-Q4 - HS-PMW-RI-112A
Kent County, MI

Well	HS-PMW-RI-112A / 2 in Diameter PVC
Sample Quarter	2022-Q4
Date	10/05/2022
Weather	Sunny/Partly Cloudy
Sampler Initials	JET
Purging Device	Bladder-Pump: NA, Peristaltic-Pump: PER-1, Centrifugal-Pump: NA
Meters Used	YSI: ProPlus (17G101583), Turbidimeter: Agile Rental (19040C075131), Water-Level-Meter: NR
Reference Measuring Point	PVC
Well Screen (ft bmp)	24.3 - 29.3
Measured Bottom Depth (ft bmp)	NR
Sample Comment	Last 3 readings are not 5 minutes apart per the Standard Operating Procedure (SOP). GZA does not believe this impacts data quality.
Initial Water Level Date/Time	10/05/2022 15:10
Initial Water Level Depth (ft bmp)	9.88
Pump/Tubing Intake Depth (ft bmp)	26.8
Tubing Length (ft)	30
Tubing Inner Diameter (in)	0.17
Purging Initiation Date/Time	10/05/2022 15:10
Total Purge Volume (gal)	5.5
Modified Sample	No
If Modified, Reasoning	
Sample Collection Information	Bottling-Start: 10/05/2022 16:15:00, Bottling-Stop: 10/05/2022 16:20:00, Parameters-Sampled: PFAS

Reading Time	Depth To Water (ft)	Cumulative Drawdown (ft)	Purge Rate (ml/min)	Temperature (deg c)	Specific Conductivity (us/cm)	Dissolved Oxygen (mg/l)	pH (su)	Oxidation-Reduction Potential (mV)	Turbidity (ntu)
15:20	9.89	0.01	350	14 +	774 +	9.6	7.2	109	14
15:30	9.89	0.01	350	14 +	769 +	8.5	7.2	105	11
15:40	9.89	0.01	350	14 +	769 +	9.8	7.2	103	6
15:50	9.89	0.01	350	14 +	768 +	9.8	7.2	104	<5
16:00	9.89	0.01	350	14 +	768 +	9.7	7.2	103	<5
16:10	9.89	0.01	350	14 +	767 +	9.6	7.2	102	<5

Notes:

1) Abbreviations include: "deg c" indicates degrees Celsius; "ft" indicates feet; "ft bmp" indicates feet below reference measuring point; "gal" indicates gallons; "in" indicates inches; "mg/l" indicates milligrams per liter; "ml/min" indicates milliliters per minute; "mV" indicates millivolts; "NA" indicates not applicable; "NR" indicates not recorded; "ntu" indicates Nephelometric Turbidity units; "su" indicates standard units; "us/cm" indicates microsiemens per centimeter; and "+" indicates the parameter(s) may be used for stabilization calculations but cannot be used for other purposes.
2) Weather temperature units are in degrees Fahrenheit, unless otherwise noted.
3) Did indicator parameters reach stabilization? Yes
4) Was the two hour time limit reached? No
5) Calculations:
   - Head Above Pump Intake (ft): 16.92
   - Total Drawdown (ft): 0.01
   - Calculated Final Purge Volume (gal): NA
6) If Drawdown Did Not Stabilize or Stabilized Drawdown >0.3 ft, is Total Purge Volume > Calculated Final Purge Volume? NA

Well Sampling Worksheet
WWW RAP Field Data
AREA 5 2023-Q1 - AREA5-RI-11B
Kent County, MI

Well	AREA5-RI-11B / 2 in Diameter PVC
Sample Quarter	2023-Q1
Date	02/24/2023
Weather	Mostly Cloudy, low 20s
Sampler Initials	DMW
Purging Device	Bladder-Pump: BP-10, Peristaltic-Pump: NA, Centrifugal-Pump: NA
Meters Used	YSI: Agile Rental 1, Turbidimeter: Agile Rental 1, Water-Level-Meter: WLM-1
Reference Measuring Point	PVC
Well Screen (ft bmp)	140.0 - 145.0
Measured Bottom Depth (ft bmp)	NR
Sample Comment	Started purging while C&D were using YSIs. YSI connected at 12:10.
Initial Water Level Date/Time	02/24/2023 10:45
Initial Water Level Depth (ft bmp)	96.49
Pump/Tubing Intake Depth (ft bmp)	142.5
Tubing Length (ft)	145
Tubing Inner Diameter (in)	0.25
Purging Initiation Date/Time	02/24/2023 10:45
Total Purge Volume (gal)	5
Modified Sample	No
If Modified, Reasoning	
Sample Collection Information	Bottling-Start: 02/24/2023 12:45:00, Bottling-Stop: 02/24/2023 12:50:00, Parameters-Sampled: PFAS

Reading Time	Depth To Water (ft)	Cumulative Drawdown (ft)	Purge Rate (ml/min)	Temperature (deg c)	Specific Conductivity (us/cm)	Dissolved Oxygen (mg/l)	pH (su)	Oxidation-Reduction Potential (mV)	Turbidity (ntu)
12:25	96.51	0.02	160	8 +	704 +	<0.5	7.5	0	66
12:30	96.51	0.02	160	8 +	702 +	<0.5	7.5	-2	54
12:35	96.51	0.02	160	8 +	700 +	<0.5	7.5	-1	61
12:40	96.51	0.02	160	8 +	702 +	<0.5	7.5	0	53
12:45	96.51	0.02	160	8 +	705 +	<0.5	7.5	2	45

Notes:

1) Abbreviations include: "deg c" indicates degrees Celsius; "ft" indicates feet; "ft bmp" indicates feet below reference measuring point; "gal" indicates gallons; "in" indicates inches; "mg/l" indicates milligrams per liter; "ml/min" indicates milliliters per minute; "mV" indicates millivolts; "NA" indicates not applicable; "NR" indicates not recorded; "ntu" indicates Nephelometric Turbidity units; "su" indicates standard units; "us/cm" indicates microsiemens per centimeter; and "+" indicates the parameter(s) may be used for stabilization calculations but cannot be used for other purposes.
2) Weather temperature units are in degrees Fahrenheit, unless otherwise noted.
3) Did indicator parameters reach stabilization? No
4) Was the two hour time limit reached? Yes
5) Calculations:
   - Head Above Pump Intake (ft) 46.01
   - Total Drawdown (ft) 0.02
   - Calculated Final Purge Volume (gal) NA
6) If Drawdown Did Not Stabilize or Stabilized Drawdown >0.3 ft, is Total Purge Volume > Calculated Final Purge Volume? NA

Well Sampling Worksheet
WWW RAP Field Data
AREA 5 2023-Q1 - AREA5-RI-11C
Kent County, MI

Well	AREA5-RI-11C / 2 in Diameter PVC
Sample Quarter	2023-Q1
Date	02/24/2023
Weather	Mostly Cloudy, low 20s
Sampler Initials	MKM
Purging Device	Bladder-Pump: BP-11, Peristaltic-Pump: NA, Centrifugal-Pump: NA
Meters Used	YSI: Agile Rental 2, Turbidimeter: Agile Rental 2, Water-Level-Meter: WLM-2
Reference Measuring Point	PVC
Well Screen (ft bmp)	232.5 - 237.5
Measured Bottom Depth (ft bmp)	NR
Sample Comment	Visibly turbid for the first hour of purge. Did not connect to YSI until 1100. AECOM/EGLE split.
Initial Water Level Date/Time	02/24/2023 10:05
Initial Water Level Depth (ft bmp)	106.63
Pump/Tubing Intake Depth (ft bmp)	234.5
Tubing Length (ft)	237.5
Tubing Inner Diameter (in)	0.25
Purging Initiation Date/Time	02/24/2023 10:05
Total Purge Volume (gal)	5
Modified Sample	No
If Modified, Reasoning	
Sample Collection Information	Bottling-Start: 02/24/2023 12:05:00, Bottling-Stop: 02/24/2023 12:10:00, Parameters-Sampled: PFAS

Reading Time	Depth To Water (ft)	Cumulative Drawdown (ft)	Purge Rate (ml/min)	Temperature (deg c)	Specific Conductivity (us/cm)	Dissolved Oxygen (mg/l)	pH (su)	Oxidation-Reduction Potential (mV)	Turbidity (ntu)
11:20	106.65	0.02	150	5 +	1,357 +	1.1	6.8	102	112
11:45	106.65	0.02	150	6 +	1,357 +	1.3	6.8	139	102
11:55	106.65	0.02	150	5 +	1,347 +	1.6	6.8	130	93
12:00	106.65	0.02	150	6 +	1,349 +	1.6	6.7	126	68
12:05	106.65	0.02	150	6 +	1,362 +	1.5	6.7	123	57

Notes:

1) Abbreviations include: "deg c" indicates degrees Celsius; "ft" indicates feet; "ft bmp" indicates feet below reference measuring point; "gal" indicates gallons; "in" indicates inches; "mg/l" indicates milligrams per liter; "ml/min" indicates milliliters per minute; "mV" indicates millivolts; "NA" indicates not applicable; "NR" indicates not recorded; "ntu" indicates Nephelometric Turbidity units; "su" indicates standard units; "us/cm" indicates microsiemens per centimeter; and "+" indicates the parameter(s) may be used for stabilization calculations but cannot be used for other purposes.
2) Weather temperature units are in degrees Fahrenheit, unless otherwise noted.
3) Did indicator parameters reach stabilization? No
4) Was the two hour time limit reached? Yes
5) Calculations:
   - Head Above Pump Intake (ft): 127.87
   - Total Drawdown (ft): 0.02
   - Calculated Final Purge Volume (gal): NA
6) If Drawdown Did Not Stabilize or Stabilized Drawdown >0.3 ft, is Total Purge Volume > Calculated Final Purge Volume? NA

Well Sampling Worksheet
WWW RAP Field Data
AREA 5 2023-Q1 - AREA5-RI-11D
Kent County, MI

Well	AREA5-RI-11D / 2 in Diameter PVC
Sample Quarter	2023-Q1
Date	02/24/2023
Weather	Cloudy, low 20s
Sampler Initials	DMW
Purging Device	Bladder-Pump: BP-12, Peristaltic-Pump: NA, Centrifugal-Pump: NA
Meters Used	YSI: Agile Rental 1, Turbidimeter: Agile Rental 1, Water-Level-Meter: WLM-3
Reference Measuring Point	PVC
Well Screen (ft bmp)	262.0 - 267.0
Measured Bottom Depth (ft bmp)	NR
Sample Comment	AECOM Split. Bladder controller leak at 1010, switched controller and resumed purging at 1012. Last 3 readings are not 5 minutes apart per Standard Operating Procedure (SOP). GZA does not believe this impacts data quality.
Initial Water Level Date/Time	02/24/2023 09:50
Initial Water Level Depth (ft bmp)	108.09
Pump/Tubing Intake Depth (ft bmp)	264.5
Tubing Length (ft)	267
Tubing Inner Diameter (in)	0.25
Purging Initiation Date/Time	02/24/2023 09:50
Total Purge Volume (gal)	5
Modified Sample	No
If Modified, Reasoning	
Sample Collection Information	Bottling-Start: 02/24/2023 11:50:00, Bottling-Stop: 02/24/2023 11:55:00, Parameters-Sampled: PFAS

Reading Time	Depth To Water (ft)	Cumulative Drawdown (ft)	Purge Rate (ml/min)	Temperature (deg c)	Specific Conductivity (us/cm)	Dissolved Oxygen (mg/l)	pH (su)	Oxidation-Reduction Potential (mV)	Turbidity (ntu)
11:20	108.12	0.03	120	8 +	1,613 +	1.9	7.2	149	341
11:30	108.12	0.03	120	7 +	1,598 +	1.2	7.2	52	338
11:40	108.12	0.03	120	7 +	1,598 +	1.1	7.2	27	173

Notes:

1) Abbreviations include: "deg c" indicates degrees Celsius; "ft" indicates feet; "ft bmp" indicates feet below reference measuring point; "gal" indicates gallons; "in" indicates inches; "mg/l" indicates milligrams per liter; "ml/min" indicates milliliters per minute; "mV" indicates millivolts; "NA" indicates not applicable; "NR" indicates not recorded; "ntu" indicates Nephelometric Turbidity units; "su" indicates standard units; "us/cm" indicates microsiemens per centimeter; and "+" indicates the parameter(s) may be used for stabilization calculations but cannot be used for other purposes.
2) Weather temperature units are in degrees Fahrenheit, unless otherwise noted.
3) Did indicator parameters reach stabilization? No
4) Was the two hour time limit reached? Yes
5) Calculations:
   - Head Above Pump Intake (ft) 156.41
   - Total Drawdown (ft) 0.03
   - Calculated Final Purge Volume (gal) NA
6) If Drawdown Did Not Stabilize or Stabilized Drawdown >0.3 ft, is Total Purge Volume > Calculated Final Purge Volume? NA

Well Sampling Worksheet
WWW RAP Field Data
AREA 5 2023-Q1 - HS-PMW-RI-103A
Kent County, MI

Well	HS-PMW-RI-103A / 2 in Diameter PVC
Sample Quarter	2023-Q1
Date	02/21/2023
Weather	Snow, 28
Sampler Initials	MKM
Purging Device	Bladder-Pump: BP-10, Peristaltic-Pump: NA, Centrifugal-Pump: NA
Meters Used	YSI: Agile Rental 2, Turbidimeter: Agile Rental 2, Water-Level-Meter: WLM-2
Reference Measuring Point	PVC
Well Screen (ft bmp)	89.6 - 94.6
Measured Bottom Depth (ft bmp)	NR
Sample Comment	Turbidity did not stabilize. Last 3 readings are not 5 minutes apart per the Standard Operating Procedure (SOP); GZA does not believe this impacts data quality.
Initial Water Level Date/Time	02/21/2023 09:30
Initial Water Level Depth (ft bmp)	75.56
Pump/Tubing Intake Depth (ft bmp)	92.1
Tubing Length (ft)	94.6
Tubing Inner Diameter (in)	0.25
Purging Initiation Date/Time	02/21/2023 09:30
Total Purge Volume (gal)	5
Modified Sample	No
If Modified, Reasoning	
Sample Collection Information	Bottling-Start: 02/21/2023 10:40:00, Bottling-Stop: 02/21/2023 10:46:00, Parameters-Sampled: PFAS

Reading Time	Depth To Water (ft)	Cumulative Drawdown (ft)	Purge Rate (ml/min)	Temperature (deg c)	Specific Conductivity (us/cm)	Dissolved Oxygen (mg/l)	pH (su)	Oxidation-Reduction Potential (mV)	Turbidity (ntu)
09:50	75.56	0.00	300	9 +	789 +	3.8	6.8	240	29 +
10:00	75.56	0.00	300	8 +	791 +	2.1	7.1	251	20 +
10:15	75.56	0.00	300	9 +	786 +	2.1	7.1	257	10 +
10:25	75.56	0.00	300	9 +	785 +	2.0	7.1	259	5 +
10:35	75.56	0.00	300	9 +	781 +	2.0	7.1	260	<5 +
10:40	75.56	0.00	300	9 +	782 +	2.0	7.1	260	<5 +

Notes:

1) Abbreviations include: "deg c" indicates degrees Celsius; "ft" indicates feet; "ft bmp" indicates feet below reference measuring point; "gal" indicates gallons; "in" indicates inches; "mg/l" indicates milligrams per liter; "ml/min" indicates milliliters per minute; "mV" indicates millivolts; "NA" indicates not applicable; "NR" indicates not recorded; "ntu" indicates Nephelometric Turbidity units; "su" indicates standard units; "us/cm" indicates microsiemens per centimeter; and "+" indicates the parameter(s) may be used for stabilization calculations but cannot be used for other purposes.
2) Weather temperature units are in degrees Fahrenheit, unless otherwise noted.
3) Did indicator parameters reach stabilization? No
4) Was the two hour time limit reached? No
5) Calculations:
   - Head Above Pump Intake (ft): 16.54
   - Total Drawdown (ft): 0.00
   - Calculated Final Purge Volume (gal): NA
6) If Drawdown Did Not Stabilize or Stabilized Drawdown >0.3 ft, is Total Purge Volume > Calculated Final Purge Volume? NA

Well Sampling Worksheet
WWW RAP Field Data
AREA 5 2023-Q1 - HS-PMW-RI-103B
Kent County, MI

Well	HS-PMW-RI-103B / 2 in Diameter PVC
Sample Quarter	2023-Q1
Date	02/21/2023
Weather	Snow 28
Sampler Initials	JET
Purging Device	Bladder-Pump: BP-11, Peristaltic-Pump: NA, Centrifugal-Pump: NA
Meters Used	YSI: Agile Rental 1, Turbidimeter: Agile Rental 1, Water-Level-Meter: WLM-1
Reference Measuring Point	PVC
Well Screen (ft bmp)	108.7 - 113.7
Measured Bottom Depth (ft bmp)	113.7
Sample Comment	DUP collected
Initial Water Level Date/Time	02/21/2023 09:30
Initial Water Level Depth (ft bmp)	77.04
Pump/Tubing Intake Depth (ft bmp)	111.2
Tubing Length (ft)	113.7
Tubing Inner Diameter (in)	0.375
Purging Initiation Date/Time	02/21/2023 09:30
Total Purge Volume (gal)	6
Modified Sample	No
If Modified, Reasoning	
Sample Collection Information	Bottling-Start: 02/21/2023 11:20:00, Bottling-Stop: 02/21/2023 11:30:00, Parameters-Sampled: PFAS

Reading Time	Depth To Water (ft)	Cumulative Drawdown (ft)	Purge Rate (ml/min)	Temperature (deg c)	Specific Conductivity (us/cm)	Dissolved Oxygen (mg/l)	pH (su)	Oxidation-Reduction Potential (mV)	Turbidity (ntu)
10:30	77.10	0.06	200	7 +	768 +	0.8	7.5	234	40
10:40	77.10	0.06	200	8 +	766 +	0.8	7.5	230	30
10:50	77.10	0.06	200	8 +	766 +	0.8	7.6	228	25
11:00	77.10	0.06	200	8 +	764 +	0.9	7.5	222	24
11:05	77.10	0.06	200	8 +	764 +	0.9	7.5	221	20
11:10	77.10	0.06	200	8 +	765 +	0.9	7.5	220	19
11:15	77.10	0.06	200	8 +	764 +	0.9	7.5	220	18

Notes:

1) Abbreviations include: "deg c" indicates degrees Celsius; "ft" indicates feet; "ft bmp" indicates feet below reference measuring point; "gal" indicates gallons; "in" indicates inches; "mg/l" indicates milligrams per liter; "ml/min" indicates milliliters per minute; "mV" indicates millivolts; "NA" indicates not applicable; "NR" indicates not recorded; "ntu" indicates Nephelometric Turbidity units; "su" indicates standard units; "us/cm" indicates microsiemens per centimeter; and "+" indicates the parameter(s) may be used for stabilization calculations but cannot be used for other purposes.
2) Weather temperature units are in degrees Fahrenheit, unless otherwise noted.
3) Did indicator parameters reach stabilization? Yes
4) Was the two hour time limit reached? No
5) Calculations:
   - Head Above Pump Intake (ft) 34.16
   - Total Drawdown (ft) 0.06
   - Calculated Final Purge Volume (gal) NA
6) If Drawdown Did Not Stabilize or Stabilized Drawdown >0.3 ft, is Total Purge Volume > Calculated Final Purge Volume? NA

Well Sampling Worksheet
WWW RAP Field Data
AREA 5 2023-Q1 - HS-PMW-RI-104A
Kent County, MI

Well	HS-PMW-RI-104A / 2 in Diameter PVC
Sample Quarter	2023-Q1
Date	02/15/2023
Weather	Cloudy/Windy
Sampler Initials	JET
Purging Device	Bladder-Pump: NA, Peristaltic-Pump: PER-2, Centrifugal-Pump: NA
Meters Used	YSI: Agile Rental 1, Turbidimeter: Agile Rental 1, Water-Level-Meter: WLM-2
Reference Measuring Point	PVC
Well Screen (ft bmp)	14.6 - 19.6
Measured Bottom Depth (ft bmp)	NR
Sample Comment	Last 3 readings are not 5 minutes apart per Standard Operating Procedure (SOP). GZA does not believe this impacts data quality.
Initial Water Level Date/Time	02/15/2023 11:40
Initial Water Level Depth (ft bmp)	13.90
Pump/Tubing Intake Depth (ft bmp)	16.1
Tubing Length (ft)	19.6
Tubing Inner Diameter (in)	0.17
Purging Initiation Date/Time	02/15/2023 11:40
Total Purge Volume (gal)	6.5
Modified Sample	No
If Modified, Reasoning	
Sample Collection Information	Bottling-Start: 02/15/2023 12:50:00, Bottling-Stop: 02/15/2023 12:52:00, Parameters-Sampled: PFAS

Reading Time	Depth To Water (ft)	Cumulative Drawdown (ft)	Purge Rate (ml/min)	Temperature (deg c)	Specific Conductivity (us/cm)	Dissolved Oxygen (mg/l)	pH (su)	Oxidation-Reduction Potential (mV)	Turbidity (ntu)
12:00	13.92	0.02	350	9 +	770 +	7.5	7.4	313	<5 +
12:20	13.92	0.02	350	9 +	747 +	7.3	7.4	321	<5 +
12:30	13.92	0.02	350	9 +	739 +	7.3	7.4	325	<5 +
12:40	13.92	0.02	350	9 +	737 +	7.3	7.4	329	<5 +

Notes:

1) Abbreviations include: "deg c" indicates degrees Celsius; "ft" indicates feet; "ft bmp" indicates feet below reference measuring point; "gal" indicates gallons; "in" indicates inches; "mg/l" indicates milligrams per liter; "ml/min" indicates milliliters per minute; "mV" indicates millivolts; "NA" indicates not applicable; "NR" indicates not recorded; "ntu" indicates Nephelometric Turbidity units; "su" indicates standard units; "us/cm" indicates microsiemens per centimeter; and "+" indicates the parameter(s) may be used for stabilization calculations but cannot be used for other purposes.
2) Weather temperature units are in degrees Fahrenheit, unless otherwise noted.
3) Did indicator parameters reach stabilization? Yes
4) Was the two hour time limit reached? No
5) Calculations:
   - Head Above Pump Intake (ft) 2.20
   - Total Drawdown (ft) 0.02
   - Calculated Final Purge Volume (gal) NA
6) If Drawdown Did Not Stabilize or Stabilized Drawdown >0.3 ft, is Total Purge Volume > Calculated Final Purge Volume? NA

Well Sampling Worksheet
WWW RAP Field Data
AREA 5 2023-Q1 - HS-PMW-RI-104B
Kent County, MI

Well	HS-PMW-RI-104B / 2 in Diameter PVC
Sample Quarter	2023-Q1
Date	02/15/2023
Weather	Cloudy, 40F
Sampler Initials	BPT
Purging Device	Bladder-Pump: NA, Peristaltic-Pump: PER-1, Centrifugal-Pump: NA
Meters Used	YSI: Agile Rental 3, Turbidimeter: Agile Rental 1, Water-Level-Meter: WLM-3
Reference Measuring Point	PVC
Well Screen (ft bmp)	45.4 - 50.4
Measured Bottom Depth (ft bmp)	50
Sample Comment	DO readings were observed to be negative but within the instrument error for the last 3 readings. The meter will be recalibrated.
Initial Water Level Date/Time	02/15/2023 11:45
Initial Water Level Depth (ft bmp)	14.00
Pump/Tubing Intake Depth (ft bmp)	47.9
Tubing Length (ft)	50
Tubing Inner Diameter (in)	0.17
Purging Initiation Date/Time	02/15/2023 11:45
Total Purge Volume (gal)	5.28
Modified Sample	No
If Modified, Reasoning	
Sample Collection Information	Bottling-Start: 02/15/2023 12:35:00, Bottling-Stop: 02/15/2023 12:45:00, Parameters-Sampled: PFAS

Reading Time	Depth To Water (ft)	Cumulative Drawdown (ft)	Purge Rate (ml/min)	Temperature (deg c)	Specific Conductivity (us/cm)	Dissolved Oxygen (mg/l)	pH (su)	Oxidation-Reduction Potential (mV)	Turbidity (ntu)
11:50	14.01	0.01	400	NR	NR	NR	NR	NR	11 +
11:55	14.01	0.01	400	10 +	588 +	2.5	7.5	285	9 +
12:00	14.01	0.01	400	10 +	587 +	1.0	7.5	284	<5 +
12:05	14.01	0.01	400	10 +	585 +	<0.5	7.5	280	<5 +
12:10	14.01	0.01	400	10 +	590 +	<0.5	7.5	275	<5 +
12:15	14.01	0.01	400	10 +	590 +	<0.5	7.5	273	<5 +
12:20	14.01	0.01	400	10 +	591 +	<0.5	7.5	272	<5 +

Notes:

1) Abbreviations include: "deg c" indicates degrees Celsius; "ft" indicates feet; "ft bmp" indicates feet below reference measuring point; "gal" indicates gallons; "in" indicates inches; "mg/l" indicates milligrams per liter; "ml/min" indicates milliliters per minute; "mV" indicates millivolts; "NA" indicates not applicable; "NR" indicates not recorded; "ntu" indicates Nephelometric Turbidity units; "su" indicates standard units; "us/cm" indicates microsiemens per centimeter; and "+" indicates the parameter(s) may be used for stabilization calculations but cannot be used for other purposes.
2) Weather temperature units are in degrees Fahrenheit, unless otherwise noted.
3) Did indicator parameters reach stabilization? Yes
4) Was the two hour time limit reached? No
5) Calculations:
   - Head Above Pump Intake (ft): 33.90
   - Total Drawdown (ft): 0.01
   - Calculated Final Purge Volume (gal): NA
6) If Drawdown Did Not Stabilize or Stabilized Drawdown >0.3 ft, is Total Purge Volume > Calculated Final Purge Volume? NA

R&W/GZA
Print Date: 1/7/2025

Well Sampling Worksheet
WWW RAP Field Data
AREA 5 2023-Q1 - HS-PMW-RI-104C
Kent County, MI

Well	HS-PMW-RI-104C / 2 in Diameter PVC
Sample Quarter	2023-Q1
Date	02/15/2023
Weather	Cloudy/Windy
Sampler Initials	JET
Purging Device	Bladder-Pump: NA, Peristaltic-Pump: PER-1, Centrifugal-Pump: NA
Meters Used	YSI: Agile Rental 1, Turbidimeter: Agile Rental 1, Water-Level-Meter: WLM-2
Reference Measuring Point	PVC
Well Screen (ft bmp)	74.3 - 79.3
Measured Bottom Depth (ft bmp)	NR
Sample Comment	
Initial Water Level Date/Time	02/15/2023 14:50
Initial Water Level Depth (ft bmp)	14.05
Pump/Tubing Intake Depth (ft bmp)	74.8
Tubing Length (ft)	79.3
Tubing Inner Diameter (in)	0.25
Purging Initiation Date/Time	02/15/2023 14:50
Total Purge Volume (gal)	9.5
Modified Sample	No
If Modified, Reasoning	
Sample Collection Information	Bottling-Start: 02/15/2023 15:50:00, Bottling-Stop: 02/15/2023 15:52:00, Parameters-Sampled: PFAS

Reading Time	Depth To Water (ft)	Cumulative Drawdown (ft)	Purge Rate (ml/min)	Temperature (deg c)	Specific Conductivity (us/cm)	Dissolved Oxygen (mg/l)	pH (su)	Oxidation-Reduction Potential (mV)	Turbidity (ntu)
15:10	14.07	0.02	300	9 +	860 +	0.6	7.4	-19	<5 +
15:20	14.07	0.02	300	9 +	862 +	<0.5	7.4	-50	<5 +
15:30	14.07	0.02	300	9 +	858 +	<0.5	7.4	-65	<5 +
15:35	14.07	0.02	300	9 +	860 +	<0.5	7.4	-71	<5 +
15:40	14.07	0.02	300	9 +	856 +	<0.5	7.4	-74	<5 +

Notes:

1) Abbreviations include: "deg c" indicates degrees Celsius; "ft" indicates feet; "ft bmp" indicates feet below reference measuring point; "gal" indicates gallons; "in" indicates inches; "mg/l" indicates milligrams per liter; "ml/min" indicates milliliters per minute; "mV" indicates millivolts; "NA" indicates not applicable; "NR" indicates not recorded; "ntu" indicates Nephelometric Turbidity units; "su" indicates standard units; "us/cm" indicates microsiemens per centimeter; and "+" indicates the parameter(s) may be used for stabilization calculations but cannot be used for other purposes.
2) Weather temperature units are in degrees Fahrenheit, unless otherwise noted.
3) Did indicator parameters reach stabilization? Yes
4) Was the two hour time limit reached? No
5) Calculations:
   - Head Above Pump Intake (ft) 60.75
   - Total Drawdown (ft) 0.02
   - Calculated Final Purge Volume (gal) NA
6) If Drawdown Did Not Stabilize or Stabilized Drawdown >0.3 ft, is Total Purge Volume > Calculated Final Purge Volume? NA

Well Sampling Worksheet
WWW RAP Field Data
AREA 5 2023-Q1 - HS-PMW-RI-104D
Kent County, MI

Well	HS-PMW-RI-104D / 2 in Diameter PVC
Sample Quarter	2023-Q1
Date	02/15/2023
Weather	Cloudy, 40F
Sampler Initials	BPT
Purging Device	Bladder-Pump: NA, Peristaltic-Pump: PER-3, Centrifugal-Pump: NA
Meters Used	YSI: Agile Rental 3, Turbidimeter: Agile Rental 1, Water-Level-Meter: WLM-3
Reference Measuring Point	PVC
Well Screen (ft bmp)	111.4 - 116.4
Measured Bottom Depth (ft bmp)	116.4
Sample Comment	Bubbles observed in sample tubing at 15:45.
Initial Water Level Date/Time	02/15/2023 15:00
Initial Water Level Depth (ft bmp)	8.00
Pump/Tubing Intake Depth (ft bmp)	115.3
Tubing Length (ft)	116.4
Tubing Inner Diameter (in)	0.17
Purging Initiation Date/Time	02/15/2023 15:00
Total Purge Volume (gal)	7.93
Modified Sample	No
If Modified, Reasoning	
Sample Collection Information	Bottling-Start: 02/15/2023 16:15:00, Bottling-Stop: 02/15/2023 16:20:00, Parameters-Sampled: PFAS

Reading Time	Depth To Water (ft)	Cumulative Drawdown (ft)	Purge Rate (ml/min)	Temperature (deg c)	Specific Conductivity (us/cm)	Dissolved Oxygen (mg/l)	pH (su)	Oxidation-Reduction Potential (mV)	Turbidity (ntu)
15:30	8.01	0.01	400	9 +	1,215 +	2.6	7.4	81	<5 +
15:35	8.01	0.01	400	9 +	1,222 +	0.8	7.4	37	<5 +
15:40	8.01	0.01	400	9 +	1,219 +	0.7	7.4	7	<5 +
15:45	8.01	0.01	400	9 +	1,220 +	1.1	7.4	-12	<5 +
15:55	8.01	0.01	400	9 +	1,220 +	0.9	7.4	-37	<5 +
16:00	8.01	0.01	400	9 +	1,217 +	1.0	7.4	-43	<5 +
16:05	8.01	0.01	400	9 +	1,221 +	1.0	7.4	-48	<5 +
16:10	8.01	0.01	400	9 +	1,218 +	0.9	7.4	-52	<5 +

Notes:

1) Abbreviations include: "deg c" indicates degrees Celsius; "ft" indicates feet; "ft bmp" indicates feet below reference measuring point; "gal" indicates gallons; "in" indicates inches; "mg/l" indicates milligrams per liter; "ml/min" indicates milliliters per minute; "mV" indicates millivolts; "NA" indicates not applicable; "NR" indicates not recorded; "ntu" indicates Nephelometric Turbidity units; "su" indicates standard units; "us/cm" indicates microsiemens per centimeter; and "+" indicates the parameter(s) may be used for stabilization calculations but cannot be used for other purposes.
2) Weather temperature units are in degrees Fahrenheit, unless otherwise noted.
3) Did indicator parameters reach stabilization? Yes
4) Was the two hour time limit reached? No
5) Calculations:
   - Head Above Pump Intake (ft) 107.30
   - Total Drawdown (ft) 0.01
   - Calculated Final Purge Volume (gal) NA
6) If Drawdown Did Not Stabilize or Stabilized Drawdown >0.3 ft, is Total Purge Volume > Calculated Final Purge Volume? NA

Well Sampling Worksheet
WWW RAP Field Data
AREA 5 2023-Q1 - HS-PMW-RI-107A
Kent County, MI

Well	HS-PMW-RI-107A / 2 in Diameter PVC
Sample Quarter	2023-Q1
Date	03/01/2023
Weather	Mostly cloudy, 40
Sampler Initials	MKM
Purging Device	Bladder-Pump: BP-12, Peristaltic-Pump: NA, Centrifugal-Pump: NA
Meters Used	YSI: Agile Rental 1, Turbidimeter: Agile Rental 1, Water-Level-Meter: WLM-1
Reference Measuring Point	PVC
Well Screen (ft bmp)	79.2 - 84.2
Measured Bottom Depth (ft bmp)	NR
Sample Comment	YSI connected another well - connected at 12:30. Turned off at 12:45. First reading at 12:55. Last 3 readings are not 5 minutes apart per Standard Operating Procedure (SOP). GZA does not believe this impacts data quality.
Initial Water Level Date/Time	03/01/2023 11:00
Initial Water Level Depth (ft bmp)	48.91
Pump/Tubing Intake Depth (ft bmp)	81.7
Tubing Length (ft)	84.2
Tubing Inner Diameter (in)	0.25
Purging Initiation Date/Time	03/01/2023 11:00
Total Purge Volume (gal)	6.7
Modified Sample	No
If Modified, Reasoning	
Sample Collection Information	Bottling-Start: 03/01/2023 13:25:00, Bottling-Stop: 03/01/2023 13:30:00, Parameters-Sampled: PFAS

Reading Time	Depth To Water (ft)	Cumulative Drawdown (ft)	Purge Rate (ml/min)	Temperature (deg c)	Specific Conductivity (us/cm)	Dissolved Oxygen (mg/l)	pH (su)	Oxidation-Reduction Potential (mV)	Turbidity (ntu)
12:55	48.91	0.00	175	9 +	602 +	<0.5	7.6	-13	24
13:00	48.91	0.00	175	9 +	597 +	<0.5	7.6	-12	10
13:05	48.91	0.00	175	9 +	595 +	0.5	7.6	-8	7
13:10	48.91	0.00	175	9 +	596 +	0.5	7.6	-6	5
13:15	48.91	0.00	175	9 +	597 +	0.5	7.6	-2	5
13:25	48.91	0.00	175	9 +	596 +	0.6	7.6	-3	5

Notes:

1) Abbreviations include: "deg c" indicates degrees Celsius; "ft" indicates feet; "ft bmp" indicates feet below reference measuring point; "gal" indicates gallons; "in" indicates inches; "mg/l" indicates milligrams per liter; "ml/min" indicates milliliters per minute; "mV" indicates millivolts; "NA" indicates not applicable; "NR" indicates not recorded; "ntu" indicates Nephelometric Turbidity units; "su" indicates standard units; "us/cm" indicates microsiemens per centimeter; and "+" indicates the parameter(s) may be used for stabilization calculations but cannot be used for other purposes.
2) Weather temperature units are in degrees Fahrenheit, unless otherwise noted.
3) Did indicator parameters reach stabilization? Yes
4) Was the two hour time limit reached? Yes
5) Calculations:
   - Head Above Pump Intake (ft) 32.79
   - Total Drawdown (ft) 0.00
   - Calculated Final Purge Volume (gal) NA
6) If Drawdown Did Not Stabilize or Stabilized Drawdown >0.3 ft, is Total Purge Volume > Calculated Final Purge Volume? NA

Well Sampling Worksheet
WWW RAP Field Data
AREA 5 2023-Q1 - HS-PMW-RI-107B
Kent County, MI

Well	HS-PMW-RI-107B / 2 in Diameter PVC
Sample Quarter	2023-Q1
Date	03/01/2023
Weather	Overcast, 43
Sampler Initials	JET
Purging Device	Bladder-Pump: BP-11, Peristaltic-Pump: NA, Centrifugal-Pump: NA
Meters Used	YSI: Agile Rental 1, Turbidimeter: Agile Rental 1, Water-Level-Meter: WLM-2
Reference Measuring Point	PVC
Well Screen (ft bmp)	175.2 - 180.2
Measured Bottom Depth (ft bmp)	NR
Sample Comment	
Initial Water Level Date/Time	03/01/2023 12:55
Initial Water Level Depth (ft bmp)	62.99
Pump/Tubing Intake Depth (ft bmp)	177.7
Tubing Length (ft)	180
Tubing Inner Diameter (in)	0.25
Purging Initiation Date/Time	03/01/2023 12:55
Total Purge Volume (gal)	3
Modified Sample	No
If Modified, Reasoning	
Sample Collection Information	Bottling-Start: 03/01/2023 15:00:00, Bottling-Stop: 03/01/2023 15:04:00, Parameters-Sampled: PFAS

Reading Time	Depth To Water (ft)	Cumulative Drawdown (ft)	Purge Rate (ml/min)	Temperature (deg c)	Specific Conductivity (us/cm)	Dissolved Oxygen (mg/l)	pH (su)	Oxidation-Reduction Potential (mV)	Turbidity (ntu)
14:10	63.45	0.46	100	9 +	1,110 +	1.2	7.0	194	>999
14:15	63.45	0.46	100	9 +	1,111 +	<0.5	6.9	193	>999
14:20	63.45	0.46	100	9 +	1,113 +	<0.5	6.9	192	896
14:25	63.45	0.46	100	9 +	1,112 +	<0.5	6.9	191	540
14:35	63.45	0.46	100	9 +	1,109 +	<0.5	6.9	189	420
14:45	63.45	0.46	100	9 +	1,110 +	<0.5	6.9	185	449
14:50	63.45	0.46	100	9 +	1,108 +	0.6	6.9	168	389
14:55	63.45	0.46	100	9 +	1,109 +	0.6	6.9	168	316

Notes:

1) Abbreviations include: "deg c" indicates degrees Celsius; "ft" indicates feet; "ft bmp" indicates feet below reference measuring point; "gal" indicates gallons; "in" indicates inches; "mg/l" indicates milligrams per liter; "ml/min" indicates milliliters per minute; "mV" indicates millivolts; "NA" indicates not applicable; "NR" indicates not recorded; "ntu" indicates Nephelometric Turbidity units; "su" indicates standard units; "us/cm" indicates microsiemens per centimeter; and "+" indicates the parameter(s) may be used for stabilization calculations but cannot be used for other purposes.
2) Weather temperature units are in degrees Fahrenheit, unless otherwise noted.
3) Did indicator parameters reach stabilization? No
4) Was the two hour time limit reached? Yes
5) Calculations:
   - Head Above Pump Intake (ft): 114.71
   - Total Drawdown (ft): 0.46
   - Calculated Final Purge Volume (gal): 0.54
6) If Drawdown Did Not Stabilize or Stabilized Drawdown >0.3 ft, is Total Purge Volume > Calculated Final Purge Volume? Yes

Well Sampling Worksheet
WWW RAP Field Data
AREA 5 2023-Q1 - HS-PMW-RI-107C
Kent County, MI

Well	HS-PMW-RI-107C / 2 in Diameter PVC
Sample Quarter	2023-Q1
Date	03/01/2023
Weather	Overcast
Sampler Initials	JET
Purging Device	Bladder-Pump: BP-10, Peristaltic-Pump: NA, Centrifugal-Pump: NA
Meters Used	YSI: Agile Rental 2, Turbidimeter: Agile Rental 2, Water-Level-Meter: WLM-3
Reference Measuring Point	PVC
Well Screen (ft bmp)	184.7 - 189.7
Measured Bottom Depth (ft bmp)	NR
Sample Comment	Inconsistent flow rate observed with violent air bubbles observed at 11:30.
Initial Water Level Date/Time	03/01/2023 10:30
Initial Water Level Depth (ft bmp)	63.09
Pump/Tubing Intake Depth (ft bmp)	187.2
Tubing Length (ft)	189.7
Tubing Inner Diameter (in)	0.25
Purging Initiation Date/Time	03/01/2023 10:30
Total Purge Volume (gal)	10
Modified Sample	No
If Modified, Reasoning	
Sample Collection Information	Bottling-Start: 03/01/2023 12:30:00, Bottling-Stop: 03/01/2023 12:32:00, Parameters-Sampled: PFAS

Reading Time	Depth To Water (ft)	Cumulative Drawdown (ft)	Purge Rate (ml/min)	Temperature (deg c)	Specific Conductivity (us/cm)	Dissolved Oxygen (mg/l)	pH (su)	Oxidation-Reduction Potential (mV)	Turbidity (ntu)
11:30	63.12	0.03	300	9 +	1,087 +	11.4	7.2	194	14
12:00	63.12	0.03	300	9 +	1,088 +	1.7	7.1	217	<5
12:05	63.12	0.03	300	9 +	1,087 +	1.4	6.9	216	<5
12:10	63.12	0.03	300	9 +	1,086 +	1.3	6.9	215	<5
12:15	63.12	0.03	300	9 +	1,090 +	1.3	6.9	211	<5
12:20	63.12	0.03	300	9 +	1,092 +	1.3	7.0	208	<5

Notes:

1) Abbreviations include: "deg c" indicates degrees Celsius; "ft" indicates feet; "ft bmp" indicates feet below reference measuring point; "gal" indicates gallons; "in" indicates inches; "mg/l" indicates milligrams per liter; "ml/min" indicates milliliters per minute; "mV" indicates millivolts; "NA" indicates not applicable; "NR" indicates not recorded; "ntu" indicates Nephelometric Turbidity units; "su" indicates standard units; "us/cm" indicates microsiemens per centimeter; and "+" indicates the parameter(s) may be used for stabilization calculations but cannot be used for other purposes.
2) Weather temperature units are in degrees Fahrenheit, unless otherwise noted.
3) Did indicator parameters reach stabilization? Yes
4) Was the two hour time limit reached? Yes
5) Calculations:
   - Head Above Pump Intake (ft): 124.11
   - Total Drawdown (ft): 0.03
   - Calculated Final Purge Volume (gal): NA
6) If Drawdown Did Not Stabilize or Stabilized Drawdown >0.3 ft, is Total Purge Volume > Calculated Final Purge Volume? NA

Well Sampling Worksheet
WWW RAP Field Data
AREA 5 2023-Q1 - HS-PMW-RI-107D
Kent County, MI

Well	HS-PMW-RI-107D / 2 in Diameter PVC
Sample Quarter	2023-Q1
Date	03/01/2023
Weather	Overcast; 40
Sampler Initials	MKM
Purging Device	Bladder-Pump: BP-11, Peristaltic-Pump: NA, Centrifugal-Pump: NA
Meters Used	YSI: Agile Rental 1, Turbidimeter: Agile Rental 1, Water-Level-Meter: WLM-2
Reference Measuring Point	PVC
Well Screen (ft bmp)	198.7 - 203.7
Measured Bottom Depth (ft bmp)	NR
Sample Comment	Purge water observed to be very turbid. YSI Connected at 11:30.
Initial Water Level Date/Time	03/01/2023 10:20
Initial Water Level Depth (ft bmp)	63.46
Pump/Tubing Intake Depth (ft bmp)	201.2
Tubing Length (ft)	203.7
Tubing Inner Diameter (in)	0.25
Purging Initiation Date/Time	03/01/2023 10:20
Total Purge Volume (gal)	5.5
Modified Sample	No
If Modified, Reasoning	
Sample Collection Information	Bottling-Start: 03/01/2023 12:20:00, Bottling-Stop: 03/01/2023 12:25:00, Parameters-Sampled: PFAS

Reading Time	Depth To Water (ft)	Cumulative Drawdown (ft)	Purge Rate (ml/min)	Temperature (deg c)	Specific Conductivity (us/cm)	Dissolved Oxygen (mg/l)	pH (su)	Oxidation-Reduction Potential (mV)	Turbidity (ntu)
11:15	63.46	0.00	175	NR	NR	NR	NR	NR	232
11:30	63.46	0.00	175	9 +	1,372 +	<0.5	7.2	-8	205
11:40	63.46	0.00	175	9 +	1,374 +	<0.5	7.2	-16	193
11:50	63.46	0.00	175	9 +	1,368 +	<0.5	7.2	-19	338
11:55	63.46	0.00	175	9 +	1,375 +	<0.5	7.2	-21	334
12:00	63.46	0.00	175	9 +	1,380 +	<0.5	7.2	-23	721
12:10	63.46	0.00	175	9 +	1,372 +	<0.5	7.2	-26	391
12:15	63.46	0.00	175	9 +	1,369 +	<0.5	7.2	-27	351
12:20	63.46	0.00	175	9 +	1,366 +	<0.5	7.2	-27	347

Notes:

1) Abbreviations include: "deg c" indicates degrees Celsius; "ft" indicates feet; "ft bmp" indicates feet below reference measuring point; "gal" indicates gallons; "in" indicates inches; "mg/l" indicates milligrams per liter; "ml/min" indicates milliliters per minute; "mV" indicates millivolts; "NA" indicates not applicable; "NR" indicates not recorded; "ntu" indicates Nephelometric Turbidity units; "su" indicates standard units; "us/cm" indicates microsiemens per centimeter; and "+" indicates the parameter(s) may be used for stabilization calculations but cannot be used for other purposes.
2) Weather temperature units are in degrees Fahrenheit, unless otherwise noted.
3) Did indicator parameters reach stabilization? No
4) Was the two hour time limit reached? Yes
5) Calculations:
   - Head Above Pump Intake (ft) 137.74
   - Total Drawdown (ft) 0.00
   - Calculated Final Purge Volume (gal) NA
6) If Drawdown Did Not Stabilize or Stabilized Drawdown >0.3 ft, is Total Purge Volume > Calculated Final Purge Volume? NA

Well Sampling Worksheet
WWW RAP Field Data
AREA 6 2023-Q1 - HS-MW-13B
Kent County, MI

Well	HS-MW-13B / 2 in Diameter PVC
Sample Quarter	2023-Q1
Date	03/16/2023
Weather	6C, Mostly Cloudy
Sampler Initials	AJG
Purging Device	Bladder-Pump: NA, Peristaltic-Pump: NA, Centrifugal-Pump: Mega Monsoon-1
Meters Used	YSI: Agile Rental 1, Turbidimeter: Agile Rental 1, Water-Level-Meter: WLM-1
Reference Measuring Point	PVC
Well Screen (ft bmp)	151.2 - 156.0
Measured Bottom Depth (ft bmp)	156
Sample Comment	Collected Duplicate sample.
Initial Water Level Date/Time	03/16/2023 10:50
Initial Water Level Depth (ft bmp)	58.64
Pump/Tubing Intake Depth (ft bmp)	153.5
Tubing Length (ft)	155
Tubing Inner Diameter (in)	0.375
Purging Initiation Date/Time	03/16/2023 10:55
Total Purge Volume (gal)	3.4
Modified Sample	No
If Modified, Reasoning	
Sample Collection Information	Bottling-Start: 03/16/2023 12:00:00, Bottling-Stop: 03/16/2023 12:10:00, Parameters-Sampled: PFAS

Reading Time	Depth To Water (ft)	Cumulative Drawdown (ft)	Purge Rate (ml/min)	Temperature (deg c)	Specific Conductivity (us/cm)	Dissolved Oxygen (mg/l)	pH (su)	Oxidation-Reduction Potential (mV)	Turbidity (ntu)
11:35	58.65	0.01	200	10 +	883 +	6.1	7.2	154	10
11:40	58.65	0.01	200	10 +	884 +	6.0	7.1	170	6
11:45	58.65	0.01	200	10 +	884 +	6.0	7.1	180	5
11:50	58.65	0.01	200	10 +	884 +	5.9	7.2	182	<5
11:55	58.65	0.01	200	10 +	885 +	5.9	7.2	186	<5
12:00	58.65	0.01	200	10 +	884 +	5.9	7.2	190	<5

Notes:

1) Abbreviations include: "deg c" indicates degrees Celsius; "ft" indicates feet; "ft bmp" indicates feet below reference measuring point; "gal" indicates gallons; "in" indicates inches; "mg/l" indicates milligrams per liter; "ml/min" indicates milliliters per minute; "mV" indicates millivolts; "NA" indicates not applicable; "NR" indicates not recorded; "ntu" indicates Nephelometric Turbidity units; "su" indicates standard units; "us/cm" indicates microsiemens per centimeter; and "+" indicates the parameter(s) may be used for stabilization calculations but cannot be used for other purposes.
2) Weather temperature units are in degrees Fahrenheit, unless otherwise noted.
3) Did indicator parameters reach stabilization? Yes
4) Was the two hour time limit reached? No
5) Calculations:
   - Head Above Pump Intake (ft) 94.86
   - Total Drawdown (ft) 0.01
   - Calculated Final Purge Volume (gal) NA
6) If Drawdown Did Not Stabilize or Stabilized Drawdown >0.3 ft, is Total Purge Volume > Calculated Final Purge Volume? NA

Well Sampling Worksheet
WWW RAP Field Data
AREA 6 2023-Q1 - HS-MW-13A
Kent County, MI

Well	HS-MW-13A / 2 in Diameter PVC
Sample Quarter	2023-Q1
Date	03/16/2023
Weather	6C, Mostly Cloudy
Sampler Initials	JET
Purging Device	Bladder-Pump: NA, Peristaltic-Pump: NA, Centrifugal-Pump: Mega Monsoon-2
Meters Used	YSI: Agile Rental 1, Turbidimeter: Agile Rental 1, Water-Level-Meter: WLM-1
Reference Measuring Point	PVC
Well Screen (ft bmp)	81.7 - 86.5
Measured Bottom Depth (ft bmp)	86.4
Sample Comment	
Initial Water Level Date/Time	03/16/2023 11:35
Initial Water Level Depth (ft bmp)	58.64
Pump/Tubing Intake Depth (ft bmp)	83.9
Tubing Length (ft)	86.4
Tubing Inner Diameter (in)	0.375
Purging Initiation Date/Time	03/16/2023 11:35
Total Purge Volume (gal)	12.9
Modified Sample	No
If Modified, Reasoning	
Sample Collection Information	Bottling-Start: 03/16/2023 12:50:00, Bottling-Stop: 03/16/2023 12:55:00, Parameters-Sampled: PFAS

Reading Time	Depth To Water (ft)	Cumulative Drawdown (ft)	Purge Rate (ml/min)	Temperature (deg c)	Specific Conductivity (us/cm)	Dissolved Oxygen (mg/l)	pH (su)	Oxidation-Reduction Potential (mV)	Turbidity (ntu)
12:05	58.68	0.04	700	10 +	537 +	6.3	7.6	347	28
12:15	58.68	0.04	700	10 +	537 +	5.9	7.7	341	16
12:25	58.68	0.04	700	10 +	537 +	5.7	7.6	335	10
12:35	58.68	0.04	700	10 +	537 +	5.7	7.7	332	6
12:40	58.68	0.04	700	10 +	537 +	5.6	7.7	328	5
12:45	58.68	0.04	700	10 +	537 +	5.6	7.7	325	5

Notes:

1) Abbreviations include: "deg c" indicates degrees Celsius; "ft" indicates feet; "ft bmp" indicates feet below reference measuring point; "gal" indicates gallons; "in" indicates inches; "mg/l" indicates milligrams per liter; "ml/min" indicates milliliters per minute; "mV" indicates millivolts; "NA" indicates not applicable; "NR" indicates not recorded; "ntu" indicates Nephelometric Turbidity units; "su" indicates standard units; "us/cm" indicates microsiemens per centimeter; and "+" indicates the parameter(s) may be used for stabilization calculations but cannot be used for other purposes.
2) Weather temperature units are in degrees Fahrenheit, unless otherwise noted.
3) Did indicator parameters reach stabilization? Yes
4) Was the two hour time limit reached? No
5) Calculations:
   - Head Above Pump Intake (ft): 25.26
   - Total Drawdown (ft): 0.04
   - Calculated Final Purge Volume (gal): NA
6) If Drawdown Did Not Stabilize or Stabilized Drawdown >0.3 ft, is Total Purge Volume > Calculated Final Purge Volume? NA

Well Sampling Worksheet
WWW RAP Field Data
AREA 6 2023-Q1 - HS-MW-13C
Kent County, MI

Well	HS-MW-13C / 2 in Diameter PVC
Sample Quarter	2023-Q1
Date	03/16/2023
Weather	6 deg. C, Mostly Cloudy
Sampler Initials	GRT
Purging Device	Bladder-Pump: LIV-2, Peristaltic-Pump: NA, Centrifugal-Pump: NA
Meters Used	YSI: Agile Rental 3, Turbidimeter: Agile Rental 2, Water-Level-Meter: WLM-3
Reference Measuring Point	PVC
Well Screen (ft bmp)	201.7 - 206.5
Measured Bottom Depth (ft bmp)	206.5
Sample Comment	
Initial Water Level Date/Time	03/16/2023 10:55
Initial Water Level Depth (ft bmp)	57.49
Pump/Tubing Intake Depth (ft bmp)	204
Tubing Length (ft)	206.5
Tubing Inner Diameter (in)	0.25
Purging Initiation Date/Time	03/16/2023 10:55
Total Purge Volume (gal)	3
Modified Sample	No
If Modified, Reasoning	
Sample Collection Information	Bottling-Start: 03/16/2023 12:50:00, Bottling-Stop: 03/16/2023 12:53:00, Parameters-Sampled: PFAS

Reading Time	Depth To Water (ft)	Cumulative Drawdown (ft)	Purge Rate (ml/min)	Temperature (deg c)	Specific Conductivity (us/cm)	Dissolved Oxygen (mg/l)	pH (su)	Oxidation-Reduction Potential (mV)	Turbidity (ntu)
11:45	58.24	0.75	90	9 +	1,676 +	6.8	7.2	10	55
11:55	58.19	0.70	90	9 +	1,679 +	8.2	7.3	-36	42
12:05	58.22	0.73	90	9 +	1,680 +	9.4	7.2	-52	24
12:15	58.18	0.69	90	9 +	1,676 +	8.9	7.3	-55	17
12:20	58.18	0.69	90	9 +	1,675 +	8.5	7.2	-62	13
12:25	58.18	0.69	90	9 +	1,674 +	6.9	7.2	-62	15
12:30	58.18	0.69	90	9 +	1,674 +	7.6	7.3	-62	14
12:35	58.18	0.69	90	9 +	1,673 +	7.0	7.3	-62	15

Notes:

1) Abbreviations include: "deg c" indicates degrees Celsius; "ft" indicates feet; "ft bmp" indicates feet below reference measuring point; "gal" indicates gallons; "in" indicates inches; "mg/l" indicates milligrams per liter; "ml/min" indicates milliliters per minute; "mV" indicates millivolts; "NA" indicates not applicable; "NR" indicates not recorded; "ntu" indicates Nephelometric Turbidity units; "su" indicates standard units; "us/cm" indicates microsiemens per centimeter; and "+" indicates the parameter(s) may be used for stabilization calculations but cannot be used for other purposes.
2) Weather temperature units are in degrees Fahrenheit, unless otherwise noted.
3) Did indicator parameters reach stabilization? Yes
4) Was the two hour time limit reached? No
5) Calculations:
   - Head Above Pump Intake (ft): 146.51
   - Total Drawdown (ft): 0.69
   - Calculated Final Purge Volume (gal): 0.65
6) If Drawdown Did Not Stabilize or Stabilized Drawdown >0.3 ft, is Total Purge Volume > Calculated Final Purge Volume? Yes

Well Sampling Worksheet
WWW RAP Field Data
AREA 6 2023-Q1 - HS-MW-13B
Kent County, MI

Well	HS-MW-13B / 2 in Diameter PVC
Sample Quarter	2023-Q1
Date	03/16/2023
Weather	6C, Mostly Cloudy
Sampler Initials	AJG
Purging Device	Bladder-Pump: NA, Peristaltic-Pump: NA, Centrifugal-Pump: Mega Monsoon-1
Meters Used	YSI: Agile Rental 1, Turbidimeter: Agile Rental 1, Water-Level-Meter: WLM-1
Reference Measuring Point	PVC
Well Screen (ft bmp)	151.2 - 156.0
Measured Bottom Depth (ft bmp)	156
Sample Comment	Collected Duplicate sample.
Initial Water Level Date/Time	03/16/2023 10:50
Initial Water Level Depth (ft bmp)	58.64
Pump/Tubing Intake Depth (ft bmp)	153.5
Tubing Length (ft)	155
Tubing Inner Diameter (in)	0.375
Purging Initiation Date/Time	03/16/2023 10:55
Total Purge Volume (gal)	3.4
Modified Sample	No
If Modified, Reasoning	
Sample Collection Information	Bottling-Start: 03/16/2023 12:00:00, Bottling-Stop: 03/16/2023 12:10:00, Parameters-Sampled: PFAS

Reading Time	Depth To Water (ft)	Cumulative Drawdown (ft)	Purge Rate (ml/min)	Temperature (deg c)	Specific Conductivity (us/cm)	Dissolved Oxygen (mg/l)	pH (su)	Oxidation-Reduction Potential (mV)	Turbidity (ntu)
11:35	58.65	0.01	200	10 +	883 +	6.1	7.2	154	10
11:40	58.65	0.01	200	10 +	884 +	6.0	7.1	170	6
11:45	58.65	0.01	200	10 +	884 +	6.0	7.1	180	5
11:50	58.65	0.01	200	10 +	884 +	5.9	7.2	182	<5
11:55	58.65	0.01	200	10 +	885 +	5.9	7.2	186	<5
12:00	58.65	0.01	200	10 +	884 +	5.9	7.2	190	<5

Notes:

1) Abbreviations include: "deg c" indicates degrees Celsius; "ft" indicates feet; "ft bmp" indicates feet below reference measuring point; "gal" indicates gallons; "in" indicates inches; "mg/l" indicates milligrams per liter; "ml/min" indicates milliliters per minute; "mV" indicates millivolts; "NA" indicates not applicable; "NR" indicates not recorded; "ntu" indicates Nephelometric Turbidity units; "su" indicates standard units; "us/cm" indicates microsiemens per centimeter; and "+" indicates the parameter(s) may be used for stabilization calculations but cannot be used for other purposes.
2) Weather temperature units are in degrees Fahrenheit, unless otherwise noted.
3) Did indicator parameters reach stabilization? Yes
4) Was the two hour time limit reached? No
5) Calculations:
   - Head Above Pump Intake (ft) 94.86
   - Total Drawdown (ft) 0.01
   - Calculated Final Purge Volume (gal) NA
6) If Drawdown Did Not Stabilize or Stabilized Drawdown >0.3 ft, is Total Purge Volume > Calculated Final Purge Volume? NA

Well Sampling Worksheet
WWW RAP Field Data
AREA 6 2023-Q1 - HS-MW-13C
Kent County, MI

Well	HS-MW-13C / 2 in Diameter PVC
Sample Quarter	2023-Q1
Date	03/16/2023
Weather	6 deg. C, Mostly Cloudy
Sampler Initials	GRT
Purging Device	Bladder-Pump: LIV-2, Peristaltic-Pump: NA, Centrifugal-Pump: NA
Meters Used	YSI: Agile Rental 3, Turbidimeter: Agile Rental 2, Water-Level-Meter: WLM-3
Reference Measuring Point	PVC
Well Screen (ft bmp)	201.7 - 206.5
Measured Bottom Depth (ft bmp)	206.5
Sample Comment	
Initial Water Level Date/Time	03/16/2023 10:55
Initial Water Level Depth (ft bmp)	57.49
Pump/Tubing Intake Depth (ft bmp)	204
Tubing Length (ft)	206.5
Tubing Inner Diameter (in)	0.25
Purging Initiation Date/Time	03/16/2023 10:55
Total Purge Volume (gal)	3
Modified Sample	No
If Modified, Reasoning	
Sample Collection Information	Bottling-Start: 03/16/2023 12:50:00, Bottling-Stop: 03/16/2023 12:53:00, Parameters-Sampled: PFAS

Reading Time	Depth To Water (ft)	Cumulative Drawdown (ft)	Purge Rate (ml/min)	Temperature (deg c)	Specific Conductivity (us/cm)	Dissolved Oxygen (mg/l)	pH (su)	Oxidation-Reduction Potential (mV)	Turbidity (ntu)
11:45	58.24	0.75	90	9 +	1,676 +	6.8	7.2	10	55
11:55	58.19	0.70	90	9 +	1,679 +	8.2	7.3	-36	42
12:05	58.22	0.73	90	9 +	1,680 +	9.4	7.2	-52	24
12:15	58.18	0.69	90	9 +	1,676 +	8.9	7.3	-55	17
12:20	58.18	0.69	90	9 +	1,675 +	8.5	7.2	-62	13
12:25	58.18	0.69	90	9 +	1,674 +	6.9	7.2	-62	15
12:30	58.18	0.69	90	9 +	1,674 +	7.6	7.3	-62	14
12:35	58.18	0.69	90	9 +	1,673 +	7.0	7.3	-62	15

Notes:

1) Abbreviations include: "deg c" indicates degrees Celsius; "ft" indicates feet; "ft bmp" indicates feet below reference measuring point; "gal" indicates gallons; "in" indicates inches; "mg/l" indicates milligrams per liter; "ml/min" indicates milliliters per minute; "mV" indicates millivolts; "NA" indicates not applicable; "NR" indicates not recorded; "ntu" indicates Nephelometric Turbidity units; "su" indicates standard units; "us/cm" indicates microsiemens per centimeter; and "+" indicates the parameter(s) may be used for stabilization calculations but cannot be used for other purposes.
2) Weather temperature units are in degrees Fahrenheit, unless otherwise noted.
3) Did indicator parameters reach stabilization? Yes
4) Was the two hour time limit reached? No
5) Calculations:
   - Head Above Pump Intake (ft): 146.51
   - Total Drawdown (ft): 0.69
   - Calculated Final Purge Volume (gal): 0.65
6) If Drawdown Did Not Stabilize or Stabilized Drawdown >0.3 ft, is Total Purge Volume > Calculated Final Purge Volume? Yes

Well Sampling Worksheet
WWW RAP Field Data
AREA 6 2023-Q1 - HS-PMW-16A
Kent County, MI

Well	HS-PMW-16A / 2 in Diameter PVC
Sample Quarter	2023-Q1
Date	03/16/2023
Weather	49F Cloudy
Sampler Initials	AJG
Purging Device	Bladder-Pump: NA, Peristaltic-Pump: NA, Centrifugal-Pump: Mega Monsoon-2
Meters Used	YSI: Agile Rental 2, Turbidimeter: Agile Rental 2, Water-Level-Meter: WLM-1
Reference Measuring Point	PVC
Measured Bottom Depth (ft bmp)	94
Sample Comment	MS/MSD collected
Initial Water Level Date/Time	03/16/2023 15:15
Initial Water Level Depth (ft bmp)	74.25
Pump/Tubing Intake Depth (ft bmp)	91.5
Tubing Length (ft)	94
Tubing Inner Diameter (in)	0.375
Purging Initiation Date/Time	03/16/2023 15:15
Total Purge Volume (gal)	3.698
Modified Sample	No
If Modified, Reasoning	
Sample Collection Information	Bottling-Start: 03/16/2023 15:55:00, Bottling-Stop: 03/16/2023 16:05:00, Parameters-Sampled: PFAS

Reading Time	Depth To Water (ft)	Cumulative Drawdown (ft)	Purge Rate (ml/min)	Temperature (deg c)	Specific Conductivity (us/cm)	Dissolved Oxygen (mg/l)	pH (su)	Oxidation-Reduction Potential (mV)	Turbidity (ntu)
15:35	74.25	0.00	350	11 +	745 +	11.0	7.1	389	7
15:40	74.25	0.00	350	11 +	745 +	9.6	7.2	386	<5
15:45	74.25	0.00	350	11 +	745 +	9.4	7.2	385	<5
15:50	74.25	0.00	350	11 +	745 +	9.4	7.2	385	<5
15:55	74.25	0.00	350	11 +	745 +	9.4	7.2	385	<5

Notes:

1) Abbreviations include: "deg c" indicates degrees Celsius; "ft" indicates feet; "ft bmp" indicates feet below reference measuring point; "gal" indicates gallons; "in" indicates inches; "mg/l" indicates milligrams per liter; "ml/min" indicates milliliters per minute; "mV" indicates millivolts; "NA" indicates not applicable; "NR" indicates not recorded; "ntu" indicates Nephelometric Turbidity units; "su" indicates standard units; "us/cm" indicates microsiemens per centimeter; and "+" indicates the parameter(s) may be used for stabilization calculations but cannot be used for other purposes.
2) Weather temperature units are in degrees Fahrenheit, unless otherwise noted.
3) Did indicator parameters reach stabilization? Yes
4) Was the two hour time limit reached? No
5) Calculations:
   - Head Above Pump Intake (ft) 17.25
   - Total Drawdown (ft) 0.00
   - Calculated Final Purge Volume (gal) NA
6) If Drawdown Did Not Stabilize or Stabilized Drawdown >0.3 ft, is Total Purge Volume > Calculated Final Purge Volume? NA

Well Sampling Worksheet
WWW RAP Field Data
AREA 6 2023-Q1 - HS-PMW-16B
Kent County, MI

Well	HS-PMW-16B / 2 in Diameter PVC
Sample Quarter	2023-Q1
Date	03/16/2023
Weather	9C, Cloudy
Sampler Initials	JET
Purging Device	Bladder-Pump: NA, Peristaltic-Pump: NA, Centrifugal-Pump: Mega Monsoon-1
Meters Used	YSI: Agile Rental 2, Turbidimeter: Agile Rental 2, Water-Level-Meter: WLM-3
Reference Measuring Point	PVC
Well Screen (ft bmp)	118.1 - 123.1
Measured Bottom Depth (ft bmp)	123.1
Sample Comment	
Initial Water Level Date/Time	03/16/2023 15:35
Initial Water Level Depth (ft bmp)	74.09
Pump/Tubing Intake Depth (ft bmp)	120.6
Tubing Length (ft)	123.1
Tubing Inner Diameter (in)	0.375
Purging Initiation Date/Time	03/16/2023 15:35
Total Purge Volume (gal)	12
Modified Sample	No
If Modified, Reasoning	
Sample Collection Information	Bottling-Start: 03/16/2023 17:05:00, Bottling-Stop: 03/16/2023 17:10:00, Parameters-Sampled: PFAS

Reading Time	Depth To Water (ft)	Cumulative Drawdown (ft)	Purge Rate (ml/min)	Temperature (deg c)	Specific Conductivity (us/cm)	Dissolved Oxygen (mg/l)	pH (su)	Oxidation-Reduction Potential (mV)	Turbidity (ntu)
16:20	74.19	0.10	500	11 +	888 +	6.3	7.3	354	11
16:30	74.19	0.10	500	11 +	889 +	6.3	7.3	347	10
16:40	74.19	0.10	500	11 +	887 +	6.3	7.3	339	5
16:45	74.19	0.10	500	11 +	888 +	6.3	7.3	336	5
16:50	74.19	0.10	500	11 +	887 +	6.3	7.3	334	<5
16:55	74.19	0.10	500	11 +	888 +	6.3	7.3	332	<5
17:00	74.19	0.10	500	11 +	886 +	6.3	7.3	331	<5

Notes:

1) Abbreviations include: "deg c" indicates degrees Celsius; "ft" indicates feet; "ft bmp" indicates feet below reference measuring point; "gal" indicates gallons; "in" indicates inches; "mg/l" indicates milligrams per liter; "ml/min" indicates milliliters per minute; "mV" indicates millivolts; "NA" indicates not applicable; "NR" indicates not recorded; "ntu" indicates Nephelometric Turbidity units; "su" indicates standard units; "us/cm" indicates microsiemens per centimeter; and "+" indicates the parameter(s) may be used for stabilization calculations but cannot be used for other purposes.
2) Weather temperature units are in degrees Fahrenheit, unless otherwise noted.
3) Did indicator parameters reach stabilization? Yes
4) Was the two hour time limit reached? No
5) Calculations:
   - Head Above Pump Intake (ft) 46.51
   - Total Drawdown (ft) 0.10
   - Calculated Final Purge Volume (gal) NA
6) If Drawdown Did Not Stabilize or Stabilized Drawdown >0.3 ft, is Total Purge Volume > Calculated Final Purge Volume? NA

Well Sampling Worksheet
WWW RAP Field Data
AREA 6 2023-Q1 - HS-PMW-16C
Kent County, MI

Well	HS-PMW-16C / 2 in Diameter PVC
Sample Quarter	2023-Q1
Date	03/16/2023
Weather	6C, Drizzle, Calm
Sampler Initials	GRT
Purging Device	Bladder-Pump: BP-3, Peristaltic-Pump: NA, Centrifugal-Pump: NA
Meters Used	YSI: Agile Rental 3, Turbidimeter: Agile Rental 2, Water-Level-Meter: WLM-2
Reference Measuring Point	PVC
Well Screen (ft bmp)	161.3 - 166.3
Measured Bottom Depth (ft bmp)	166.25
Sample Comment	
Initial Water Level Date/Time	03/16/2023 16:10
Initial Water Level Depth (ft bmp)	77.37
Pump/Tubing Intake Depth (ft bmp)	163.75
Tubing Length (ft)	166.25
Tubing Inner Diameter (in)	0.25
Purging Initiation Date/Time	03/16/2023 16:10
Total Purge Volume (gal)	3
Modified Sample	No
If Modified, Reasoning	
Sample Collection Information	Bottling-Start: 03/16/2023 17:50:00, Bottling-Stop: 03/16/2023 17:53:00, Parameters-Sampled: PFAS

Reading Time	Depth To Water (ft)	Cumulative Drawdown (ft)	Purge Rate (ml/min)	Temperature (deg c)	Specific Conductivity (us/cm)	Dissolved Oxygen (mg/l)	pH (su)	Oxidation-Reduction Potential (mV)	Turbidity (ntu)
16:25	77.62	0.25	100	8 +	859 +	4.6	7.7	143	1030
16:40	77.62	0.25	100	8 +	843 +	3.9	7.7	166	1030
16:50	77.62	0.25	100	8 +	806 +	5.0	7.6	182	1030
17:00	77.62	0.25	100	8 +	799 +	4.7	7.6	185	1030
17:05	77.62	0.25	100	8 +	794 +	5.1	7.6	187	889
17:10	77.62	0.25	100	8 +	787 +	5.7	7.6	191	751
17:15	77.62	0.25	100	8 +	783 +	6.2	7.6	193	736
17:20	77.62	0.25	100	8 +	787 +	9.1	7.6	197	637
17:25	77.62	0.25	100	8 +	796 +	9.6	7.6	201	612

Well Sampling Worksheet
WWW RAP Field Data
AREA 6 2023-Q1 - HS-PMW-16C
Kent County, MI

Well	HS-PMW-16C / 2 in Diameter PVC
Sample Quarter	2023-Q1
Date	03/16/2023
Weather	6C, Drizzle, Calm
Sampler Initials	GRT
Purging Device	Bladder-Pump: BP-3, Peristaltic-Pump: NA, Centrifugal-Pump: NA
Meters Used	YSI: Agile Rental 3, Turbidimeter: Agile Rental 2, Water-Level-Meter: WLM-2
Reference Measuring Point	PVC
Well Screen (ft bmp)	161.3 - 166.3
Measured Bottom Depth (ft bmp)	166.25
Sample Comment	
Initial Water Level Date/Time	03/16/2023 16:10
Initial Water Level Depth (ft bmp)	77.37
Pump/Tubing Intake Depth (ft bmp)	163.75
Tubing Length (ft)	166.25
Tubing Inner Diameter (in)	0.25
Purging Initiation Date/Time	03/16/2023 16:10
Total Purge Volume (gal)	3
Modified Sample	No
If Modified, Reasoning	
Sample Collection Information	Bottling-Start: 03/16/2023 17:50:00, Bottling-Stop: 03/16/2023 17:53:00, Parameters-Sampled: PFAS

Reading Time	Depth To Water (ft)	Cumulative Drawdown (ft)	Purge Rate (ml/min)	Temperature (deg c)	Specific Conductivity (us/cm)	Dissolved Oxygen (mg/l)	pH (su)	Oxidation-Reduction Potential (mV)	Turbidity (ntu)
17:30	77.62	0.25	100	8 +	785 +	8.7	7.6	205	615
17:35	77.62	0.25	100	8 +	782 +	8.8	7.6	206	606
17:40	77.62	0.25	100	8 +	775 +	8.3	7.6	208	581

Notes:

1) Abbreviations include: "deg c" indicates degrees Celsius; "ft" indicates feet; "ft bmp" indicates feet below reference measuring point; "gal" indicates gallons; "in" indicates inches; "mg/l" indicates milligrams per liter; "ml/min" indicates milliliters per minute; "mV" indicates millivolts; "NA" indicates not applicable; "NR" indicates not recorded; "ntu" indicates Nephelometric Turbidity units; "su" indicates standard units; "us/cm" indicates microsiemens per centimeter; and "+" indicates the parameter(s) may be used for stabilization calculations but cannot be used for other purposes.
2) Weather temperature units are in degrees Fahrenheit, unless otherwise noted.
3) Did indicator parameters reach stabilization? Yes
4) Was the two hour time limit reached? No
5) Calculations:
   - Head Above Pump Intake (ft) 86.38
   - Total Drawdown (ft) 0.25
   - Calculated Final Purge Volume (gal) NA
6) If Drawdown Did Not Stabilize or Stabilized Drawdown >0.3 ft, is Total Purge Volume > Calculated Final Purge Volume? NA

Well Sampling Worksheet
WWW RAP Field Data
AREA 6 2023-Q1 - HS-PMW-RI-108A
Kent County, MI

Well	HS-PMW-RI-108A / 2 in Diameter PVC
Sample Quarter	2023-Q1
Date	03/14/2023
Weather	Sunny, Snow on Ground, 28F
Sampler Initials	MKM
Purging Device	Bladder-Pump: NA, Peristaltic-Pump: PER-1, Centrifugal-Pump: NA
Meters Used	YSI: Agile Rental 3, Turbidimeter: Agile Rental 2, Water-Level-Meter: WLM-2
Reference Measuring Point	PVC
Well Screen (ft bmp)	65.2 - 70.2
Measured Bottom Depth (ft bmp)	70.2
Sample Comment	Flow cell was tipped over at 1140 and corrected after the readings were recorded.
Initial Water Level Date/Time	03/14/2023 10:39
Initial Water Level Depth (ft bmp)	16.98
Pump/Tubing Intake Depth (ft bmp)	67.7
Tubing Length (ft)	70.2
Tubing Inner Diameter (in)	0.17
Purging Initiation Date/Time	03/14/2023 10:55
Total Purge Volume (gal)	8
Modified Sample	No
If Modified, Reasoning	
Sample Collection Information	Bottling-Start: 03/14/2023 12:55:00, Bottling-Stop: 03/14/2023 13:00:00, Parameters-Sampled: PFAS

Reading Time	Depth To Water (ft)	Cumulative Drawdown (ft)	Purge Rate (ml/min)	Temperature (deg c)	Specific Conductivity (us/cm)	Dissolved Oxygen (mg/l)	pH (su)	Oxidation-Reduction Potential (mV)	Turbidity (ntu)
11:30	17.17	0.19	300	10 +	548 +	4.2	7.2	210	<5
11:35	17.17	0.19	300	10 +	548 +	4.2	7.2	206	<5
11:40	17.17	0.19	300	10 +	549 +	4.1	7.2	204	<5
11:45	17.17	0.19	300	10 +	547 +	3.4	7.2	205	<5
11:50	17.17	0.19	300	11 +	548 +	2.9	7.2	200	<5
12:00	17.17	0.19	300	11 +	551 +	1.9	7.2	184	<5
12:05	17.17	0.19	300	10 +	551 +	1.4	7.2	154	<5
12:10	17.17	0.19	300	10 +	554 +	1.3	7.3	100	<5
12:15	17.17	0.19	300	10 +	558 +	1.2	7.2	71	<5
12:25	17.17	0.19	300	10 +	575 +	1.2	7.3	-2	<5
12:30	17.17	0.19	300	10 +	590 +	1.1	7.4	-29	<5
12:35	17.17	0.19	300	11 +	602 +	1.1	7.3	-51	<5
12:40	17.17	0.19	300	10 +	613 +	1.0	7.3	-69	<5

Well Sampling Worksheet
WWW RAP Field Data
AREA 6 2023-Q1 - HS-PMW-RI-108A
Kent County, MI

Well	HS-PMW-RI-108A / 2 in Diameter PVC
Sample Quarter	2023-Q1
Date	03/14/2023
Weather	Sunny, Snow on Ground, 28F
Sampler Initials	MKM
Purging Device	Bladder-Pump: NA, Peristaltic-Pump: PER-1, Centrifugal-Pump: NA
Meters Used	YSI: Agile Rental 3, Turbidimeter: Agile Rental 2, Water-Level-Meter: WLM-2
Reference Measuring Point	PVC
Well Screen (ft bmp)	65.2 - 70.2
Measured Bottom Depth (ft bmp)	70.2
Sample Comment	Flow cell was tipped over at 1140 and corrected after the readings were recorded.
Initial Water Level Date/Time	03/14/2023 10:39
Initial Water Level Depth (ft bmp)	16.98
Pump/Tubing Intake Depth (ft bmp)	67.7
Tubing Length (ft)	70.2
Tubing Inner Diameter (in)	0.17
Purging Initiation Date/Time	03/14/2023 10:55
Total Purge Volume (gal)	8
Modified Sample	No
If Modified, Reasoning	
Sample Collection Information	Bottling-Start: 03/14/2023 12:55:00, Bottling-Stop: 03/14/2023 13:00:00, Parameters-Sampled: PFAS

Reading Time	Depth To Water (ft)	Cumulative Drawdown (ft)	Purge Rate (ml/min)	Temperature (deg c)	Specific Conductivity (us/cm)	Dissolved Oxygen (mg/l)	pH (su)	Oxidation-Reduction Potential (mV)	Turbidity (ntu)
12:45	17.17	0.19	300	11 +	625 +	0.9	7.3	-84	<5
12:50	17.17	0.19	300	11 +	630 +	0.8	7.3	-91	<5
12:55	17.17	0.19	300	11 +	638 +	0.8	7.3	-101	<5

Notes:

1) Abbreviations include: "deg c" indicates degrees Celsius; "ft" indicates feet; "ft bmp" indicates feet below reference measuring point; "gal" indicates gallons; "in" indicates inches; "mg/l" indicates milligrams per liter; "ml/min" indicates milliliters per minute; "mV" indicates millivolts; "NA" indicates not applicable; "NR" indicates not recorded; "ntu" indicates Nephelometric Turbidity units; "su" indicates standard units; "us/cm" indicates microsiemens per centimeter; and "+" indicates the parameter(s) may be used for stabilization calculations but cannot be used for other purposes.
2) Weather temperature units are in degrees Fahrenheit, unless otherwise noted.
3) Did indicator parameters reach stabilization? Yes
4) Was the two hour time limit reached? Yes
5) Calculations:
   - Head Above Pump Intake (ft) 50.72
   - Total Drawdown (ft) 0.19
   - Calculated Final Purge Volume (gal) NA
6) If Drawdown Did Not Stabilize or Stabilized Drawdown >0.3 ft, is Total Purge Volume > Calculated Final Purge Volume? NA

Well Sampling Worksheet
WWW RAP Field Data
AREA 6 2023-Q1 - HS-PMW-RI-108B
Kent County, MI

Well	HS-PMW-RI-108B / 2 in Diameter PVC
Sample Quarter	2023-Q1
Date	03/14/2023
Weather	Clear, 36F
Sampler Initials	AJG
Purging Device	Bladder-Pump: BP-11, Peristaltic-Pump: NA, Centrifugal-Pump: NA
Meters Used	YSI: Agile Rental 1, Turbidimeter: Agile Rental 1, Water-Level-Meter: WLM-2
Reference Measuring Point	PVC
Well Screen (ft bmp)	131.6 - 136.6
Measured Bottom Depth (ft bmp)	136.5
Sample Comment	YSI connected to other well until 12:55. Water was observed to be cloudy/gray.
Initial Water Level Date/Time	03/14/2023 10:55
Initial Water Level Depth (ft bmp)	73.90
Pump/Tubing Intake Depth (ft bmp)	134
Tubing Length (ft)	136.5
Tubing Inner Diameter (in)	0.25
Purging Initiation Date/Time	03/14/2023 11:00
Total Purge Volume (gal)	6
Modified Sample	No
If Modified, Reasoning	
Sample Collection Information	Bottling-Start: 03/14/2023 13:10:00, Bottling-Stop: 03/14/2023 13:15:00, Parameters-Sampled: PFAS

Reading Time	Depth To Water (ft)	Cumulative Drawdown (ft)	Purge Rate (ml/min)	Temperature (deg c)	Specific Conductivity (us/cm)	Dissolved Oxygen (mg/l)	pH (su)	Oxidation-Reduction Potential (mV)	Turbidity (ntu)
13:00	76.90	3.00	175	10 +	731 +	3.0	7.4	-44	374
13:05	76.90	3.00	175	10 +	736 +	3.0	7.4	-35	322
13:10	76.90	3.00	175	10 +	738 +	3.2	7.4	-24	288

Notes:

1) Abbreviations include: "deg c" indicates degrees Celsius; "ft" indicates feet; "ft bmp" indicates feet below reference measuring point; "gal" indicates gallons; "in" indicates inches; "mg/l" indicates milligrams per liter; "ml/min" indicates milliliters per minute; "mV" indicates millivolts; "NA" indicates not applicable; "NR" indicates not recorded; "ntu" indicates Nephelometric Turbidity units; "su" indicates standard units; "us/cm" indicates microsiemens per centimeter; and "+" indicates the parameter(s) may be used for stabilization calculations but cannot be used for other purposes.
2) Weather temperature units are in degrees Fahrenheit, unless otherwise noted.
3) Did indicator parameters reach stabilization? No
4) Was the two hour time limit reached? Yes
5) Calculations:
   - Head Above Pump Intake (ft) 60.10
   - Total Drawdown (ft) 3.00
   - Calculated Final Purge Volume (gal) 0.83
6) If Drawdown Did Not Stabilize or Stabilized Drawdown >0.3 ft, is Total Purge Volume > Calculated Final Purge Volume? Yes

Well Sampling Worksheet
WWW RAP Field Data
AREA 6 2023-Q1 - HS-PMW-RI-108D
Kent County, MI

Well	HS-PMW-RI-108D / 2 in Diameter PVC
Sample Quarter	2023-Q1
Date	03/14/2023
Weather	Clear, 34F
Sampler Initials	AJG
Purging Device	Bladder-Pump: BP-11, Peristaltic-Pump: NA, Centrifugal-Pump: NA
Meters Used	YSI: Agile Rental 1, Turbidimeter: Agile Rental 1, Water-Level-Meter: WLM-2
Reference Measuring Point	PVC
Well Screen (ft bmp)	223.0 - 228.0
Measured Bottom Depth (ft bmp)	228
Sample Comment	NR
Initial Water Level Date/Time	03/14/2023 15:30
Initial Water Level Depth (ft bmp)	75.15
Pump/Tubing Intake Depth (ft bmp)	225.5
Tubing Length (ft)	228
Tubing Inner Diameter (in)	0.25
Purging Initiation Date/Time	03/14/2023 15:40
Total Purge Volume (gal)	7
Modified Sample	No
If Modified, Reasoning	
Sample Collection Information	Bottling-Start: 03/14/2023 17:40:00, Bottling-Stop: 03/14/2023 17:45:00, Parameters-Sampled: PFAS

Reading Time	Depth To Water (ft)	Cumulative Drawdown (ft)	Purge Rate (ml/min)	Temperature (deg c)	Specific Conductivity (us/cm)	Dissolved Oxygen (mg/l)	pH (su)	Oxidation-Reduction Potential (mV)	Turbidity (ntu)
16:25	75.40	0.25	200	9 +	607 +	2.7	7.4	76	1,020
16:30	75.40	0.25	200	9 +	606 +	0.8	7.3	27	569
16:35	75.40	0.25	200	10 +	606 +	0.8	7.3	33	281
16:40	75.40	0.25	200	10 +	606 +	0.8	7.3	34	201
16:45	75.40	0.25	200	10 +	605 +	0.8	7.3	16	206
16:50	75.40	0.25	200	10 +	606 +	0.8	7.3	1	195
16:55	75.40	0.25	200	10 +	606 +	0.7	7.3	-5	171
17:00	75.40	0.25	200	10 +	607 +	0.8	7.3	-9	111
17:05	75.40	0.25	200	10 +	606 +	0.7	7.3	-23	88
17:10	75.40	0.25	200	10 +	606 +	0.7	7.3	-34	58
17:15	75.40	0.25	200	10 +	606 +	0.6	7.3	-43	51
17:20	75.40	0.25	200	10 +	606 +	0.6	7.3	-50	43
17:25	75.40	0.25	200	10 +	606 +	0.8	7.3	-23	62

Well Sampling Worksheet
WWW RAP Field Data
AREA 6 2023-Q1 - HS-PMW-RI-108D
Kent County, MI

Well	HS-PMW-RI-108D / 2 in Diameter PVC
Sample Quarter	2023-Q1
Date	03/14/2023
Weather	Clear, 34F
Sampler Initials	AJG
Purging Device	Bladder-Pump: BP-11, Peristaltic-Pump: NA, Centrifugal-Pump: NA
Meters Used	YSI: Agile Rental 1, Turbidimeter: Agile Rental 1, Water-Level-Meter: WLM-2
Reference Measuring Point	PVC
Well Screen (ft bmp)	223.0 - 228.0
Measured Bottom Depth (ft bmp)	228
Sample Comment	NR
Initial Water Level Date/Time	03/14/2023 15:30
Initial Water Level Depth (ft bmp)	75.15
Pump/Tubing Intake Depth (ft bmp)	225.5
Tubing Length (ft)	228
Tubing Inner Diameter (in)	0.25
Purging Initiation Date/Time	03/14/2023 15:40
Total Purge Volume (gal)	7
Modified Sample	No
If Modified, Reasoning	
Sample Collection Information	Bottling-Start: 03/14/2023 17:40:00, Bottling-Stop: 03/14/2023 17:45:00, Parameters-Sampled: PFAS

Reading Time	Depth To Water (ft)	Cumulative Drawdown (ft)	Purge Rate (ml/min)	Temperature (deg c)	Specific Conductivity (us/cm)	Dissolved Oxygen (mg/l)	pH (su)	Oxidation-Reduction Potential (mV)	Turbidity (ntu)
17:30	75.40	0.25	200	10 +	606 +	0.6	7.3	-34	50
17:35	75.40	0.25	200	10 +	605 +	0.6	7.3	-45	42
17:40	75.40	0.25	200	10 +	604 +	0.6	7.3	-48	82

Notes:

1) Abbreviations include: "deg c" indicates degrees Celsius; "ft" indicates feet; "ft bmp" indicates feet below reference measuring point; "gal" indicates gallons; "in" indicates inches; "mg/l" indicates milligrams per liter; "ml/min" indicates milliliters per minute; "mV" indicates millivolts; "NA" indicates not applicable; "NR" indicates not recorded; "ntu" indicates Nephelometric Turbidity units; "su" indicates standard units; "us/cm" indicates microsiemens per centimeter; and "+" indicates the parameter(s) may be used for stabilization calculations but cannot be used for other purposes.
2) Weather temperature units are in degrees Fahrenheit, unless otherwise noted.
3) Did indicator parameters reach stabilization? No
4) Was the two hour time limit reached? Yes
5) Calculations:
   - Head Above Pump Intake (ft) 150.35
   - Total Drawdown (ft) 0.25
   - Calculated Final Purge Volume (gal) NA
6) If Drawdown Did Not Stabilize or Stabilized Drawdown >0.3 ft, is Total Purge Volume > Calculated Final Purge Volume? NA

Well Sampling Worksheet
WWW RAP Field Data
AREA 6 2023-Q1 - HS-PMW-RI-109A
Kent County, MI

Well	HS-PMW-RI-109A / 2 in Diameter PVC
Sample Quarter	2023-Q1
Date	03/14/2023
Weather	Cold/Sunny
Sampler Initials	JET
Purging Device	Bladder-Pump: NA, Peristaltic-Pump: PER-2, Centrifugal-Pump: NA
Meters Used	YSI: Agile Rental 3, Turbidimeter: Agile Rental 2, Water-Level-Meter: WLM-1
Reference Measuring Point	PVC
Well Screen (ft bmp)	13.6 - 18.6
Measured Bottom Depth (ft bmp)	18.5
Sample Comment	
Initial Water Level Date/Time	03/14/2023 11:05
Initial Water Level Depth (ft bmp)	8.83
Pump/Tubing Intake Depth (ft bmp)	16.5
Tubing Length (ft)	20.5
Tubing Inner Diameter (in)	0.17
Purging Initiation Date/Time	03/14/2023 11:05
Total Purge Volume (gal)	4.75
Modified Sample	No
If Modified, Reasoning	
Sample Collection Information	Bottling-Start: 03/14/2023 13:10:00, Bottling-Stop: 03/14/2023 13:13:00, Parameters-Sampled: PFAS

Reading Time	Depth To Water (ft)	Cumulative Drawdown (ft)	Purge Rate (ml/min)	Temperature (deg c)	Specific Conductivity (us/cm)	Dissolved Oxygen (mg/l)	pH (su)	Oxidation-Reduction Potential (mV)	Turbidity (ntu)
12:20	11.88	3.05	150	7 +	532 +	8.2	7.6	225	6
12:40	11.88	3.05	150	7 +	534 +	7.4	7.5	234	<5
12:50	12.21	3.38	150	7 +	536 +	8.3	7.5	237	<5
12:55	12.44	3.61	150	7 +	536 +	8.2	7.5	238	<5
13:00	12.60	3.77	150	7 +	535 +	9.3	7.5	240	<5
13:05	12.72	3.89	150	7 +	535 +	9.3	7.5	239	<5

Notes:

1) Abbreviations include: "deg c" indicates degrees Celsius; "ft" indicates feet; "ft bmp" indicates feet below reference measuring point; "gal" indicates gallons; "in" indicates inches; "mg/l" indicates milligrams per liter; "ml/min" indicates milliliters per minute; "mV" indicates millivolts; "NA" indicates not applicable; "NR" indicates not recorded; "ntu" indicates Nephelometric Turbidity units; "su" indicates standard units; "us/cm" indicates microsiemens per centimeter; and "+" indicates the parameter(s) may be used for stabilization calculations but cannot be used for other purposes.
2) Weather temperature units are in degrees Fahrenheit, unless otherwise noted.
3) Did indicator parameters reach stabilization? No
4) Was the two hour time limit reached? Yes
5) Calculations:
   - Head Above Pump Intake (ft) 7.67
   - Total Drawdown (ft) 3.89
   - Calculated Final Purge Volume (gal) 0.65
6) If Drawdown Did Not Stabilize or Stabilized Drawdown >0.3 ft, is Total Purge Volume > Calculated Final Purge Volume? Yes

Well Sampling Worksheet
WWW RAP Field Data
AREA 6 2023-Q1 - HS-PMW-RI-109B
Kent County, MI

Well	HS-PMW-RI-109B / 2 in Diameter PVC
Sample Quarter	2023-Q1
Date	03/14/2023
Weather	Sunny
Sampler Initials	JET
Purging Device	Bladder-Pump: NA, Peristaltic-Pump: NA, Centrifugal-Pump: Mega Monsoon-1
Meters Used	YSI: Agile Rental 3, Turbidimeter: Agile Rental 2, Water-Level-Meter: WLM-3
Reference Measuring Point	PVC
Well Screen (ft bmp)	124.6 - 129.6
Measured Bottom Depth (ft bmp)	129.4
Sample Comment	
Initial Water Level Date/Time	03/14/2023 16:30
Initial Water Level Depth (ft bmp)	65.42
Pump/Tubing Intake Depth (ft bmp)	126.9
Tubing Length (ft)	129.6
Tubing Inner Diameter (in)	0.375
Purging Initiation Date/Time	03/14/2023 16:30
Total Purge Volume (gal)	9
Modified Sample	No
If Modified, Reasoning	
Sample Collection Information	Bottling-Start: 03/14/2023 18:10:00, Bottling-Stop: 03/14/2023 18:11:00, Parameters-Sampled: PFAS

Reading Time	Depth To Water (ft)	Cumulative Drawdown (ft)	Purge Rate (ml/min)	Temperature (deg c)	Specific Conductivity (us/cm)	Dissolved Oxygen (mg/l)	pH (su)	Oxidation-Reduction Potential (mV)	Turbidity (ntu)
17:15	65.46	0.04	350	10 +	837 +	7.5	7.2	238	34
17:25	65.47	0.05	350	10 +	833 +	6.6	7.2	239	21
17:35	65.47	0.05	350	10 +	827 +	6.5	7.2	244	19
17:45	65.43	0.01	350	10 +	824 +	6.2	7.2	252	12
17:55	65.43	0.01	350	10 +	820 +	6.2	7.2	259	9
18:00	65.43	0.01	350	10 +	817 +	5.9	7.2	261	9
18:05	65.43	0.01	350	10 +	814 +	5.9	7.2	262	9

Notes:

1) Abbreviations include: "deg c" indicates degrees Celsius; "ft" indicates feet; "ft bmp" indicates feet below reference measuring point; "gal" indicates gallons; "in" indicates inches; "mg/l" indicates milligrams per liter; "ml/min" indicates milliliters per minute; "mV" indicates millivolts; "NA" indicates not applicable; "NR" indicates not recorded; "ntu" indicates Nephelometric Turbidity units; "su" indicates standard units; "us/cm" indicates microsiemens per centimeter; and "+" indicates the parameter(s) may be used for stabilization calculations but cannot be used for other purposes.
2) Weather temperature units are in degrees Fahrenheit, unless otherwise noted.
3) Did indicator parameters reach stabilization? Yes
4) Was the two hour time limit reached? No
5) Calculations:
   - Head Above Pump Intake (ft) 61.48
   - Total Drawdown (ft) 0.01
   - Calculated Final Purge Volume (gal) NA
6) If Drawdown Did Not Stabilize or Stabilized Drawdown >0.3 ft, is Total Purge Volume > Calculated Final Purge Volume? NA

Well Sampling Worksheet
WWW RAP Field Data
AREA 6 2023-Q1 - HS-PMW-RI-109C
Kent County, MI

Well	HS-PMW-RI-109C / 2 in Diameter PVC
Sample Quarter	2023-Q1
Date	03/14/2023
Weather	Cold /Sunny
Sampler Initials	JET
Purging Device	Bladder-Pump: NA, Peristaltic-Pump: NA, Centrifugal-Pump: Mega Monsoon-2
Meters Used	YSI: Agile Rental 3, Turbidimeter: Agile Rental 2, Water-Level-Meter: WLM-1
Reference Measuring Point	PVC
Well Screen (ft bmp)	143.7 - 148.7
Measured Bottom Depth (ft bmp)	148.7
Sample Comment	Higher initial flow rate required to bring water to surface, flow rate was decreased at 1400 to 350 ml/min.
Initial Water Level Date/Time	03/14/2023 14:00
Initial Water Level Depth (ft bmp)	65.17
Pump/Tubing Intake Depth (ft bmp)	146.2
Tubing Length (ft)	150
Tubing Inner Diameter (in)	0.375
Purging Initiation Date/Time	03/14/2023 14:00
Total Purge Volume (gal)	11.1
Modified Sample	No
If Modified, Reasoning	
Sample Collection Information	Bottling-Start: 03/14/2023 16:10:00, Bottling-Stop: 03/14/2023 16:11:00, Parameters-Sampled: PFAS

Reading Time	Depth To Water (ft)	Cumulative Drawdown (ft)	Purge Rate (ml/min)	Temperature (deg c)	Specific Conductivity (us/cm)	Dissolved Oxygen (mg/l)	pH (su)	Oxidation-Reduction Potential (mV)	Turbidity (ntu)
14:35	72.42	7.25	350	11 +	439 +	<0.5	7.6	-26	34
14:45	72.22	7.05	350	11 +	439 +	<0.5	7.6	-87	19
15:00	72.22	7.05	350	11 +	439 +	<0.5	7.6	-112	13
15:10	72.02	6.85	350	11 +	440 +	<0.5	7.6	-119	7
15:30	71.79	6.62	350	11 +	441 +	<0.5	7.6	-126	6
15:35	71.98	6.81	350	11 +	442 +	<0.5	7.6	-128	5
15:40	71.82	6.65	350	11 +	442 +	<0.5	7.6	-128	<5
15:45	71.82	6.65	350	11 +	442 +	<0.5	7.6	-129	<5

Well Sampling Worksheet
WWW RAP Field Data
AREA 6 2023-Q1 - HS-PMW-RI-109C
Kent County, MI

Well	HS-PMW-RI-109C / 2 in Diameter PVC
Sample Quarter	2023-Q1
Date	03/14/2023
Weather	Cold /Sunny
Sampler Initials	JET
Purging Device	Bladder-Pump: NA, Peristaltic-Pump: NA, Centrifugal-Pump: Mega Monsoon-2
Meters Used	YSI: Agile Rental 3, Turbidimeter: Agile Rental 2, Water-Level-Meter: WLM-1
Reference Measuring Point	PVC
Well Screen (ft bmp)	143.7 - 148.7
Measured Bottom Depth (ft bmp)	148.7
Sample Comment	Higher initial flow rate required to bring water to surface, flow rate was decreased at 1400 to 350 ml/min.
Initial Water Level Date/Time	03/14/2023 14:00
Initial Water Level Depth (ft bmp)	65.17
Pump/Tubing Intake Depth (ft bmp)	146.2
Tubing Length (ft)	150
Tubing Inner Diameter (in)	0.375
Purging Initiation Date/Time	03/14/2023 14:00
Total Purge Volume (gal)	11.1
Modified Sample	No
If Modified, Reasoning	
Sample Collection Information	Bottling-Start: 03/14/2023 16:10:00, Bottling-Stop: 03/14/2023 16:11:00, Parameters-Sampled: PFAS

Reading Time	Depth To Water (ft)	Cumulative Drawdown (ft)	Purge Rate (ml/min)	Temperature (deg c)	Specific Conductivity (us/cm)	Dissolved Oxygen (mg/l)	pH (su)	Oxidation-Reduction Potential (mV)	Turbidity (ntu)
15:50	71.72	6.55	350	11 +	442 +	<0.5	7.6	-129	<5
15:55	71.49	6.32	350	11 +	443 +	<0.5	7.6	-131	<5
16:00	71.58	6.41	350	11 +	444 +	<0.5	7.6	-131	<5

Notes:

1) Abbreviations include: "deg c" indicates degrees Celsius; "ft" indicates feet; "ft bmp" indicates feet below reference measuring point; "gal" indicates gallons; "in" indicates inches; "mg/l" indicates milligrams per liter; "ml/min" indicates milliliters per minute; "mV" indicates millivolts; "NA" indicates not applicable; "NR" indicates not recorded; "ntu" indicates Nephelometric Turbidity units; "su" indicates standard units; "us/cm" indicates microsiemens per centimeter; and "+" indicates the parameter(s) may be used for stabilization calculations but cannot be used for other purposes.
2) Weather temperature units are in degrees Fahrenheit, unless otherwise noted.
3) Did indicator parameters reach stabilization? No
4) Was the two hour time limit reached? Yes
5) Calculations:
   - Head Above Pump Intake (ft) 81.03
   - Total Drawdown (ft) 6.41
   - Calculated Final Purge Volume (gal) 1.88
6) If Drawdown Did Not Stabilize or Stabilized Drawdown >0.3 ft, is Total Purge Volume > Calculated Final Purge Volume? Yes

Well Sampling Worksheet
WWW RAP Field Data
AREA 11/12 2023-Q1 - HS-PMW-RI-111A
Kent County, MI

Well	HS-PMW-RI-111A / 2 in Diameter PVC
Sample Quarter	2023-Q1
Date	02/01/2023
Weather	Sunny, 19°F, Snow on Ground
Sampler Initials	JET
Purging Device	Bladder-Pump: NA, Peristaltic-Pump: PER-3, Centrifugal-Pump: NA
Meters Used	YSI: Agile Rental 2, Turbidimeter: Agile Rental 2, Water-Level-Meter: WLM-4
Reference Measuring Point	PVC
Well Screen (ft bmp)	12.9 - 17.9
Measured Bottom Depth (ft bmp)	NR
Sample Comment	Last 3 readings are not 5 minutes apart per the Standard Operating Procedure (SOP). GZA does not believe this impacts data quality.
Initial Water Level Date/Time	02/01/2023 09:45
Initial Water Level Depth (ft bmp)	8.40
Pump/Tubing Intake Depth (ft bmp)	15.4
Tubing Length (ft)	17.9
Tubing Inner Diameter (in)	0.17
Purging Initiation Date/Time	02/01/2023 09:45
Total Purge Volume (gal)	7.133
Modified Sample	No
If Modified, Reasoning	
Sample Collection Information	Bottling-Start: 02/01/2023 11:15:00, Bottling-Stop: 02/01/2023 11:20:00, Parameters-Sampled: PFAS

Reading Time	Depth To Water (ft)	Cumulative Drawdown (ft)	Purge Rate (ml/min)	Temperature (deg c)	Specific Conductivity (us/cm)	Dissolved Oxygen (mg/l)	pH (su)	Oxidation-Reduction Potential (mV)	Turbidity (ntu)
10:40	8.40	0.00	300	10 +	593 +	6.1 +	7.0	259	<5
10:50	8.40	0.00	300	10 +	593 +	6.0 +	6.9	257	<5
11:00	8.40	0.00	300	10 +	593 +	6.0 +	6.9	253	<5

Notes:

1) Abbreviations include: "deg c" indicates degrees Celsius; "ft" indicates feet; "ft bmp" indicates feet below reference measuring point; "gal" indicates gallons; "in" indicates inches; "mg/l" indicates milligrams per liter; "ml/min" indicates milliliters per minute; "mV" indicates millivolts; "NA" indicates not applicable; "NR" indicates not recorded; "ntu" indicates Nephelometric Turbidity units; "su" indicates standard units; "us/cm" indicates microsiemens per centimeter; and "+" indicates the parameter(s) may be used for stabilization calculations but cannot be used for other purposes.
2) Weather temperature units are in degrees Fahrenheit, unless otherwise noted.
3) Did indicator parameters reach stabilization? Yes
4) Was the two hour time limit reached? No
5) Calculations:
   - Head Above Pump Intake (ft): 7.00
   - Total Drawdown (ft): 0.00
   - Calculated Final Purge Volume (gal): NA
6) If Drawdown Did Not Stabilize or Stabilized Drawdown >0.3 ft, is Total Purge Volume > Calculated Final Purge Volume? NA

Well Sampling Worksheet
WWW RAP Field Data
AREA 11/12 2023-Q1 - HS-PMW-RI-111B
Kent County, MI

Well	HS-PMW-RI-111B / 2 in Diameter PVC
Sample Quarter	2023-Q1
Date	02/01/2023
Weather	Sunny, Snow on Ground, 19°F
Sampler Initials	MKM
Purging Device	Bladder-Pump: NA, Peristaltic-Pump: PER-1, Centrifugal-Pump: NA
Meters Used	YSI: Agile Rental 1, Turbidimeter: Agile Rental 1, Water-Level-Meter: WLM-1
Reference Measuring Point	PVC
Well Screen (ft bmp)	47.9 - 52.9
Measured Bottom Depth (ft bmp)	NR
Sample Comment	
Initial Water Level Date/Time	02/01/2023 10:03
Initial Water Level Depth (ft bmp)	8.73
Pump/Tubing Intake Depth (ft bmp)	50.4
Tubing Length (ft)	52.9
Tubing Inner Diameter (in)	0.17
Purging Initiation Date/Time	02/01/2023 09:55
Total Purge Volume (gal)	5.3
Modified Sample	No
If Modified, Reasoning	
Sample Collection Information	Bottling-Start: 02/01/2023 10:45:00, Bottling-Stop: 02/01/2023 10:50:00, Parameters-Sampled: PFAS

Reading Time	Depth To Water (ft)	Cumulative Drawdown (ft)	Purge Rate (ml/min)	Temperature (deg c)	Specific Conductivity (us/cm)	Dissolved Oxygen (mg/l)	pH (su)	Oxidation-Reduction Potential (mV)	Turbidity (ntu)
10:20	8.75	0.02	400	11 +	701 +	6.2	7.4	297	<5
10:30	8.75	0.02	400	11 +	701 +	5.9	7.4	288	<5
10:35	8.75	0.02	400	11 +	700 +	5.7	7.4	281	<5
10:40	8.75	0.02	400	11 +	700 +	5.7	7.4	275	<5
10:45	8.75	0.02	400	11 +	701 +	5.6	7.4	272	<5

Notes:

1) Abbreviations include: "deg c" indicates degrees Celsius; "ft" indicates feet; "ft bmp" indicates feet below reference measuring point; "gal" indicates gallons; "in" indicates inches; "mg/l" indicates milligrams per liter; "ml/min" indicates milliliters per minute; "mV" indicates millivolts; "NA" indicates not applicable; "NR" indicates not recorded; "ntu" indicates Nephelometric Turbidity units; "su" indicates standard units; "us/cm" indicates microsiemens per centimeter; and "+" indicates the parameter(s) may be used for stabilization calculations but cannot be used for other purposes.
2) Weather temperature units are in degrees Fahrenheit, unless otherwise noted.
3) Did indicator parameters reach stabilization? Yes
4) Was the two hour time limit reached? No
5) Calculations:
   - Head Above Pump Intake (ft): 41.67
   - Total Drawdown (ft): 0.02
   - Calculated Final Purge Volume (gal): NA
6) If Drawdown Did Not Stabilize or Stabilized Drawdown >0.3 ft, is Total Purge Volume > Calculated Final Purge Volume? NA

Well Sampling Worksheet
WWW RAP Field Data
AREA 11/12 2023-Q1 - HS-PMW-RI-112A
Kent County, MI

Well	HS-PMW-RI-112A / 2 in Diameter PVC
Sample Quarter	2023-Q1
Date	02/01/2023
Weather	Sunny/Cold
Sampler Initials	JET
Purging Device	Bladder-Pump: NA, Peristaltic-Pump: PER-3, Centrifugal-Pump: NA
Meters Used	YSI: Agile Rental 2, Turbidimeter: Agile Rental 2, Water-Level-Meter: WLM-1
Reference Measuring Point	PVC
Well Screen (ft bmp)	24.3 - 29.3
Measured Bottom Depth (ft bmp)	29.28
Sample Comment	YSI batteries died after 15:00 readings.
Initial Water Level Date/Time	02/01/2023 14:00
Initial Water Level Depth (ft bmp)	9.21
Pump/Tubing Intake Depth (ft bmp)	26.8
Tubing Length (ft)	29.3
Tubing Inner Diameter (in)	0.17
Purging Initiation Date/Time	02/01/2023 14:00
Total Purge Volume (gal)	8.3
Modified Sample	No
If Modified, Reasoning	
Sample Collection Information	Bottling-Start: 02/01/2023 15:45:00, Bottling-Stop: 02/01/2023 15:50:00, Parameters-Sampled: PFAS

Reading Time	Depth To Water (ft)	Cumulative Drawdown (ft)	Purge Rate (ml/min)	Temperature (deg c)	Specific Conductivity (us/cm)	Dissolved Oxygen (mg/l)	pH (su)	Oxidation-Reduction Potential (mV)	Turbidity (ntu)
14:20	9.21	0.00	300	9 +	646 +	8.4 +	6.8	242	6
15:00	9.21	0.00	300	9 +	649 +	9.4 +	7.2	182	<5
15:10	9.21	0.00	300	9 +	644 +	8.6 +	6.5	201	<5
15:20	9.21	0.00	300	9 +	646 +	8.5 +	6.8	206	<5
15:25	9.21	0.00	300	9 +	644 +	8.5 +	7.0	208	<5
15:30	9.21	0.00	300	9 +	645 +	8.5 +	6.8	209	<5
15:35	9.21	0.00	300	9 +	643 +	8.4 +	6.8	210	<5
15:40	9.21	0.00	300	9 +	645 +	8.4 +	6.8	212	<5

Notes:

1) Abbreviations include: "deg c" indicates degrees Celsius; "ft" indicates feet; "ft bmp" indicates feet below reference measuring point; "gal" indicates gallons; "in" indicates inches; "mg/l" indicates milligrams per liter; "ml/min" indicates milliliters per minute; "mV" indicates millivolts; "NA" indicates not applicable; "NR" indicates not recorded; "ntu" indicates Nephelometric Turbidity units; "su" indicates standard units; "us/cm" indicates microsiemens per centimeter; and "+" indicates the parameter(s) may be used for stabilization calculations but cannot be used for other purposes.
2) Weather temperature units are in degrees Fahrenheit, unless otherwise noted.
3) Did indicator parameters reach stabilization? Yes
4) Was the two hour time limit reached? No
5) Calculations:
   - Head Above Pump Intake (ft): 17.59
   - Total Drawdown (ft): 0.00
   - Calculated Final Purge Volume (gal): NA
6) If Drawdown Did Not Stabilize or Stabilized Drawdown >0.3 ft, is Total Purge Volume > Calculated Final Purge Volume? NA

Well Sampling Worksheet
WWW RAP Field Data
AREA 11/12 2023-Q1 - HS-PMW-RI-112B
Kent County, MI

Well	HS-PMW-RI-112B / 2 in Diameter PVC
Sample Quarter	2023-Q1
Date	02/01/2023
Weather	Mostly Cloudy, Snow on Ground, 25°F
Sampler Initials	MKM
Purging Device	Bladder-Pump: NA, Peristaltic-Pump: PER-1, Centrifugal-Pump: NA
Meters Used	YSI: Agile Rental 1, Turbidimeter: Agile Rental 1, Water-Level-Meter: WLM-4
Reference Measuring Point	PVC
Well Screen (ft bmp)	69.4 - 74.4
Measured Bottom Depth (ft bmp)	75.55
Sample Comment	
Initial Water Level Date/Time	02/01/2023 14:08
Initial Water Level Depth (ft bmp)	9.03
Pump/Tubing Intake Depth (ft bmp)	72.4
Tubing Length (ft)	75.55
Tubing Inner Diameter (in)	0.17
Purging Initiation Date/Time	02/01/2023 14:00
Total Purge Volume (gal)	3.5
Modified Sample	No
If Modified, Reasoning	
Sample Collection Information	Bottling-Start: 02/01/2023 15:20:00, Bottling-Stop: 02/01/2023 15:25:00, Parameters-Sampled: PFAS

Reading Time	Depth To Water (ft)	Cumulative Drawdown (ft)	Purge Rate (ml/min)	Temperature (deg c)	Specific Conductivity (us/cm)	Dissolved Oxygen (mg/l)	pH (su)	Oxidation-Reduction Potential (mV)	Turbidity (ntu)
14:20	9.08	0.05	400	10 +	1,029 +	<0.5	7.3	172	31
14:45	9.08	0.05	400	10 +	1,025 +	<0.5	7.3	69	<5
14:50	9.08	0.05	400	10 +	1,027 +	<0.5	7.3	58	<5
15:00	9.08	0.05	400	10 +	1,016 +	<0.5	7.3	42	<5
15:05	9.08	0.05	400	10 +	1,011 +	<0.5	7.3	35	<5
15:10	9.08	0.05	400	10 +	1,017 +	<0.5	7.3	29	<5
15:15	9.08	0.05	400	10 +	1,020 +	<0.5	7.3	21	<5
15:20	9.08	0.05	400	10 +	1,020 +	<0.5	7.3	22	<5

Notes:

1) Abbreviations include: "deg c" indicates degrees Celsius; "ft" indicates feet; "ft bmp" indicates feet below reference measuring point; "gal" indicates gallons; "in" indicates inches; "mg/l" indicates milligrams per liter; "ml/min" indicates milliliters per minute; "mV" indicates millivolts; "NA" indicates not applicable; "NR" indicates not recorded; "ntu" indicates Nephelometric Turbidity units; "su" indicates standard units; "us/cm" indicates microsiemens per centimeter; and "+" indicates the parameter(s) may be used for stabilization calculations but cannot be used for other purposes.
2) Weather temperature units are in degrees Fahrenheit, unless otherwise noted.
3) Did indicator parameters reach stabilization? Yes
4) Was the two hour time limit reached? No
5) Calculations:
   - Head Above Pump Intake (ft): 63.37
   - Total Drawdown (ft): 0.05
   - Calculated Final Purge Volume (gal): NA
6) If Drawdown Did Not Stabilize or Stabilized Drawdown >0.3 ft, is Total Purge Volume > Calculated Final Purge Volume? NA

Well Sampling Worksheet
WWW RAP Field Data
AREA 5 2023-Q1 - AREA5-RI-3A
Kent County, MI

Well	AREA5-RI-3A / 2 in Diameter PVC
Sample Quarter	2023-Q1
Date	02/13/2023
Weather	Sunny 40s
Sampler Initials	DMW
Purging Device	Bladder-Pump: BP-11, Peristaltic-Pump: NA, Centrifugal-Pump: NA
Meters Used	YSI: Agile Rental 2, Turbidimeter: Agile Rental 2, Water-Level-Meter: WLM-2
Reference Measuring Point	PVC
Well Screen (ft bmp)	61.8 - 66.8
Measured Bottom Depth (ft bmp)	NR
Sample Comment	
Initial Water Level Date/Time	02/13/2023 14:15
Initial Water Level Depth (ft bmp)	33.28
Pump/Tubing Intake Depth (ft bmp)	64.3
Tubing Length (ft)	66.8
Tubing Inner Diameter (in)	0.17
Purging Initiation Date/Time	02/13/2023 14:15
Total Purge Volume (gal)	9.5
Modified Sample	No
If Modified, Reasoning	
Sample Collection Information	Bottling-Start: 02/13/2023 16:15:00, Bottling-Stop: 02/13/2023 16:20:00, Parameters-Sampled: PFAS

Reading Time	Depth To Water (ft)	Cumulative Drawdown (ft)	Purge Rate (ml/min)	Temperature (deg c)	Specific Conductivity (us/cm)	Dissolved Oxygen (mg/l)	pH (su)	Oxidation-Reduction Potential (mV)	Turbidity (ntu)
14:50	33.28	0.00	300	10 +	557 +	5.6	7.0	227	11
15:10	33.35	0.07	300	10 +	556 +	5.3	7.1	216	7
15:20	33.36	0.08	300	10 +	556 +	5.2	7.1	216	6
15:30	33.36	0.08	300	10 +	556 +	5.2	7.1	218	8
15:35	33.31	0.03	300	10 +	556 +	5.2	7.1	218	5
15:40	33.28	0.00	300	10 +	556 +	5.2	7.1	221	5
15:45	33.28	0.00	300	10 +	556 +	5.2	7.1	222	6
15:50	33.28	0.00	300	10 +	556 +	5.2	7.1	224	5
15:55	33.28	0.00	300	10 +	556 +	5.2	7.1	226	6
16:00	33.28	0.00	300	10 +	556 +	5.2	7.1	228	5

Well Sampling Worksheet
WWW RAP Field Data
AREA 5 2023-Q1 - AREA5-RI-3A
Kent County, MI

Well	AREA5-RI-3A / 2 in Diameter PVC
Sample Quarter	2023-Q1
Date	02/13/2023
Weather	Sunny 40s
Sampler Initials	DMW
Purging Device	Bladder-Pump: BP-11, Peristaltic-Pump: NA, Centrifugal-Pump: NA
Meters Used	YSI: Agile Rental 2, Turbidimeter: Agile Rental 2, Water-Level-Meter: WLM-2
Reference Measuring Point	PVC
Well Screen (ft bmp)	61.8 - 66.8
Measured Bottom Depth (ft bmp)	NR
Sample Comment	
Initial Water Level Date/Time	02/13/2023 14:15
Initial Water Level Depth (ft bmp)	33.28
Pump/Tubing Intake Depth (ft bmp)	64.3
Tubing Length (ft)	66.8
Tubing Inner Diameter (in)	0.17
Purging Initiation Date/Time	02/13/2023 14:15
Total Purge Volume (gal)	9.5
Modified Sample	No
If Modified, Reasoning	
Sample Collection Information	Bottling-Start: 02/13/2023 16:15:00, Bottling-Stop: 02/13/2023 16:20:00, Parameters-Sampled: PFAS

Reading Time	Depth To Water (ft)	Cumulative Drawdown (ft)	Purge Rate (ml/min)	Temperature (deg c)	Specific Conductivity (us/cm)	Dissolved Oxygen (mg/l)	pH (su)	Oxidation-Reduction Potential (mV)	Turbidity (ntu)
16:05	33.28	0.00	300	10 +	556 +	5.2	7.1	230	6
16:10	33.28	0.00	300	10 +	556 +	5.2	7.1	234	5
16:15	33.28	0.00	300	10 +	556 +	5.2	7.1	236	5

Notes:

1) Abbreviations include: "deg c" indicates degrees Celsius; "ft" indicates feet; "ft bmp" indicates feet below reference measuring point; "gal" indicates gallons; "in" indicates inches; "mg/l" indicates milligrams per liter; "ml/min" indicates milliliters per minute; "mV" indicates millivolts; "NA" indicates not applicable; "NR" indicates not recorded; "ntu" indicates Nephelometric Turbidity units; "su" indicates standard units; "us/cm" indicates microsiemens per centimeter; and "+" indicates the parameter(s) may be used for stabilization calculations but cannot be used for other purposes.
2) Weather temperature units are in degrees Fahrenheit, unless otherwise noted.
3) Did indicator parameters reach stabilization? Yes
4) Was the two hour time limit reached? Yes
5) Calculations:
   - Head Above Pump Intake (ft) 31.02
   - Total Drawdown (ft) 0.00
   - Calculated Final Purge Volume (gal) NA
6) If Drawdown Did Not Stabilize or Stabilized Drawdown >0.3 ft, is Total Purge Volume > Calculated Final Purge Volume? NA

Well Sampling Worksheet
WWW RAP Field Data
AREA 5 2023-Q1 - AREA5-RI-3B
Kent County, MI

Well	AREA5-RI-3B / 2 in Diameter PVC
Sample Quarter	2023-Q1
Date	02/13/2023
Weather	Sunny
Sampler Initials	JET
Purging Device	Bladder-Pump: NA, Peristaltic-Pump: BP-12, Centrifugal-Pump: NA
Meters Used	YSI: Agile Rental 1, Turbidimeter: Agile Rental 1, Water-Level-Meter: WLM-1
Reference Measuring Point	PVC
Well Screen (ft bmp)	109.0 - 114.0
Measured Bottom Depth (ft bmp)	NR
Sample Comment	Last 3 readings are not 5 minutes apart per Standard Operating Procedure (SOP). GZA does not believe this impacts data quality.
Initial Water Level Date/Time	02/13/2023 15:10
Initial Water Level Depth (ft bmp)	34.68
Pump/Tubing Intake Depth (ft bmp)	111.5
Tubing Length (ft)	114
Tubing Inner Diameter (in)	0.25
Purging Initiation Date/Time	02/13/2023 15:10
Total Purge Volume (gal)	5.5
Modified Sample	No
If Modified, Reasoning	
Sample Collection Information	Bottling-Start: 02/13/2023 17:10:00, Bottling-Stop: 02/13/2023 17:12:00, Parameters-Sampled: PFAS

Reading Time	Depth To Water (ft)	Cumulative Drawdown (ft)	Purge Rate (ml/min)	Temperature (deg c)	Specific Conductivity (us/cm)	Dissolved Oxygen (mg/l)	pH (su)	Oxidation-Reduction Potential (mV)	Turbidity (ntu)
15:50	34.78	0.10	175	10 +	1,896 +	0.7	7.1	97	236
16:10	34.78	0.10	175	10 +	1,888 +	0.9	7.1	29	89
16:30	34.78	0.10	175	10 +	1,881 +	1.3	7.1	13	45
16:50	34.78	0.10	175	10 +	1,875 +	1.4	7.1	14	33
17:00	34.78	0.10	175	10 +	1,874 +	1.4	7.1	16	30
17:10	34.78	0.10	175	10 +	1,872 +	1.6	7.1	19	28

Notes:

1) Abbreviations include: "deg c" indicates degrees Celsius; "ft" indicates feet; "ft bmp" indicates feet below reference measuring point; "gal" indicates gallons; "in" indicates inches; "mg/l" indicates milligrams per liter; "ml/min" indicates milliliters per minute; "mV" indicates millivolts; "NA" indicates not applicable; "NR" indicates not recorded; "ntu" indicates Nephelometric Turbidity units; "su" indicates standard units; "us/cm" indicates microsiemens per centimeter; and "+" indicates the parameter(s) may be used for stabilization calculations but cannot be used for other purposes.
2) Weather temperature units are in degrees Fahrenheit, unless otherwise noted.
3) Did indicator parameters reach stabilization? No
4) Was the two hour time limit reached? Yes
5) Calculations:
   - Head Above Pump Intake (ft): 76.82
   - Total Drawdown (ft): 0.10
   - Calculated Final Purge Volume (gal): NA
6) If Drawdown Did Not Stabilize or Stabilized Drawdown >0.3 ft, is Total Purge Volume > Calculated Final Purge Volume? NA

Well Sampling Worksheet
WWW RAP Field Data
AREA 5 2023-Q1 - AREA5-RI-8A
Kent County, MI

Well	AREA5-RI-8A / 2 in Diameter PVC
Sample Quarter	2023-Q1
Date	02/17/2023
Weather	Sunny, cold
Sampler Initials	BPT
Purging Device	Bladder-Pump: NA, Peristaltic-Pump: LIV-1, Centrifugal-Pump: NA
Meters Used	YSI: Agile Rental 3, Turbidimeter: Agile Rental 1, Water-Level-Meter: WLM-1
Reference Measuring Point	PVC
Well Screen (ft bmp)	85.1 - 90.1
Measured Bottom Depth (ft bmp)	90.6
Sample Comment	Last 3 readings are not 5 minutes apart per the Standard Operating Procedure (SOP); GZA does not believe this impacts data quality.
Initial Water Level Date/Time	02/17/2023 11:10
Initial Water Level Depth (ft bmp)	81.61
Pump/Tubing Intake Depth (ft bmp)	87.7
Tubing Length (ft)	90.1
Tubing Inner Diameter (in)	0.25
Purging Initiation Date/Time	02/17/2023 11:10
Total Purge Volume (gal)	6.6
Modified Sample	No
If Modified, Reasoning	
Sample Collection Information	Bottling-Start: 02/17/2023 13:15:00, Bottling-Stop: 02/17/2023 13:20:00, Parameters-Sampled: PFAS

Reading Time	Depth To Water (ft)	Cumulative Drawdown (ft)	Purge Rate (ml/min)	Temperature (deg c)	Specific Conductivity (us/cm)	Dissolved Oxygen (mg/l)	pH (su)	Oxidation-Reduction Potential (mV)	Turbidity (ntu)
11:50	81.61	0.00	200	9 +	489 +	10.0	7.3	319	34 +
12:00	81.61	0.00	200	9 +	495 +	9.5	7.3	326	22 +
12:05	81.61	0.00	200	9 +	492 +	9.1	7.3	328	16 +
12:15	81.61	0.00	200	9 +	494 +	9.3	7.3	331	12 +
12:25	81.61	0.00	200	9 +	498 +	9.3	7.3	336	8 +
12:35	81.61	0.00	200	9 +	498 +	9.2	7.3	339	6 +
12:45	81.61	0.00	200	9 +	498 +	9.2	7.3	343	6 +
12:50	81.61	0.00	200	9 +	498 +	9.2	7.3	344	<5 +
13:00	81.61	0.00	200	9 +	500 +	9.2	7.3	347	<5 +

Notes:

1) Abbreviations include: "deg c" indicates degrees Celsius; "ft" indicates feet; "ft bmp" indicates feet below reference measuring point; "gal" indicates gallons; "in" indicates inches; "mg/l" indicates milligrams per liter; "ml/min" indicates milliliters per minute; "mV" indicates millivolts; "NA" indicates not applicable; "NR" indicates not recorded; "ntu" indicates Nephelometric Turbidity units; "su" indicates standard units; "us/cm" indicates microsiemens per centimeter; and "+" indicates the parameter(s) may be used for stabilization calculations but cannot be used for other purposes.
2) Weather temperature units are in degrees Fahrenheit, unless otherwise noted.
3) Did indicator parameters reach stabilization? No
4) Was the two hour time limit reached? Yes
5) Calculations:
   - Head Above Pump Intake (ft) 6.09
   - Total Drawdown (ft) 0.00
   - Calculated Final Purge Volume (gal) NA
6) If Drawdown Did Not Stabilize or Stabilized Drawdown >0.3 ft, is Total Purge Volume > Calculated Final Purge Volume? NA

Well Sampling Worksheet
WWW RAP Field Data
AREA 5 2023-Q1 - AREA5-RI-8B
Kent County, MI

Well	AREA5-RI-8B / 2 in Diameter PVC
Sample Quarter	2023-Q1
Date	02/17/2023
Weather	Sunny/Cold
Sampler Initials	JET
Purging Device	Bladder-Pump: BP-12, Peristaltic-Pump: NA, Centrifugal-Pump: NA
Meters Used	YSI: Agile Rental 1, Turbidimeter: Agile Rental 1, Water-Level-Meter: WLM-3
Reference Measuring Point	PVC
Well Screen (ft bmp)	156.5 - 161.5
Measured Bottom Depth (ft bmp)	NR
Sample Comment	Last 3 readings are not 5 minutes apart per Standard Operating Procedure (SOP). GZA does not believe this impacts data quality.
Initial Water Level Date/Time	02/17/2023 12:00
Initial Water Level Depth (ft bmp)	81.33
Pump/Tubing Intake Depth (ft bmp)	159
Tubing Length (ft)	161.5
Tubing Inner Diameter (in)	0.25
Purging Initiation Date/Time	02/17/2023 12:00
Total Purge Volume (gal)	6.7
Modified Sample	No
If Modified, Reasoning	
Sample Collection Information	Bottling-Start: 02/17/2023 14:10:00, Bottling-Stop: 02/17/2023 14:15:00, Parameters-Sampled: PFAS

Reading Time	Depth To Water (ft)	Cumulative Drawdown (ft)	Purge Rate (ml/min)	Temperature (deg c)	Specific Conductivity (us/cm)	Dissolved Oxygen (mg/l)	pH (su)	Oxidation-Reduction Potential (mV)	Turbidity (ntu)
13:00	81.33	0.00	200	8 +	841 +	<0.5	7.2	241	55 +
13:20	81.33	0.00	200	8 +	851 +	<0.5	7.2	128	34 +
13:40	81.33	0.00	200	8 +	847 +	<0.5	7.2	77	25 +
13:50	81.33	0.00	200	8 +	843 +	<0.5	7.2	61	21 +
14:00	81.33	0.00	200	8 +	844 +	<0.5	7.2	51	21 +

Notes:

1) Abbreviations include: "deg c" indicates degrees Celsius; "ft" indicates feet; "ft bmp" indicates feet below reference measuring point; "gal" indicates gallons; "in" indicates inches; "mg/l" indicates milligrams per liter; "ml/min" indicates milliliters per minute; "mV" indicates millivolts; "NA" indicates not applicable; "NR" indicates not recorded; "ntu" indicates Nephelometric Turbidity units; "su" indicates standard units; "us/cm" indicates microsiemens per centimeter; and "+" indicates the parameter(s) may be used for stabilization calculations but cannot be used for other purposes.
2) Weather temperature units are in degrees Fahrenheit, unless otherwise noted.
3) Did indicator parameters reach stabilization? No
4) Was the two hour time limit reached? Yes
5) Calculations:
   - Head Above Pump Intake (ft): 77.67
   - Total Drawdown (ft): 0.00
   - Calculated Final Purge Volume (gal): NA
6) If Drawdown Did Not Stabilize or Stabilized Drawdown >0.3 ft, is Total Purge Volume > Calculated Final Purge Volume? NA

Well Sampling Worksheet
WWW RAP Field Data
AREA 5 2023-Q1 - AREA5-RI-8C
Kent County, MI

Well	AREA5-RI-8C / 2 in Diameter PVC
Sample Quarter	2023-Q1
Date	02/17/2023
Weather	Sunny, Cold, 30s
Sampler Initials	DMW
Purging Device	Bladder-Pump: BP-11, Peristaltic-Pump: NA, Centrifugal-Pump: NA
Meters Used	YSI: Agile Rental 3, Turbidimeter: Agile Rental 1, Water-Level-Meter: WLM-2
Reference Measuring Point	PVC
Well Screen (ft bmp)	174.4 - 179.4
Measured Bottom Depth (ft bmp)	NR
Sample Comment	Bladder pump issues from 11:15 to 12:30.
Initial Water Level Date/Time	02/17/2023 12:30
Initial Water Level Depth (ft bmp)	85.33
Pump/Tubing Intake Depth (ft bmp)	176.9
Tubing Length (ft)	179.4
Tubing Inner Diameter (in)	0.25
Purging Initiation Date/Time	02/17/2023 12:30
Total Purge Volume (gal)	5.5
Modified Sample	No
If Modified, Reasoning	
Sample Collection Information	Bottling-Start: 02/17/2023 14:35:00, Bottling-Stop: 02/17/2023 14:40:00, Parameters-Sampled: PFAS

Reading Time	Depth To Water (ft)	Cumulative Drawdown (ft)	Purge Rate (ml/min)	Temperature (deg c)	Specific Conductivity (us/cm)	Dissolved Oxygen (mg/l)	pH (su)	Oxidation-Reduction Potential (mV)	Turbidity (ntu)
14:00	85.35	0.02	150	8 +	793 +	4.7	7.3	328	309 +
14:10	85.35	0.02	150	8 +	790 +	5.0	7.3	325	270 +
14:15	85.35	0.02	150	8 +	793 +	5.2	7.3	325	234 +
14:20	85.35	0.02	150	8 +	790 +	5.4	7.3	325	215 +
14:25	85.35	0.02	150	8 +	791 +	5.7	7.3	325	191 +
14:30	85.35	0.02	150	8 +	790 +	6.0	7.3	325	199 +

Notes:

1) Abbreviations include: "deg c" indicates degrees Celsius; "ft" indicates feet; "ft bmp" indicates feet below reference measuring point; "gal" indicates gallons; "in" indicates inches; "mg/l" indicates milligrams per liter; "ml/min" indicates milliliters per minute; "mV" indicates millivolts; "NA" indicates not applicable; "NR" indicates not recorded; "ntu" indicates Nephelometric Turbidity units; "su" indicates standard units; "us/cm" indicates microsiemens per centimeter; and "+" indicates the parameter(s) may be used for stabilization calculations but cannot be used for other purposes.
2) Weather temperature units are in degrees Fahrenheit, unless otherwise noted.
3) Did indicator parameters reach stabilization? No
4) Was the two hour time limit reached? Yes
5) Calculations:
   - Head Above Pump Intake (ft): 91.57
   - Total Drawdown (ft): 0.02
   - Calculated Final Purge Volume (gal): NA
6) If Drawdown Did Not Stabilize or Stabilized Drawdown >0.3 ft, is Total Purge Volume > Calculated Final Purge Volume? NA

Well Sampling Worksheet
WWW RAP Field Data
AREA 5 2023-Q1 - AREA5-RI-9A
Kent County, MI

Well	AREA5-RI-9A / 2 in Diameter PVC
Sample Quarter	2023-Q1
Date	02/16/2023
Weather	Snow, 30F
Sampler Initials	BPT
Purging Device	Bladder-Pump: LIV-1, Peristaltic-Pump: NA, Centrifugal-Pump: NA
Meters Used	YSI: Agile Rental 1, Turbidimeter: Agile Rental 2, Water-Level-Meter: WLM-1
Reference Measuring Point	PVC
Well Screen (ft bmp)	98.5 - 103.5
Measured Bottom Depth (ft bmp)	103.5
Sample Comment	Last 3 readings are not 5 minutes apart per Standard Operating Procedure (SOP). GZA does not believe this impacts data quality.
Initial Water Level Date/Time	02/16/2023 14:00
Initial Water Level Depth (ft bmp)	95.96
Pump/Tubing Intake Depth (ft bmp)	101.1
Tubing Length (ft)	103.5
Tubing Inner Diameter (in)	0.25
Purging Initiation Date/Time	02/16/2023 14:00
Total Purge Volume (gal)	5
Modified Sample	No
If Modified, Reasoning	
Sample Collection Information	Bottling-Start: 02/16/2023 15:45:00, Bottling-Stop: 02/16/2023 15:50:00, Parameters-Sampled: PFAS

Reading Time	Depth To Water (ft)	Cumulative Drawdown (ft)	Purge Rate (ml/min)	Temperature (deg c)	Specific Conductivity (us/cm)	Dissolved Oxygen (mg/l)	pH (su)	Oxidation-Reduction Potential (mV)	Turbidity (ntu)
15:05	96.50	0.54	180	8 +	615 +	2.2	7.3	302	17
15:15	96.50	0.54	180	8 +	614 +	2.1	7.3	302	17
15:25	96.50	0.54	180	7 +	611 +	2.0	7.3	302	16
15:35	96.50	0.54	180	8 +	612 +	2.0	7.4	301	17

Notes:

1) Abbreviations include: "deg c" indicates degrees Celsius; "ft" indicates feet; "ft bmp" indicates feet below reference measuring point; "gal" indicates gallons; "in" indicates inches; "mg/l" indicates milligrams per liter; "ml/min" indicates milliliters per minute; "mV" indicates millivolts; "NA" indicates not applicable; "NR" indicates not recorded; "ntu" indicates Nephelometric Turbidity units; "su" indicates standard units; "us/cm" indicates microsiemens per centimeter; and "+" indicates the parameter(s) may be used for stabilization calculations but cannot be used for other purposes.
2) Weather temperature units are in degrees Fahrenheit, unless otherwise noted.
3) Did indicator parameters reach stabilization? Yes
4) Was the two hour time limit reached? No
5) Calculations:
   - Head Above Pump Intake (ft) 5.14
   - Total Drawdown (ft) 0.54
   - Calculated Final Purge Volume (gal) 0.36
6) If Drawdown Did Not Stabilize or Stabilized Drawdown >0.3 ft, is Total Purge Volume > Calculated Final Purge Volume? Yes

Well Sampling Worksheet
WWW RAP Field Data
AREA 5 2023-Q1 - AREA5-RI-9B
Kent County, MI

Well	AREA5-RI-9B / 2 in Diameter PVC
Sample Quarter	2023-Q1
Date	02/16/2023
Weather	Snowy
Sampler Initials	JET
Purging Device	Bladder-Pump: BP-10, Peristaltic-Pump: NA, Centrifugal-Pump: NA
Meters Used	YSI: Agile Rental 2, Turbidimeter: Agile Rental 2, Water-Level-Meter: WLM-3
Reference Measuring Point	PVC
Well Screen (ft bmp)	151.6 - 156.6
Measured Bottom Depth (ft bmp)	NR
Sample Comment	Last 3 readings are not 5 minutes apart per Standard Operating Procedure (SOP). GZA does not believe this impacts data quality.
Initial Water Level Date/Time	02/16/2023 14:25
Initial Water Level Depth (ft bmp)	110.53
Pump/Tubing Intake Depth (ft bmp)	154.1
Tubing Length (ft)	156.6
Tubing Inner Diameter (in)	0.25
Purging Initiation Date/Time	02/16/2023 14:25
Total Purge Volume (gal)	9.9
Modified Sample	No
If Modified, Reasoning	
Sample Collection Information	Bottling-Start: 02/16/2023 16:30:00, Bottling-Stop: 02/16/2023 16:35:00, Parameters-Sampled: PFAS

Reading Time	Depth To Water (ft)	Cumulative Drawdown (ft)	Purge Rate (ml/min)	Temperature (deg c)	Specific Conductivity (us/cm)	Dissolved Oxygen (mg/l)	pH (su)	Oxidation-Reduction Potential (mV)	Turbidity (ntu)
15:25	110.53	0.00	300	8 +	783 +	<0.5	7.1	81	293
15:35	110.53	0.00	300	8 +	788 +	<0.5	7.0	-23	189
15:45	110.53	0.00	300	8 +	786 +	<0.5	7.1	-57	132
16:05	110.53	0.00	300	8 +	784 +	<0.5	7.1	-76	101
16:15	110.53	0.00	300	8 +	787 +	<0.5	7.1	-81	78
16:25	110.53	0.00	300	8 +	785 +	<0.5	7.1	-85	69

Notes:

1) Abbreviations include: "deg c" indicates degrees Celsius; "ft" indicates feet; "ft bmp" indicates feet below reference measuring point; "gal" indicates gallons; "in" indicates inches; "mg/l" indicates milligrams per liter; "ml/min" indicates milliliters per minute; "mV" indicates millivolts; "NA" indicates not applicable; "NR" indicates not recorded; "ntu" indicates Nephelometric Turbidity units; "su" indicates standard units; "us/cm" indicates microsiemens per centimeter; and "+" indicates the parameter(s) may be used for stabilization calculations but cannot be used for other purposes.
2) Weather temperature units are in degrees Fahrenheit, unless otherwise noted.
3) Did indicator parameters reach stabilization? No
4) Was the two hour time limit reached? Yes
5) Calculations:
   - Head Above Pump Intake (ft): 43.57
   - Total Drawdown (ft): 0.00
   - Calculated Final Purge Volume (gal): NA
6) If Drawdown Did Not Stabilize or Stabilized Drawdown >0.3 ft, is Total Purge Volume > Calculated Final Purge Volume? NA

R&W/GZA
Print Date: 1/7/2025

Well Sampling Worksheet
WWW RAP Field Data
AREA 5 2023-Q1 - AREA5-RI-9C
Kent County, MI

Well	AREA5-RI-9C / 2 in Diameter PVC
Sample Quarter	2023-Q1
Date	02/16/2023
Weather	Snowy, 30s
Sampler Initials	DMW
Purging Device	Bladder-Pump: BP-11, Peristaltic-Pump: NA, Centrifugal-Pump: NA
Meters Used	YSI: Agile Rental 3, Turbidimeter: Agile Rental 1, Water-Level-Meter: WLM-2
Reference Measuring Point	PVC
Well Screen (ft bmp)	221.9 - 226.9
Measured Bottom Depth (ft bmp)	NR
Sample Comment	
Initial Water Level Date/Time	02/16/2023 14:05
Initial Water Level Depth (ft bmp)	111.03
Pump/Tubing Intake Depth (ft bmp)	224.4
Tubing Length (ft)	226.9
Tubing Inner Diameter (in)	0.17
Purging Initiation Date/Time	02/16/2023 14:05
Total Purge Volume (gal)	5.5
Modified Sample	No
If Modified, Reasoning	
Sample Collection Information	Bottling-Start: 02/16/2023 16:05:00, Bottling-Stop: 02/16/2023 16:07:00, Parameters-Sampled: PFAS

Reading Time	Depth To Water (ft)	Cumulative Drawdown (ft)	Purge Rate (ml/min)	Temperature (deg c)	Specific Conductivity (us/cm)	Dissolved Oxygen (mg/l)	pH (su)	Oxidation-Reduction Potential (mV)	Turbidity (ntu)
15:00	111.03	0.00	175	8 +	1,145 +	1.1	7.4	90	340
15:15	111.03	0.00	175	8 +	1,123 +	0.8	7.4	-28	225
15:30	111.03	0.00	175	8 +	1,125 +	0.7	7.4	-58	146
15:40	111.03	0.00	175	8 +	1,144 +	0.7	7.4	-64	148
15:45	111.03	0.00	175	8 +	1,135 +	0.7	7.4	-67	128
15:50	111.03	0.00	175	8 +	1,134 +	0.7	7.4	-68	104
15:55	111.03	0.00	175	8 +	1,143 +	0.7	7.4	-69	88
16:00	111.03	0.00	175	8 +	1,136 +	0.7	7.4	-70	100

Notes:

1) Abbreviations include: "deg c" indicates degrees Celsius; "ft" indicates feet; "ft bmp" indicates feet below reference measuring point; "gal" indicates gallons; "in" indicates inches; "mg/l" indicates milligrams per liter; "ml/min" indicates milliliters per minute; "mV" indicates millivolts; "NA" indicates not applicable; "NR" indicates not recorded; "ntu" indicates Nephelometric Turbidity units; "su" indicates standard units; "us/cm" indicates microsiemens per centimeter; and "+" indicates the parameter(s) may be used for stabilization calculations but cannot be used for other purposes.
2) Weather temperature units are in degrees Fahrenheit, unless otherwise noted.
3) Did indicator parameters reach stabilization? No
4) Was the two hour time limit reached? Yes
5) Calculations:
   - Head Above Pump Intake (ft): 113.37
   - Total Drawdown (ft): 0.00
   - Calculated Final Purge Volume (gal): NA
6) If Drawdown Did Not Stabilize or Stabilized Drawdown >0.3 ft, is Total Purge Volume > Calculated Final Purge Volume? NA

Well Sampling Worksheet
WWW RAP Field Data
AREA 5 2023-Q1 - AREA5-RI-11A
Kent County, MI

Well	AREA5-RI-11A / 2 in Diameter PVC
Sample Quarter	2023-Q1
Date	02/24/2023
Weather	Cloudy, low 20s
Sampler Initials	MKM
Purging Device	Bladder-Pump: BP-12, Peristaltic-Pump: NA, Centrifugal-Pump: NA
Meters Used	YSI: Agile Rental 2, Turbidimeter: Agile Rental 2, Water-Level-Meter: WLM-2
Reference Measuring Point	PVC
Well Screen (ft bmp)	110.0 - 115.0
Measured Bottom Depth (ft bmp)	NR
Sample Comment	
Initial Water Level Date/Time	02/24/2023 12:50
Initial Water Level Depth (ft bmp)	97.85
Pump/Tubing Intake Depth (ft bmp)	112.5
Tubing Length (ft)	115
Tubing Inner Diameter (in)	0.25
Purging Initiation Date/Time	02/24/2023 12:50
Total Purge Volume (gal)	5.5
Modified Sample	No
If Modified, Reasoning	
Sample Collection Information	Bottling-Start: 02/24/2023 14:45:00, Bottling-Stop: 02/24/2023 14:48:00, Parameters-Sampled: PFAS

Reading Time	Depth To Water (ft)	Cumulative Drawdown (ft)	Purge Rate (ml/min)	Temperature (deg c)	Specific Conductivity (us/cm)	Dissolved Oxygen (mg/l)	pH (su)	Oxidation-Reduction Potential (mV)	Turbidity (ntu)
13:40	97.85	0.00	170	8 +	629 +	2.3	6.9	131	18
13:50	97.85	0.00	170	7 +	629 +	2.1	6.9	54	13
14:00	97.85	0.00	170	7 +	634 +	2.0	6.9	23	10
14:10	97.85	0.00	170	7 +	634 +	1.9	6.9	11	9
14:20	97.85	0.00	170	7 +	637 +	1.7	6.9	6	8
14:30	97.85	0.00	170	7 +	635 +	1.7	6.9	4	7
14:35	97.85	0.00	170	7 +	636 +	1.5	6.9	2	6
14:40	97.85	0.00	170	7 +	637 +	1.5	7.0	1	6
14:45	97.85	0.00	170	7 +	637 +	1.5	7.0	-1	6

Notes:

1) Abbreviations include: "deg c" indicates degrees Celsius; "ft" indicates feet; "ft bmp" indicates feet below reference measuring point; "gal" indicates gallons; "in" indicates inches; "mg/l" indicates milligrams per liter; "ml/min" indicates milliliters per minute; "mV" indicates millivolts; "NA" indicates not applicable; "NR" indicates not recorded; "ntu" indicates Nephelometric Turbidity units; "su" indicates standard units; "us/cm" indicates microsiemens per centimeter; and "+" indicates the parameter(s) may be used for stabilization calculations but cannot be used for other purposes.
2) Weather temperature units are in degrees Fahrenheit, unless otherwise noted.
3) Did indicator parameters reach stabilization? Yes
4) Was the two hour time limit reached? No
5) Calculations:
   - Head Above Pump Intake (ft) 14.65
   - Total Drawdown (ft) 0.00
   - Calculated Final Purge Volume (gal) NA
6) If Drawdown Did Not Stabilize or Stabilized Drawdown >0.3 ft, is Total Purge Volume > Calculated Final Purge Volume? NA

Well Sampling Worksheet
WWW RAP Field Data
PERIMETER 2023-Q2 - WV-MW-5D
Kent County, MI

Well	WV-MW-5D / 2 in Diameter PVC
Sample Quarter	2023-Q2
Date	06/13/2023
Weather	Cloudy, 60s
Sampler Initials	AW
Purging Device	Bladder-Pump: NA, Peristaltic-Pump: NA, Centrifugal-Pump: Mega Monsoon #1
Meters Used	YSI: Agile Rental 3, Turbidimeter: Agile Rental 3, Water-Level-Meter: GeoTech Rental
Reference Measuring Point	PVC
Well Screen (ft bmp)	71.8 - 76.8
Expected Well Bottom Depth (ft bmp)	76.8
Measured Bottom Depth (ft bmp)	76.8
Sample Comment	15:04 - Depth to Water = 64.66 ft bmp. 15:45 - Depth to Water = 64.69 ft bmp and remained constant for duration of purge. 16:00 - YSI Connected.
Initial Water Level Date/Time	06/13/2023 15:04
Initial Water Level Depth (ft bmp)	64.66
Pump/Tubing Intake Depth (ft bmp)	74.3
Tubing Length (ft)	78
Tubing Inner Diameter (in)	0.17
Purging Initiation Date/Time	06/13/2023 15:35
Total Purge Volume (gal)	5.2
Modified Sample	No
If Modified, Reasoning	
Sample Collection Information	Bottling-Start: 06/13/2023 16:45:00, Bottling-Stop: 06/13/2023 16:50:00, Parameters-Sampled: PFAS

Reading Time	Depth To Water (ft)	Cumulative Drawdown (ft)	Purge Rate (ml/min)	Temperature (deg c)	Specific Conductivity (us/cm)	Dissolved Oxygen (mg/l)	pH (su)	Oxidation-Reduction Potential (mV)	Turbidity (ntu)
15:45	64.69	0.03	300	NR	NR	NR	NR	NR	124
15:50	64.69	0.03	300	NR	NR	NR	NR	NR	78
15:55	64.69	0.03	300	NR	NR	NR	NR	NR	54
16:00	64.69	0.03	300	14 +	675 +	8.5	7.2	131 +	42
16:05	64.69	0.03	300	14 +	675 +	7.9	7.2	153 +	27
16:10	64.69	0.03	300	13 +	675 +	7.8	7.2	169 +	20
16:15	64.69	0.03	300	13 +	675 +	7.8	7.2	178 +	13
16:20	64.69	0.03	300	13 +	675 +	7.8	7.2	185 +	9
16:25	64.69	0.03	300	13 +	674 +	7.8	7.2	191 +	8

Well Sampling Worksheet
WWW RAP Field Data
PERIMETER 2023-Q2 - WV-MW-5D
Kent County, MI

Well	WV-MW-5D / 2 in Diameter PVC
Sample Quarter	2023-Q2
Date	06/13/2023
Weather	Cloudy, 60s
Sampler Initials	AW
Purging Device	Bladder-Pump: NA, Peristaltic-Pump: NA, Centrifugal-Pump: Mega Monsoon #1
Meters Used	YSI: Agile Rental 3, Turbidimeter: Agile Rental 3, Water-Level-Meter: GeoTech Rental
Reference Measuring Point	PVC
Well Screen (ft bmp)	71.8 - 76.8
Expected Well Bottom Depth (ft bmp)	76.8
Measured Bottom Depth (ft bmp)	76.8
Sample Comment	15:04 - Depth to Water = 64.66 ft bmp. 15:45 - Depth to Water = 64.69 ft bmp and remained constant for duration of purge. 16:00 - YSI Connected.
Initial Water Level Date/Time	06/13/2023 15:04
Initial Water Level Depth (ft bmp)	64.66
Pump/Tubing Intake Depth (ft bmp)	74.3
Tubing Length (ft)	78
Tubing Inner Diameter (in)	0.17
Purging Initiation Date/Time	06/13/2023 15:35
Total Purge Volume (gal)	5.2
Modified Sample	No
If Modified, Reasoning	
Sample Collection Information	Bottling-Start: 06/13/2023 16:45:00, Bottling-Stop: 06/13/2023 16:50:00, Parameters-Sampled: PFAS

Reading Time	Depth To Water (ft)	Cumulative Drawdown (ft)	Purge Rate (ml/min)	Temperature (deg c)	Specific Conductivity (us/cm)	Dissolved Oxygen (mg/l)	pH (su)	Oxidation-Reduction Potential (mV)	Turbidity (ntu)
16:30	64.69	0.03	300	13 +	674 +	7.8	7.2	194 +	5
16:35	64.69	0.03	300	13 +	674 +	7.7	7.2	200 +	5
16:40	64.69	0.03	300	13 +	674 +	7.8	7.2	203 +	4

Notes:

1) Abbreviations include: "deg c" indicates degrees Celsius; "ft" indicates feet; "ft bmp" indicates feet below reference measuring point; "gal" indicates gallons; "in" indicates inches; "mg/l" indicates milligrams per liter; "ml/min" indicates milliliters per minute; "mV" indicates millivolts; "NA" indicates not applicable; "NR" indicates not recorded; "ntu" indicates Nephelometric Turbidity units; "su" indicates standard units; "us/cm" indicates microsiemens per centimeter; and "+" indicates the parameter(s) may be used for stabilization calculations but cannot be used for other purposes.
2) Weather temperature units are in degrees Fahrenheit, unless otherwise noted.
3) Did indicator parameters reach stabilization? Yes
4) Was the two hour time limit reached? No
5) Calculations:
   - Head Above Pump Intake (ft) 9.64
   - Total Drawdown (ft) 0.03
   - Calculated Final Purge Volume (gal) NA
6) If Drawdown Did Not Stabilize or Stabilized Drawdown >0.3 ft, is Total Purge Volume > Calculated Final Purge Volume? NA

Well Sampling Worksheet
WWW RAP Field Data
PERIMETER 2023-Q2 - WV-MW-5S
Kent County, MI

Well	WV-MW-5S / 2 in Diameter PVC
Sample Quarter	2023-Q2
Date	06/13/2023
Weather	Cloudy/Rainy, 60F
Sampler Initials	WVK
Purging Device	Bladder-Pump: NA, Peristaltic-Pump: NA, Centrifugal-Pump: Mega Monsoon #2
Meters Used	YSI: Agile Rental 2, Turbidimeter: Agile Rental 2, Water-Level-Meter: WLM-3
Reference Measuring Point	PVC
Well Screen (ft bmp)	64.4 - 69.4
Expected Well Bottom Depth (ft bmp)	69.4
Measured Bottom Depth (ft bmp)	68
Sample Comment	Static water level below the top of the well screen. Tubing intake was lowered to midway between the water level and the measured bottom of the well. 15:40 - Flow stopped and the pump speed was increased. 16:00 - YSI Connected. 16:50 - Recommend lower purge speed of 50ml/min for the next sample event.
Initial Water Level Date/Time	06/13/2023 15:00
Initial Water Level Depth (ft bmp)	64.44
Pump/Tubing Intake Depth (ft bmp)	66.2
Tubing Length (ft)	67
Tubing Inner Diameter (in)	0.25
Purging Initiation Date/Time	06/13/2023 15:30
Total Purge Volume (gal)	4
Modified Sample	Yes
If Modified, Reasoning	Initial Depth to Water Below Top of Well Screen.
Sample Collection Information	Bottling-Start: 06/13/2023 16:55:00, Bottling-Stop: 06/13/2023 17:00:00, Parameters-Sampled: PFAS

Reading Time	Depth To Water (ft)	Cumulative Drawdown (ft)	Purge Rate (ml/min)	Temperature (deg c)	Specific Conductivity (us/cm)	Dissolved Oxygen (mg/l)	pH (su)	Oxidation-Reduction Potential (mV)	Turbidity (ntu)
15:35	64.45	0.01	540	NR	NR	NR	NR	NR	NR
15:40	64.45	0.01	100	NR	NR	NR	NR	NR	188
15:45	64.46	0.02	440	NR	NR	NR	NR	NR	137
15:50	64.46	0.02	440	NR	NR	NR	NR	NR	69
15:55	64.46	0.02	440	NR	NR	NR	NR	NR	22
16:00	64.46	0.02	440	13 +	735 +	9.2	7.2	190	16
16:05	64.46	0.02	440	13 +	732 +	8.9	7.1	165	12
16:10	64.46	0.02	440	13 +	730 +	8.7	7.1	161	8
16:15	64.46	0.02	440	13 +	729 +	8.6	7.1	159	7
16:20	64.46	0.02	440	13 +	728 +	8.5	7.1	158	7
16:25	64.46	0.02	440	13 +	729 +	8.6	7.1	170	<5
16:30	64.46	0.02	440	13 +	726 +	8.6	7.1	197	<5
16:35	64.46	0.02	440	13 +	725 +	8.6	7.1	211	<5

Well Sampling Worksheet
WWW RAP Field Data
PERIMETER 2023-Q2 - WV-MW-5S
Kent County, MI

Well	WV-MW-5S / 2 in Diameter PVC
Sample Quarter	2023-Q2
Date	06/13/2023
Weather	Cloudy/Rainy, 60F
Sampler Initials	WVK
Purging Device	Bladder-Pump: NA, Peristaltic-Pump: NA, Centrifugal-Pump: Mega Monsoon #2
Meters Used	YSI: Agile Rental 2, Turbidimeter: Agile Rental 2, Water-Level-Meter: WLM-3
Reference Measuring Point	PVC
Well Screen (ft bmp)	64.4 - 69.4
Expected Well Bottom Depth (ft bmp)	69.4
Measured Bottom Depth (ft bmp)	68
Sample Comment	Static water level below the top of the well screen. Tubing intake was lowered to midway between the water level and the measured bottom of the well. 15:40 - Flow stopped and the pump speed was increased. 16:00 - YSI Connected. 16:50 - Recommend lower purge speed of 50ml/min for the next sample event.
Initial Water Level Date/Time	06/13/2023 15:00
Initial Water Level Depth (ft bmp)	64.44
Pump/Tubing Intake Depth (ft bmp)	66.2
Tubing Length (ft)	67
Tubing Inner Diameter (in)	0.25
Purging Initiation Date/Time	06/13/2023 15:30
Total Purge Volume (gal)	4
Modified Sample	Yes
If Modified, Reasoning	Initial Depth to Water Below Top of Well Screen.
Sample Collection Information	Bottling-Start: 06/13/2023 16:55:00, Bottling-Stop: 06/13/2023 17:00:00, Parameters-Sampled: PFAS

Reading Time	Depth To Water (ft)	Cumulative Drawdown (ft)	Purge Rate (ml/min)	Temperature (deg c)	Specific Conductivity (us/cm)	Dissolved Oxygen (mg/l)	pH (su)	Oxidation-Reduction Potential (mV)	Turbidity (ntu)
16:40	64.46	0.02	440	13 +	726 +	8.8	7.1	218	<5
16:45	64.46	0.02	440	13 +	725 +	8.7	7.1	223	<5
16:50	64.46	0.02	440	13 +	725 +	8.7	7.1	223	<5

Notes:

1) Abbreviations include: "deg c" indicates degrees Celsius; "ft" indicates feet; "ft bmp" indicates feet below reference measuring point; "gal" indicates gallons; "in" indicates inches; "mg/l" indicates milligrams per liter; "ml/min" indicates milliliters per minute; "mV" indicates millivolts; "NA" indicates not applicable; "NR" indicates not recorded; "ntu" indicates Nephelometric Turbidity units; "su" indicates standard units; "us/cm" indicates microsiemens per centimeter; and "+" indicates the parameter(s) may be used for stabilization calculations but cannot be used for other purposes.
2) Weather temperature units are in degrees Fahrenheit, unless otherwise noted.
3) Did indicator parameters reach stabilization? Yes
4) Was the two hour time limit reached? No
5) Calculations:
   - Head Above Pump Intake (ft) 1.76
   - Total Drawdown (ft) 0.02
   - Calculated Final Purge Volume (gal) NA
6) If Drawdown Did Not Stabilize or Stabilized Drawdown >0.3 ft, is Total Purge Volume > Calculated Final Purge Volume? NA

Well Sampling Worksheet
WWW RAP Field Data
PERIMETER 2023-Q2 - WV-MW-11D
Kent County, MI

Well	WV-MW-11D / 2 in Diameter PVC
Sample Quarter	2023-Q2
Date	06/13/2023
Weather	Clear, 70s
Sampler Initials	AW
Purging Device	Bladder-Pump: NA, Peristaltic-Pump: PER-2, Centrifugal-Pump: NA
Meters Used	YSI: Agile Rental 3, Turbidimeter: Agile Rental 3, Water-Level-Meter: NA
Reference Measuring Point	PVC
Well Screen (ft bmp)	161.9 - 166.9
Expected Well Bottom Depth (ft bmp)	166.9
Measured Bottom Depth (ft bmp)	166.9
Sample Comment	Artesian. Water level above top of PVC was not measured on 6/13/2023. Flow of artesian well could not overcome the head in the tubing, a peristaltic pump with a pumping rate of 300 mL/min was used to maintain the static depth of water at the top of the PVC.
Initial Water Level Date/Time	06/13/2023 10:45
Initial Water Level Depth (ft bmp)	Artesian
Pump/Tubing Intake Depth (ft bmp)	164.4
Tubing Length (ft)	167
Tubing Inner Diameter (in)	0.25
Purging Initiation Date/Time	06/13/2023 10:45
Total Purge Volume (gal)	4.4
Modified Sample	No
If Modified, Reasoning	
Sample Collection Information	Bottling-Start: 06/13/2023 11:40:00, Bottling-Stop: 06/13/2023 11:45:00, Parameters-Sampled: PFAS

Reading Time	Depth To Water (ft)	Cumulative Drawdown (ft)	Purge Rate (ml/min)	Temperature (deg c)	Specific Conductivity (us/cm)	Dissolved Oxygen (mg/l)	pH (su)	Oxidation-Reduction Potential (mV)	Turbidity (ntu)
11:00	0.00	0.00	300	11 +	649 +	1.0	7.5	-87 +	176
11:05	0.00	0.00	300	11 +	648 +	1.1	7.5	-92 +	37
11:10	0.00	0.00	300	11 +	648 +	1.3	7.5	-116 +	20
11:15	0.00	0.00	300	11 +	648 +	1.1	7.5	-121 +	<5
11:20	0.00	0.00	300	11 +	648 +	1.0	7.5	-123 +	<5
11:25	0.00	0.00	300	11 +	647 +	0.6	7.5	-124 +	<5
11:30	0.00	0.00	300	11 +	648 +	0.5	7.5	-125 +	<5
11:35	0.00	0.00	300	11 +	647 +	0.6	7.5	-127 +	<5

Notes:

1) Abbreviations include: "deg c" indicates degrees Celsius; "ft" indicates feet; "ft bmp" indicates feet below reference measuring point; "gal" indicates gallons; "in" indicates inches; "mg/l" indicates milligrams per liter; "ml/min" indicates milliliters per minute; "mV" indicates millivolts; "NA" indicates not applicable; "NR" indicates not recorded; "ntu" indicates Nephelometric Turbidity units; "su" indicates standard units; "us/cm" indicates microsiemens per centimeter; and "+" indicates the parameter(s) may be used for stabilization calculations but cannot be used for other purposes.
2) Weather temperature units are in degrees Fahrenheit, unless otherwise noted.
3) Did indicator parameters reach stabilization? Yes
4) Was the two hour time limit reached? No
5) Calculations:
   - Head Above Pump Intake (ft) 164.40
   - Total Drawdown (ft) 0.00
   - Calculated Final Purge Volume (gal) NA
6) If Drawdown Did Not Stabilize or Stabilized Drawdown >0.3 ft, is Total Purge Volume > Calculated Final Purge Volume? NA

Well Sampling Worksheet
WWW RAP Field Data
PERIMETER 2023-Q2 - WV-MW-11S
Kent County, MI

Well	WV-MW-11S / 2 in Diameter PVC
Sample Quarter	2023-Q2
Date	06/13/2023
Weather	Clear, 70s
Sampler Initials	AW
Purging Device	Bladder-Pump: NA, Peristaltic-Pump: PER-2, Centrifugal-Pump: NA
Meters Used	YSI: Agile Rental 3, Turbidimeter: Agile Rental 3, Water-Level-Meter: GeoTech Rental
Reference Measuring Point	PVC
Well Screen (ft bmp)	32.5 - 37.5
Expected Well Bottom Depth (ft bmp)	37.5
Measured Bottom Depth (ft bmp)	37.5
Sample Comment	9:45 - Depth to Water = 10.58 ft bmp. 9:50 - Depth to Water = 10.59 ft bmp and remained constant for duration of purge.
Initial Water Level Date/Time	06/13/2023 09:45
Initial Water Level Depth (ft bmp)	10.58
Pump/Tubing Intake Depth (ft bmp)	35
Tubing Length (ft)	37
Tubing Inner Diameter (in)	0.17
Purging Initiation Date/Time	06/13/2023 09:45
Total Purge Volume (gal)	1.6
Modified Sample	No
If Modified, Reasoning	
Sample Collection Information	Bottling-Start: 06/13/2023 10:20:00, Bottling-Stop: 06/13/2023 10:25:00, Parameters-Sampled: PFAS

Reading Time	Depth To Water (ft)	Cumulative Drawdown (ft)	Purge Rate (ml/min)	Temperature (deg c)	Specific Conductivity (us/cm)	Dissolved Oxygen (mg/l)	pH (su)	Oxidation-Reduction Potential (mV)	Turbidity (ntu)
09:50	10.59	0.01	200	11 +	569 +	1.1	7.3	156 +	6
09:55	10.59	0.01	200	11 +	570 +	0.9	7.3	157 +	5
10:00	10.59	0.01	200	11 +	570 +	0.7	7.4	159 +	5
10:05	10.59	0.01	200	11 +	571 +	0.5	7.4	155 +	<5
10:10	10.59	0.01	200	11 +	571 +	0.5	7.4	154 +	<5
10:15	10.59	0.01	200	11 +	560 +	0.4	7.4	153 +	<5

Notes:

1) Abbreviations include: "deg c" indicates degrees Celsius; "ft" indicates feet; "ft bmp" indicates feet below reference measuring point; "gal" indicates gallons; "in" indicates inches; "mg/l" indicates milligrams per liter; "ml/min" indicates milliliters per minute; "mV" indicates millivolts; "NA" indicates not applicable; "NR" indicates not recorded; "ntu" indicates Nephelometric Turbidity units; "su" indicates standard units; "us/cm" indicates microsiemens per centimeter; and "+" indicates the parameter(s) may be used for stabilization calculations but cannot be used for other purposes.
2) Weather temperature units are in degrees Fahrenheit, unless otherwise noted.
3) Did indicator parameters reach stabilization? Yes
4) Was the two hour time limit reached? No
5) Calculations:
   - Head Above Pump Intake (ft): 24.42
   - Total Drawdown (ft): 0.01
   - Calculated Final Purge Volume (gal): NA
6) If Drawdown Did Not Stabilize or Stabilized Drawdown >0.3 ft, is Total Purge Volume > Calculated Final Purge Volume? NA

Well Sampling Worksheet
WWW RAP Field Data
PERIMETER 2023-Q2 - WV-MW-15A
Kent County, MI

Well	WV-MW-15A / 2 in Diameter PVC
Sample Quarter	2023-Q2
Date	06/13/2023
Weather	Mostly Sunny 60
Sampler Initials	RCP
Purging Device	Bladder-Pump: NA, Peristaltic-Pump: PER-01, Centrifugal-Pump: NA
Meters Used	YSI: Agile Rental 2, Turbidimeter: Agile Rental 2, Water-Level-Meter: WLM-3
Reference Measuring Point	PVC
Well Screen (ft bmp)	8.8 - 13.8
Expected Well Bottom Depth (ft bmp)	13.8
Measured Bottom Depth (ft bmp)	NR
Sample Comment	YSI Connected at 12:15. Collected duplicate sample.
Initial Water Level Date/Time	06/13/2023 11:20
Initial Water Level Depth (ft bmp)	4.54
Pump/Tubing Intake Depth (ft bmp)	11.3
Tubing Length (ft)	14
Tubing Inner Diameter (in)	0.25
Purging Initiation Date/Time	06/13/2023 11:25
Total Purge Volume (gal)	5
Modified Sample	No
If Modified, Reasoning	
Sample Collection Information	Bottling-Start: 06/13/2023 12:40:00, Bottling-Stop: 06/13/2023 12:45:00, Parameters-Sampled: PFAS

Reading Time	Depth To Water (ft)	Cumulative Drawdown (ft)	Purge Rate (ml/min)	Temperature (deg c)	Specific Conductivity (us/cm)	Dissolved Oxygen (mg/l)	pH (su)	Oxidation-Reduction Potential (mV)	Turbidity (ntu)
11:30	4.55	0.01	200	NR	NR	NR	NR	NR	NR
11:35	4.55	0.01	200	NR	NR	NR	NR	NR	81
11:40	4.55	0.01	200	NR	NR	NR	NR	NR	49
11:45	4.55	0.01	200	NR	NR	NR	NR	NR	37
11:50	4.55	0.01	200	NR	NR	NR	NR	NR	23
11:55	4.55	0.01	200	NR	NR	NR	NR	NR	20
12:00	4.55	0.01	200	NR	NR	NR	NR	NR	14
12:05	4.55	0.01	200	NR	NR	NR	NR	NR	11
12:10	4.55	0.01	200	NR	NR	NR	NR	NR	8
12:15	4.55	0.01	200	11 +	349 +	<0.5	7.8	-93	8
12:20	4.55	0.01	200	11 +	349 +	<0.5	7.7	-95	7

Well Sampling Worksheet
WWW RAP Field Data
PERIMETER 2023-Q2 - WV-MW-15A
Kent County, MI

Well	WV-MW-15A / 2 in Diameter PVC
Sample Quarter	2023-Q2
Date	06/13/2023
Weather	Mostly Sunny 60
Sampler Initials	RCP
Purging Device	Bladder-Pump: NA, Peristaltic-Pump: PER-01, Centrifugal-Pump: NA
Meters Used	YSI: Agile Rental 2, Turbidimeter: Agile Rental 2, Water-Level-Meter: WLM-3
Reference Measuring Point	PVC
Well Screen (ft bmp)	8.8 - 13.8
Expected Well Bottom Depth (ft bmp)	13.8
Measured Bottom Depth (ft bmp)	NR
Sample Comment	YSI Connected at 12:15. Collected duplicate sample.
Initial Water Level Date/Time	06/13/2023 11:20
Initial Water Level Depth (ft bmp)	4.54
Pump/Tubing Intake Depth (ft bmp)	11.3
Tubing Length (ft)	14
Tubing Inner Diameter (in)	0.25
Purging Initiation Date/Time	06/13/2023 11:25
Total Purge Volume (gal)	5
Modified Sample	No
If Modified, Reasoning	
Sample Collection Information	Bottling-Start: 06/13/2023 12:40:00, Bottling-Stop: 06/13/2023 12:45:00, Parameters-Sampled: PFAS

Reading Time	Depth To Water (ft)	Cumulative Drawdown (ft)	Purge Rate (ml/min)	Temperature (deg c)	Specific Conductivity (us/cm)	Dissolved Oxygen (mg/l)	pH (su)	Oxidation-Reduction Potential (mV)	Turbidity (ntu)
12:25	4.55	0.01	200	11 +	348 +	<0.5	7.7	-100	<5
12:30	4.55	0.01	200	11 +	349 +	<0.5	7.7	-99	<5
12:35	4.55	0.01	200	11 +	348 +	<0.5	7.7	-101	<5

Notes:

1) Abbreviations include: "deg c" indicates degrees Celsius; "ft" indicates feet; "ft bmp" indicates feet below reference measuring point; "gal" indicates gallons; "in" indicates inches; "mg/l" indicates milligrams per liter; "ml/min" indicates milliliters per minute; "mV" indicates millivolts; "NA" indicates not applicable; "NR" indicates not recorded; "ntu" indicates Nephelometric Turbidity units; "su" indicates standard units; "us/cm" indicates microsiemens per centimeter; and "+" indicates the parameter(s) may be used for stabilization calculations but cannot be used for other purposes.
2) Weather temperature units are in degrees Fahrenheit, unless otherwise noted.
3) Did indicator parameters reach stabilization? Yes
4) Was the two hour time limit reached? No
5) Calculations:
   - Head Above Pump Intake (ft) 6.76
   - Total Drawdown (ft) 0.01
   - Calculated Final Purge Volume (gal) NA
6) If Drawdown Did Not Stabilize or Stabilized Drawdown >0.3 ft, is Total Purge Volume > Calculated Final Purge Volume? NA

Well Sampling Worksheet
WWW RAP Field Data
PERIMETER 2023-Q2 - WV-MW-15B
Kent County, MI

Well	WV-MW-15B / 2 in Diameter PVC
Sample Quarter	2023-Q2
Date	06/13/2023
Weather	60F Sunny
Sampler Initials	RCP
Purging Device	Bladder-Pump: NA, Peristaltic-Pump: PER-01, Centrifugal-Pump: NA
Meters Used	YSI: Agile Rental 2, Turbidimeter: Agile Rental 2, Water-Level-Meter: WLM-3
Reference Measuring Point	PVC
Well Screen (ft bmp)	32.8 - 37.8
Expected Well Bottom Depth (ft bmp)	37.8
Measured Bottom Depth (ft bmp)	NR
Sample Comment	10:10 - Reduced pump speed. 10:40 - YSI Connected.
Initial Water Level Date/Time	06/13/2023 10:00
Initial Water Level Depth (ft bmp)	4.52
Pump/Tubing Intake Depth (ft bmp)	35.3
Tubing Length (ft)	38
Tubing Inner Diameter (in)	0.17
Purging Initiation Date/Time	06/13/2023 10:03
Total Purge Volume (gal)	2.5
Modified Sample	No
If Modified, Reasoning	
Sample Collection Information	Bottling-Start: 06/13/2023 11:10:00, Bottling-Stop: 06/13/2023 11:17:00, Parameters-Sampled: PFAS

Reading Time	Depth To Water (ft)	Cumulative Drawdown (ft)	Purge Rate (ml/min)	Temperature (deg c)	Specific Conductivity (us/cm)	Dissolved Oxygen (mg/l)	pH (su)	Oxidation-Reduction Potential (mV)	Turbidity (ntu)
10:10	4.68	0.16	120	NR	NR	NR	NR	NR	NR
10:15	4.69	0.17	120	NR	NR	NR	NR	NR	10
10:20	4.68	0.16	120	NR	NR	NR	NR	NR	8
10:25	4.68	0.16	120	NR	NR	NR	NR	NR	6
10:30	4.68	0.16	120	NR	NR	NR	NR	NR	<5
10:40	4.68	0.16	120	12 +	426 +	0.8	7.8	-6	<5
10:45	4.68	0.16	120	11 +	421 +	<0.5	7.6	-70	<5
10:50	4.69	0.17	120	11 +	421 +	<0.5	7.6	-80	<5

Well Sampling Worksheet
WWW RAP Field Data
PERIMETER 2023-Q2 - WV-MW-15B
Kent County, MI

Well	WV-MW-15B / 2 in Diameter PVC
Sample Quarter	2023-Q2
Date	06/13/2023
Weather	60F Sunny
Sampler Initials	RCP
Purging Device	Bladder-Pump: NA, Peristaltic-Pump: PER-01, Centrifugal-Pump: NA
Meters Used	YSI: Agile Rental 2, Turbidimeter: Agile Rental 2, Water-Level-Meter: WLM-3
Reference Measuring Point	PVC
Well Screen (ft bmp)	32.8 - 37.8
Expected Well Bottom Depth (ft bmp)	37.8
Measured Bottom Depth (ft bmp)	NR
Sample Comment	10:10 - Reduced pump speed. 10:40 - YSI Connected.
Initial Water Level Date/Time	06/13/2023 10:00
Initial Water Level Depth (ft bmp)	4.52
Pump/Tubing Intake Depth (ft bmp)	35.3
Tubing Length (ft)	38
Tubing Inner Diameter (in)	0.17
Purging Initiation Date/Time	06/13/2023 10:03
Total Purge Volume (gal)	2.5
Modified Sample	No
If Modified, Reasoning	
Sample Collection Information	Bottling-Start: 06/13/2023 11:10:00, Bottling-Stop: 06/13/2023 11:17:00, Parameters-Sampled: PFAS

Reading Time	Depth To Water (ft)	Cumulative Drawdown (ft)	Purge Rate (ml/min)	Temperature (deg c)	Specific Conductivity (us/cm)	Dissolved Oxygen (mg/l)	pH (su)	Oxidation-Reduction Potential (mV)	Turbidity (ntu)
10:55	4.69	0.17	120	11 +	421 +	<0.5	7.6	-86	<5
11:00	4.69	0.17	120	11 +	422 +	<0.5	7.7	-92	<5
11:05	4.69	0.17	120	11 +	422 +	<0.5	7.7	-95	<5

Notes:

1) Abbreviations include: "deg c" indicates degrees Celsius; "ft" indicates feet; "ft bmp" indicates feet below reference measuring point; "gal" indicates gallons; "in" indicates inches; "mg/l" indicates milligrams per liter; "ml/min" indicates milliliters per minute; "mV" indicates millivolts; "NA" indicates not applicable; "NR" indicates not recorded; "ntu" indicates Nephelometric Turbidity units; "su" indicates standard units; "us/cm" indicates microsiemens per centimeter; and "+" indicates the parameter(s) may be used for stabilization calculations but cannot be used for other purposes.
2) Weather temperature units are in degrees Fahrenheit, unless otherwise noted.
3) Did indicator parameters reach stabilization? Yes
4) Was the two hour time limit reached? No
5) Calculations:
   - Head Above Pump Intake (ft) 30.78
   - Total Drawdown (ft) 0.17
   - Calculated Final Purge Volume (gal) NA
6) If Drawdown Did Not Stabilize or Stabilized Drawdown >0.3 ft, is Total Purge Volume > Calculated Final Purge Volume? NA

Well Sampling Worksheet
WWW RAP Field Data
PERIMETER 2023-Q2 - WV-MW-15C
Kent County, MI

Well	WV-MW-15C / 2 in Diameter PVC
Sample Quarter	2023-Q2
Date	06/13/2023
Weather	Mostly Sunny, 60
Sampler Initials	MKM
Purging Device	Bladder-Pump: NA, Peristaltic-Pump: PER-3, Centrifugal-Pump: NA
Meters Used	YSI: Agile Rental 1, Turbidimeter: Agile Rental 1, Water-Level-Meter: WLM-2
Reference Measuring Point	PVC
Well Screen (ft bmp)	43.2 - 48.0
Expected Well Bottom Depth (ft bmp)	48
Measured Bottom Depth (ft bmp)	NR
Sample Comment	11:45 - Depth to Water = 4.41 ft bmp. 12:10 - YSI Connected. 12:15 - Depth To Water = 4.42 ft bmp and remained stable. Collected MS / MSD.
Initial Water Level Date/Time	06/13/2023 11:25
Initial Water Level Depth (ft bmp)	4.37
Pump/Tubing Intake Depth (ft bmp)	45.6
Tubing Length (ft)	47
Tubing Inner Diameter (in)	0.25
Purging Initiation Date/Time	06/13/2023 11:43
Total Purge Volume (gal)	3
Modified Sample	No
If Modified, Reasoning	
Sample Collection Information	Bottling-Start: 06/13/2023 12:30:00, Bottling-Stop: 06/13/2023 12:35:00, Parameters-Sampled: PFAS

Reading Time	Depth To Water (ft)	Cumulative Drawdown (ft)	Purge Rate (ml/min)	Temperature (deg c)	Specific Conductivity (us/cm)	Dissolved Oxygen (mg/l)	pH (su)	Oxidation-Reduction Potential (mV)	Turbidity (ntu)
11:45	4.41	0.04	200	NR	NR	NR	NR	NR	NR
12:00	4.41	0.04	200	NR	NR	NR	NR	NR	NR
12:10	4.41	0.04	200	11 +	808 +	<0.5	7.3	-104	<5
12:15	4.42	0.05	200	11 +	815 +	<0.5	7.3	-109	<5
12:20	4.42	0.05	200	11 +	820 +	<0.5	7.3	-113	<5
12:25	4.42	0.05	200	11 +	824 +	<0.5	7.2	-116	<5

Notes:

1) Abbreviations include: "deg c" indicates degrees Celsius; "ft" indicates feet; "ft bmp" indicates feet below reference measuring point; "gal" indicates gallons; "in" indicates inches; "mg/l" indicates milligrams per liter; "ml/min" indicates milliliters per minute; "mV" indicates millivolts; "NA" indicates not applicable; "NR" indicates not recorded; "ntu" indicates Nephelometric Turbidity units; "su" indicates standard units; "us/cm" indicates microsiemens per centimeter; and "+" indicates the parameter(s) may be used for stabilization calculations but cannot be used for other purposes.
2) Weather temperature units are in degrees Fahrenheit, unless otherwise noted.
3) Did indicator parameters reach stabilization? Yes
4) Was the two hour time limit reached? No
5) Calculations:
   - Head Above Pump Intake (ft): 41.23
   - Total Drawdown (ft): 0.05
   - Calculated Final Purge Volume (gal): NA
6) If Drawdown Did Not Stabilize or Stabilized Drawdown >0.3 ft, is Total Purge Volume > Calculated Final Purge Volume? NA

Well Sampling Worksheet
WWW RAP Field Data
PERIMETER 2023-Q2 - WV-MW-15D
Kent County, MI

Well	WV-MW-15D / 2 in Diameter PVC
Sample Quarter	2023-Q2
Date	06/13/2023
Weather	Sunny, 55
Sampler Initials	MKM
Purging Device	Bladder-Pump: NA, Peristaltic-Pump: PER-3, Centrifugal-Pump: NA
Meters Used	YSI: Agile Rental 1, Turbidimeter: Agile Rental 1, Water-Level-Meter: NA
Reference Measuring Point	PVC
Well Screen (ft bmp)	134.9 - 137.6
Expected Well Bottom Depth (ft bmp)	137.6
Measured Bottom Depth (ft bmp)	137.6
Sample Comment	Artesian well with low overflow rate. Connected peristaltic pump because flow from artesian aquifer could not overcome head in tubing. Pumped at a rate that maintained artesian water level at top of PVC.
Initial Water Level Date/Time	06/13/2023 10:10
Initial Water Level Depth (ft bmp)	Artesian
Pump/Tubing Intake Depth (ft bmp)	136.2
Tubing Length (ft)	139.2
Tubing Inner Diameter (in)	0.25
Purging Initiation Date/Time	06/13/2023 10:10
Total Purge Volume (gal)	6
Modified Sample	No
If Modified, Reasoning	
Sample Collection Information	Bottling-Start: 06/13/2023 11:40:00, Bottling-Stop: 06/13/2023 11:42:00, Parameters-Sampled: PFAS

Reading Time	Depth To Water (ft)	Cumulative Drawdown (ft)	Purge Rate (ml/min)	Temperature (deg c)	Specific Conductivity (us/cm)	Dissolved Oxygen (mg/l)	pH (su)	Oxidation-Reduction Potential (mV)	Turbidity (ntu)
10:15	0.00	0.00	400	NR	NR	NR	NR	NR	NR
10:40	0.00	0.00	400	10 +	891 +	<0.5	7.0	-77	17
10:45	0.00	0.00	400	10 +	892 +	<0.5	7.1	-85	18
10:50	0.00	0.00	400	10 +	891 +	<0.5	7.0	-92	16
10:55	0.00	0.00	400	10 +	891 +	<0.5	7.1	-95	13
11:00	0.00	0.00	400	10 +	891 +	<0.5	7.1	-98	14
11:05	0.00	0.00	400	11 +	891 +	<0.5	7.0	-100	12
11:10	0.00	0.00	400	10 +	891 +	<0.5	7.1	-102	13
11:15	0.00	0.00	400	10 +	891 +	<0.5	7.1	-103	11
11:20	0.00	0.00	400	11 +	890 +	<0.5	7.0	-104	8

Well Sampling Worksheet
WWW RAP Field Data
PERIMETER 2023-Q2 - WV-MW-15D
Kent County, MI

Well	WV-MW-15D / 2 in Diameter PVC
Sample Quarter	2023-Q2
Date	06/13/2023
Weather	Sunny, 55
Sampler Initials	MKM
Purging Device	Bladder-Pump: NA, Peristaltic-Pump: PER-3, Centrifugal-Pump: NA
Meters Used	YSI: Agile Rental 1, Turbidimeter: Agile Rental 1, Water-Level-Meter: NA
Reference Measuring Point	PVC
Well Screen (ft bmp)	134.9 - 137.6
Expected Well Bottom Depth (ft bmp)	137.6
Measured Bottom Depth (ft bmp)	137.6
Sample Comment	Artesian well with low overflow rate. Connected peristaltic pump because flow from artesian aquifer could not overcome head in tubing. Pumped at a rate that maintained artesian water level at top of PVC.
Initial Water Level Date/Time	06/13/2023 10:10
Initial Water Level Depth (ft bmp)	Artesian
Pump/Tubing Intake Depth (ft bmp)	136.2
Tubing Length (ft)	139.2
Tubing Inner Diameter (in)	0.25
Purging Initiation Date/Time	06/13/2023 10:10
Total Purge Volume (gal)	6
Modified Sample	No
If Modified, Reasoning	
Sample Collection Information	Bottling-Start: 06/13/2023 11:40:00, Bottling-Stop: 06/13/2023 11:42:00, Parameters-Sampled: PFAS

Reading Time	Depth To Water (ft)	Cumulative Drawdown (ft)	Purge Rate (ml/min)	Temperature (deg c)	Specific Conductivity (us/cm)	Dissolved Oxygen (mg/l)	pH (su)	Oxidation-Reduction Potential (mV)	Turbidity (ntu)
11:25	0.00	0.00	400	11 +	890 +	<0.5	7.1	-104	6
11:30	0.00	0.00	400	11 +	890 +	<0.5	7.0	-105	7
11:35	0.00	0.00	400	11 +	890 +	<0.5	7.1	-105	6

Notes:

1) Abbreviations include: "deg c" indicates degrees Celsius; "ft" indicates feet; "ft bmp" indicates feet below reference measuring point; "gal" indicates gallons; "in" indicates inches; "mg/l" indicates milligrams per liter; "ml/min" indicates milliliters per minute; "mV" indicates millivolts; "NA" indicates not applicable; "NR" indicates not recorded; "ntu" indicates Nephelometric Turbidity units; "su" indicates standard units; "us/cm" indicates microsiemens per centimeter; and "+" indicates the parameter(s) may be used for stabilization calculations but cannot be used for other purposes.
2) Weather temperature units are in degrees Fahrenheit, unless otherwise noted.
3) Did indicator parameters reach stabilization? Yes
4) Was the two hour time limit reached? No
5) Calculations:
   - Head Above Pump Intake (ft) 136.20
   - Total Drawdown (ft) 0.00
   - Calculated Final Purge Volume (gal) NA
6) If Drawdown Did Not Stabilize or Stabilized Drawdown >0.3 ft, is Total Purge Volume > Calculated Final Purge Volume? NA

Well Sampling Worksheet
WWW RAP Field Data
PERIMETER 2023-Q2 - WV-PMW-RI-101A
Kent County, MI

Well	WV-PMW-RI-101A / 2 in Diameter PVC
Sample Quarter	2023-Q2
Date	06/20/2023
Weather	Sunny 75F
Sampler Initials	RCP
Purging Device	Bladder-Pump: NA, Peristaltic-Pump: NA, Centrifugal-Pump: Mega Monsoon #2
Meters Used	YSI: Agile Rental 3, Turbidimeter: Agile Rental 3, Water-Level-Meter: WLM-2
Reference Measuring Point	PVC
Well Screen (ft bmp)	42.6 - 47.6
Expected Well Bottom Depth (ft bmp)	47.6
Measured Bottom Depth (ft bmp)	47.6
Sample Comment	YSI Connected at 11:25.
Initial Water Level Date/Time	06/20/2023 10:40
Initial Water Level Depth (ft bmp)	37.71
Pump/Tubing Intake Depth (ft bmp)	45.1
Tubing Length (ft)	47.5
Tubing Inner Diameter (in)	0.17
Purging Initiation Date/Time	06/20/2023 10:45
Total Purge Volume (gal)	2
Modified Sample	No
If Modified, Reasoning	
Sample Collection Information	Bottling-Start: 06/20/2023 11:50:00, Bottling-Stop: 06/20/2023 11:55:00, Parameters-Sampled: PFAS

Reading Time	Depth To Water (ft)	Cumulative Drawdown (ft)	Purge Rate (ml/min)	Temperature (deg c)	Specific Conductivity (us/cm)	Dissolved Oxygen (mg/l)	pH (su)	Oxidation-Reduction Potential (mV)	Turbidity (ntu)
10:50	37.76	0.05	100	NR	NR	NR	NR	NR	NR
11:00	37.78	0.07	180	NR	NR	NR	NR	NR	79
11:15	37.79	0.08	180	NR	NR	NR	NR	NR	13
11:25	37.79	0.08	180	13 +	832 +	8.3	7.1	250	7
11:35	37.79	0.08	180	13 +	830 +	8.2	7.1	250	<5
11:40	37.79	0.08	180	13 +	831 +	8.3	7.1	250	<5
11:45	37.79	0.08	180	13 +	828 +	8.3	7.1	251	<5

Notes:

1) Abbreviations include: "deg c" indicates degrees Celsius; "ft" indicates feet; "ft bmp" indicates feet below reference measuring point; "gal" indicates gallons; "in" indicates inches; "mg/l" indicates milligrams per liter; "ml/min" indicates milliliters per minute; "mV" indicates millivolts; "NA" indicates not applicable; "NR" indicates not recorded; "ntu" indicates Nephelometric Turbidity units; "su" indicates standard units; "us/cm" indicates microsiemens per centimeter; and "+" indicates the parameter(s) may be used for stabilization calculations but cannot be used for other purposes.
2) Weather temperature units are in degrees Fahrenheit, unless otherwise noted.
3) Did indicator parameters reach stabilization? Yes
4) Was the two hour time limit reached? No
5) Calculations:
   - Head Above Pump Intake (ft) 7.39
   - Total Drawdown (ft) 0.08
   - Calculated Final Purge Volume (gal) NA
6) If Drawdown Did Not Stabilize or Stabilized Drawdown >0.3 ft, is Total Purge Volume > Calculated Final Purge Volume? NA

Well Sampling Worksheet
WWW RAP Field Data
PERIMETER 2023-Q2 - WV-PMW-RI-101B
Kent County, MI

Well	WV-PMW-RI-101B / 2 in Diameter PVC
Sample Quarter	2023-Q2
Date	06/20/2023
Weather	65 and Sunny
Sampler Initials	WVK
Purging Device	Bladder-Pump: BP-11, Peristaltic-Pump: NA, Centrifugal-Pump: NA
Meters Used	YSI: Agile Rental 1, Turbidimeter: Agile Rental 1, Water-Level-Meter: WLM-4
Reference Measuring Point	PVC
Well Screen (ft bmp)	281.5 - 286.5
Expected Well Bottom Depth (ft bmp)	286.5
Measured Bottom Depth (ft bmp)	NR
Sample Comment	10:40 - Water to surface. Purge water observed to be very clear. 10:50 - Purge water observed to be suddenly turbid and chalky. 11:40 - YSI Connected. Last 3 readings are not 5 minutes apart per the Standard Operating Procedure (SOP). GZA does not believe this impacts data quality.
Initial Water Level Date/Time	06/20/2023 10:30
Initial Water Level Depth (ft bmp)	126.83
Pump/Tubing Intake Depth (ft bmp)	284
Tubing Length (ft)	287
Tubing Inner Diameter (in)	0.25
Purging Initiation Date/Time	06/20/2023 10:40
Total Purge Volume (gal)	3.5
Modified Sample	No
If Modified, Reasoning	
Sample Collection Information	Bottling-Start: 06/20/2023 12:45:00, Bottling-Stop: 06/20/2023 12:50:00, Parameters-Sampled: PFAS

Reading Time	Depth To Water (ft)	Cumulative Drawdown (ft)	Purge Rate (ml/min)	Temperature (deg c)	Specific Conductivity (us/cm)	Dissolved Oxygen (mg/l)	pH (su)	Oxidation-Reduction Potential (mV)	Turbidity (ntu)
10:40	126.51	-0.32	100	NR	NR	NR	NR	NR	NR
10:50	126.41	-0.42	100	NR	NR	NR	NR	NR	>999
11:00	126.29	-0.54	100	NR	NR	NR	NR	NR	997
11:10	126.15	-0.68	100	NR	NR	NR	NR	NR	625
11:25	126.01	-0.82	100	NR	NR	NR	NR	NR	560
11:40	126.01	-0.82	100	NR	NR	NR	NR	NR	376
11:50	125.93	-0.90	100	14 +	522 +	<0.5	7.3	-77	332
12:00	125.87	-0.96	100	14 +	515 +	0.5	7.3	-87	263
12:10	125.75	-1.08	100	14 +	520 +	0.8	7.3	-88	250

Well Sampling Worksheet
WWW RAP Field Data
PERIMETER 2023-Q2 - WV-PMW-RI-101B
Kent County, MI

Well	WV-PMW-RI-101B / 2 in Diameter PVC
Sample Quarter	2023-Q2
Date	06/20/2023
Weather	65 and Sunny
Sampler Initials	WVK
Purging Device	Bladder-Pump: BP-11, Peristaltic-Pump: NA, Centrifugal-Pump: NA
Meters Used	YSI: Agile Rental 1, Turbidimeter: Agile Rental 1, Water-Level-Meter: WLM-4
Reference Measuring Point	PVC
Well Screen (ft bmp)	281.5 - 286.5
Expected Well Bottom Depth (ft bmp)	286.5
Measured Bottom Depth (ft bmp)	NR
Sample Comment	10:40 - Water to surface. Purge water observed to be very clear. 10:50 - Purge water observed to be suddenly turbid and chalky. 11:40 - YSI Connected. Last 3 readings are not 5 minutes apart per the Standard Operating Procedure (SOP). GZA does not believe this impacts data quality.
Initial Water Level Date/Time	06/20/2023 10:30
Initial Water Level Depth (ft bmp)	126.83
Pump/Tubing Intake Depth (ft bmp)	284
Tubing Length (ft)	287
Tubing Inner Diameter (in)	0.25
Purging Initiation Date/Time	06/20/2023 10:40
Total Purge Volume (gal)	3.5
Modified Sample	No
If Modified, Reasoning	
Sample Collection Information	Bottling-Start: 06/20/2023 12:45:00, Bottling-Stop: 06/20/2023 12:50:00, Parameters-Sampled: PFAS

Reading Time	Depth To Water (ft)	Cumulative Drawdown (ft)	Purge Rate (ml/min)	Temperature (deg c)	Specific Conductivity (us/cm)	Dissolved Oxygen (mg/l)	pH (su)	Oxidation-Reduction Potential (mV)	Turbidity (ntu)
12:20	125.71	-1.12	100	14 +	518 +	0.6	7.3	-80	132
12:30	125.71	-1.12	100	14 +	519 +	0.7	7.3	-81	155
12:40	125.71	-1.12	100	14 +	518 +	<0.5	7.3	-82	148

Notes:

1) Abbreviations include: "deg c" indicates degrees Celsius; "ft" indicates feet; "ft bmp" indicates feet below reference measuring point; "gal" indicates gallons; "in" indicates inches; "mg/l" indicates milligrams per liter; "ml/min" indicates milliliters per minute; "mV" indicates millivolts; "NA" indicates not applicable; "NR" indicates not recorded; "ntu" indicates Nephelometric Turbidity units; "su" indicates standard units; "us/cm" indicates microsiemens per centimeter; and "+" indicates the parameter(s) may be used for stabilization calculations but cannot be used for other purposes.
2) Weather temperature units are in degrees Fahrenheit, unless otherwise noted.
3) Did indicator parameters reach stabilization? No
4) Was the two hour time limit reached? Yes
5) Calculations:
   - Head Above Pump Intake (ft) 157.17
   - Total Drawdown (ft) -1.12
   - Calculated Final Purge Volume (gal) 0.93
6) If Drawdown Did Not Stabilize or Stabilized Drawdown >0.3 ft, is Total Purge Volume > Calculated Final Purge Volume? Yes

Well Sampling Worksheet
WWW RAP Field Data
PERIMETER 2023-Q2 - WV-PMW-RI-102
Kent County, MI

Well	WV-PMW-RI-102 / 2 in Diameter PVC
Sample Quarter	2023-Q2
Date	06/20/2023
Weather	Sunny 60
Sampler Initials	NCK
Purging Device	Bladder-Pump: NA, Peristaltic-Pump: NA, Centrifugal-Pump: Mega Monsoon #1
Meters Used	YSI: Agile Rental 2, Turbidimeter: Agile Rental 2, Water-Level-Meter: WLM-2
Reference Measuring Point	PVC
Well Screen (ft bmp)	47.2 - 52.2
Expected Well Bottom Depth (ft bmp)	52.2
Measured Bottom Depth (ft bmp)	52.25
Sample Comment	10:10 - Purge water observed to be turbid. 10:45 - YSI Connected.
Initial Water Level Date/Time	06/20/2023 10:00
Initial Water Level Depth (ft bmp)	45.18
Pump/Tubing Intake Depth (ft bmp)	49.8
Tubing Length (ft)	52
Tubing Inner Diameter (in)	0.17
Purging Initiation Date/Time	06/20/2023 10:05
Total Purge Volume (gal)	8
Modified Sample	No
If Modified, Reasoning	
Sample Collection Information	Bottling-Start: 06/20/2023 11:10:00, Bottling-Stop: 06/20/2023 11:15:00, Parameters-Sampled: PFAS

Reading Time	Depth To Water (ft)	Cumulative Drawdown (ft)	Purge Rate (ml/min)	Temperature (deg c)	Specific Conductivity (us/cm)	Dissolved Oxygen (mg/l)	pH (su)	Oxidation-Reduction Potential (mV)	Turbidity (ntu)
10:10	45.20	0.02	500	NR	NR	NR	NR	NR	NR
10:15	45.21	0.03	500	NR	NR	NR	NR	NR	NR
10:30	45.21	0.03	500	NR	NR	NR	NR	NR	NR
10:45	45.21	0.03	500	NR	NR	NR	NR	NR	NR
11:00	45.21	0.03	500	12 +	621 +	9.8	7.4	237	<5
11:05	45.21	0.03	500	12 +	621 +	9.8	7.4	236	<5
11:10	45.21	0.03	500	12 +	621 +	9.8	7.4	236	<5

Notes:

1) Abbreviations include: "deg c" indicates degrees Celsius; "ft" indicates feet; "ft bmp" indicates feet below reference measuring point; "gal" indicates gallons; "in" indicates inches; "mg/l" indicates milligrams per liter; "ml/min" indicates milliliters per minute; "mV" indicates millivolts; "NA" indicates not applicable; "NR" indicates not recorded; "ntu" indicates Nephelometric Turbidity units; "su" indicates standard units; "us/cm" indicates microsiemens per centimeter; and "+" indicates the parameter(s) may be used for stabilization calculations but cannot be used for other purposes.
2) Weather temperature units are in degrees Fahrenheit, unless otherwise noted.
3) Did indicator parameters reach stabilization? Yes
4) Was the two hour time limit reached? No
5) Calculations:
   - Head Above Pump Intake (ft) 4.62
   - Total Drawdown (ft) 0.03
   - Calculated Final Purge Volume (gal) NA
6) If Drawdown Did Not Stabilize or Stabilized Drawdown >0.3 ft, is Total Purge Volume > Calculated Final Purge Volume? NA

Well Sampling Worksheet
WWW RAP Field Data
PERIMETER 2023-Q2 - WV-PMW-RI-104A
Kent County, MI

Well	WV-PMW-RI-104A / 2 in Diameter PVC
Sample Quarter	2023-Q2
Date	06/19/2023
Weather	Sunny and 80
Sampler Initials	WVK
Purging Device	Bladder-Pump: NA, Peristaltic-Pump: PER-1, Centrifugal-Pump: NA
Meters Used	YSI: Agile Rental 1, Turbidimeter: Agile Rental 1, Water-Level-Meter: WLM-2
Reference Measuring Point	PVC
Well Screen (ft bmp)	25.6 - 30.6
Expected Well Bottom Depth (ft bmp)	30.6
Measured Bottom Depth (ft bmp)	30.63
Sample Comment	15:15 - Purge water observed bo be very clear. 15:35 - YSI Connected. Dissolved oxygen (DO) readings were observed to be fluctuating dramatically when meter was used at the previous well. DO and Oxidation-
Initial Water Level Date/Time	06/19/2023 15:10
Initial Water Level Depth (ft bmp)	20.66
Pump/Tubing Intake Depth (ft bmp)	28.1
Tubing Length (ft)	30
Tubing Inner Diameter (in)	0.17
Purging Initiation Date/Time	06/19/2023 15:10
Total Purge Volume (gal)	3
Modified Sample	No
If Modified, Reasoning	
Sample Collection Information	Bottling-Start: 06/19/2023 17:15:00, Bottling-Stop: 06/19/2023 17:20:00, Parameters-Sampled: PFAS

Reading Time	Depth To Water (ft)	Cumulative Drawdown (ft)	Purge Rate (ml/min)	Temperature (deg c)	Specific Conductivity (us/cm)	Dissolved Oxygen (mg/l)	pH (su)	Oxidation-Reduction Potential (mV)	Turbidity (ntu)
15:15	20.67	0.01	100	NR	NR	NR	NR	NR	NR
15:25	20.67	0.01	100	NR	NR	NR	NR	NR	<5
15:35	20.67	0.01	100	NR	NR	NR	NR	NR	<5
15:45	20.67	0.01	100	12.9 +	622 +	7.12 +	7.5	146.3 +	<5
15:55	20.67	0.01	100	12.6 +	621 +	6.16 +	7.8	166.2 +	<5
16:05	20.67	0.01	100	12.5 +	624 +	6.17 +	7.7	177 +	<5
16:15	20.67	0.01	100	12.6 +	620 +	5.9 +	7.8	187 +	<5
16:25	20.67	0.01	100	12.5 +	619 +	5.9 +	7.5	190.6 +	<5
16:35	20.67	0.01	100	12.6 +	619 +	5.4 +	7.9	194.8 +	<5
16:45	20.67	0.01	100	12 +	618 +	6.2 +	7.8	197.7 +	<5
16:55	20.67	0.01	100	12.2 +	616 +	5.7 +	7.6	200.8 +	<5
17:00	20.67	0.01	100	12.1 +	617 +	6.9 +	7.8	202 +	<5
17:05	20.67	0.01	100	11.8 +	618 +	5.98 +	7.7	205 +	<5
17:10	20.67	0.01	100	11.5 +	618 +	7.7 +	7.5	207 +	<5

Notes:

1) Abbreviations include: "deg c" indicates degrees Celsius; "ft" indicates feet; "ft bmp" indicates feet below reference measuring point; "gal" indicates gallons; "in" indicates inches; "mg/l" indicates milligrams per liter; "ml/min" indicates milliliters per minute; "mV" indicates millivolts; "NA" indicates not applicable; "NR" indicates not recorded; "ntu" indicates Nephelometric Turbidity units; "su" indicates standard units; "us/cm" indicates microsiemens per centimeter; and "+" indicates the parameter(s) may be used for stabilization calculations but cannot be used for other purposes.
2) Weather temperature units are in degrees Fahrenheit, unless otherwise noted.
3) Did indicator parameters reach stabilization? No
4) Was the two hour time limit reached? Yes
5) Calculations:
   - Head Above Pump Intake (ft) 7.44
   - Total Drawdown (ft) 0.01
   - Calculated Final Purge Volume (gal) NA
6) If Drawdown Did Not Stabilize or Stabilized Drawdown >0.3 ft, is Total Purge Volume > Calculated Final Purge Volume? NA

Well Sampling Worksheet
WWW RAP Field Data
PERIMETER 2023-Q2 - WV-PMW-RI-104B
Kent County, MI

Well	WV-PMW-RI-104B / 2 in Diameter PVC
Sample Quarter	2023-Q2
Date	06/19/2023
Weather	Sunny 80
Sampler Initials	NCK
Purging Device	Bladder-Pump: NA, Peristaltic-Pump: PER-3, Centrifugal-Pump: NA
Meters Used	YSI: Agile Rental 3, Turbidimeter: Agile Rental 3, Water-Level-Meter: WLM-2
Reference Measuring Point	PVC
Well Screen (ft bmp)	130.0 - 135.0
Expected Well Bottom Depth (ft bmp)	135
Measured Bottom Depth (ft bmp)	NR
Sample Comment	15:30 - Purge water observed to be very turbid. 16:45 - YSI Connected.
Initial Water Level Date/Time	06/19/2023 15:20
Initial Water Level Depth (ft bmp)	16.72
Pump/Tubing Intake Depth (ft bmp)	132.5
Tubing Length (ft)	135
Tubing Inner Diameter (in)	0.17
Purging Initiation Date/Time	06/19/2023 15:20
Total Purge Volume (gal)	8
Modified Sample	No
If Modified, Reasoning	
Sample Collection Information	Bottling-Start: 06/19/2023 17:20:00, Bottling-Stop: 06/19/2023 17:24:00, Parameters-Sampled: PFAS

Reading Time	Depth To Water (ft)	Cumulative Drawdown (ft)	Purge Rate (ml/min)	Temperature (deg c)	Specific Conductivity (us/cm)	Dissolved Oxygen (mg/l)	pH (su)	Oxidation-Reduction Potential (mV)	Turbidity (ntu)
15:30	16.85	0.13	300	NR	NR	NR	NR	NR	NR
15:45	16.89	0.17	290	NR	NR	NR	NR	NR	NR
16:00	16.89	0.17	290	NR	NR	NR	NR	NR	>999
16:15	16.89	0.17	290	NR	NR	NR	NR	NR	812
16:30	16.89	0.17	290	NR	NR	NR	NR	NR	552
16:45	16.89	0.17	290	12 +	768 +	<0.5	7.9	-123	490
17:00	16.89	0.17	290	11 +	762 +	<0.5	7.8	-155	444
17:05	16.89	0.17	290	11 +	762 +	<0.5	7.8	-158	383

Well Sampling Worksheet
WWW RAP Field Data
PERIMETER 2023-Q2 - WV-PMW-RI-104B
Kent County, MI

Well	WV-PMW-RI-104B / 2 in Diameter PVC
Sample Quarter	2023-Q2
Date	06/19/2023
Weather	Sunny 80
Sampler Initials	NCK
Purging Device	Bladder-Pump: NA, Peristaltic-Pump: PER-3, Centrifugal-Pump: NA
Meters Used	YSI: Agile Rental 3, Turbidimeter: Agile Rental 3, Water-Level-Meter: WLM-2
Reference Measuring Point	PVC
Well Screen (ft bmp)	130.0 - 135.0
Expected Well Bottom Depth (ft bmp)	135
Measured Bottom Depth (ft bmp)	NR
Sample Comment	15:30 - Purge water observed to be very turbid. 16:45 - YSI Connected.
Initial Water Level Date/Time	06/19/2023 15:20
Initial Water Level Depth (ft bmp)	16.72
Pump/Tubing Intake Depth (ft bmp)	132.5
Tubing Length (ft)	135
Tubing Inner Diameter (in)	0.17
Purging Initiation Date/Time	06/19/2023 15:20
Total Purge Volume (gal)	8
Modified Sample	No
If Modified, Reasoning	
Sample Collection Information	Bottling-Start: 06/19/2023 17:20:00, Bottling-Stop: 06/19/2023 17:24:00, Parameters-Sampled: PFAS

Reading Time	Depth To Water (ft)	Cumulative Drawdown (ft)	Purge Rate (ml/min)	Temperature (deg c)	Specific Conductivity (us/cm)	Dissolved Oxygen (mg/l)	pH (su)	Oxidation-Reduction Potential (mV)	Turbidity (ntu)
17:10	16.89	0.17	290	11 +	761 +	<0.5	7.8	-161	388
17:15	16.89	0.17	290	11 +	764 +	<0.5	7.8	-163	348
17:20	16.89	0.17	290	11 +	763 +	<0.5	7.8	-164	364

Notes:

1) Abbreviations include: "deg c" indicates degrees Celsius; "ft" indicates feet; "ft bmp" indicates feet below reference measuring point; "gal" indicates gallons; "in" indicates inches; "mg/l" indicates milligrams per liter; "ml/min" indicates milliliters per minute; "mV" indicates millivolts; "NA" indicates not applicable; "NR" indicates not recorded; "ntu" indicates Nephelometric Turbidity units; "su" indicates standard units; "us/cm" indicates microsiemens per centimeter; and "+" indicates the parameter(s) may be used for stabilization calculations but cannot be used for other purposes.
2) Weather temperature units are in degrees Fahrenheit, unless otherwise noted.
3) Did indicator parameters reach stabilization? No
4) Was the two hour time limit reached? Yes
5) Calculations:
   - Head Above Pump Intake (ft) 115.78
   - Total Drawdown (ft) 0.17
   - Calculated Final Purge Volume (gal) NA
6) If Drawdown Did Not Stabilize or Stabilized Drawdown >0.3 ft, is Total Purge Volume > Calculated Final Purge Volume? NA

Well Sampling Worksheet
WWW RAP Field Data
PERIMETER 2023-Q2 - WV-PMW-RI-105A
Kent County, MI

Well	WV-PMW-RI-105A / 2 in Diameter PVC
Sample Quarter	2023-Q2
Date	06/15/2023
Weather	58F Cloudy
Sampler Initials	JET
Purging Device	Bladder-Pump: NA, Peristaltic-Pump: PER-3, Centrifugal-Pump: NA
Meters Used	YSI: Agile Rental 3, Turbidimeter: Agile Rental 3, Water-Level-Meter: WLM-1
Reference Measuring Point	PVC
Well Screen (ft bmp)	34.5 - 39.5
Expected Well Bottom Depth (ft bmp)	39.5
Measured Bottom Depth (ft bmp)	NR
Sample Comment	Depth to water was monitored for 60 minutes. No drawdown observed. YSI Connected at 11:05.
Initial Water Level Date/Time	06/15/2023 10:55
Initial Water Level Depth (ft bmp)	21.15
Pump/Tubing Intake Depth (ft bmp)	37.5
Tubing Length (ft)	40
Tubing Inner Diameter (in)	0.17
Purging Initiation Date/Time	06/15/2023 10:55
Total Purge Volume (gal)	4
Modified Sample	No
If Modified, Reasoning	
Sample Collection Information	Bottling-Start: 06/15/2023 11:30:00, Bottling-Stop: 06/15/2023 11:35:00, Parameters-Sampled: PFAS

Reading Time	Depth To Water (ft)	Cumulative Drawdown (ft)	Purge Rate (ml/min)	Temperature (deg c)	Specific Conductivity (us/cm)	Dissolved Oxygen (mg/l)	pH (su)	Oxidation-Reduction Potential (mV)	Turbidity (ntu)
11:05	21.15	0.00	325	NR	NR	NR	NR	NR	<5
11:15	21.15	0.00	325	11 +	530 +	4.6	7.4	187	<5
11:20	21.15	0.00	325	11 +	530 +	4.6	7.4	184	<5
11:25	21.15	0.00	325	11 +	530 +	4.5	7.4	185	<5

Notes:

1) Abbreviations include: "deg c" indicates degrees Celsius; "ft" indicates feet; "ft bmp" indicates feet below reference measuring point; "gal" indicates gallons; "in" indicates inches; "mg/l" indicates milligrams per liter; "ml/min" indicates milliliters per minute; "mV" indicates millivolts; "NA" indicates not applicable; "NR" indicates not recorded; "ntu" indicates Nephelometric Turbidity units; "su" indicates standard units; "us/cm" indicates microsiemens per centimeter; and "+" indicates the parameter(s) may be used for stabilization calculations but cannot be used for other purposes.
2) Weather temperature units are in degrees Fahrenheit, unless otherwise noted.
3) Did indicator parameters reach stabilization? Yes
4) Was the two hour time limit reached? No
5) Calculations:
   - Head Above Pump Intake (ft) 16.35
   - Total Drawdown (ft) 0.00
   - Calculated Final Purge Volume (gal) NA
6) If Drawdown Did Not Stabilize or Stabilized Drawdown >0.3 ft, is Total Purge Volume > Calculated Final Purge Volume? NA

Well Sampling Worksheet
WWW RAP Field Data
PERIMETER 2023-Q2 - WV-PMW-RI-105B
Kent County, MI

Well	WV-PMW-RI-105B / 2 in Diameter PVC
Sample Quarter	2023-Q2
Date	06/15/2023
Weather	58F Cloudy
Sampler Initials	RCP
Purging Device	Bladder-Pump: NA, Peristaltic-Pump: PER-01, Centrifugal-Pump: NA
Meters Used	YSI: Agile Rental 2, Turbidimeter: Agile Rental 2, Water-Level-Meter: WLM-3
Reference Measuring Point	PVC
Well Screen (ft bmp)	79.1 - 84.1
Expected Well Bottom Depth (ft bmp)	84.1
Measured Bottom Depth (ft bmp)	84.2
Sample Comment	10:55 - Pump speed increased. 12:15 - YSI Connected.
Initial Water Level Date/Time	06/15/2023 10:35
Initial Water Level Depth (ft bmp)	18.11
Pump/Tubing Intake Depth (ft bmp)	81.7
Tubing Length (ft)	85
Tubing Inner Diameter (in)	0.25
Purging Initiation Date/Time	06/15/2023 10:40
Total Purge Volume (gal)	1.5
Modified Sample	No
If Modified, Reasoning	
Sample Collection Information	Bottling-Start: 06/15/2023 12:45:00, Bottling-Stop: 06/15/2023 12:50:00, Parameters-Sampled: PFAS

Reading Time	Depth To Water (ft)	Cumulative Drawdown (ft)	Purge Rate (ml/min)	Temperature (deg c)	Specific Conductivity (us/cm)	Dissolved Oxygen (mg/l)	pH (su)	Oxidation-Reduction Potential (mV)	Turbidity (ntu)
10:50	18.12	0.01	140	NR	NR	NR	NR	NR	NR
10:55	18.12	0.01	140	NR	NR	NR	NR	NR	NR
11:00	18.12	0.01	180	NR	NR	NR	NR	NR	NR
11:05	18.12	0.01	180	NR	NR	NR	NR	NR	197
11:10	18.12	0.01	180	NR	NR	NR	NR	NR	136
11:15	18.12	0.01	180	NR	NR	NR	NR	NR	117
11:20	18.12	0.01	180	NR	NR	NR	NR	NR	80
11:25	18.12	0.01	180	NR	NR	NR	NR	NR	59
11:30	18.12	0.01	180	NR	NR	NR	NR	NR	49
11:35	18.12	0.01	180	NR	NR	NR	NR	NR	45
11:45	18.12	0.01	180	NR	NR	NR	NR	NR	27
11:55	18.12	0.01	180	NR	NR	NR	NR	NR	22
12:00	18.12	0.01	180	NR	NR	NR	NR	NR	19
12:10	18.12	0.01	180	NR	NR	NR	NR	NR	12
12:15	18.12	0.01	180	12 +	547 +	<0.5	7.6	-88	15
12:20	18.12	0.01	180	12 +	552 +	<0.5	7.6	-144	10
12:25	18.12	0.01	180	12 +	550 +	<0.5	7.7	-156	7

Well Sampling Worksheet
WWW RAP Field Data
PERIMETER 2023-Q2 - WV-PMW-RI-105B
Kent County, MI

Well	WV-PMW-RI-105B / 2 in Diameter PVC
Sample Quarter	2023-Q2
Date	06/15/2023
Weather	58F Cloudy
Sampler Initials	RCP
Purging Device	Bladder-Pump: NA, Peristaltic-Pump: PER-01, Centrifugal-Pump: NA
Meters Used	YSI: Agile Rental 2, Turbidimeter: Agile Rental 2, Water-Level-Meter: WLM-3
Reference Measuring Point	PVC
Well Screen (ft bmp)	79.1 - 84.1
Expected Well Bottom Depth (ft bmp)	84.1
Measured Bottom Depth (ft bmp)	84.2
Sample Comment	10:55 - Pump speed increased. 12:15 - YSI Connected.
Initial Water Level Date/Time	06/15/2023 10:35
Initial Water Level Depth (ft bmp)	18.11
Pump/Tubing Intake Depth (ft bmp)	81.7
Tubing Length (ft)	85
Tubing Inner Diameter (in)	0.25
Purging Initiation Date/Time	06/15/2023 10:40
Total Purge Volume (gal)	1.5
Modified Sample	No
If Modified, Reasoning	
Sample Collection Information	Bottling-Start: 06/15/2023 12:45:00, Bottling-Stop: 06/15/2023 12:50:00, Parameters-Sampled: PFAS

Reading Time	Depth To Water (ft)	Cumulative Drawdown (ft)	Purge Rate (ml/min)	Temperature (deg c)	Specific Conductivity (us/cm)	Dissolved Oxygen (mg/l)	pH (su)	Oxidation-Reduction Potential (mV)	Turbidity (ntu)
12:30	18.12	0.01	180	12 +	547 +	<0.5	7.7	-162	10
12:35	18.12	0.01	180	12 +	549 +	<0.5	7.7	-166	8
12:40	18.12	0.01	180	12 +	548 +	<0.5	7.7	-170	8

Notes:

1) Abbreviations include: "deg c" indicates degrees Celsius; "ft" indicates feet; "ft bmp" indicates feet below reference measuring point; "gal" indicates gallons; "in" indicates inches; "mg/l" indicates milligrams per liter; "ml/min" indicates milliliters per minute; "mV" indicates millivolts; "NA" indicates not applicable; "NR" indicates not recorded; "ntu" indicates Nephelometric Turbidity units; "su" indicates standard units; "us/cm" indicates microsiemens per centimeter; and "+" indicates the parameter(s) may be used for stabilization calculations but cannot be used for other purposes.
2) Weather temperature units are in degrees Fahrenheit, unless otherwise noted.
3) Did indicator parameters reach stabilization? No
4) Was the two hour time limit reached? Yes
5) Calculations:
   - Head Above Pump Intake (ft) 63.59
   - Total Drawdown (ft) 0.01
   - Calculated Final Purge Volume (gal) NA
6) If Drawdown Did Not Stabilize or Stabilized Drawdown >0.3 ft, is Total Purge Volume > Calculated Final Purge Volume? NA

Well Sampling Worksheet
WWW RAP Field Data
PERIMETER 2023-Q2 - WV-PMW-RI-106A
Kent County, MI

Well	WV-PMW-RI-106A / 2 in Diameter PVC
Sample Quarter	2023-Q2
Date	06/12/2023
Weather	Mostly Cloudy
Sampler Initials	AW
Purging Device	Bladder-Pump: NA, Peristaltic-Pump: PER-2, Centrifugal-Pump: NA
Meters Used	YSI: Agile Rental 2, Turbidimeter: Agile Rental 2, Water-Level-Meter: GeoTech Rental
Reference Measuring Point	PVC
Well Screen (ft bmp)	18.5 - 23.5
Expected Well Bottom Depth (ft bmp)	23.5
Measured Bottom Depth (ft bmp)	NR
Sample Comment	14:50-14:55 - YSI not connected. 15:00 - YSI connected.
Initial Water Level Date/Time	06/12/2023 14:40
Initial Water Level Depth (ft bmp)	8.55
Pump/Tubing Intake Depth (ft bmp)	21
Tubing Length (ft)	24
Tubing Inner Diameter (in)	0.17
Purging Initiation Date/Time	06/12/2023 14:40
Total Purge Volume (gal)	2
Modified Sample	No
If Modified, Reasoning	
Sample Collection Information	Bottling-Start: 06/12/2023 15:35:00, Bottling-Stop: 06/12/2023 15:40:00, Parameters-Sampled: PFAS

Reading Time	Depth To Water (ft)	Cumulative Drawdown (ft)	Purge Rate (ml/min)	Temperature (deg c)	Specific Conductivity (us/cm)	Dissolved Oxygen (mg/l)	pH (su)	Oxidation-Reduction Potential (mV)	Turbidity (ntu)
14:50	8.64	0.09	150	NR	NR	NR	NR	NR	NR
14:55	8.63	0.08	150	NR	NR	NR	NR	NR	NR
15:00	8.63	0.08	150	10 +	350 +	1.3	7.7	200	7
15:05	8.63	0.08	150	10 +	349 +	1.2	7.8	200	7
15:10	8.63	0.08	150	10 +	355 +	1.1	7.8	200	6
15:15	8.63	0.08	150	10 +	361 +	1.1	7.8	199	6
15:20	8.63	0.08	150	10 +	364 +	1.0	7.8	200	<5
15:25	8.63	0.08	150	10 +	367 +	1.0	7.9	200	<5
15:30	8.63	0.08	150	10 +	367 +	1.0	7.9	199	<5

Notes:

1) Abbreviations include: "deg c" indicates degrees Celsius; "ft" indicates feet; "ft bmp" indicates feet below reference measuring point; "gal" indicates gallons; "in" indicates inches; "mg/l" indicates milligrams per liter; "ml/min" indicates milliliters per minute; "mV" indicates millivolts; "NA" indicates not applicable; "NR" indicates not recorded; "ntu" indicates Nephelometric Turbidity units; "su" indicates standard units; "us/cm" indicates microsiemens per centimeter; and "+" indicates the parameter(s) may be used for stabilization calculations but cannot be used for other purposes.
2) Weather temperature units are in degrees Fahrenheit, unless otherwise noted.
3) Did indicator parameters reach stabilization? Yes
4) Was the two hour time limit reached? No
5) Calculations:
   - Head Above Pump Intake (ft) 12.45
   - Total Drawdown (ft) 0.08
   - Calculated Final Purge Volume (gal) NA
6) If Drawdown Did Not Stabilize or Stabilized Drawdown >0.3 ft, is Total Purge Volume > Calculated Final Purge Volume? NA

Well Sampling Worksheet
WWW RAP Field Data
PERIMETER 2023-Q2 - WV-PMW-RI-106B
Kent County, MI

Well	WV-PMW-RI-106B / 2 in Diameter PVC
Sample Quarter	2023-Q2
Date	06/12/2023
Weather	Cloudy 60F
Sampler Initials	RCP
Purging Device	Bladder-Pump: NA, Peristaltic-Pump: PER-1, Centrifugal-Pump: NA
Meters Used	YSI: Agile Rental 3, Turbidimeter: Agile Rental 3, Water-Level-Meter: WLM-2
Reference Measuring Point	PVC
Well Screen (ft bmp)	34.0 - 39.0
Expected Well Bottom Depth (ft bmp)	39
Measured Bottom Depth (ft bmp)	39
Sample Comment	YSI Connected at 16:20.
Initial Water Level Date/Time	06/12/2023 15:57
Initial Water Level Depth (ft bmp)	8.12
Pump/Tubing Intake Depth (ft bmp)	36.5
Tubing Length (ft)	36.5
Tubing Inner Diameter (in)	0.17
Purging Initiation Date/Time	06/12/2023 15:57
Total Purge Volume (gal)	3
Modified Sample	No
If Modified, Reasoning	
Sample Collection Information	Bottling-Start: 06/12/2023 16:50:00, Bottling-Stop: 06/12/2023 16:55:00, Parameters-Sampled: PFAS

Reading Time	Depth To Water (ft)	Cumulative Drawdown (ft)	Purge Rate (ml/min)	Temperature (deg c)	Specific Conductivity (us/cm)	Dissolved Oxygen (mg/l)	pH (su)	Oxidation-Reduction Potential (mV)	Turbidity (ntu)
16:05	8.12	0.00	120	NR	NR	NR	NR	NR	NR
16:15	8.13	0.01	180	NR	NR	NR	NR	NR	<5
16:20	8.13	0.01	180	10 +	699 +	51.7	8.0	179	<5
16:25	8.13	0.01	180	10 +	576 +	49.0	8.0	201	<5
16:30	8.13	0.01	180	10 +	490 +	50.0	8.0	211	<5
16:35	8.13	0.01	180	10 +	484 +	51.1	8.0	220	<5
16:40	8.13	0.01	180	10 +	484 +	50.4	8.0	225	<5
16:45	8.13	0.01	180	10 +	484 +	50.6	8.0	229	<5

Notes:

1) Abbreviations include: "deg c" indicates degrees Celsius; "ft" indicates feet; "ft bmp" indicates feet below reference measuring point; "gal" indicates gallons; "in" indicates inches; "mg/l" indicates milligrams per liter; "ml/min" indicates milliliters per minute; "mV" indicates millivolts; "NA" indicates not applicable; "NR" indicates not recorded; "ntu" indicates Nephelometric Turbidity units; "su" indicates standard units; "us/cm" indicates microsiemens per centimeter; and "+" indicates the parameter(s) may be used for stabilization calculations but cannot be used for other purposes.
2) Weather temperature units are in degrees Fahrenheit, unless otherwise noted.
3) Did indicator parameters reach stabilization? Yes
4) Was the two hour time limit reached? No
5) Calculations:
   - Head Above Pump Intake (ft) 28.38
   - Total Drawdown (ft) 0.01
   - Calculated Final Purge Volume (gal) NA
6) If Drawdown Did Not Stabilize or Stabilized Drawdown >0.3 ft, is Total Purge Volume > Calculated Final Purge Volume? NA

Well Sampling Worksheet
WWW RAP Field Data
PERIMETER 2023-Q2 - WV-PMW-RI-106C
Kent County, MI

Well	WV-PMW-RI-106C / 2 in Diameter PVC
Sample Quarter	2023-Q2
Date	06/12/2023
Weather	Cloudy 60F
Sampler Initials	RCP
Purging Device	Bladder-Pump: NA, Peristaltic-Pump: PER-1, Centrifugal-Pump: NA
Meters Used	YSI: Agile Rental 3, Turbidimeter: Agile Rental 3, Water-Level-Meter: WLM-2
Reference Measuring Point	PVC
Well Screen (ft bmp)	53.9 - 58.9
Expected Well Bottom Depth (ft bmp)	58.9
Measured Bottom Depth (ft bmp)	58.9
Sample Comment	15:05 - Depth to Water = 8.40 ft bmp and remained stable. 15:25 - YSI Connected.
Initial Water Level Date/Time	06/12/2023 14:55
Initial Water Level Depth (ft bmp)	8.37
Pump/Tubing Intake Depth (ft bmp)	56.4
Tubing Length (ft)	59
Tubing Inner Diameter (in)	0.17
Purging Initiation Date/Time	06/12/2023 14:55
Total Purge Volume (gal)	2
Modified Sample	No
If Modified, Reasoning	
Sample Collection Information	Bottling-Start: 06/12/2023 15:45:00, Bottling-Stop: 06/12/2023 15:50:00, Parameters-Sampled: PFAS

Reading Time	Depth To Water (ft)	Cumulative Drawdown (ft)	Purge Rate (ml/min)	Temperature (deg c)	Specific Conductivity (us/cm)	Dissolved Oxygen (mg/l)	pH (su)	Oxidation-Reduction Potential (mV)	Turbidity (ntu)
15:05	8.40	0.03	120	NR	NR	NR	NR	NR	NR
15:15	8.40	0.03	120	NR	NR	NR	NR	NR	6
15:20	8.40	0.03	120	NR	NR	NR	NR	NR	6
15:25	8.40	0.03	120	11 +	2,245 +	0.5	8.1	215	<5
15:30	8.40	0.03	120	11 +	2,245 +	0.6	8.2	207	<5
15:35	8.40	0.03	120	11 +	2,246 +	0.6	8.2	204	<5
15:40	8.40	0.03	120	11 +	2,247 +	0.5	8.2	201	<5

Notes:

1) Abbreviations include: "deg c" indicates degrees Celsius; "ft" indicates feet; "ft bmp" indicates feet below reference measuring point; "gal" indicates gallons; "in" indicates inches; "mg/l" indicates milligrams per liter; "ml/min" indicates milliliters per minute; "mV" indicates millivolts; "NA" indicates not applicable; "NR" indicates not recorded; "ntu" indicates Nephelometric Turbidity units; "su" indicates standard units; "us/cm" indicates microsiemens per centimeter; and "+" indicates the parameter(s) may be used for stabilization calculations but cannot be used for other purposes.
2) Weather temperature units are in degrees Fahrenheit, unless otherwise noted.
3) Did indicator parameters reach stabilization? Yes
4) Was the two hour time limit reached? No
5) Calculations:
   - Head Above Pump Intake (ft) 48.03
   - Total Drawdown (ft) 0.03
   - Calculated Final Purge Volume (gal) NA
6) If Drawdown Did Not Stabilize or Stabilized Drawdown >0.3 ft, is Total Purge Volume > Calculated Final Purge Volume? NA

Well Sampling Worksheet
WWW RAP Field Data
PERIMETER 2023-Q2 - WV-PMW-RI-106D
Kent County, MI

Well	WV-PMW-RI-106D / 2 in Diameter PVC
Sample Quarter	2023-Q2
Date	06/12/2023
Weather	Overcast; Breezy
Sampler Initials	AW
Purging Device	Bladder-Pump: NA, Peristaltic-Pump: PER-2, Centrifugal-Pump: NA
Meters Used	YSI: Agile Rental 2, Turbidimeter: Agile Rental 2, Water-Level-Meter: GeoTech Rental
Reference Measuring Point	PVC
Well Screen (ft bmp)	70.2 - 75.2
Expected Well Bottom Depth (ft bmp)	75.2
Measured Bottom Depth (ft bmp)	NR
Sample Comment	
Initial Water Level Date/Time	06/12/2023 15:50
Initial Water Level Depth (ft bmp)	15.33
Pump/Tubing Intake Depth (ft bmp)	72.7
Tubing Length (ft)	75
Tubing Inner Diameter (in)	0.17
Purging Initiation Date/Time	06/12/2023 15:50
Total Purge Volume (gal)	1.4
Modified Sample	No
If Modified, Reasoning	
Sample Collection Information	Bottling-Start: 06/12/2023 16:25:00, Bottling-Stop: 06/12/2023 16:30:00, Parameters-Sampled: PFAS

Reading Time	Depth To Water (ft)	Cumulative Drawdown (ft)	Purge Rate (ml/min)	Temperature (deg c)	Specific Conductivity (us/cm)	Dissolved Oxygen (mg/l)	pH (su)	Oxidation-Reduction Potential (mV)	Turbidity (ntu)
16:00	15.37	0.04	150	10 +	397 +	<0.5	7.9	-133	<5
16:05	15.37	0.04	150	10 +	445 +	<0.5	7.9	-132	<5
16:10	15.37	0.04	150	10 +	449 +	<0.5	7.9	-132	<5
16:15	15.37	0.04	150	10 +	452 +	<0.5	7.9	-133	<5

Notes:

1) Abbreviations include: "deg c" indicates degrees Celsius; "ft" indicates feet; "ft bmp" indicates feet below reference measuring point; "gal" indicates gallons; "in" indicates inches; "mg/l" indicates milligrams per liter; "ml/min" indicates milliliters per minute; "mV" indicates millivolts; "NA" indicates not applicable; "NR" indicates not recorded; "ntu" indicates Nephelometric Turbidity units; "su" indicates standard units; "us/cm" indicates microsiemens per centimeter; and "+" indicates the parameter(s) may be used for stabilization calculations but cannot be used for other purposes.
2) Weather temperature units are in degrees Fahrenheit, unless otherwise noted.
3) Did indicator parameters reach stabilization? Yes
4) Was the two hour time limit reached? No
5) Calculations:
   - Head Above Pump Intake (ft) 57.37
   - Total Drawdown (ft) 0.04
   - Calculated Final Purge Volume (gal) NA
6) If Drawdown Did Not Stabilize or Stabilized Drawdown >0.3 ft, is Total Purge Volume > Calculated Final Purge Volume? NA

Well Sampling Worksheet
WWW RAP Field Data
PERIMETER 2023-Q2 - WV-PMW-RI-106E
Kent County, MI

Well	WV-PMW-RI-106E / 2 in Diameter PVC
Sample Quarter	2023-Q2
Date	06/12/2023
Weather	60F Cloudy
Sampler Initials	JET
Purging Device	Bladder-Pump: LIV-1, Peristaltic-Pump: NA, Centrifugal-Pump: NA
Meters Used	YSI: Agile Rental 1, Turbidimeter: Agile Rental 1, Water-Level-Meter: WLM-3
Reference Measuring Point	PVC
Well Screen (ft bmp)	176.0 - 181.0
Expected Well Bottom Depth (ft bmp)	181
Measured Bottom Depth (ft bmp)	NR
Sample Comment	YSI Connected at 16:40.
Initial Water Level Date/Time	06/12/2023 15:20
Initial Water Level Depth (ft bmp)	141.27
Pump/Tubing Intake Depth (ft bmp)	178.5
Tubing Length (ft)	180
Tubing Inner Diameter (in)	0.17
Purging Initiation Date/Time	06/12/2023 15:20
Total Purge Volume (gal)	3
Modified Sample	No
If Modified, Reasoning	
Sample Collection Information	Bottling-Start: 06/12/2023 17:25:00, Bottling-Stop: 06/12/2023 17:40:00, Parameters-Sampled: PFAS

Reading Time	Depth To Water (ft)	Cumulative Drawdown (ft)	Purge Rate (ml/min)	Temperature (deg c)	Specific Conductivity (us/cm)	Dissolved Oxygen (mg/l)	pH (su)	Oxidation-Reduction Potential (mV)	Turbidity (ntu)
15:30	142.60	1.33	50	NR	NR	NR	NR	NR	NR
15:50	142.45	1.18	50	NR	NR	NR	NR	NR	NR
16:10	142.45	1.18	50	NR	NR	NR	NR	NR	>999
16:30	142.45	1.18	50	NR	NR	NR	NR	NR	>999
16:40	142.45	1.18	50	11 +	702 +	3.8	7.6	105	263
17:00	142.45	1.18	50	11 +	688 +	1.5	7.6	106	119
17:10	142.45	1.18	50	11 +	690 +	4.9	7.5	105	57
17:15	142.45	1.18	50	11 +	690 +	4.7	7.5	106	41
17:20	142.45	1.18	50	11 +	687 +	4.1	7.5	107	32

Notes:

1) Abbreviations include: "deg c" indicates degrees Celsius; "ft" indicates feet; "ft bmp" indicates feet below reference measuring point; "gal" indicates gallons; "in" indicates inches; "mg/l" indicates milligrams per liter; "ml/min" indicates milliliters per minute; "mV" indicates millivolts; "NA" indicates not applicable; "NR" indicates not recorded; "ntu" indicates Nephelometric Turbidity units; "su" indicates standard units; "us/cm" indicates microsiemens per centimeter; and "+" indicates the parameter(s) may be used for stabilization calculations but cannot be used for other purposes.
2) Weather temperature units are in degrees Fahrenheit, unless otherwise noted.
3) Did indicator parameters reach stabilization? No
4) Was the two hour time limit reached? Yes
5) Calculations:
   - Head Above Pump Intake (ft) 37.23
   - Total Drawdown (ft) 1.18
   - Calculated Final Purge Volume (gal) 0.40
6) If Drawdown Did Not Stabilize or Stabilized Drawdown >0.3 ft, is Total Purge Volume > Calculated Final Purge Volume? Yes

Well Sampling Worksheet
WWW RAP Field Data
PERIMETER 2023-Q2 - WV-PMW-RI-107
Kent County, MI

Well	WV-PMW-RI-107 / 2 in Diameter PVC
Sample Quarter	2023-Q2
Date	06/21/2023
Weather	80° and Sunny
Sampler Initials	WVK
Purging Device	Bladder-Pump: BP-11, Peristaltic-Pump: NA, Centrifugal-Pump: NA
Meters Used	YSI: Agile Rental 3, Turbidimeter: Agile Rental 3, Water-Level-Meter: WLM-2
Reference Measuring Point	PVC
Well Screen (ft bmp)	189.5 - 194.5
Expected Well Bottom Depth (ft bmp)	194.5
Measured Bottom Depth (ft bmp)	194.5
Sample Comment	10:20 - Water quickly to the surface and observed to be brown in color. 11:15 - Purge water observed to be less chalky brown and more chalky white. 11:40 - YSI connected.
Initial Water Level Date/Time	06/21/2023 10:15
Initial Water Level Depth (ft bmp)	105.48
Pump/Tubing Intake Depth (ft bmp)	192
Tubing Length (ft)	195
Tubing Inner Diameter (in)	0.25
Purging Initiation Date/Time	06/21/2023 10:20
Total Purge Volume (gal)	4.5
Modified Sample	No
If Modified, Reasoning	
Sample Collection Information	Bottling-Start: 06/21/2023 12:25:00, Bottling-Stop: 06/21/2023 12:30:00, Parameters-Sampled: PFAS

Reading Time	Depth To Water (ft)	Cumulative Drawdown (ft)	Purge Rate (ml/min)	Temperature (deg c)	Specific Conductivity (us/cm)	Dissolved Oxygen (mg/l)	pH (su)	Oxidation-Reduction Potential (mV)	Turbidity (ntu)
10:20	106.48	1.00	90	NR	NR	NR	NR	NR	NR
10:30	106.48	1.00	90	NR	NR	NR	NR	NR	>999
10:45	106.40	0.92	90	NR	NR	NR	NR	NR	>999
11:00	106.40	0.92	100	NR	NR	NR	NR	NR	>999
11:15	106.40	0.92	100	NR	NR	NR	NR	NR	722
11:30	106.37	0.89	100	NR	NR	NR	NR	NR	380
11:40	106.37	0.89	100	14 +	409 +	0.5	7.7	-97	229
11:50	106.37	0.89	100	14 +	409 +	<0.5	7.6	-125	169
12:00	106.37	0.89	100	14 +	409 +	<0.5	7.6	-134	107

Well Sampling Worksheet
WWW RAP Field Data
PERIMETER 2023-Q2 - WV-PMW-RI-107
Kent County, MI

Well	WV-PMW-RI-107 / 2 in Diameter PVC
Sample Quarter	2023-Q2
Date	06/21/2023
Weather	80° and Sunny
Sampler Initials	WVK
Purging Device	Bladder-Pump: BP-11, Peristaltic-Pump: NA, Centrifugal-Pump: NA
Meters Used	YSI: Agile Rental 3, Turbidimeter: Agile Rental 3, Water-Level-Meter: WLM-2
Reference Measuring Point	PVC
Well Screen (ft bmp)	189.5 - 194.5
Expected Well Bottom Depth (ft bmp)	194.5
Measured Bottom Depth (ft bmp)	194.5
Sample Comment	10:20 - Water quickly to the surface and observed to be brown in color. 11:15 - Purge water observed to be less chalky brown and more chalky white. 11:40 - YSI connected.
Initial Water Level Date/Time	06/21/2023 10:15
Initial Water Level Depth (ft bmp)	105.48
Pump/Tubing Intake Depth (ft bmp)	192
Tubing Length (ft)	195
Tubing Inner Diameter (in)	0.25
Purging Initiation Date/Time	06/21/2023 10:20
Total Purge Volume (gal)	4.5
Modified Sample	No
If Modified, Reasoning	
Sample Collection Information	Bottling-Start: 06/21/2023 12:25:00, Bottling-Stop: 06/21/2023 12:30:00, Parameters-Sampled: PFAS

Reading Time	Depth To Water (ft)	Cumulative Drawdown (ft)	Purge Rate (ml/min)	Temperature (deg c)	Specific Conductivity (us/cm)	Dissolved Oxygen (mg/l)	pH (su)	Oxidation-Reduction Potential (mV)	Turbidity (ntu)
12:10	106.37	0.89	100	14 +	409 +	<0.5	7.6	-138	95
12:15	106.37	0.89	100	13 +	409 +	<0.5	7.6	-139	82
12:20	106.37	0.89	100	14 +	409 +	<0.5	7.6	-140	89

Notes:

1) Abbreviations include: "deg c" indicates degrees Celsius; "ft" indicates feet; "ft bmp" indicates feet below reference measuring point; "gal" indicates gallons; "in" indicates inches; "mg/l" indicates milligrams per liter; "ml/min" indicates milliliters per minute; "mV" indicates millivolts; "NA" indicates not applicable; "NR" indicates not recorded; "ntu" indicates Nephelometric Turbidity units; "su" indicates standard units; "us/cm" indicates microsiemens per centimeter; and "+" indicates the parameter(s) may be used for stabilization calculations but cannot be used for other purposes.
2) Weather temperature units are in degrees Fahrenheit, unless otherwise noted.
3) Did indicator parameters reach stabilization? No
4) Was the two hour time limit reached? Yes
5) Calculations:
   - Head Above Pump Intake (ft) 86.52
   - Total Drawdown (ft) 0.89
   - Calculated Final Purge Volume (gal) 0.65
6) If Drawdown Did Not Stabilize or Stabilized Drawdown >0.3 ft, is Total Purge Volume > Calculated Final Purge Volume? Yes

Well Sampling Worksheet
WWW RAP Field Data
PERIMETER 2023-Q2 - WV-PMW-RI-108
Kent County, MI

Well	WV-PMW-RI-108 / 2 in Diameter PVC
Sample Quarter	2023-Q2
Date	06/21/2023
Weather	Sunny 75
Sampler Initials	NCK
Purging Device	Bladder-Pump: NA, Peristaltic-Pump: PER-1, Centrifugal-Pump: NA
Meters Used	YSI: Agile Rental 2, Turbidimeter: Agile Rental 2, Water-Level-Meter: WLM-4
Reference Measuring Point	PVC
Well Screen (ft bmp)	12.9 - 17.9
Expected Well Bottom Depth (ft bmp)	17.9
Measured Bottom Depth (ft bmp)	17.9
Sample Comment	YSI Connected at 11:00. Well has not been surveyed yet. Bottom depth in ft bmp was measured after sampling.
Initial Water Level Date/Time	06/21/2023 10:20
Initial Water Level Depth (ft bmp)	10.60
Pump/Tubing Intake Depth (ft bmp)	15.4
Tubing Length (ft)	17.4
Tubing Inner Diameter (in)	0.17
Purging Initiation Date/Time	06/21/2023 10:20
Total Purge Volume (gal)	3
Modified Sample	No
If Modified, Reasoning	
Sample Collection Information	Bottling-Start: 06/21/2023 11:20:00, Bottling-Stop: 06/21/2023 11:27:00, Parameters-Sampled: PFAS

Reading Time	Depth To Water (ft)	Cumulative Drawdown (ft)	Purge Rate (ml/min)	Temperature (deg c)	Specific Conductivity (us/cm)	Dissolved Oxygen (mg/l)	pH (su)	Oxidation-Reduction Potential (mV)	Turbidity (ntu)
10:25	10.67	0.07	175	NR	NR	NR	NR	NR	NR
10:30	10.67	0.07	175	NR	NR	NR	NR	NR	NR
10:45	10.67	0.07	175	NR	NR	NR	NR	NR	NR
11:00	10.67	0.07	175	NR	NR	NR	NR	NR	NR
11:10	10.67	0.07	175	12 +	418 +	5.6	7.4	222	<5
11:15	10.67	0.07	175	12 +	426 +	5.7	7.4	223	<5
11:20	10.67	0.07	175	12 +	424 +	5.7	7.4	223	<5

Notes:

1) Abbreviations include: "deg c" indicates degrees Celsius; "ft" indicates feet; "ft bmp" indicates feet below reference measuring point; "gal" indicates gallons; "in" indicates inches; "mg/l" indicates milligrams per liter; "ml/min" indicates milliliters per minute; "mV" indicates millivolts; "NA" indicates not applicable; "NR" indicates not recorded; "ntu" indicates Nephelometric Turbidity units; "su" indicates standard units; "us/cm" indicates microsiemens per centimeter; and "+" indicates the parameter(s) may be used for stabilization calculations but cannot be used for other purposes.
2) Weather temperature units are in degrees Fahrenheit, unless otherwise noted.
3) Did indicator parameters reach stabilization? Yes
4) Was the two hour time limit reached? No
5) Calculations:
   - Head Above Pump Intake (ft) 4.80
   - Total Drawdown (ft) 0.07
   - Calculated Final Purge Volume (gal) NA
6) If Drawdown Did Not Stabilize or Stabilized Drawdown >0.3 ft, is Total Purge Volume > Calculated Final Purge Volume? NA

Well Sampling Worksheet
WWW RAP Field Data
AREA 5 2023-Q2 - AREA5-RI-3A
Kent County, MI

Well	AREA5-RI-3A / 2 in Diameter PVC
Sample Quarter	2023-Q2
Date	04/17/2023
Weather	34F Snowy
Sampler Initials	JET
Purging Device	Bladder-Pump: NA, Peristaltic-Pump: NA, Centrifugal-Pump: Mega Monsoon #1
Meters Used	YSI: Agile Rental 1, Turbidimeter: Agile Rental 1, Water-Level-Meter: WLM-3
Reference Measuring Point	PVC
Well Screen (ft bmp)	61.8 - 66.8
Measured Bottom Depth (ft bmp)	NR
Sample Comment	11:20 SWL = 31.29 ft bmp; 11:40 SWL = 31.35 ft bmp. Adjusted pump settings at 11:40.
Initial Water Level Date/Time	04/17/2023 10:50
Initial Water Level Depth (ft bmp)	31.19
Pump/Tubing Intake Depth (ft bmp)	64.3
Tubing Length (ft)	66
Tubing Inner Diameter (in)	0.375
Purging Initiation Date/Time	04/17/2023 10:50
Total Purge Volume (gal)	3
Modified Sample	No
If Modified, Reasoning	
Sample Collection Information	Bottling-Start: 04/17/2023 12:50:00, Bottling-Stop: 04/17/2023 12:55:00, Parameters-Sampled: PFAS

Reading Time	Depth To Water (ft)	Cumulative Drawdown (ft)	Purge Rate (ml/min)	Temperature (deg c)	Specific Conductivity (us/cm)	Dissolved Oxygen (mg/l)	pH (su)	Oxidation-Reduction Potential (mV)	Turbidity (ntu)
11:20	31.29	0.10	100	NR	NR	NR	NR	NR	NR
11:40	31.35	0.16	100	NR	NR	NR	NR	NR	NR
12:00	31.35	0.16	100	9 +	617 +	5.5	7.0	252	6
12:10	31.35	0.16	100	9 +	613 +	5.8	7.0	266	<5
12:20	31.35	0.16	100	9 +	613 +	5.8	7.1	273	<5
12:30	31.35	0.16	100	10 +	613 +	5.4	7.1	278	<5
12:35	31.35	0.16	100	10 +	613 +	5.5	7.1	281	<5
12:40	31.35	0.16	100	10 +	613 +	5.2	7.0	284	<5

Notes:

1) Abbreviations include: "deg c" indicates degrees Celsius; "ft" indicates feet; "ft bmp" indicates feet below reference measuring point; "gal" indicates gallons; "in" indicates inches; "mg/l" indicates milligrams per liter; "ml/min" indicates milliliters per minute; "mV" indicates millivolts; "NA" indicates not applicable; "NR" indicates not recorded; "ntu" indicates Nephelometric Turbidity units; "su" indicates standard units; "us/cm" indicates microsiemens per centimeter; and "+" indicates the parameter(s) may be used for stabilization calculations but cannot be used for other purposes.
2) Weather temperature units are in degrees Fahrenheit, unless otherwise noted.
3) Did indicator parameters reach stabilization? Yes
4) Was the two hour time limit reached? Yes
5) Calculations:
   - Head Above Pump Intake (ft) 33.11
   - Total Drawdown (ft) 0.16
   - Calculated Final Purge Volume (gal) NA
6) If Drawdown Did Not Stabilize or Stabilized Drawdown >0.3 ft, is Total Purge Volume > Calculated Final Purge Volume? NA

Well Sampling Worksheet
WWW RAP Field Data
AREA 5 2023-Q2 - AREA5-RI-3B
Kent County, MI

Well	AREA5-RI-3B / 2 in Diameter PVC
Sample Quarter	2023-Q2
Date	04/17/2023
Weather	34F Snowy
Sampler Initials	NCK
Purging Device	Bladder-Pump: BP-12, Peristaltic-Pump: NA, Centrifugal-Pump: NA
Meters Used	YSI: Agile Rental 3, Turbidimeter: Agile Rental 1, Water-Level-Meter: WLM-2
Reference Measuring Point	PVC
Well Screen (ft bmp)	109.0 - 114.0
Measured Bottom Depth (ft bmp)	NR
Sample Comment	Maximum observed drawdown between 12:00 and 12:15 was SWL = 33.15 ft bmp. Quickly remedied by adjusting discharge time. SWL after 12:15 = 33.08 ft bmp. Water was visibly turbid at 13:00. YSI Connected at 13:15. Readings were collected at 15 minute intervals due to high turbidity until 13:50.
Initial Water Level Date/Time	04/17/2023 12:00
Initial Water Level Depth (ft bmp)	32.89
Pump/Tubing Intake Depth (ft bmp)	111.5
Tubing Length (ft)	113.5
Tubing Inner Diameter (in)	0.25
Purging Initiation Date/Time	04/17/2023 12:00
Total Purge Volume (gal)	1.9
Modified Sample	No
If Modified, Reasoning	
Sample Collection Information	Bottling-Start: 04/17/2023 14:00:00, Bottling-Stop: 04/17/2023 14:13:00, Parameters-Sampled: PFAS

Reading Time	Depth To Water (ft)	Cumulative Drawdown (ft)	Purge Rate (ml/min)	Temperature (deg c)	Specific Conductivity (us/cm)	Dissolved Oxygen (mg/l)	pH (su)	Oxidation-Reduction Potential (mV)	Turbidity (ntu)
12:15	33.08	0.19	60	NR	NR	NR	NR	NR	NR
12:30	33.08	0.19	60	NR	NR	NR	NR	NR	NR
12:45	33.08	0.19	60	NR	NR	NR	NR	NR	NR
13:00	33.08	0.19	60	NR	NR	NR	NR	NR	NR
13:15	33.08	0.19	60	8 +	2,166 +	3.2	7.0	127	550
13:30	33.08	0.19	60	8 +	2,147 +	2.7	7.1	74	417
13:45	33.08	0.19	60	8 +	2,154 +	2.5	7.1	61	311

Well Sampling Worksheet
WWW RAP Field Data
AREA 5 2023-Q2 - AREA5-RI-3B
Kent County, MI

Well	AREA5-RI-3B / 2 in Diameter PVC
Sample Quarter	2023-Q2
Date	04/17/2023
Weather	34F Snowy
Sampler Initials	NCK
Purging Device	Bladder-Pump: BP-12, Peristaltic-Pump: NA, Centrifugal-Pump: NA
Meters Used	YSI: Agile Rental 3, Turbidimeter: Agile Rental 1, Water-Level-Meter: WLM-2
Reference Measuring Point	PVC
Well Screen (ft bmp)	109.0 - 114.0
Measured Bottom Depth (ft bmp)	NR
Sample Comment	Maximum observed drawdown between 12:00 and 12:15 was SWL = 33.15 ft bmp. Quickly remedied by adjusting discharge time. SWL after 12:15 = 33.08 ft bmp. Water was visibly turbid at 13:00. YSI Connected at 13:15. Readings were collected at 15 minute intervals due to high turbidity until 13:50.
Initial Water Level Date/Time	04/17/2023 12:00
Initial Water Level Depth (ft bmp)	32.89
Pump/Tubing Intake Depth (ft bmp)	111.5
Tubing Length (ft)	113.5
Tubing Inner Diameter (in)	0.25
Purging Initiation Date/Time	04/17/2023 12:00
Total Purge Volume (gal)	1.9
Modified Sample	No
If Modified, Reasoning	
Sample Collection Information	Bottling-Start: 04/17/2023 14:00:00, Bottling-Stop: 04/17/2023 14:13:00, Parameters-Sampled: PFAS

Reading Time	Depth To Water (ft)	Cumulative Drawdown (ft)	Purge Rate (ml/min)	Temperature (deg c)	Specific Conductivity (us/cm)	Dissolved Oxygen (mg/l)	pH (su)	Oxidation-Reduction Potential (mV)	Turbidity (ntu)
13:50	33.08	0.19	60	8 +	2,149 +	2.2	7.1	55	251
13:55	33.08	0.19	60	8 +	2,154 +	1.8	7.1	48	217
14:00	33.08	0.19	60	9 +	2,156 +	1.7	7.1	44	190

Notes:

1) Abbreviations include: "deg c" indicates degrees Celsius; "ft" indicates feet; "ft bmp" indicates feet below reference measuring point; "gal" indicates gallons; "in" indicates inches; "mg/l" indicates milligrams per liter; "ml/min" indicates milliliters per minute; "mV" indicates millivolts; "NA" indicates not applicable; "NR" indicates not recorded; "ntu" indicates Nephelometric Turbidity units; "su" indicates standard units; "us/cm" indicates microsiemens per centimeter; and "+" indicates the parameter(s) may be used for stabilization calculations but cannot be used for other purposes.
2) Weather temperature units are in degrees Fahrenheit, unless otherwise noted.
3) Did indicator parameters reach stabilization? No
4) Was the two hour time limit reached? Yes
5) Calculations:
   - Head Above Pump Intake (ft) 78.61
   - Total Drawdown (ft) 0.19
   - Calculated Final Purge Volume (gal) NA
6) If Drawdown Did Not Stabilize or Stabilized Drawdown >0.3 ft, is Total Purge Volume > Calculated Final Purge Volume? NA

Well Sampling Worksheet
WWW RAP Field Data
AREA 5 2023-Q2 - AREA5-RI-8A
Kent County, MI

Well	AREA5-RI-8A / 2 in Diameter PVC
Sample Quarter	2023-Q2
Date	04/21/2023
Weather	54F Sunny
Sampler Initials	JET
Purging Device	Bladder-Pump: NA, Peristaltic-Pump: NA, Centrifugal-Pump: Mega Monsoon #2
Meters Used	YSI: Agile Rental 3, Turbidimeter: Agile Rental 1, Water-Level-Meter: WLM-4
Reference Measuring Point	PVC
Well Screen (ft bmp)	85.1 - 90.1
Measured Bottom Depth (ft bmp)	NR
Sample Comment	YSI Connected at 15:10.
Initial Water Level Date/Time	04/21/2023 14:10
Initial Water Level Depth (ft bmp)	81.26
Pump/Tubing Intake Depth (ft bmp)	87.6
Tubing Length (ft)	89
Tubing Inner Diameter (in)	0.17
Purging Initiation Date/Time	04/21/2023 14:10
Total Purge Volume (gal)	9.5
Modified Sample	No
If Modified, Reasoning	
Sample Collection Information	Bottling-Start: 04/21/2023 15:35:00, Bottling-Stop: 04/21/2023 15:40:00, Parameters-Sampled: PFAS

Reading Time	Depth To Water (ft)	Cumulative Drawdown (ft)	Purge Rate (ml/min)	Temperature (deg c)	Specific Conductivity (us/cm)	Dissolved Oxygen (mg/l)	pH (su)	Oxidation-Reduction Potential (mV)	Turbidity (ntu)
14:40	81.26	0.00	450	NR	NR	NR	NR	NR	NR
14:50	81.26	0.00	450	NR	NR	NR	NR	NR	12
15:10	81.26	0.00	450	13 +	664 +	9.7	7.1	226	10
15:20	81.26	0.00	450	13 +	670 +	9.7	7.2	228	<5
15:25	81.26	0.00	450	13 +	671 +	9.7	7.2	229	<5
15:30	81.26	0.00	450	13 +	672 +	9.7	7.2	231	<5

Notes:

1) Abbreviations include: "deg c" indicates degrees Celsius; "ft" indicates feet; "ft bmp" indicates feet below reference measuring point; "gal" indicates gallons; "in" indicates inches; "mg/l" indicates milligrams per liter; "ml/min" indicates milliliters per minute; "mV" indicates millivolts; "NA" indicates not applicable; "NR" indicates not recorded; "ntu" indicates Nephelometric Turbidity units; "su" indicates standard units; "us/cm" indicates microsiemens per centimeter; and "+" indicates the parameter(s) may be used for stabilization calculations but cannot be used for other purposes.
2) Weather temperature units are in degrees Fahrenheit, unless otherwise noted.
3) Did indicator parameters reach stabilization? Yes
4) Was the two hour time limit reached? No
5) Calculations:
   - Head Above Pump Intake (ft) 6.34
   - Total Drawdown (ft) 0.00
   - Calculated Final Purge Volume (gal) NA
6) If Drawdown Did Not Stabilize or Stabilized Drawdown >0.3 ft, is Total Purge Volume > Calculated Final Purge Volume? NA

Well Sampling Worksheet
WWW RAP Field Data
AREA 5 2023-Q2 - AREA5-RI-8B
Kent County, MI

Well	AREA5-RI-8B / 2 in Diameter PVC
Sample Quarter	2023-Q2
Date	04/21/2023
Weather	Cloudy 60s
Sampler Initials	NCK
Purging Device	Bladder-Pump: NA, Peristaltic-Pump: NA, Centrifugal-Pump: Mega Monsoon #1
Meters Used	YSI: Agile Rental 1, Turbidimeter: Agile Rental 1, Water-Level-Meter: WLM-3
Reference Measuring Point	PVC
Well Screen (ft bmp)	156.5 - 161.5
Measured Bottom Depth (ft bmp)	NR
Sample Comment	Turbidity did not stabilize. Water observed to be very turbid at the start of purge. YSI Connected at 15:05.
Initial Water Level Date/Time	04/21/2023 14:25
Initial Water Level Depth (ft bmp)	80.99
Pump/Tubing Intake Depth (ft bmp)	159
Tubing Length (ft)	161
Tubing Inner Diameter (in)	0.17
Purging Initiation Date/Time	04/21/2023 14:25
Total Purge Volume (gal)	9
Modified Sample	No
If Modified, Reasoning	
Sample Collection Information	Bottling-Start: 04/21/2023 16:00:00, Bottling-Stop: 04/21/2023 16:06:00, Parameters-Sampled: PFAS

Reading Time	Depth To Water (ft)	Cumulative Drawdown (ft)	Purge Rate (ml/min)	Temperature (deg c)	Specific Conductivity (us/cm)	Dissolved Oxygen (mg/l)	pH (su)	Oxidation-Reduction Potential (mV)	Turbidity (ntu)
14:25	81.03	0.04	270	NR	NR	NR	NR	NR	NR
14:35	81.03	0.04	270	NR	NR	NR	NR	NR	NR
14:45	81.03	0.04	270	NR	NR	NR	NR	NR	NR
15:05	81.03	0.04	270	11 +	996 +	<0.5	6.9	10	127 +
15:15	81.03	0.04	270	11 +	992 +	<0.5	6.9	-63	41 +
15:20	81.03	0.04	270	11 +	990 +	<0.5	6.9	-70	32 +
15:25	81.03	0.04	270	11 +	989 +	<0.5	6.9	-77	20 +
15:30	81.03	0.04	270	11 +	989 +	<0.5	6.9	-80	19 +
15:35	81.03	0.04	270	11 +	989 +	<0.5	6.8	-81	21 +
15:40	81.03	0.04	270	11 +	988 +	<0.5	6.8	-83	16 +
15:45	81.03	0.04	270	11 +	988 +	<0.5	6.9	-84	13 +

Well Sampling Worksheet
WWW RAP Field Data
AREA 5 2023-Q2 - AREA5-RI-8B
Kent County, MI

Well	AREA5-RI-8B / 2 in Diameter PVC
Sample Quarter	2023-Q2
Date	04/21/2023
Weather	Cloudy 60s
Sampler Initials	NCK
Purging Device	Bladder-Pump: NA, Peristaltic-Pump: NA, Centrifugal-Pump: Mega Monsoon #1
Meters Used	YSI: Agile Rental 1, Turbidimeter: Agile Rental 1, Water-Level-Meter: WLM-3
Reference Measuring Point	PVC
Well Screen (ft bmp)	156.5 - 161.5
Measured Bottom Depth (ft bmp)	NR
Sample Comment	Turbidity did not stabilize. Water observed to be very turbid at the start of purge. YSI Connected at 15:05.
Initial Water Level Date/Time	04/21/2023 14:25
Initial Water Level Depth (ft bmp)	80.99
Pump/Tubing Intake Depth (ft bmp)	159
Tubing Length (ft)	161
Tubing Inner Diameter (in)	0.17
Purging Initiation Date/Time	04/21/2023 14:25
Total Purge Volume (gal)	9
Modified Sample	No
If Modified, Reasoning	
Sample Collection Information	Bottling-Start: 04/21/2023 16:00:00, Bottling-Stop: 04/21/2023 16:06:00, Parameters-Sampled: PFAS

Reading Time	Depth To Water (ft)	Cumulative Drawdown (ft)	Purge Rate (ml/min)	Temperature (deg c)	Specific Conductivity (us/cm)	Dissolved Oxygen (mg/l)	pH (su)	Oxidation-Reduction Potential (mV)	Turbidity (ntu)
15:50	81.03	0.04	270	11 +	987 +	<0.5	6.9	-86	11 +
15:55	81.03	0.04	270	11 +	987 +	<0.5	6.9	-87	9 +
16:00	81.03	0.04	270	11 +	986 +	<0.5	6.9	-88	10 +

Notes:

1) Abbreviations include: "deg c" indicates degrees Celsius; "ft" indicates feet; "ft bmp" indicates feet below reference measuring point; "gal" indicates gallons; "in" indicates inches; "mg/l" indicates milligrams per liter; "ml/min" indicates milliliters per minute; "mV" indicates millivolts; "NA" indicates not applicable; "NR" indicates not recorded; "ntu" indicates Nephelometric Turbidity units; "su" indicates standard units; "us/cm" indicates microsiemens per centimeter; and "+" indicates the parameter(s) may be used for stabilization calculations but cannot be used for other purposes.
2) Weather temperature units are in degrees Fahrenheit, unless otherwise noted.
3) Did indicator parameters reach stabilization? No
4) Was the two hour time limit reached? No
5) Calculations:
   - Head Above Pump Intake (ft) 78.01
   - Total Drawdown (ft) 0.04
   - Calculated Final Purge Volume (gal) NA
6) If Drawdown Did Not Stabilize or Stabilized Drawdown >0.3 ft, is Total Purge Volume > Calculated Final Purge Volume? NA

Well Sampling Worksheet
WWW RAP Field Data
AREA 5 2023-Q2 - AREA5-RI-8C
Kent County, MI

Well	AREA5-RI-8C / 2 in Diameter PVC
Sample Quarter	2023-Q2
Date	05/02/2023
Weather	39F Rain
Sampler Initials	BPT
Purging Device	Bladder-Pump: BP-12, Peristaltic-Pump: NA, Centrifugal-Pump: NA
Meters Used	YSI: Agile Rental 2, Turbidimeter: Agile Rental 2, Water-Level-Meter: WLM-2
Reference Measuring Point	PVC
Well Screen (ft bmp)	174.4 - 179.4
Measured Bottom Depth (ft bmp)	NR
Sample Comment	10:50 - Pump flow rate dropped drastically; pressure adjusted. 11:55 - YSI fell over. Last 3 water level readings were not the same per Standard Operating Procedure (SOP). Water level meters are considered accurate to +/- 0.01 feet and last 3 readings were within this range. GZA does not believe this impacts data quality.
Initial Water Level Date/Time	05/02/2023 10:00
Initial Water Level Depth (ft bmp)	84.83
Pump/Tubing Intake Depth (ft bmp)	176.9
Tubing Length (ft)	180
Tubing Inner Diameter (in)	0.25
Purging Initiation Date/Time	05/02/2023 10:05
Total Purge Volume (gal)	1.8
Modified Sample	No
If Modified, Reasoning	
Sample Collection Information	Bottling-Start: 05/02/2023 12:20:00, Bottling-Stop: 05/02/2023 12:30:00, Parameters-Sampled: PFAS

Reading Time	Depth To Water (ft)	Cumulative Drawdown (ft)	Purge Rate (ml/min)	Temperature (deg c)	Specific Conductivity (us/cm)	Dissolved Oxygen (mg/l)	pH (su)	Oxidation-Reduction Potential (mV)	Turbidity (ntu)
10:50	84.80	-0.03	NR	NR	NR	NR	NR	NR	64
11:25	84.73	-0.10	NR	NR	NR	NR	NR	NR	53
11:35	84.70	-0.13	50	7 +	970 +	8.3	7.2	229	44
11:45	84.68	-0.15	50	7 +	983 +	7.0	7.2	228	61
11:50	84.65	-0.18	50	7 +	980 +	6.4	7.2	228	161
11:55	84.60	-0.23	50	8 +	5 +	11.0	NR	NR	NR
12:00	84.78	-0.05	50	8 +	978 +	8.1	7.2	234	NR
12:05	84.75	-0.08	50	7 +	980 +	6.8	7.2	235	108
12:10	84.75	-0.08	50	7 +	982 +	6.9	7.2	234	92
12:15	84.76	-0.07	50	8 +	967 +	6.8	7.2	229	70

Notes:

1) Abbreviations include: "deg c" indicates degrees Celsius; "ft" indicates feet; "ft bmp" indicates feet below reference measuring point; "gal" indicates gallons; "in" indicates inches; "mg/l" indicates milligrams per liter; "ml/min" indicates milliliters per minute; "mV" indicates millivolts; "NA" indicates not applicable; "NR" indicates not recorded; "ntu" indicates Nephelometric Turbidity units; "su" indicates standard units; "us/cm" indicates microsiemens per centimeter; and "+" indicates the parameter(s) may be used for stabilization calculations but cannot be used for other purposes.
2) Weather temperature units are in degrees Fahrenheit, unless otherwise noted.
3) Did indicator parameters reach stabilization? No
4) Was the two hour time limit reached? Yes
5) Calculations:
   - Head Above Pump Intake (ft) 92.07
   - Total Drawdown (ft) -0.07
   - Calculated Final Purge Volume (gal) NA
6) If Drawdown Did Not Stabilize or Stabilized Drawdown >0.3 ft, is Total Purge Volume > Calculated Final Purge Volume? NA

Well Sampling Worksheet
WWW RAP Field Data
AREA 5 2023-Q2 - AREA5-RI-9A
Kent County, MI

Well	AREA5-RI-9A / 2 in Diameter PVC
Sample Quarter	2023-Q2
Date	04/21/2023
Weather	Cloudy, High 40s
Sampler Initials	DMW
Purging Device	Bladder-Pump: BP-11, Peristaltic-Pump: NA, Centrifugal-Pump: NA
Meters Used	YSI: Agile Rental 2, Turbidimeter: Agile Rental 2, Water-Level-Meter: WLM-2
Reference Measuring Point	PVC
Well Screen (ft bmp)	98.5 - 103.5
Measured Bottom Depth (ft bmp)	103.5
Sample Comment	10:40 - Initial water level with equipment 96.40 ft bmp. Started pumping with 30 second discharge (D)/30 second fill (F), 75 psi and SWL = 95.59 ft bmp. 10:50 - Water at Surface with initial flow rate of 180 mL/min and SWL = 95.75 ft bmp. Adjusted to 15F/30D and 100mL/min. 10:50-11:27 Made multiple adjustments to control settings to decrease flow rate. Pump was having issues keeping water in tubing and flow rate measurements were not consistent. Many adjustments were made to ensure steady flow. Flow rates ranged from 33 mL/min to 220 mL/min. 11:00-11:06 - SWL readings were measured from 95.55 ft bmp when flow was low. 33 mL/min with settings of 60F/30D. 11:08 – 150 mL/min and SWL = 95.75 to 95.91 ft bmp. 11:10-11:15 220 mL/min with settings 40F/20D and SWL = 95.91 ft bmp. 11:17 - Increased fill time to slow flow (65F/35D). 11:20-11:27 No water discharged from tubing. 11:27 - Changed controls to 20F/20D and water began flowing 250 mL/min and SWL = 96.08 ft bmp. 11:32 - Settings 40F/20D, 150 mL/min, and SWL = 95.95 ft bmp. 11:39 - 120 mL/min, 50F/25D, and SWL = 95.91 ft bmp. 11:42 – 100 mL/min, 60F/28D, and SWL = 95.89 ft bmp; 11:42-11:51 steady flow rate, SWL = 95.86 ft bmp, stable water
Initial Water Level Date/Time	04/21/2023 10:40
Initial Water Level Depth (ft bmp)	95.59
Pump/Tubing Intake Depth (ft bmp)	101
Tubing Length (ft)	107
Tubing Inner Diameter (in)	0.25
Purging Initiation Date/Time	04/21/2023 10:50
Total Purge Volume (gal)	4.5
Modified Sample	No
If Modified, Reasoning	
Sample Collection Information	Bottling-Start: 04/21/2023 12:35:00, Bottling-Stop: 04/21/2023 12:41:00, Parameters-Sampled: PFAS

Reading Time	Depth To Water (ft)	Cumulative Drawdown (ft)	Purge Rate (ml/min)	Temperature (deg c)	Specific Conductivity (us/cm)	Dissolved Oxygen (mg/l)	pH (su)	Oxidation-Reduction Potential (mV)	Turbidity (ntu)
11:55	95.86	0.27	100	10 +	726 +	4.7	7.3	245	42
12:05	95.86	0.27	100	10 +	730 +	4.0	7.3	242	35
12:15	95.86	0.27	100	10 +	728 +	3.6	7.3	240	27
12:20	95.86	0.27	100	10 +	728 +	3.6	7.3	240	23
12:25	95.86	0.27	100	10 +	728 +	3.5	7.3	238	21
12:30	95.86	0.27	100	10 +	728 +	3.4	7.3	238	21

Notes:

1) Abbreviations include: "deg c" indicates degrees Celsius; "ft" indicates feet; "ft bmp" indicates feet below reference measuring point; "gal" indicates gallons; "in" indicates inches; "mg/l" indicates milligrams per liter; "ml/min" indicates milliliters per minute; "mV" indicates millivolts; "NA" indicates not applicable; "NR" indicates not recorded; "ntu" indicates Nephelometric Turbidity units; "su" indicates standard units; "us/cm" indicates microsiemens per centimeter; and "+" indicates the parameter(s) may be used for stabilization calculations but cannot be used for other purposes.
2) Weather temperature units are in degrees Fahrenheit, unless otherwise noted.
3) Did indicator parameters reach stabilization? Yes
4) Was the two hour time limit reached? No
5) Calculations:
   - Head Above Pump Intake (ft) 5.41
   - Total Drawdown (ft) 0.27
   - Calculated Final Purge Volume (gal) NA
6) If Drawdown Did Not Stabilize or Stabilized Drawdown >0.3 ft, is Total Purge Volume > Calculated Final Purge Volume? NA

Well Sampling Worksheet
WWW RAP Field Data
AREA 5 2023-Q2 - AREA5-RI-9B
Kent County, MI

Well	AREA5-RI-9B / 2 in Diameter PVC
Sample Quarter	2023-Q2
Date	04/28/2023
Weather	50F, Cloudy
Sampler Initials	BLW
Purging Device	Bladder-Pump: NA, Peristaltic-Pump: NA, Centrifugal-Pump: Mega Monsoon #2
Meters Used	YSI: Agile Rental 2, Turbidimeter: Agile Rental 2, Water-Level-Meter: WLM-2
Reference Measuring Point	PVC
Well Screen (ft bmp)	151.6 - 156.6
Measured Bottom Depth (ft bmp)	156.6
Sample Comment	YSI Connected at 11:50.
Initial Water Level Date/Time	04/28/2023 11:15
Initial Water Level Depth (ft bmp)	110.02
Pump/Tubing Intake Depth (ft bmp)	154.1
Tubing Length (ft)	158
Tubing Inner Diameter (in)	0.25
Purging Initiation Date/Time	04/28/2023 11:35
Total Purge Volume (gal)	4.25
Modified Sample	No
If Modified, Reasoning	
Sample Collection Information	Bottling-Start: 04/28/2023 13:35:00, Bottling-Stop: 04/28/2023 13:45:00, Parameters-Sampled: PFAS

Reading Time	Depth To Water (ft)	Cumulative Drawdown (ft)	Purge Rate (ml/min)	Temperature (deg c)	Specific Conductivity (us/cm)	Dissolved Oxygen (mg/l)	pH (su)	Oxidation-Reduction Potential (mV)	Turbidity (ntu)
11:40	110.04	0.02	140	NR	NR	NR	NR	NR	NR
11:50	110.04	0.02	140	11 +	817 +	0.7	7.3	-79	>999
12:00	110.03	0.01	140	11 +	817 +	0.5	7.4	-94	495
12:10	110.03	0.01	140	11 +	814 +	<0.5	7.4	-100	191
12:20	110.04	0.02	140	11 +	817 +	<0.5	7.3	-100	98
12:25	110.04	0.02	140	11 +	814 +	<0.5	7.3	-102	70
12:30	110.04	0.02	140	11 +	819 +	<0.5	7.3	-103	55
12:35	110.04	0.02	140	11 +	819 +	<0.5	7.3	-102	41
12:40	110.04	0.02	140	11 +	818 +	<0.5	7.3	-102	37
12:45	110.04	0.02	140	11 +	817 +	<0.5	7.3	-102	31
12:50	110.04	0.02	140	11 +	817 +	<0.5	7.3	-102	27
12:55	110.04	0.02	140	11 +	818 +	<0.5	7.3	-101	24
13:00	110.04	0.02	140	11 +	817 +	<0.5	7.3	-101	21
13:05	110.04	0.02	140	11 +	817 +	<0.5	7.3	-100	22
13:10	110.04	0.02	140	11 +	817 +	<0.5	7.3	-101	19
13:15	110.04	0.02	140	11 +	817 +	<0.5	7.3	-101	17

Well Sampling Worksheet
WWW RAP Field Data
AREA 5 2023-Q2 - AREA5-RI-9B
Kent County, MI

Well	AREA5-RI-9B / 2 in Diameter PVC
Sample Quarter	2023-Q2
Date	04/28/2023
Weather	50F, Cloudy
Sampler Initials	BLW
Purging Device	Bladder-Pump: NA, Peristaltic-Pump: NA, Centrifugal-Pump: Mega Monsoon #2
Meters Used	YSI: Agile Rental 2, Turbidimeter: Agile Rental 2, Water-Level-Meter: WLM-2
Reference Measuring Point	PVC
Well Screen (ft bmp)	151.6 - 156.6
Measured Bottom Depth (ft bmp)	156.6
Sample Comment	YSI Connected at 11:50.
Initial Water Level Date/Time	04/28/2023 11:15
Initial Water Level Depth (ft bmp)	110.02
Pump/Tubing Intake Depth (ft bmp)	154.1
Tubing Length (ft)	158
Tubing Inner Diameter (in)	0.25
Purging Initiation Date/Time	04/28/2023 11:35
Total Purge Volume (gal)	4.25
Modified Sample	No
If Modified, Reasoning	
Sample Collection Information	Bottling-Start: 04/28/2023 13:35:00, Bottling-Stop: 04/28/2023 13:45:00, Parameters-Sampled: PFAS

Reading Time	Depth To Water (ft)	Cumulative Drawdown (ft)	Purge Rate (ml/min)	Temperature (deg c)	Specific Conductivity (us/cm)	Dissolved Oxygen (mg/l)	pH (su)	Oxidation-Reduction Potential (mV)	Turbidity (ntu)
13:20	110.04	0.02	140	11 +	816 +	<0.5	7.3	-103	15
13:25	110.04	0.02	140	11 +	817 +	<0.5	7.3	-103	14
13:30	110.04	0.02	140	11 +	817 +	<0.5	7.3	-101	14

Notes:

1) Abbreviations include: "deg c" indicates degrees Celsius; "ft" indicates feet; "ft bmp" indicates feet below reference measuring point; "gal" indicates gallons; "in" indicates inches; "mg/l" indicates milligrams per liter; "ml/min" indicates milliliters per minute; "mV" indicates millivolts; "NA" indicates not applicable; "NR" indicates not recorded; "ntu" indicates Nephelometric Turbidity units; "su" indicates standard units; "us/cm" indicates microsiemens per centimeter; and "+" indicates the parameter(s) may be used for stabilization calculations but cannot be used for other purposes.
2) Weather temperature units are in degrees Fahrenheit, unless otherwise noted.
3) Did indicator parameters reach stabilization? Yes
4) Was the two hour time limit reached? Yes
5) Calculations:
   - Head Above Pump Intake (ft): 44.08
   - Total Drawdown (ft): 0.02
   - Calculated Final Purge Volume (gal): NA
6) If Drawdown Did Not Stabilize or Stabilized Drawdown >0.3 ft, is Total Purge Volume > Calculated Final Purge Volume? NA

Well Sampling Worksheet
WWW RAP Field Data
AREA 5 2023-Q2 - AREA5-RI-9C
Kent County, MI

Well	AREA5-RI-9C / 2 in Diameter PVC
Sample Quarter	2023-Q2
Date	04/28/2023
Weather	Cloudy 54
Sampler Initials	NCK
Purging Device	Bladder-Pump: BP-10, Peristaltic-Pump: NA, Centrifugal-Pump: NA
Meters Used	YSI: Agile Rental 1, Turbidimeter: Agile Rental 1, Water-Level-Meter: WLM-3
Reference Measuring Point	PVC
Well Screen (ft bmp)	221.9 - 226.9
Measured Bottom Depth (ft bmp)	NR
Sample Comment	Bladder+ with generator and air compressor. 11:40 - Water observed to be turbid.
Initial Water Level Date/Time	04/28/2023 11:25
Initial Water Level Depth (ft bmp)	110.50
Pump/Tubing Intake Depth (ft bmp)	224.6
Tubing Length (ft)	230
Tubing Inner Diameter (in)	0.25
Purging Initiation Date/Time	04/28/2023 11:30
Total Purge Volume (gal)	3
Modified Sample	No
If Modified, Reasoning	
Sample Collection Information	Bottling-Start: 04/28/2023 13:30:00, Bottling-Stop: 04/28/2023 13:37:00, Parameters-Sampled: PFAS

Reading Time	Depth To Water (ft)	Cumulative Drawdown (ft)	Purge Rate (ml/min)	Temperature (deg c)	Specific Conductivity (us/cm)	Dissolved Oxygen (mg/l)	pH (su)	Oxidation-Reduction Potential (mV)	Turbidity (ntu)
11:40	110.51	0.01	90	NR	NR	NR	NR	NR	NR
11:50	110.51	0.01	90	NR	NR	NR	NR	NR	NR
12:00	110.51	0.01	80	NR	NR	NR	NR	NR	NR
12:10	110.51	0.01	80	NR	NR	NR	NR	NR	NR
12:25	110.51	0.01	90	11 +	1,255 +	1.1	7.1	-19	159
12:40	110.51	0.01	110	10 +	1,274 +	0.6	7.1	-41	89
12:50	110.51	0.01	110	10 +	1,287 +	<0.5	7.1	-46	63
13:00	110.51	0.01	110	10 +	1,306 +	<0.5	7.0	-48	59
13:05	110.51	0.01	110	10 +	1,299 +	<0.5	7.0	-48	39
13:10	110.51	0.01	110	10 +	1,302 +	<0.5	7.0	-45	29
13:15	110.51	0.01	110	10 +	1,309 +	<0.5	7.0	-48	28

Well Sampling Worksheet
WWW RAP Field Data
AREA 5 2023-Q2 - AREA5-RI-9C
Kent County, MI

Well	AREA5-RI-9C / 2 in Diameter PVC
Sample Quarter	2023-Q2
Date	04/28/2023
Weather	Cloudy 54
Sampler Initials	NCK
Purging Device	Bladder-Pump: BP-10, Peristaltic-Pump: NA, Centrifugal-Pump: NA
Meters Used	YSI: Agile Rental 1, Turbidimeter: Agile Rental 1, Water-Level-Meter: WLM-3
Reference Measuring Point	PVC
Well Screen (ft bmp)	221.9 - 226.9
Measured Bottom Depth (ft bmp)	NR
Sample Comment	Bladder+ with generator and air compressor. 11:40 - Water observed to be turbid.
Initial Water Level Date/Time	04/28/2023 11:25
Initial Water Level Depth (ft bmp)	110.50
Pump/Tubing Intake Depth (ft bmp)	224.6
Tubing Length (ft)	230
Tubing Inner Diameter (in)	0.25
Purging Initiation Date/Time	04/28/2023 11:30
Total Purge Volume (gal)	3
Modified Sample	No
If Modified, Reasoning	
Sample Collection Information	Bottling-Start: 04/28/2023 13:30:00, Bottling-Stop: 04/28/2023 13:37:00, Parameters-Sampled: PFAS

Reading Time	Depth To Water (ft)	Cumulative Drawdown (ft)	Purge Rate (ml/min)	Temperature (deg c)	Specific Conductivity (us/cm)	Dissolved Oxygen (mg/l)	pH (su)	Oxidation-Reduction Potential (mV)	Turbidity (ntu)
13:20	110.51	0.01	110	10 +	1,306 +	<0.5	7.0	-48	24
13:25	110.51	0.01	110	10 +	1,312 +	<0.5	7.0	-49	21
13:30	110.51	0.01	110	10 +	1,314 +	<0.5	7.0	-49	22

Notes:

1) Abbreviations include: "deg c" indicates degrees Celsius; "ft" indicates feet; "ft bmp" indicates feet below reference measuring point; "gal" indicates gallons; "in" indicates inches; "mg/l" indicates milligrams per liter; "ml/min" indicates milliliters per minute; "mV" indicates millivolts; "NA" indicates not applicable; "NR" indicates not recorded; "ntu" indicates Nephelometric Turbidity units; "su" indicates standard units; "us/cm" indicates microsiemens per centimeter; and "+" indicates the parameter(s) may be used for stabilization calculations but cannot be used for other purposes.
2) Weather temperature units are in degrees Fahrenheit, unless otherwise noted.
3) Did indicator parameters reach stabilization? No
4) Was the two hour time limit reached? Yes
5) Calculations:
   - Head Above Pump Intake (ft) 114.10
   - Total Drawdown (ft) 0.01
   - Calculated Final Purge Volume (gal) NA
6) If Drawdown Did Not Stabilize or Stabilized Drawdown >0.3 ft, is Total Purge Volume > Calculated Final Purge Volume? NA

Well Sampling Worksheet
WWW RAP Field Data
AREA 5 2023-Q2 - AREA5-RI-11A
Kent County, MI

Well	AREA5-RI-11A / 2 in Diameter PVC
Sample Quarter	2023-Q2
Date	04/19/2023
Weather	38F Sunny
Sampler Initials	JET
Purging Device	Bladder-Pump: NA, Peristaltic-Pump: NA, Centrifugal-Pump: Mega Monsoon #1
Meters Used	YSI: Agile Rental 3, Turbidimeter: Agile Rental 1, Water-Level-Meter: WLM-2
Reference Measuring Point	PVC
Well Screen (ft bmp)	110.0 - 115.0
Measured Bottom Depth (ft bmp)	NR
Sample Comment	YSI Connected 12:00.
Initial Water Level Date/Time	04/19/2023 10:40
Initial Water Level Depth (ft bmp)	96.70
Pump/Tubing Intake Depth (ft bmp)	112.5
Tubing Length (ft)	114
Tubing Inner Diameter (in)	0.17
Purging Initiation Date/Time	04/19/2023 10:40
Total Purge Volume (gal)	11.1
Modified Sample	No
If Modified, Reasoning	
Sample Collection Information	Bottling-Start: 04/19/2023 12:45:00, Bottling-Stop: 04/19/2023 12:50:00, Parameters-Sampled: PFAS

Reading Time	Depth To Water (ft)	Cumulative Drawdown (ft)	Purge Rate (ml/min)	Temperature (deg c)	Specific Conductivity (us/cm)	Dissolved Oxygen (mg/l)	pH (su)	Oxidation-Reduction Potential (mV)	Turbidity (ntu)
10:50	96.72	0.02	350	NR	NR	NR	NR	NR	NR
11:10	96.72	0.02	350	NR	NR	NR	NR	NR	NR
11:20	96.72	0.02	350	NR	NR	NR	NR	NR	42
11:40	96.70	0.00	350	NR	NR	NR	NR	NR	16
12:00	96.70	0.00	350	12 +	630 +	<0.5	7.3	70	7
12:10	96.70	0.00	350	12 +	630 +	<0.5	7.3	40	6
12:15	96.70	0.00	350	12 +	631 +	<0.5	7.3	24	6
12:20	96.70	0.00	350	12 +	631 +	<0.5	7.3	14	6
12:25	96.70	0.00	350	12 +	631 +	<0.5	7.3	4	6

Well Sampling Worksheet
WWW RAP Field Data
AREA 5 2023-Q2 - AREA5-RI-11A
Kent County, MI

Well	AREA5-RI-11A / 2 in Diameter PVC
Sample Quarter	2023-Q2
Date	04/19/2023
Weather	38F Sunny
Sampler Initials	JET
Purging Device	Bladder-Pump: NA, Peristaltic-Pump: NA, Centrifugal-Pump: Mega Monsoon #1
Meters Used	YSI: Agile Rental 3, Turbidimeter: Agile Rental 1, Water-Level-Meter: WLM-2
Reference Measuring Point	PVC
Well Screen (ft bmp)	110.0 - 115.0
Measured Bottom Depth (ft bmp)	NR
Sample Comment	YSI Connected 12:00.
Initial Water Level Date/Time	04/19/2023 10:40
Initial Water Level Depth (ft bmp)	96.70
Pump/Tubing Intake Depth (ft bmp)	112.5
Tubing Length (ft)	114
Tubing Inner Diameter (in)	0.17
Purging Initiation Date/Time	04/19/2023 10:40
Total Purge Volume (gal)	11.1
Modified Sample	No
If Modified, Reasoning	
Sample Collection Information	Bottling-Start: 04/19/2023 12:45:00, Bottling-Stop: 04/19/2023 12:50:00, Parameters-Sampled: PFAS

Reading Time	Depth To Water (ft)	Cumulative Drawdown (ft)	Purge Rate (ml/min)	Temperature (deg c)	Specific Conductivity (us/cm)	Dissolved Oxygen (mg/l)	pH (su)	Oxidation-Reduction Potential (mV)	Turbidity (ntu)
12:30	96.70	0.00	350	12 +	631 +	<0.5	7.3	-6	5
12:35	96.70	0.00	350	12 +	632 +	<0.5	7.3	-12	<5
12:40	96.70	0.00	350	12 +	632 +	<0.5	7.3	-19	<5

Notes:

1) Abbreviations include: "deg c" indicates degrees Celsius; "ft" indicates feet; "ft bmp" indicates feet below reference measuring point; "gal" indicates gallons; "in" indicates inches; "mg/l" indicates milligrams per liter; "ml/min" indicates milliliters per minute; "mV" indicates millivolts; "NA" indicates not applicable; "NR" indicates not recorded; "ntu" indicates Nephelometric Turbidity units; "su" indicates standard units; "us/cm" indicates microsiemens per centimeter; and "+" indicates the parameter(s) may be used for stabilization calculations but cannot be used for other purposes.
2) Weather temperature units are in degrees Fahrenheit, unless otherwise noted.
3) Did indicator parameters reach stabilization? No
4) Was the two hour time limit reached? Yes
5) Calculations:
   - Head Above Pump Intake (ft) 15.80
   - Total Drawdown (ft) 0.00
   - Calculated Final Purge Volume (gal) NA
6) If Drawdown Did Not Stabilize or Stabilized Drawdown >0.3 ft, is Total Purge Volume > Calculated Final Purge Volume? NA

Well Sampling Worksheet
WWW RAP Field Data
AREA 5 2023-Q2 - AREA5-RI-11B
Kent County, MI

Well	AREA5-RI-11B / 2 in Diameter PVC
Sample Quarter	2023-Q2
Date	04/19/2023
Weather	38F Sunny
Sampler Initials	NCK
Purging Device	Bladder-Pump: NA, Peristaltic-Pump: NA, Centrifugal-Pump: Mega Monsoon #2
Meters Used	YSI: Agile Rental 1, Turbidimeter: Agile Rental 1, Water-Level-Meter: WLM-3
Reference Measuring Point	PVC
Well Screen (ft bmp)	140.0 - 145.0
Measured Bottom Depth (ft bmp)	NR
Sample Comment	10:40 to 11:10 SWL measured every 10 minutes then switched to recording with YSI. Maximum drawdown 0.02 ft. Water visibly turbid at beginning of purge.
Initial Water Level Date/Time	04/19/2023 10:40
Initial Water Level Depth (ft bmp)	96.32
Pump/Tubing Intake Depth (ft bmp)	142.5
Tubing Length (ft)	144.5
Tubing Inner Diameter (in)	0.17
Purging Initiation Date/Time	04/19/2023 10:40
Total Purge Volume (gal)	9
Modified Sample	No
If Modified, Reasoning	
Sample Collection Information	Bottling-Start: 04/19/2023 11:50:00, Bottling-Stop: 04/19/2023 11:54:00, Parameters-Sampled: PFAS

Reading Time	Depth To Water (ft)	Cumulative Drawdown (ft)	Purge Rate (ml/min)	Temperature (deg c)	Specific Conductivity (us/cm)	Dissolved Oxygen (mg/l)	pH (su)	Oxidation-Reduction Potential (mV)	Turbidity (ntu)
10:50	96.34	0.02	500	NR	NR	NR	NR	NR	NR
11:00	96.34	0.02	500	NR	NR	NR	NR	NR	NR
11:10	96.34	0.02	490	NR	NR	NR	NR	NR	NR
11:15	96.34	0.02	490	11 +	676 +	1.8	7.0	-4	10
11:30	96.34	0.02	490	11 +	676 +	0.6	7.1	-69	8
11:40	96.32	0.00	490	11 +	677 +	<0.5	7.1	-78	<5
11:45	96.32	0.00	490	11 +	676 +	<0.5	7.0	-82	<5
11:50	96.32	0.00	490	11 +	677 +	<0.5	7.1	-83	<5

Notes:

1) Abbreviations include: "deg c" indicates degrees Celsius; "ft" indicates feet; "ft bmp" indicates feet below reference measuring point; "gal" indicates gallons; "in" indicates inches; "mg/l" indicates milligrams per liter; "ml/min" indicates milliliters per minute; "mV" indicates millivolts; "NA" indicates not applicable; "NR" indicates not recorded; "ntu" indicates Nephelometric Turbidity units; "su" indicates standard units; "us/cm" indicates microsiemens per centimeter; and "+" indicates the parameter(s) may be used for stabilization calculations but cannot be used for other purposes.
2) Weather temperature units are in degrees Fahrenheit, unless otherwise noted.
3) Did indicator parameters reach stabilization? Yes
4) Was the two hour time limit reached? No
5) Calculations:
   - Head Above Pump Intake (ft) 46.18
   - Total Drawdown (ft) 0.00
   - Calculated Final Purge Volume (gal) NA
6) If Drawdown Did Not Stabilize or Stabilized Drawdown >0.3 ft, is Total Purge Volume > Calculated Final Purge Volume? NA

Well Sampling Worksheet
WWW RAP Field Data
AREA 5 2023-Q2 - AREA5-RI-11C
Kent County, MI

Well	AREA5-RI-11C / 2 in Diameter PVC
Sample Quarter	2023-Q2
Date	04/19/2023
Weather	38F Sunny
Sampler Initials	NCK
Purging Device	Bladder-Pump: BP-10, Peristaltic-Pump: NA, Centrifugal-Pump: NA
Meters Used	YSI: Agile Rental 1, Turbidimeter: Agile Rental 1, Water-Level-Meter: WLM-3
Reference Measuring Point	PVC
Well Screen (ft bmp)	232.5 - 237.5
Measured Bottom Depth (ft bmp)	NR
Sample Comment	No drawdown observed during pumping. 0.02 ft of drawdown observed during bladder refills. High turbidity observed at beginning of purge. Connected YSI at 15:20.
Initial Water Level Date/Time	04/19/2023 14:10
Initial Water Level Depth (ft bmp)	106.13
Pump/Tubing Intake Depth (ft bmp)	235
Tubing Length (ft)	238
Tubing Inner Diameter (in)	0.25
Purging Initiation Date/Time	04/19/2023 14:10
Total Purge Volume (gal)	2.2
Modified Sample	No
If Modified, Reasoning	
Sample Collection Information	Bottling-Start: 04/19/2023 16:10:00, Bottling-Stop: 04/19/2023 16:20:00, Parameters-Sampled: PFAS

Reading Time	Depth To Water (ft)	Cumulative Drawdown (ft)	Purge Rate (ml/min)	Temperature (deg c)	Specific Conductivity (us/cm)	Dissolved Oxygen (mg/l)	pH (su)	Oxidation-Reduction Potential (mV)	Turbidity (ntu)
14:20	106.13	0.00	NR	NR	NR	NR	NR	NR	NR
14:40	106.13	0.00	NR	NR	NR	NR	NR	NR	NR
15:00	106.13	0.00	NR	NR	NR	NR	NR	NR	NR
15:20	106.13	0.00	70	9 +	1,375 +	2.9	6.9	121	56
15:30	106.13	0.00	70	9 +	1,376 +	2.5	5.8	116	37
15:40	106.13	0.00	70	9 +	1,376 +	2.1	5.8	110	31
15:50	106.13	0.00	70	9 +	1,382 +	1.7	6.9	104	29
15:55	106.13	0.00	70	9 +	1,385 +	1.6	6.8	102	25
16:00	106.13	0.00	70	9 +	1,384 +	1.5	6.7	101	26
16:05	106.13	0.00	70	9 +	1,383 +	1.4	6.7	100	26
16:10	106.13	0.00	70	9 +	1,384 +	1.3	6.6	100	25

Notes:

1) Abbreviations include: "deg c" indicates degrees Celsius; "ft" indicates feet; "ft bmp" indicates feet below reference measuring point; "gal" indicates gallons; "in" indicates inches; "mg/l" indicates milligrams per liter; "ml/min" indicates milliliters per minute; "mV" indicates millivolts; "NA" indicates not applicable; "NR" indicates not recorded; "ntu" indicates Nephelometric Turbidity units; "su" indicates standard units; "us/cm" indicates microsiemens per centimeter; and "+" indicates the parameter(s) may be used for stabilization calculations but cannot be used for other purposes.
2) Weather temperature units are in degrees Fahrenheit, unless otherwise noted.
3) Did indicator parameters reach stabilization? Yes
4) Was the two hour time limit reached? Yes
5) Calculations:
   - Head Above Pump Intake (ft) 128.87
   - Total Drawdown (ft) 0.00
   - Calculated Final Purge Volume (gal) NA
6) If Drawdown Did Not Stabilize or Stabilized Drawdown >0.3 ft, is Total Purge Volume > Calculated Final Purge Volume? NA

Well Sampling Worksheet
WWW RAP Field Data
AREA 5 2023-Q2 - AREA5-RI-11D
Kent County, MI

Well	AREA5-RI-11D / 2 in Diameter PVC
Sample Quarter	2023-Q2
Date	04/19/2023
Weather	38F Sunny
Sampler Initials	JET
Purging Device	Bladder-Pump: BP-12, Peristaltic-Pump: NA, Centrifugal-Pump: NA
Meters Used	YSI: Agile Rental 3, Turbidimeter: Agile Rental 1, Water-Level-Meter: WLM-2
Reference Measuring Point	PVC
Well Screen (ft bmp)	262.0 - 267.0
Measured Bottom Depth (ft bmp)	NR
Sample Comment	14:45 SWL = 107.62 ft bmp and stabilized. YSI Connected at 16:00.
Initial Water Level Date/Time	04/19/2023 14:30
Initial Water Level Depth (ft bmp)	107.59
Pump/Tubing Intake Depth (ft bmp)	264.5
Tubing Length (ft)	267
Tubing Inner Diameter (in)	0.25
Purging Initiation Date/Time	04/19/2023 14:30
Total Purge Volume (gal)	6.3
Modified Sample	No
If Modified, Reasoning	
Sample Collection Information	Bottling-Start: 04/19/2023 16:35:00, Bottling-Stop: 04/19/2023 16:40:00, Parameters-Sampled: PFAS

Reading Time	Depth To Water (ft)	Cumulative Drawdown (ft)	Purge Rate (ml/min)	Temperature (deg c)	Specific Conductivity (us/cm)	Dissolved Oxygen (mg/l)	pH (su)	Oxidation-Reduction Potential (mV)	Turbidity (ntu)
14:45	107.62	0.03	200	NR	NR	NR	NR	NR	NR
15:00	107.62	0.03	200	NR	NR	NR	NR	NR	NR
15:15	107.62	0.03	200	NR	NR	NR	NR	NR	439
15:30	107.62	0.03	200	NR	NR	NR	NR	NR	235
15:45	107.62	0.03	200	NR	NR	NR	NR	NR	116
16:00	107.62	0.03	200	9 +	1,704 +	1.5	7.1	204	76
16:10	107.62	0.03	200	9 +	1,703 +	1.3	7.1	151	47
16:20	107.62	0.03	200	9 +	1,700 +	1.2	7.1	124	33
16:25	107.62	0.03	200	9 +	1,695 +	1.2	7.1	114	30
16:30	107.62	0.03	200	9 +	1,690 +	1.2	7.1	104	26

Notes:

1) Abbreviations include: "deg c" indicates degrees Celsius; "ft" indicates feet; "ft bmp" indicates feet below reference measuring point; "gal" indicates gallons; "in" indicates inches; "mg/l" indicates milligrams per liter; "ml/min" indicates milliliters per minute; "mV" indicates millivolts; "NA" indicates not applicable; "NR" indicates not recorded; "ntu" indicates Nephelometric Turbidity units; "su" indicates standard units; "us/cm" indicates microsiemens per centimeter; and "+" indicates the parameter(s) may be used for stabilization calculations but cannot be used for other purposes.
2) Weather temperature units are in degrees Fahrenheit, unless otherwise noted.
3) Did indicator parameters reach stabilization? No
4) Was the two hour time limit reached? Yes
5) Calculations:
   - Head Above Pump Intake (ft) 156.91
   - Total Drawdown (ft) 0.03
   - Calculated Final Purge Volume (gal) NA
6) If Drawdown Did Not Stabilize or Stabilized Drawdown >0.3 ft, is Total Purge Volume > Calculated Final Purge Volume? NA

Well Sampling Worksheet
WWW RAP Field Data
AREA 19 2023-Q2 - AREA19-MW-8A
Kent County, MI

Well	AREA19-MW-8A / 2 in Diameter PVC
Sample Quarter	2023-Q2
Date	06/19/2023
Weather	76 Sunny
Sampler Initials	WVK
Purging Device	Bladder-Pump: NA, Peristaltic-Pump: PER-1, Centrifugal-Pump: NA
Meters Used	YSI: Agile Rental 1, Turbidimeter: Agile Rental 1, Water-Level-Meter: WLM-2
Reference Measuring Point	PVC
Well Screen (ft bmp)	29.5 - 34.5
Measured Bottom Depth (ft bmp)	34.5
Sample Comment	Pump intake was adjusted based on the assumed bottom depth of 32 ft below ground surface. Bottom depth was later measured at 34.5 ft bmp. 11:45 - Purge water was observed to be clear and water level stabilized. 12:05 - YSI connected. Dissolved oxygen (DO) readings were observed to be fluctuating dramatically. DO and Oxidation-Reduction Potential readings were qualified due to the observed flucation in DO.
Initial Water Level Date/Time	06/19/2023 11:30
Initial Water Level Depth (ft bmp)	30.39
Pump/Tubing Intake Depth (ft bmp)	31
Tubing Length (ft)	38
Tubing Inner Diameter (in)	0.17
Purging Initiation Date/Time	06/19/2023 11:30
Total Purge Volume (gal)	3
Modified Sample	No
If Modified, Reasoning	
Sample Collection Information	Bottling-Start: 06/19/2023 13:45:00, Bottling-Stop: 06/19/2023 13:50:00, Parameters-Sampled: PFAS

Reading Time	Depth To Water (ft)	Cumulative Drawdown (ft)	Purge Rate (ml/min)	Temperature (deg c)	Specific Conductivity (us/cm)	Dissolved Oxygen (mg/l)	pH (su)	Oxidation-Reduction Potential (mV)	Turbidity (ntu)
11:35	30.40	0.01	80	NR	NR	NR	NR	NR	NR
11:45	30.40	0.01	80	NR	NR	NR	NR	NR	<5
11:55	30.40	0.01	80	NR	NR	NR	NR	NR	<5
12:05	30.40	0.01	80	15 +	467 +	13.9 +	8.0	174 +	<5
12:10	30.40	0.01	80	15 +	464 +	10.1 +	7.4	184 +	<5
12:15	30.40	0.01	80	15 +	463 +	7.4 +	7.4	190 +	<5
12:20	30.40	0.01	80	16 +	462 +	7.9 +	7.5	197 +	<5
12:25	30.40	0.01	80	15 +	461 +	8.2 +	7.5	202 +	<5
12:30	30.40	0.01	80	15 +	462 +	11.9 +	7.5	205 +	<5
12:35	30.40	0.01	80	15 +	461 +	8.7 +	7.6	205 +	<5
12:40	30.40	0.01	80	15 +	459 +	9.2 +	7.5	211 +	<5
12:45	30.40	0.01	80	15 +	460 +	7.6 +	7.5	213 +	<5
12:50	30.40	0.01	80	15 +	460 +	6.0 +	7.5	218 +	<5
12:55	30.40	0.01	80	15 +	458 +	7.5 +	7.6	220 +	<5
13:00	30.40	0.01	80	14 +	459 +	6.1 +	7.4	223 +	<5
13:05	30.40	0.01	80	14 +	460 +	10.6 +	7.6	223 +	<5
13:10	30.40	0.01	80	14 +	459 +	9.9 +	7.6	224 +	<5
13:15	30.40	0.01	80	14 +	459 +	9.1 +	7.6	225 +	<5
13:20	30.40	0.01	80	15 +	458 +	9.1 +	7.5	227 +	<5

Well Sampling Worksheet
WWW RAP Field Data
AREA 19 2023-Q2 - AREA19-MW-8A
Kent County, MI

Well	AREA19-MW-8A / 2 in Diameter PVC
Sample Quarter	2023-Q2
Date	06/19/2023
Weather	76 Sunny
Sampler Initials	WVK
Purging Device	Bladder-Pump: NA, Peristaltic-Pump: PER-1, Centrifugal-Pump: NA
Meters Used	YSI: Agile Rental 1, Turbidimeter: Agile Rental 1, Water-Level-Meter: WLM-2
Reference Measuring Point	PVC
Well Screen (ft bmp)	29.5 - 34.5
Measured Bottom Depth (ft bmp)	34.5
Sample Comment	Pump intake was adjusted based on the assumed bottom depth of 32 ft below ground surface. Bottom depth was later measured at 34.5 ft bmp. 11:45 - Purge water was observed to be clear and water level stabilized. 12:05 - YSI connected. Dissolved oxygen (DO) readings were observed to be fluctuating dramatically. DO and Oxidation-Reduction Potential readings were qualified due to the observed flucation in DO.
Initial Water Level Date/Time	06/19/2023 11:30
Initial Water Level Depth (ft bmp)	30.39
Pump/Tubing Intake Depth (ft bmp)	31
Tubing Length (ft)	38
Tubing Inner Diameter (in)	0.17
Purging Initiation Date/Time	06/19/2023 11:30
Total Purge Volume (gal)	3
Modified Sample	No
If Modified, Reasoning	
Sample Collection Information	Bottling-Start: 06/19/2023 13:45:00, Bottling-Stop: 06/19/2023 13:50:00, Parameters-Sampled: PFAS

Reading Time	Depth To Water (ft)	Cumulative Drawdown (ft)	Purge Rate (ml/min)	Temperature (deg c)	Specific Conductivity (us/cm)	Dissolved Oxygen (mg/l)	pH (su)	Oxidation-Reduction Potential (mV)	Turbidity (ntu)
13:25	30.40	0.01	80	14 +	457 +	8.9 +	7.6	228 +	<5
13:30	30.40	0.01	80	14 +	458 +	8.8 +	7.5	230 +	<5
13:35	30.40	0.01	80	15 +	457 +	8.9 +	7.5	230 +	<5

Notes:

1) Abbreviations include: "deg c" indicates degrees Celsius; "ft" indicates feet; "ft bmp" indicates feet below reference measuring point; "gal" indicates gallons; "in" indicates inches; "mg/l" indicates milligrams per liter; "ml/min" indicates milliliters per minute; "mV" indicates millivolts; "NA" indicates not applicable; "NR" indicates not recorded; "ntu" indicates Nephelometric Turbidity units; "su" indicates standard units; "us/cm" indicates microsiemens per centimeter; and "+" indicates the parameter(s) may be used for stabilization calculations but cannot be used for other purposes.
2) Weather temperature units are in degrees Fahrenheit, unless otherwise noted.
3) Did indicator parameters reach stabilization? Yes
4) Was the two hour time limit reached? Yes
5) Calculations:
   - Head Above Pump Intake (ft) 0.61
   - Total Drawdown (ft) 0.01
   - Calculated Final Purge Volume (gal) NA

Well Sampling Worksheet
WWW RAP Field Data
AREA 19 2023-Q2 - AREA19-MW-8B
Kent County, MI

Well	AREA19-MW-8B / 2 in Diameter PVC
Sample Quarter	2023-Q2
Date	06/19/2023
Weather	75F Sunny
Sampler Initials	RCP
Purging Device	Bladder-Pump: NA, Peristaltic-Pump: NA, Centrifugal-Pump: Mega Monsoon #1
Meters Used	YSI: Agile Rental 3, Turbidimeter: Agile Rental 3, Water-Level-Meter: WLM-2
Reference Measuring Point	PVC
Well Screen (ft bmp)	180.8 - 185.8
Measured Bottom Depth (ft bmp)	186.59
Sample Comment	Drawdown exceeded 0.3 ft at a purge rate of 50 ml/min. Purge water was visibly turbid. Bottom depth was not measured until after sampling. Pump was chosen based on well installation log in feet below ground surface. Because this is a stickup well, the pump depth was not within the well screen based on the pump electrical cord length. A bladder pump will be used at this well in the future.
Initial Water Level Date/Time	06/19/2023 11:30
Initial Water Level Depth (ft bmp)	93.85
Pump/Tubing Intake Depth (ft bmp)	172.5
Tubing Length (ft)	180
Tubing Inner Diameter (in)	0.17
Purging Initiation Date/Time	06/19/2023 11:30
Total Purge Volume (gal)	1.6
Modified Sample	No
If Modified, Reasoning	
Sample Collection Information	Bottling-Start: 06/19/2023 13:30:00, Bottling-Stop: 06/19/2023 13:35:00, Parameters-Sampled: PFAS

Reading Time	Depth To Water (ft)	Cumulative Drawdown (ft)	Purge Rate (ml/min)	Temperature (deg c)	Specific Conductivity (us/cm)	Dissolved Oxygen (mg/l)	pH (su)	Oxidation-Reduction Potential (mV)	Turbidity (ntu)
11:40	94.62	0.77	50	NR	NR	NR	NR	NR	NR
11:45	94.69	0.84	50	NR	NR	NR	NR	NR	NR
11:50	94.71	0.86	50	NR	NR	NR	NR	NR	NR
12:00	94.60	0.75	50	NR	NR	NR	NR	NR	NR
12:05	94.55	0.70	50	NR	NR	NR	NR	NR	NR
12:15	94.55	0.70	50	NR	NR	NR	NR	NR	NR
12:30	94.55	0.70	50	NR	NR	NR	NR	NR	>999
12:40	94.55	0.70	50	NR	NR	NR	NR	NR	>999
12:50	94.55	0.70	50	NR	NR	NR	NR	NR	>999
13:00	94.55	0.70	50	NR	NR	NR	NR	NR	>999
13:15	94.55	0.70	50	13 +	846 +	<0.5	8.3	-60	>999

Well Sampling Worksheet
WWW RAP Field Data
AREA 19 2023-Q2 - AREA19-MW-8B
Kent County, MI

Well	AREA19-MW-8B / 2 in Diameter PVC
Sample Quarter	2023-Q2
Date	06/19/2023
Weather	75F Sunny
Sampler Initials	RCP
Purging Device	Bladder-Pump: NA, Peristaltic-Pump: NA, Centrifugal-Pump: Mega Monsoon #1
Meters Used	YSI: Agile Rental 3, Turbidimeter: Agile Rental 3, Water-Level-Meter: WLM-2
Reference Measuring Point	PVC
Well Screen (ft bmp)	180.8 - 185.8
Measured Bottom Depth (ft bmp)	186.59
Sample Comment	Drawdown exceeded 0.3 ft at a purge rate of 50 ml/min. Purge water was visibly turbid. Bottom depth was not measured until after sampling. Pump was chosen based on well installation log in feet below ground surface. Because this is a stickup well, the pump depth was not within the well screen based on the pump electrical cord length. A bladder pump will be used at this well in the future.
Initial Water Level Date/Time	06/19/2023 11:30
Initial Water Level Depth (ft bmp)	93.85
Pump/Tubing Intake Depth (ft bmp)	172.5
Tubing Length (ft)	180
Tubing Inner Diameter (in)	0.17
Purging Initiation Date/Time	06/19/2023 11:30
Total Purge Volume (gal)	1.6
Modified Sample	No
If Modified, Reasoning	
Sample Collection Information	Bottling-Start: 06/19/2023 13:30:00, Bottling-Stop: 06/19/2023 13:35:00, Parameters-Sampled: PFAS

Reading Time	Depth To Water (ft)	Cumulative Drawdown (ft)	Purge Rate (ml/min)	Temperature (deg c)	Specific Conductivity (us/cm)	Dissolved Oxygen (mg/l)	pH (su)	Oxidation-Reduction Potential (mV)	Turbidity (ntu)
13:20	94.55	0.70	50	13 +	836 +	<0.5	8.3	-64	>999
13:25	94.55	0.70	50	13 +	835 +	<0.5	8.2	-65	>999
13:30	94.55	0.70	50	13 +	829 +	<0.5	8.2	-65	>999

Notes:

1) Abbreviations include: "deg c" indicates degrees Celsius; "ft" indicates feet; "ft bmp" indicates feet below reference measuring point; "gal" indicates gallons; "in" indicates inches; "mg/l" indicates milligrams per liter; "ml/min" indicates milliliters per minute; "mV" indicates millivolts; "NA" indicates not applicable; "NR" indicates not recorded; "ntu" indicates Nephelometric Turbidity units; "su" indicates standard units; "us/cm" indicates microsiemens per centimeter; and "+" indicates the parameter(s) may be used for stabilization calculations but cannot be used for other purposes.
2) Weather temperature units are in degrees Fahrenheit, unless otherwise noted.
3) Did indicator parameters reach stabilization? Yes * Turbidity Out of Range
4) Was the two hour time limit reached? Yes
5) Calculations:
   - Head Above Pump Intake (ft) 78.65
   - Total Drawdown (ft) 0.70
   - Calculated Final Purge Volume (gal) 0.33
6) If Drawdown Did Not Stabilize or Stabilized Drawdown >0.3 ft, is Total Purge Volume > Calculated Final Purge Volume? Yes

Well Sampling Worksheet
WWW RAP Field Data
AREA 19 2023-Q2 - AREA19-MW-8C
Kent County, MI

Well	AREA19-MW-8C / 2 in Diameter PVC
Sample Quarter	2023-Q2
Date	06/20/2023
Weather	Sunny and 75
Sampler Initials	WVK
Purging Device	Bladder-Pump: BP-10, Peristaltic-Pump: NA, Centrifugal-Pump: NA
Meters Used	YSI: Agile Rental 2, Turbidimeter: Agile Rental 2, Water-Level-Meter: WLM-4
Reference Measuring Point	PVC
Well Screen (ft bmp)	247.0 - 252.0
Measured Bottom Depth (ft bmp)	251
Sample Comment	14:25 - Purge water was observed to be very clear. 14:35 - Purge water turned chocolate brown. 14:50 - Purge water is slowly clearing up. 15:30 - YSI connected. Last 3 readings are not 5 minutes apart per the Standard Operating Procedure (SOP). GZA does not believe this impacts data quality.
Initial Water Level Date/Time	06/20/2023 14:20
Initial Water Level Depth (ft bmp)	116.51
Pump/Tubing Intake Depth (ft bmp)	247.5
Tubing Length (ft)	250
Tubing Inner Diameter (in)	0.25
Purging Initiation Date/Time	06/20/2023 14:20
Total Purge Volume (gal)	3.5
Modified Sample	No
If Modified, Reasoning	
Sample Collection Information	Bottling-Start: 06/20/2023 16:30:00, Bottling-Stop: 06/20/2023 16:35:00, Parameters-Sampled: PFAS

Reading Time	Depth To Water (ft)	Cumulative Drawdown (ft)	Purge Rate (ml/min)	Temperature (deg c)	Specific Conductivity (us/cm)	Dissolved Oxygen (mg/l)	pH (su)	Oxidation-Reduction Potential (mV)	Turbidity (ntu)
14:25	116.80	0.29	100	NR	NR	NR	NR	NR	22
14:35	116.67	0.16	100	NR	NR	NR	NR	NR	>999
14:50	116.62	0.11	100	NR	NR	NR	NR	NR	788
15:05	116.61	0.10	100	NR	NR	NR	NR	NR	259
15:20	116.58	0.07	100	NR	NR	NR	NR	NR	115
15:30	116.57	0.06	100	14 +	709 +	1.2	7.6	-97	88
15:40	116.54	0.03	100	13 +	700 +	0.6	7.5	-109	76
15:50	116.54	0.03	100	13 +	703 +	0.6	7.5	-110	70
15:55	116.54	0.03	100	12 +	708 +	0.6	7.5	-111	58
16:00	116.54	0.03	100	12 +	706 +	0.6	7.5	-110	77

Well Sampling Worksheet
WWW RAP Field Data
AREA 19 2023-Q2 - AREA19-MW-8C
Kent County, MI

Well	AREA19-MW-8C / 2 in Diameter PVC
Sample Quarter	2023-Q2
Date	06/20/2023
Weather	Sunny and 75
Sampler Initials	WVK
Purging Device	Bladder-Pump: BP-10, Peristaltic-Pump: NA, Centrifugal-Pump: NA
Meters Used	YSI: Agile Rental 2, Turbidimeter: Agile Rental 2, Water-Level-Meter: WLM-4
Reference Measuring Point	PVC
Well Screen (ft bmp)	247.0 - 252.0
Measured Bottom Depth (ft bmp)	251
Sample Comment	14:25 - Purge water was observed to be very clear. 14:35 - Purge water turned chocolate brown. 14:50 - Purge water is slowly clearing up. 15:30 - YSI connected. Last 3 readings are not 5 minutes apart per the Standard Operating Procedure (SOP). GZA does not believe this impacts data quality.
Initial Water Level Date/Time	06/20/2023 14:20
Initial Water Level Depth (ft bmp)	116.51
Pump/Tubing Intake Depth (ft bmp)	247.5
Tubing Length (ft)	250
Tubing Inner Diameter (in)	0.25
Purging Initiation Date/Time	06/20/2023 14:20
Total Purge Volume (gal)	3.5
Modified Sample	No
If Modified, Reasoning	
Sample Collection Information	Bottling-Start: 06/20/2023 16:30:00, Bottling-Stop: 06/20/2023 16:35:00, Parameters-Sampled: PFAS

Reading Time	Depth To Water (ft)	Cumulative Drawdown (ft)	Purge Rate (ml/min)	Temperature (deg c)	Specific Conductivity (us/cm)	Dissolved Oxygen (mg/l)	pH (su)	Oxidation-Reduction Potential (mV)	Turbidity (ntu)
16:05	116.54	0.03	100	12 +	707 +	0.5	7.5	-113	85
16:10	116.54	0.03	100	12 +	709 +	0.5	7.5	-113	100
16:20	116.54	0.03	100	12 +	709 +	0.5	7.5	-115	125

Notes:

1) Abbreviations include: "deg c" indicates degrees Celsius; "ft" indicates feet; "ft bmp" indicates feet below reference measuring point; "gal" indicates gallons; "in" indicates inches; "mg/l" indicates milligrams per liter; "ml/min" indicates milliliters per minute; "mV" indicates millivolts; "NA" indicates not applicable; "NR" indicates not recorded; "ntu" indicates Nephelometric Turbidity units; "su" indicates standard units; "us/cm" indicates microsiemens per centimeter; and "+" indicates the parameter(s) may be used for stabilization calculations but cannot be used for other purposes.
2) Weather temperature units are in degrees Fahrenheit, unless otherwise noted.
3) Did indicator parameters reach stabilization? No
4) Was the two hour time limit reached? Yes
5) Calculations:
   - Head Above Pump Intake (ft) 130.99
   - Total Drawdown (ft) 0.03
   - Calculated Final Purge Volume (gal) NA
6) If Drawdown Did Not Stabilize or Stabilized Drawdown >0.3 ft, is Total Purge Volume > Calculated Final Purge Volume? NA

Well Sampling Worksheet
WWW RAP Field Data
AREA 19 2023-Q2 - AREA19-MW-9A
Kent County, MI

Well	AREA19-MW-9A / 2 in Diameter PVC
Sample Quarter	2023-Q2
Date	06/14/2023
Weather	Sunny 72
Sampler Initials	RCP
Purging Device	Bladder-Pump: NA, Peristaltic-Pump: PER-2, Centrifugal-Pump: NA
Meters Used	YSI: Agile Rental 3, Turbidimeter: Agile Rental 3, Water-Level-Meter: WLM-3
Reference Measuring Point	PVC
Well Screen (ft bmp)	18.8 - 23.8
Measured Bottom Depth (ft bmp)	23.8
Sample Comment	15:05 - Lowered pump speed. YSI Connected at 15:20. Last 3 water level readings were not the same per Standard Operating Procedure (SOP). Water level meters are considered accurate to +/- 0.01 feet and last 3 readings were within this range. GZA does not believe this impacts data quality.
Initial Water Level Date/Time	06/14/2023 14:55
Initial Water Level Depth (ft bmp)	4.49
Pump/Tubing Intake Depth (ft bmp)	21.5
Tubing Length (ft)	24
Tubing Inner Diameter (in)	0.17
Purging Initiation Date/Time	06/14/2023 15:00
Total Purge Volume (gal)	3.3
Modified Sample	No
If Modified, Reasoning	
Sample Collection Information	Bottling-Start: 06/14/2023 16:10:00, Bottling-Stop: 06/14/2023 16:15:00, Parameters-Sampled: PFAS

Reading Time	Depth To Water (ft)	Cumulative Drawdown (ft)	Purge Rate (ml/min)	Temperature (deg c)	Specific Conductivity (us/cm)	Dissolved Oxygen (mg/l)	pH (su)	Oxidation-Reduction Potential (mV)	Turbidity (ntu)
15:05	4.95	0.46	NR	NR	NR	NR	NR	NR	NR
15:10	4.81	0.32	190	NR	NR	NR	NR	NR	NR
15:15	4.80	0.31	190	NR	NR	NR	NR	NR	<5
15:20	4.80	0.31	190	12 +	679	2.3	7.5	151	<5
15:25	4.80	0.31	190	11 +	680	2.3	7.5	140	<5
15:30	4.80	0.31	190	12 +	681	1.8	7.5	138	<5
15:35	4.81	0.32	190	12 +	682	1.7	7.4	134	<5
15:40	4.81	0.32	190	12 +	684	1.9	7.4	141	<5
15:45	4.81	0.32	190	12 +	686	1.7	7.4	137	<5
15:50	4.81	0.32	190	12 +	690	1.6	7.4	130	<5

Well Sampling Worksheet
WWW RAP Field Data
AREA 19 2023-Q2 - AREA19-MW-9A
Kent County, MI

Well	AREA19-MW-9A / 2 in Diameter PVC
Sample Quarter	2023-Q2
Date	06/14/2023
Weather	Sunny 72
Sampler Initials	RCP
Purging Device	Bladder-Pump: NA, Peristaltic-Pump: PER-2, Centrifugal-Pump: NA
Meters Used	YSI: Agile Rental 3, Turbidimeter: Agile Rental 3, Water-Level-Meter: WLM-3
Reference Measuring Point	PVC
Well Screen (ft bmp)	18.8 - 23.8
Measured Bottom Depth (ft bmp)	23.8
Sample Comment	15:05 - Lowered pump speed. YSI Connected at 15:20. Last 3 water level readings were not the same per Standard Operating Procedure (SOP). Water level meters are considered accurate to +/- 0.01 feet and last 3 readings were within this range. GZA does not believe this impacts data quality.
Initial Water Level Date/Time	06/14/2023 14:55
Initial Water Level Depth (ft bmp)	4.49
Pump/Tubing Intake Depth (ft bmp)	21.5
Tubing Length (ft)	24
Tubing Inner Diameter (in)	0.17
Purging Initiation Date/Time	06/14/2023 15:00
Total Purge Volume (gal)	3.3
Modified Sample	No
If Modified, Reasoning	
Sample Collection Information	Bottling-Start: 06/14/2023 16:10:00, Bottling-Stop: 06/14/2023 16:15:00, Parameters-Sampled: PFAS

Reading Time	Depth To Water (ft)	Cumulative Drawdown (ft)	Purge Rate (ml/min)	Temperature (deg c)	Specific Conductivity (us/cm)	Dissolved Oxygen (mg/l)	pH (su)	Oxidation-Reduction Potential (mV)	Turbidity (ntu)
15:55	4.82	0.33	190	11 +	693	1.1	5.0	130	<5
16:00	4.82	0.33	190	11 +	695	1.0	4.9	131	<5
16:05	4.83	0.34	190	11 +	695	1.0	4.9	131	<5

Notes:

1) Abbreviations include: "deg c" indicates degrees Celsius; "ft" indicates feet; "ft bmp" indicates feet below reference measuring point; "gal" indicates gallons; "in" indicates inches; "mg/l" indicates milligrams per liter; "ml/min" indicates milliliters per minute; "mV" indicates millivolts; "NA" indicates not applicable; "NR" indicates not recorded; "ntu" indicates Nephelometric Turbidity units; "su" indicates standard units; "us/cm" indicates microsiemens per centimeter; and "+" indicates the parameter(s) may be used for stabilization calculations but cannot be used for other purposes.
2) Weather temperature units are in degrees Fahrenheit, unless otherwise noted.
3) Did indicator parameters reach stabilization? Yes
4) Was the two hour time limit reached? No
5) Calculations:
   - Head Above Pump Intake (ft) 17.01
   - Total Drawdown (ft) 0.34
   - Calculated Final Purge Volume (gal) 0.08
6) If Drawdown Did Not Stabilize or Stabilized Drawdown >0.3 ft, is Total Purge Volume > Calculated Final Purge Volume? Yes

Well Sampling Worksheet
WWW RAP Field Data
AREA 19 2023-Q2 - AREA19-MW-9B
Kent County, MI

Well	AREA19-MW-9B / 2 in Diameter PVC
Sample Quarter	2023-Q2
Date	06/15/2023
Weather	Cloudy 70
Sampler Initials	WVK
Purging Device	Bladder-Pump: BP-10, Peristaltic-Pump: NA, Centrifugal-Pump: NA
Meters Used	YSI: Agile Rental 2, Turbidimeter: Agile Rental 2, Water-Level-Meter: WLM-2
Reference Measuring Point	PVC
Well Screen (ft bmp)	93.0 - 98.0
Measured Bottom Depth (ft bmp)	NR
Sample Comment	14:45 - Water level stabilized and purge water was observed to be very clear. 15:55 - YSI connected.
Initial Water Level Date/Time	06/15/2023 14:35
Initial Water Level Depth (ft bmp)	59.55
Pump/Tubing Intake Depth (ft bmp)	95.5
Tubing Length (ft)	100
Tubing Inner Diameter (in)	0.17
Purging Initiation Date/Time	06/15/2023 14:40
Total Purge Volume (gal)	5.15
Modified Sample	No
If Modified, Reasoning	
Sample Collection Information	Bottling-Start: 06/15/2023 16:25:00, Bottling-Stop: 06/15/2023 16:30:00, Parameters-Sampled: PFAS

Reading Time	Depth To Water (ft)	Cumulative Drawdown (ft)	Purge Rate (ml/min)	Temperature (deg c)	Specific Conductivity (us/cm)	Dissolved Oxygen (mg/l)	pH (su)	Oxidation-Reduction Potential (mV)	Turbidity (ntu)
14:45	59.56	0.01	400	NR	NR	NR	NR	NR	NR
14:55	59.53	-0.02	300	NR	NR	NR	NR	NR	NR
15:05	59.53	-0.02	300	NR	NR	NR	NR	NR	71
15:15	59.53	-0.02	300	NR	NR	NR	NR	NR	58
15:35	59.53	-0.02	300	NR	NR	NR	NR	NR	55
15:45	59.53	-0.02	300	NR	NR	NR	NR	NR	51
16:00	59.53	-0.02	300	12 +	590 +	2.4	7.7	-30	37
16:05	59.53	-0.02	300	12 +	592 +	2.3	7.7	-27	35

Well Sampling Worksheet
WWW RAP Field Data
AREA 19 2023-Q2 - AREA19-MW-9B
Kent County, MI

Well	AREA19-MW-9B / 2 in Diameter PVC
Sample Quarter	2023-Q2
Date	06/15/2023
Weather	Cloudy 70
Sampler Initials	WVK
Purging Device	Bladder-Pump: BP-10, Peristaltic-Pump: NA, Centrifugal-Pump: NA
Meters Used	YSI: Agile Rental 2, Turbidimeter: Agile Rental 2, Water-Level-Meter: WLM-2
Reference Measuring Point	PVC
Well Screen (ft bmp)	93.0 - 98.0
Measured Bottom Depth (ft bmp)	NR
Sample Comment	14:45 - Water level stabilized and purge water was observed to be very clear. 15:55 - YSI connected.
Initial Water Level Date/Time	06/15/2023 14:35
Initial Water Level Depth (ft bmp)	59.55
Pump/Tubing Intake Depth (ft bmp)	95.5
Tubing Length (ft)	100
Tubing Inner Diameter (in)	0.17
Purging Initiation Date/Time	06/15/2023 14:40
Total Purge Volume (gal)	5.15
Modified Sample	No
If Modified, Reasoning	
Sample Collection Information	Bottling-Start: 06/15/2023 16:25:00, Bottling-Stop: 06/15/2023 16:30:00, Parameters-Sampled: PFAS

Reading Time	Depth To Water (ft)	Cumulative Drawdown (ft)	Purge Rate (ml/min)	Temperature (deg c)	Specific Conductivity (us/cm)	Dissolved Oxygen (mg/l)	pH (su)	Oxidation-Reduction Potential (mV)	Turbidity (ntu)
16:10	59.53	-0.02	300	12 +	591 +	2.3	7.7	-26	37
16:15	59.53	-0.02	300	12 +	589 +	2.3	7.7	-25	36
16:20	59.53	-0.02	300	11 +	590 +	2.3	7.7	-26	39

Notes:

1) Abbreviations include: "deg c" indicates degrees Celsius; "ft" indicates feet; "ft bmp" indicates feet below reference measuring point; "gal" indicates gallons; "in" indicates inches; "mg/l" indicates milligrams per liter; "ml/min" indicates milliliters per minute; "mV" indicates millivolts; "NA" indicates not applicable; "NR" indicates not recorded; "ntu" indicates Nephelometric Turbidity units; "su" indicates standard units; "us/cm" indicates microsiemens per centimeter; and "+" indicates the parameter(s) may be used for stabilization calculations but cannot be used for other purposes.
2) Weather temperature units are in degrees Fahrenheit, unless otherwise noted.
3) Did indicator parameters reach stabilization? Yes
4) Was the two hour time limit reached? No
5) Calculations:
   - Head Above Pump Intake (ft): 35.95
   - Total Drawdown (ft): -0.02
   - Calculated Final Purge Volume (gal): NA
6) If Drawdown Did Not Stabilize or Stabilized Drawdown >0.3 ft, is Total Purge Volume > Calculated Final Purge Volume? NA

Well Sampling Worksheet
WWW RAP Field Data
AREA 19 2023-Q2 - AREA19-MW-9C
Kent County, MI

Well	AREA19-MW-9C / 2 in Diameter PVC
Sample Quarter	2023-Q2
Date	06/15/2023
Weather	Cloudy 70F
Sampler Initials	RCP
Purging Device	Bladder-Pump: BP-12, Peristaltic-Pump: NA, Centrifugal-Pump: NA
Meters Used	YSI: Agile Rental 3, Turbidimeter: Agile Rental 3, Water-Level-Meter: WLM-3
Reference Measuring Point	PVC
Well Screen (ft bmp)	157.0 - 162.0
Measured Bottom Depth (ft bmp)	NR
Sample Comment	15:10 - Static water level slow to stabilize. Increased fill time. 15:15 - Increased discharge time. YSI Connected at 15:55. Static water level did stabilize. This well should be vented or unplugged before sampling in the future.
Initial Water Level Date/Time	06/15/2023 14:55
Initial Water Level Depth (ft bmp)	56.88
Pump/Tubing Intake Depth (ft bmp)	159
Tubing Length (ft)	163
Tubing Inner Diameter (in)	0.25
Purging Initiation Date/Time	06/15/2023 15:00
Total Purge Volume (gal)	2
Modified Sample	No
If Modified, Reasoning	
Sample Collection Information	Bottling-Start: 06/15/2023 17:00:00, Bottling-Stop: 06/15/2023 17:02:00, Parameters-Sampled: PFAS

Reading Time	Depth To Water (ft)	Cumulative Drawdown (ft)	Purge Rate (ml/min)	Temperature (deg c)	Specific Conductivity (us/cm)	Dissolved Oxygen (mg/l)	pH (su)	Oxidation-Reduction Potential (mV)	Turbidity (ntu)
15:10	57.38	0.50	30	NR	NR	NR	NR	NR	NR
15:15	57.16	0.28	25	NR	NR	NR	NR	NR	NR
15:25	57.89	1.01	210	NR	NR	NR	NR	NR	NR
15:30	58.09	1.21	210	NR	NR	NR	NR	NR	NR
15:40	58.14	1.26	210	NR	NR	NR	NR	NR	NR
15:45	58.14	1.26	210	NR	NR	NR	NR	NR	7
15:55	58.14	1.26	210	11 +	352	<0.5	8.4	126	8
16:00	58.14	1.26	210	11 +	352	<0.5	8.5	62	8
16:05	58.14	1.26	210	11 +	352	<0.5	8.4	23	8
16:10	58.14	1.26	210	11 +	353	<0.5	8.4	-5	6
16:15	58.14	1.26	210	11 +	357	<0.5	8.4	-54	<5
16:20	58.14	1.26	210	11 +	361	<0.5	8.3	-79	<5
16:25	58.14	1.26	210	11 +	362	<0.5	8.3	-97	<5
16:30	58.14	1.26	210	11 +	366	<0.5	8.3	-113	<5
16:35	58.14	1.26	210	11 +	368	<0.5	8.2	-127	<5
16:40	58.14	1.26	210	11 +	370	<0.5	8.2	-134	<5

Well Sampling Worksheet
WWW RAP Field Data
AREA 19 2023-Q2 - AREA19-MW-9C
Kent County, MI

Well	AREA19-MW-9C / 2 in Diameter PVC
Sample Quarter	2023-Q2
Date	06/15/2023
Weather	Cloudy 70F
Sampler Initials	RCP
Purging Device	Bladder-Pump: BP-12, Peristaltic-Pump: NA, Centrifugal-Pump: NA
Meters Used	YSI: Agile Rental 3, Turbidimeter: Agile Rental 3, Water-Level-Meter: WLM-3
Reference Measuring Point	PVC
Well Screen (ft bmp)	157.0 - 162.0
Measured Bottom Depth (ft bmp)	NR
Sample Comment	15:10 - Static water level slow to stabilize. Increased fill time. 15:15 - Increased discharge time. YSI Connected at 15:55. Static water level did stabilize. This well should be vented or unplugged before sampling in the future.
Initial Water Level Date/Time	06/15/2023 14:55
Initial Water Level Depth (ft bmp)	56.88
Pump/Tubing Intake Depth (ft bmp)	159
Tubing Length (ft)	163
Tubing Inner Diameter (in)	0.25
Purging Initiation Date/Time	06/15/2023 15:00
Total Purge Volume (gal)	2
Modified Sample	No
If Modified, Reasoning	
Sample Collection Information	Bottling-Start: 06/15/2023 17:00:00, Bottling-Stop: 06/15/2023 17:02:00, Parameters-Sampled: PFAS

Reading Time	Depth To Water (ft)	Cumulative Drawdown (ft)	Purge Rate (ml/min)	Temperature (deg c)	Specific Conductivity (us/cm)	Dissolved Oxygen (mg/l)	pH (su)	Oxidation-Reduction Potential (mV)	Turbidity (ntu)
16:45	58.14	1.26	210	11 +	372	<0.5	8.2	-142	<5
16:50	58.14	1.26	210	11 +	373	<0.5	8.2	-147	<5
16:55	58.14	1.26	210	11 +	374	<0.5	8.2	-151	<5

Notes:

1) Abbreviations include: "deg c" indicates degrees Celsius; "ft" indicates feet; "ft bmp" indicates feet below reference measuring point; "gal" indicates gallons; "in" indicates inches; "mg/l" indicates milligrams per liter; "ml/min" indicates milliliters per minute; "mV" indicates millivolts; "NA" indicates not applicable; "NR" indicates not recorded; "ntu" indicates Nephelometric Turbidity units; "su" indicates standard units; "us/cm" indicates microsiemens per centimeter; and "+" indicates the parameter(s) may be used for stabilization calculations but cannot be used for other purposes.
2) Weather temperature units are in degrees Fahrenheit, unless otherwise noted.
3) Did indicator parameters reach stabilization? Yes
4) Was the two hour time limit reached? Yes
5) Calculations:
   - Head Above Pump Intake (ft) 102.12
   - Total Drawdown (ft) 1.26
   - Calculated Final Purge Volume (gal) 0.63
6) If Drawdown Did Not Stabilize or Stabilized Drawdown >0.3 ft, is Total Purge Volume > Calculated Final Purge Volume? Yes

Well Sampling Worksheet
WWW RAP Field Data
AREA 19 2023-Q2 - AREA19-MW-15A
Kent County, MI

Well	AREA19-MW-15A / 2 in Diameter PVC
Sample Quarter	2023-Q2
Date	06/16/2023
Weather	59F Partly Cloudy
Sampler Initials	WVK
Purging Device	Bladder-Pump: BP-10, Peristaltic-Pump: NA, Centrifugal-Pump: NA
Meters Used	YSI: Agile Rental 2, Turbidimeter: Agile Rental 2, Water-Level-Meter: WLM-2
Reference Measuring Point	PVC
Well Screen (ft bmp)	44.5 - 49.5
Measured Bottom Depth (ft bmp)	NR
Sample Comment	10:30 - Water level dropped quickly. Adjusted pump accordingly. Purge water observed to be clear. 10:40 - Still drawing down. Worked to adjust/lower purge rate. 11:25 - YSI Connected. 12:15 - Water level stabilized.
Initial Water Level Date/Time	06/16/2023 10:20
Initial Water Level Depth (ft bmp)	41.80
Pump/Tubing Intake Depth (ft bmp)	47.5
Tubing Length (ft)	50
Tubing Inner Diameter (in)	0.25
Purging Initiation Date/Time	06/16/2023 10:25
Total Purge Volume (gal)	2
Modified Sample	No
If Modified, Reasoning	
Sample Collection Information	Bottling-Start: 06/16/2023 12:30:00, Bottling-Stop: 06/16/2023 12:35:00, Parameters-Sampled: PFAS

Reading Time	Depth To Water (ft)	Cumulative Drawdown (ft)	Purge Rate (ml/min)	Temperature (deg c)	Specific Conductivity (us/cm)	Dissolved Oxygen (mg/l)	pH (su)	Oxidation-Reduction Potential (mV)	Turbidity (ntu)
10:30	42.38	0.58	475	NR	NR	NR	NR	NR	NR
10:40	43.14	1.34	150	NR	NR	NR	NR	NR	NR
10:55	43.28	1.48	50	NR	NR	NR	NR	NR	NR
11:05	43.15	1.35	50	NR	NR	NR	NR	NR	<5
11:15	43.17	1.37	50	NR	NR	NR	NR	NR	<5
11:25	43.17	1.37	50	NR	NR	NR	NR	NR	<5
11:35	43.16	1.36	50	13 +	772 +	4.9	7.4	5	<5
11:45	43.17	1.37	50	12 +	772 +	4.0	7.4	-45	14
11:55	43.20	1.40	50	12 +	761 +	4.9	7.4	-10	8
12:05	43.20	1.40	50	13 +	759 +	4.8	7.5	-2	5

Well Sampling Worksheet
WWW RAP Field Data
AREA 19 2023-Q2 - AREA19-MW-15A
Kent County, MI

Well	AREA19-MW-15A / 2 in Diameter PVC
Sample Quarter	2023-Q2
Date	06/16/2023
Weather	59F Partly Cloudy
Sampler Initials	WVK
Purging Device	Bladder-Pump: BP-10, Peristaltic-Pump: NA, Centrifugal-Pump: NA
Meters Used	YSI: Agile Rental 2, Turbidimeter: Agile Rental 2, Water-Level-Meter: WLM-2
Reference Measuring Point	PVC
Well Screen (ft bmp)	44.5 - 49.5
Measured Bottom Depth (ft bmp)	NR
Sample Comment	10:30 - Water level dropped quickly. Adjusted pump accordingly. Purge water observed to be clear. 10:40 - Still drawing down. Worked to adjust/lower purge rate. 11:25 - YSI Connected. 12:15 - Water level stabilized.
Initial Water Level Date/Time	06/16/2023 10:20
Initial Water Level Depth (ft bmp)	41.80
Pump/Tubing Intake Depth (ft bmp)	47.5
Tubing Length (ft)	50
Tubing Inner Diameter (in)	0.25
Purging Initiation Date/Time	06/16/2023 10:25
Total Purge Volume (gal)	2
Modified Sample	No
If Modified, Reasoning	
Sample Collection Information	Bottling-Start: 06/16/2023 12:30:00, Bottling-Stop: 06/16/2023 12:35:00, Parameters-Sampled: PFAS

Reading Time	Depth To Water (ft)	Cumulative Drawdown (ft)	Purge Rate (ml/min)	Temperature (deg c)	Specific Conductivity (us/cm)	Dissolved Oxygen (mg/l)	pH (su)	Oxidation-Reduction Potential (mV)	Turbidity (ntu)
12:15	43.20	1.40	50	13 +	762 +	5.1	7.5	-3	<5
12:20	43.20	1.40	50	13 +	758 +	5.0	7.5	-3	<5
12:25	43.20	1.40	50	13 +	756 +	4.8	7.5	-3	<5

Notes:

1) Abbreviations include: "deg c" indicates degrees Celsius; "ft" indicates feet; "ft bmp" indicates feet below reference measuring point; "gal" indicates gallons; "in" indicates inches; "mg/l" indicates milligrams per liter; "ml/min" indicates milliliters per minute; "mV" indicates millivolts; "NA" indicates not applicable; "NR" indicates not recorded; "ntu" indicates Nephelometric Turbidity units; "su" indicates standard units; "us/cm" indicates microsiemens per centimeter; and "+" indicates the parameter(s) may be used for stabilization calculations but cannot be used for other purposes.
2) Weather temperature units are in degrees Fahrenheit, unless otherwise noted.
3) Did indicator parameters reach stabilization? Yes
4) Was the two hour time limit reached? Yes
5) Calculations:
   - Head Above Pump Intake (ft) 5.70
   - Total Drawdown (ft) 1.40
   - Calculated Final Purge Volume (gal) 0.35
6) If Drawdown Did Not Stabilize or Stabilized Drawdown >0.3 ft, is Total Purge Volume > Calculated Final Purge Volume? Yes

Well Sampling Worksheet
WWW RAP Field Data
AREA 19 2023-Q2 - AREA19-MW-15B
Kent County, MI

Well	AREA19-MW-15B / 2 in Diameter PVC
Sample Quarter	2023-Q2
Date	06/16/2023
Weather	59F Partly Cloudy
Sampler Initials	RCP
Purging Device	Bladder-Pump: BP-11, Peristaltic-Pump: NA, Centrifugal-Pump: NA
Meters Used	YSI: Agile Rental 3, Turbidimeter: Agile Rental 3, Water-Level-Meter: WLM-2
Reference Measuring Point	PVC
Well Screen (ft bmp)	128.6 - 133.6
Measured Bottom Depth (ft bmp)	NR
Sample Comment	YSI Connected at 12:45
Initial Water Level Date/Time	06/16/2023 11:15
Initial Water Level Depth (ft bmp)	99.87
Pump/Tubing Intake Depth (ft bmp)	131.1
Tubing Length (ft)	136
Tubing Inner Diameter (in)	0.25
Purging Initiation Date/Time	06/16/2023 11:20
Total Purge Volume (gal)	2.5
Modified Sample	No
If Modified, Reasoning	
Sample Collection Information	Bottling-Start: 06/16/2023 13:25:00, Bottling-Stop: 06/16/2023 13:30:00, Parameters-Sampled: PFAS

Reading Time	Depth To Water (ft)	Cumulative Drawdown (ft)	Purge Rate (ml/min)	Temperature (deg c)	Specific Conductivity (us/cm)	Dissolved Oxygen (mg/l)	pH (su)	Oxidation-Reduction Potential (mV)	Turbidity (ntu)
11:25	99.96	0.09	70	NR	NR	NR	NR	NR	NR
11:35	99.96	0.09	70	NR	NR	NR	NR	NR	NR
11:40	99.96	0.09	70	NR	NR	NR	NR	NR	NR
11:45	99.96	0.09	70	NR	NR	NR	NR	NR	38
11:50	99.96	0.09	70	NR	NR	NR	NR	NR	44
11:55	99.96	0.09	70	NR	NR	NR	NR	NR	42
12:05	99.96	0.09	70	NR	NR	NR	NR	NR	47
12:15	99.96	0.09	70	NR	NR	NR	NR	NR	29
12:25	99.96	0.09	70	NR	NR	NR	NR	NR	17
12:40	99.96	0.09	70	NR	NR	NR	NR	NR	14
12:45	99.96	0.09	70	16 +	1,019 +	<0.5	8.2	147	12
12:50	99.96	0.09	70	16 +	1,019 +	<0.5	8.2	108	13
12:55	99.96	0.09	70	15 +	1,026 +	<0.5	8.2	80	15
13:00	99.96	0.09	70	16 +	1,027 +	<0.5	8.2	56	16
13:05	99.96	0.09	70	16 +	1,043 +	<0.5	8.2	40	16

Well Sampling Worksheet
WWW RAP Field Data
AREA 19 2023-Q2 - AREA19-MW-15B
Kent County, MI

Well	AREA19-MW-15B / 2 in Diameter PVC
Sample Quarter	2023-Q2
Date	06/16/2023
Weather	59F Partly Cloudy
Sampler Initials	RCP
Purging Device	Bladder-Pump: BP-11, Peristaltic-Pump: NA, Centrifugal-Pump: NA
Meters Used	YSI: Agile Rental 3, Turbidimeter: Agile Rental 3, Water-Level-Meter: WLM-2
Reference Measuring Point	PVC
Well Screen (ft bmp)	128.6 - 133.6
Measured Bottom Depth (ft bmp)	NR
Sample Comment	YSI Connected at 12:45
Initial Water Level Date/Time	06/16/2023 11:15
Initial Water Level Depth (ft bmp)	99.87
Pump/Tubing Intake Depth (ft bmp)	131.1
Tubing Length (ft)	136
Tubing Inner Diameter (in)	0.25
Purging Initiation Date/Time	06/16/2023 11:20
Total Purge Volume (gal)	2.5
Modified Sample	No
If Modified, Reasoning	
Sample Collection Information	Bottling-Start: 06/16/2023 13:25:00, Bottling-Stop: 06/16/2023 13:30:00, Parameters-Sampled: PFAS

Reading Time	Depth To Water (ft)	Cumulative Drawdown (ft)	Purge Rate (ml/min)	Temperature (deg c)	Specific Conductivity (us/cm)	Dissolved Oxygen (mg/l)	pH (su)	Oxidation-Reduction Potential (mV)	Turbidity (ntu)
13:10	99.96	0.09	70	16 +	1,053 +	<0.5	8.2	22	19
13:15	99.96	0.09	70	16 +	1,051 +	<0.5	8.2	10	20
13:20	99.96	0.09	70	16 +	1,066 +	<0.5	8.2	-1	21

Notes:

1) Abbreviations include: "deg c" indicates degrees Celsius; "ft" indicates feet; "ft bmp" indicates feet below reference measuring point; "gal" indicates gallons; "in" indicates inches; "mg/l" indicates milligrams per liter; "ml/min" indicates milliliters per minute; "mV" indicates millivolts; "NA" indicates not applicable; "NR" indicates not recorded; "ntu" indicates Nephelometric Turbidity units; "su" indicates standard units; "us/cm" indicates microsiemens per centimeter; and "+" indicates the parameter(s) may be used for stabilization calculations but cannot be used for other purposes.
2) Weather temperature units are in degrees Fahrenheit, unless otherwise noted.
3) Did indicator parameters reach stabilization? No
4) Was the two hour time limit reached? Yes
5) Calculations:
   - Head Above Pump Intake (ft): 31.23
   - Total Drawdown (ft): 0.09
   - Calculated Final Purge Volume (gal): NA
6) If Drawdown Did Not Stabilize or Stabilized Drawdown >0.3 ft, is Total Purge Volume > Calculated Final Purge Volume? NA

Well Sampling Worksheet
WWW RAP Field Data
AREA 19 2023-Q2 - AREA19-MW-15C
Kent County, MI

Well	AREA19-MW-15C / 2 in Diameter PVC
Sample Quarter	2023-Q2
Date	06/16/2023
Weather	59F Partly Cloudy
Sampler Initials	NCK
Purging Device	Bladder-Pump: NA, Peristaltic-Pump: NA, Centrifugal-Pump: Mega Monsoon #2
Meters Used	YSI: Agile Rental 1, Turbidimeter: Agile Rental 1, Water-Level-Meter: WLM-3
Reference Measuring Point	PVC
Well Screen (ft bmp)	164.2 - 169.2
Measured Bottom Depth (ft bmp)	NR
Sample Comment	Water was observed to be very turbid for the duration of the purge. YSI Connected at 12:25.
Initial Water Level Date/Time	06/16/2023 10:35
Initial Water Level Depth (ft bmp)	99.98
Pump/Tubing Intake Depth (ft bmp)	166.7
Tubing Length (ft)	170
Tubing Inner Diameter (in)	0.17
Purging Initiation Date/Time	06/16/2023 10:40
Total Purge Volume (gal)	3
Modified Sample	No
If Modified, Reasoning	
Sample Collection Information	Bottling-Start: 06/16/2023 12:40:00, Bottling-Stop: 06/16/2023 12:46:00, Parameters-Sampled: PFAS

Reading Time	Depth To Water (ft)	Cumulative Drawdown (ft)	Purge Rate (ml/min)	Temperature (deg c)	Specific Conductivity (us/cm)	Dissolved Oxygen (mg/l)	pH (su)	Oxidation-Reduction Potential (mV)	Turbidity (ntu)
10:50	100.11	0.13	60	NR	NR	NR	NR	NR	NR
11:00	100.10	0.12	60	NR	NR	NR	NR	NR	NR
11:30	100.10	0.12	60	NR	NR	NR	NR	NR	NR
12:00	100.10	0.12	60	NR	NR	NR	NR	NR	NR
12:25	100.10	0.12	60	12 +	507 +	1.1	7.5	-35	>999
12:30	100.10	0.12	60	12 +	505 +	1.0	7.6	-109	>999
12:35	100.10	0.12	60	13 +	504 +	0.6	7.6	-162	>999
12:40	100.10	0.12	60	12 +	505 +	<0.5	7.5	-178	>999

Notes:

1) Abbreviations include: "deg c" indicates degrees Celsius; "ft" indicates feet; "ft bmp" indicates feet below reference measuring point; "gal" indicates gallons; "in" indicates inches; "mg/l" indicates milligrams per liter; "ml/min" indicates milliliters per minute; "mV" indicates millivolts; "NA" indicates not applicable; "NR" indicates not recorded; "ntu" indicates Nephelometric Turbidity units; "su" indicates standard units; "us/cm" indicates microsiemens per centimeter; and "+" indicates the parameter(s) may be used for stabilization calculations but cannot be used for other purposes.
2) Weather temperature units are in degrees Fahrenheit, unless otherwise noted.
3) Did indicator parameters reach stabilization? No * Turbidity Out of Range
4) Was the two hour time limit reached? Yes
5) Calculations:
   - Head Above Pump Intake (ft) 66.72
   - Total Drawdown (ft) 0.12
   - Calculated Final Purge Volume (gal) NA
6) If Drawdown Did Not Stabilize or Stabilized Drawdown >0.3 ft, is Total Purge Volume > Calculated Final Purge Volume? NA

Well Sampling Worksheet
WWW RAP Field Data
AREA 6 2023-Q2 - HS-MW-13A
Kent County, MI

Well	HS-MW-13A / 2 in Diameter PVC
Sample Quarter	2023-Q2
Date	04/25/2023
Weather	34 F Cloudy
Sampler Initials	JET
Purging Device	Bladder-Pump: NA, Peristaltic-Pump: NA, Centrifugal-Pump: Mega Monsoon #1
Meters Used	YSI: Agile Rental 2, Turbidimeter: Agile Rental 2, Water-Level-Meter: WLM-4
Reference Measuring Point	PVC
Well Screen (ft bmp)	81.7 - 86.5
Measured Bottom Depth (ft bmp)	NR
Sample Comment	YSI Connected at 11:40.
Initial Water Level Date/Time	04/25/2023 10:35
Initial Water Level Depth (ft bmp)	58.21
Pump/Tubing Intake Depth (ft bmp)	84
Tubing Length (ft)	86
Tubing Inner Diameter (in)	0.17
Purging Initiation Date/Time	04/25/2023 10:35
Total Purge Volume (gal)	11.1
Modified Sample	No
If Modified, Reasoning	
Sample Collection Information	Bottling-Start: 04/25/2023 12:25:00, Bottling-Stop: 04/25/2023 12:30:00, Parameters-Sampled: PFAS

Reading Time	Depth To Water (ft)	Cumulative Drawdown (ft)	Purge Rate (ml/min)	Temperature (deg c)	Specific Conductivity (us/cm)	Dissolved Oxygen (mg/l)	pH (su)	Oxidation-Reduction Potential (mV)	Turbidity (ntu)
10:40	58.25	0.04	400	NR	NR	NR	NR	NR	NR
10:50	58.24	0.03	400	NR	NR	NR	NR	NR	185
11:00	58.24	0.03	400	NR	NR	NR	NR	NR	85
11:10	58.24	0.03	400	NR	NR	NR	NR	NR	43
11:20	58.24	0.03	400	NR	NR	NR	NR	NR	29
11:30	58.24	0.03	400	NR	NR	NR	NR	NR	26
11:40	58.24	0.03	400	11 +	567 +	5.2	7.6	64	12
11:50	58.24	0.03	400	11 +	567 +	5.2	7.6	106	7
12:00	58.24	0.03	400	11 +	567 +	5.2	7.6	127	6
12:05	58.24	0.03	400	11 +	567 +	5.2	7.6	132	5

Well Sampling Worksheet
WWW RAP Field Data
AREA 6 2023-Q2 - HS-MW-13A
Kent County, MI

Well	HS-MW-13A / 2 in Diameter PVC
Sample Quarter	2023-Q2
Date	04/25/2023
Weather	34 F Cloudy
Sampler Initials	JET
Purging Device	Bladder-Pump: NA, Peristaltic-Pump: NA, Centrifugal-Pump: Mega Monsoon #1
Meters Used	YSI: Agile Rental 2, Turbidimeter: Agile Rental 2, Water-Level-Meter: WLM-4
Reference Measuring Point	PVC
Well Screen (ft bmp)	81.7 - 86.5
Measured Bottom Depth (ft bmp)	NR
Sample Comment	YSI Connected at 11:40.
Initial Water Level Date/Time	04/25/2023 10:35
Initial Water Level Depth (ft bmp)	58.21
Pump/Tubing Intake Depth (ft bmp)	84
Tubing Length (ft)	86
Tubing Inner Diameter (in)	0.17
Purging Initiation Date/Time	04/25/2023 10:35
Total Purge Volume (gal)	11.1
Modified Sample	No
If Modified, Reasoning	
Sample Collection Information	Bottling-Start: 04/25/2023 12:25:00, Bottling-Stop: 04/25/2023 12:30:00, Parameters-Sampled: PFAS

Reading Time	Depth To Water (ft)	Cumulative Drawdown (ft)	Purge Rate (ml/min)	Temperature (deg c)	Specific Conductivity (us/cm)	Dissolved Oxygen (mg/l)	pH (su)	Oxidation-Reduction Potential (mV)	Turbidity (ntu)
12:10	58.24	0.03	400	11 +	567 +	5.2	7.6	145	<5
12:15	58.24	0.03	400	11 +	567 +	5.2	7.6	149	<5
12:20	58.24	0.03	400	11 +	567 +	5.2	7.6	154	<5

Notes:

1) Abbreviations include: "deg c" indicates degrees Celsius; "ft" indicates feet; "ft bmp" indicates feet below reference measuring point; "gal" indicates gallons; "in" indicates inches; "mg/l" indicates milligrams per liter; "ml/min" indicates milliliters per minute; "mV" indicates millivolts; "NA" indicates not applicable; "NR" indicates not recorded; "ntu" indicates Nephelometric Turbidity units; "su" indicates standard units; "us/cm" indicates microsiemens per centimeter; and "+" indicates the parameter(s) may be used for stabilization calculations but cannot be used for other purposes.
2) Weather temperature units are in degrees Fahrenheit, unless otherwise noted.
3) Did indicator parameters reach stabilization? Yes
4) Was the two hour time limit reached? No
5) Calculations:
   - Head Above Pump Intake (ft): 25.79
   - Total Drawdown (ft): 0.03
   - Calculated Final Purge Volume (gal): NA
6) If Drawdown Did Not Stabilize or Stabilized Drawdown >0.3 ft, is Total Purge Volume > Calculated Final Purge Volume? NA

Well Sampling Worksheet
WWW RAP Field Data
AREA 6 2023-Q2 - HS-MW-13B
Kent County, MI

Well	HS-MW-13B / 2 in Diameter PVC
Sample Quarter	2023-Q2
Date	04/25/2023
Weather	40 Cloudy
Sampler Initials	BLW
Purging Device	Bladder-Pump: NA, Peristaltic-Pump: NA, Centrifugal-Pump: Mega Monsoon #2
Meters Used	YSI: Agile Rental 2, Turbidimeter: Agile Rental 2, Water-Level-Meter: WLM-2
Reference Measuring Point	PVC
Well Screen (ft bmp)	151.2 - 156.0
Measured Bottom Depth (ft bmp)	NR
Sample Comment	YSI Connected at 10:45.
Initial Water Level Date/Time	04/25/2023 10:06
Initial Water Level Depth (ft bmp)	58.25
Pump/Tubing Intake Depth (ft bmp)	153.5
Tubing Length (ft)	156
Tubing Inner Diameter (in)	0.17
Purging Initiation Date/Time	04/25/2023 10:25
Total Purge Volume (gal)	2.8
Modified Sample	No
If Modified, Reasoning	
Sample Collection Information	Bottling-Start: 04/25/2023 11:35, Bottling-Stop: 04/25/2023 11:45, Parameters-Sampled: PFAS

Reading Time	Depth To Water (ft)	Cumulative Drawdown (ft)	Purge Rate (ml/min)	Temperature (deg c)	Specific Conductivity (us/cm)	Dissolved Oxygen (mg/l)	pH (su)	Oxidation-Reduction Potential (mV)	Turbidity (ntu)
10:35	58.26	0.01	175	NR	NR	NR	NR	NR	NR
10:45	58.26	0.01	175	11 +	461 +	0.9	7.4	65	7
10:55	58.27	0.20	175	12 +	461 +	<0.5	7.4	-58	9
11:00	58.27	0.02	175	11 +	461 +	<0.5	7.4	-77	7
11:05	58.27	0.02	175	11 +	462 +	<0.5	7.4	-88	7
11:10	58.27	0.02	175	11 +	401 +	<0.5	7.5	-97	8
11:15	58.27	0.02	175	12 +	461 +	1.1	7.4	-103	8
11:20	58.27	0.02	175	12 +	461 +	1.0	7.4	-107	8
11:25	58.27	0.02	175	12 +	461 +	1.0	7.4	-111	8

Notes:

1) Abbreviations include: "deg c" indicates degrees Celsius; "ft" indicates feet; "ft bmp" indicates feet below reference measuring point; "gal" indicates gallons; "in" indicates inches; "mg/l" indicates milligrams per liter; "ml/min" indicates milliliters per minute; "mV" indicates millivolts; "NA" indicates not applicable; "NR" indicates not recorded; "ntu" indicates Nephelometric Turbidity units; "su" indicates standard units; "us/cm" indicates microsiemens per centimeter; and "+" indicates the parameter(s) may be used for stabilization calculations but cannot be used for other purposes.
2) Weather temperature units are in degrees Fahrenheit, unless otherwise noted.
3) Did indicator parameters reach stabilization? Yes
4) Was the two hour time limit reached? No
5) Calculations:
   - Head Above Pump Intake (ft) 95.25
   - Total Drawdown (ft) 0.02
   - Calculated Final Purge Volume (gal) NA
6) If Drawdown Did Not Stabilize or Stabilized Drawdown >0.3 ft, is Total Purge Volume > Calculated Final Purge Volume? NA

Well Sampling Worksheet
WWW RAP Field Data
AREA 6 2023-Q2 - HS-MW-13C
Kent County, MI

Well	HS-MW-13C / 2 in Diameter PVC
Sample Quarter	2023-Q2
Date	05/05/2023
Weather	68F Sunny
Sampler Initials	JET
Purging Device	Bladder-Pump: BP-10, Peristaltic-Pump: NA, Centrifugal-Pump: NA
Meters Used	YSI: Agile Rental 1, Turbidimeter: Agile Rental 1, Water-Level-Meter: WLM-3
Reference Measuring Point	PVC
Well Screen (ft bmp)	201.7 - 206.5
Measured Bottom Depth (ft bmp)	NR
Sample Comment	10:55 - Water in air line, pulled pump. 11:20 - Replaced pump control box. Water to surface. 12:05 - Continued adjusting pump. YSI Connected at 12:50.
Initial Water Level Date/Time	05/05/2023 10:35
Initial Water Level Depth (ft bmp)	57.46
Pump/Tubing Intake Depth (ft bmp)	197.4
Tubing Length (ft)	199
Tubing Inner Diameter (in)	0.25
Purging Initiation Date/Time	05/05/2023 10:35
Total Purge Volume (gal)	3
Modified Sample	No
If Modified, Reasoning	
Sample Collection Information	Bottling-Start: 05/05/2023 13:05:00, Bottling-Stop: 05/05/2023 13:10:00, Parameters-Sampled: PFAS

Reading Time	Depth To Water (ft)	Cumulative Drawdown (ft)	Purge Rate (ml/min)	Temperature (deg c)	Specific Conductivity (us/cm)	Dissolved Oxygen (mg/l)	pH (su)	Oxidation-Reduction Potential (mV)	Turbidity (ntu)
10:55	NR	NR	NR	NR	NR	NR	NR	NR	NR
11:20	57.67	0.21	150	NR	NR	NR	NR	NR	NR
11:50	57.91	0.45	150	NR	NR	NR	NR	NR	>999
12:05	58.00	0.54	275	NR	NR	NR	NR	NR	>999
12:10	57.85	0.39	125	NR	NR	NR	NR	NR	>999
12:25	57.68	0.22	100	NR	NR	NR	NR	NR	>999
12:35	57.66	0.20	100	NR	NR	NR	NR	NR	>999
12:50	57.65	0.19	100	14 +	1,759 +	2.0	7.1	-82	>999
12:55	57.64	0.18	100	14 +	1,751 +	0.9	7.3	-71	>999
13:00	57.63	0.17	100	14 +	1,745 +	<0.5	7.3	-83	>999

Notes:

1) Abbreviations include: "deg c" indicates degrees Celsius; "ft" indicates feet; "ft bmp" indicates feet below reference measuring point; "gal" indicates gallons; "in" indicates inches; "mg/l" indicates milligrams per liter; "ml/min" indicates milliliters per minute; "mV" indicates millivolts; "NA" indicates not applicable; "NR" indicates not recorded; "ntu" indicates Nephelometric Turbidity units; "su" indicates standard units; "us/cm" indicates microsiemens per centimeter; and "+" indicates the parameter(s) may be used for stabilization calculations but cannot be used for other purposes.
2) Weather temperature units are in degrees Fahrenheit, unless otherwise noted.
3) Did indicator parameters reach stabilization? No * Turbidity Out of Range
4) Was the two hour time limit reached? Yes
5) Calculations:
   - Head Above Pump Intake (ft) 139.94
   - Total Drawdown (ft) 0.17
   - Calculated Final Purge Volume (gal) 0.54
6) If Drawdown Did Not Stabilize or Stabilized Drawdown >0.3 ft, is Total Purge Volume > Calculated Final Purge Volume? Yes

Well Sampling Worksheet
WWW RAP Field Data
PERIMETER 2023-Q2 - HS-MW-32A
Kent County, MI

Well	HS-MW-32A / 2 in Diameter PVC
Sample Quarter	2023-Q2
Date	06/12/2023
Weather	57F Cloudy
Sampler Initials	JET
Purging Device	Bladder-Pump: NA, Peristaltic-Pump: PER-3, Centrifugal-Pump: NA
Meters Used	YSI: Agile Rental 3, Turbidimeter: Agile Rental 3, Water-Level-Meter: WLM-2
Reference Measuring Point	PVC
Well Screen (ft bmp)	63.5 - 68.1
Expected Well Bottom Depth (ft bmp)	68.1
Measured Bottom Depth (ft bmp)	68.3
Sample Comment	10:15 - Depth to Water = 8.10 ft bmp, remained stable. YSI Connected at 10:45.
Initial Water Level Date/Time	06/12/2023 10:10
Initial Water Level Depth (ft bmp)	8.09
Pump/Tubing Intake Depth (ft bmp)	65.8
Tubing Length (ft)	68
Tubing Inner Diameter (in)	0.17
Purging Initiation Date/Time	06/12/2023 10:10
Total Purge Volume (gal)	3.5
Modified Sample	No
If Modified, Reasoning	
Sample Collection Information	Bottling-Start: 06/12/2023 11:35:00, Bottling-Stop: 06/12/2023 11:40:00, Parameters-Sampled: PFAS

Reading Time	Depth To Water (ft)	Cumulative Drawdown (ft)	Purge Rate (ml/min)	Temperature (deg c)	Specific Conductivity (us/cm)	Dissolved Oxygen (mg/l)	pH (su)	Oxidation-Reduction Potential (mV)	Turbidity (ntu)
10:15	8.10	0.01	200	NR	NR	NR	NR	NR	NR
10:25	8.10	0.01	200	NR	NR	NR	NR	NR	9
10:35	8.10	0.01	200	NR	NR	NR	NR	NR	8
10:45	8.10	0.01	200	11 +	1,187 +	0.6	7.4	-64	7
10:55	8.10	0.01	200	11 +	1,186 +	<0.5	7.4	-103	7
11:00	8.10	0.01	200	11 +	1,184 +	<0.5	7.4	-115	8
11:05	8.10	0.01	200	11 +	1,185 +	<0.5	7.4	-117	7
11:10	8.10	0.01	200	11 +	1,184 +	<0.5	7.4	-120	6

Well Sampling Worksheet
WWW RAP Field Data
PERIMETER 2023-Q2 - HS-MW-32A
Kent County, MI

Well	HS-MW-32A / 2 in Diameter PVC
Sample Quarter	2023-Q2
Date	06/12/2023
Weather	57F Cloudy
Sampler Initials	JET
Purging Device	Bladder-Pump: NA, Peristaltic-Pump: PER-3, Centrifugal-Pump: NA
Meters Used	YSI: Agile Rental 3, Turbidimeter: Agile Rental 3, Water-Level-Meter: WLM-2
Reference Measuring Point	PVC
Well Screen (ft bmp)	63.5 - 68.1
Expected Well Bottom Depth (ft bmp)	68.1
Measured Bottom Depth (ft bmp)	68.3
Sample Comment	10:15 - Depth to Water = 8.10 ft bmp, remained stable. YSI Connected at 10:45.
Initial Water Level Date/Time	06/12/2023 10:10
Initial Water Level Depth (ft bmp)	8.09
Pump/Tubing Intake Depth (ft bmp)	65.8
Tubing Length (ft)	68
Tubing Inner Diameter (in)	0.17
Purging Initiation Date/Time	06/12/2023 10:10
Total Purge Volume (gal)	3.5
Modified Sample	No
If Modified, Reasoning	
Sample Collection Information	Bottling-Start: 06/12/2023 11:35:00, Bottling-Stop: 06/12/2023 11:40:00, Parameters-Sampled: PFAS

Reading Time	Depth To Water (ft)	Cumulative Drawdown (ft)	Purge Rate (ml/min)	Temperature (deg c)	Specific Conductivity (us/cm)	Dissolved Oxygen (mg/l)	pH (su)	Oxidation-Reduction Potential (mV)	Turbidity (ntu)
11:15	8.10	0.01	200	11 +	1,185 +	<0.5	7.4	-121	5
11:20	8.10	0.01	200	11 +	1,187 +	<0.5	7.4	-122	5
11:25	8.10	0.01	200	11 +	1,185 +	<0.5	7.4	-123	5

Notes:

1) Abbreviations include: "deg c" indicates degrees Celsius; "ft" indicates feet; "ft bmp" indicates feet below reference measuring point; "gal" indicates gallons; "in" indicates inches; "mg/l" indicates milligrams per liter; "ml/min" indicates milliliters per minute; "mV" indicates millivolts; "NA" indicates not applicable; "NR" indicates not recorded; "ntu" indicates Nephelometric Turbidity units; "su" indicates standard units; "us/cm" indicates microsiemens per centimeter; and "+" indicates the parameter(s) may be used for stabilization calculations but cannot be used for other purposes.
2) Weather temperature units are in degrees Fahrenheit, unless otherwise noted.
3) Did indicator parameters reach stabilization? Yes
4) Was the two hour time limit reached? No
5) Calculations:
   - Head Above Pump Intake (ft) 57.71
   - Total Drawdown (ft) 0.01
   - Calculated Final Purge Volume (gal) NA
6) If Drawdown Did Not Stabilize or Stabilized Drawdown >0.3 ft, is Total Purge Volume > Calculated Final Purge Volume? NA

Well Sampling Worksheet
WWW RAP Field Data
PERIMETER 2023-Q2 - HS-MW-32B
Kent County, MI

Well	HS-MW-32B / 2 in Diameter PVC
Sample Quarter	2023-Q2
Date	06/12/2023
Weather	Overcast
Sampler Initials	MKM
Purging Device	Bladder-Pump: NA, Peristaltic-Pump: PER-1, Centrifugal-Pump: NA
Meters Used	YSI: Agile Rental 1, Turbidimeter: Agile Rental 1, Water-Level-Meter: WLM-3
Reference Measuring Point	PVC
Well Screen (ft bmp)	81.8 - 86.4
Expected Well Bottom Depth (ft bmp)	86.4
Measured Bottom Depth (ft bmp)	85.8
Sample Comment	Depth to water was dropping in first 5 minutes and flow rate was adjusted. 10:09 - Depth to Water = 8.80 ft bmp. 10:15 - Depth to Water = 8.81 ft bmp. 10:30 - YSI Connected. 11:10 - Bubble was noted on dissolved oxygen probe.
Initial Water Level Date/Time	06/12/2023 09:50
Initial Water Level Depth (ft bmp)	8.60
Pump/Tubing Intake Depth (ft bmp)	83.8
Tubing Length (ft)	86
Tubing Inner Diameter (in)	0.17
Purging Initiation Date/Time	06/12/2023 10:05
Total Purge Volume (gal)	2
Modified Sample	No
If Modified, Reasoning	
Sample Collection Information	Bottling-Start: 06/12/2023 11:50:00, Bottling-Stop: 06/12/2023 11:55:00, Parameters-Sampled: PFAS

Reading Time	Depth To Water (ft)	Cumulative Drawdown (ft)	Purge Rate (ml/min)	Temperature (deg c)	Specific Conductivity (us/cm)	Dissolved Oxygen (mg/l)	pH (su)	Oxidation-Reduction Potential (mV)	Turbidity (ntu)
10:09	8.80	0.20	100	NR	NR	NR	NR	NR	NR
10:15	8.81	0.21	100	NR	NR	NR	NR	NR	NR
10:30	8.81	0.21	100	11 +	1,138 +	<0.5	7.2	-83	133
10:40	8.81	0.21	100	11 +	1,136 +	<0.5	7.2	-99	83
10:50	8.81	0.21	100	11 +	1,135 +	<0.5	7.2	-110	52
11:00	8.83	0.23	100	10 +	1,135 +	<0.5	7.2	-116	24
11:10	8.82	0.22	100	10 +	1,132 +	<0.5	7.2	-119	15
11:20	8.83	0.23	100	11 +	1,131 +	<0.5	7.2	-120	9
11:25	8.83	0.23	100	10 +	1,133 +	<0.5	7.2	-120	6
11:30	8.83	0.23	100	10 +	1,132 +	<0.5	7.2	-120	7

Well Sampling Worksheet
WWW RAP Field Data
PERIMETER 2023-Q2 - HS-MW-32B
Kent County, MI

Well	HS-MW-32B / 2 in Diameter PVC
Sample Quarter	2023-Q2
Date	06/12/2023
Weather	Overcast
Sampler Initials	MKM
Purging Device	Bladder-Pump: NA, Peristaltic-Pump: PER-1, Centrifugal-Pump: NA
Meters Used	YSI: Agile Rental 1, Turbidimeter: Agile Rental 1, Water-Level-Meter: WLM-3
Reference Measuring Point	PVC
Well Screen (ft bmp)	81.8 - 86.4
Expected Well Bottom Depth (ft bmp)	86.4
Measured Bottom Depth (ft bmp)	85.8
Sample Comment	Depth to water was dropping in first 5 minutes and flow rate was adjusted. 10:09 - Depth to Water = 8.80 ft bmp. 10:15 - Depth to Water = 8.81 ft bmp. 10:30 - YSI Connected. 11:10 - Bubble was noted on dissolved oxygen probe.
Initial Water Level Date/Time	06/12/2023 09:50
Initial Water Level Depth (ft bmp)	8.60
Pump/Tubing Intake Depth (ft bmp)	83.8
Tubing Length (ft)	86
Tubing Inner Diameter (in)	0.17
Purging Initiation Date/Time	06/12/2023 10:05
Total Purge Volume (gal)	2
Modified Sample	No
If Modified, Reasoning	
Sample Collection Information	Bottling-Start: 06/12/2023 11:50:00, Bottling-Stop: 06/12/2023 11:55:00, Parameters-Sampled: PFAS

Reading Time	Depth To Water (ft)	Cumulative Drawdown (ft)	Purge Rate (ml/min)	Temperature (deg c)	Specific Conductivity (us/cm)	Dissolved Oxygen (mg/l)	pH (su)	Oxidation-Reduction Potential (mV)	Turbidity (ntu)
11:35	8.83	0.23	100	10 +	1,134 +	<0.5	7.2	-120	<5
11:40	8.83	0.23	100	10 +	1,133 +	<0.5	7.2	-120	<5
11:45	8.83	0.23	100	10 +	1,132 +	<0.5	7.2	-120	<5

Notes:

1) Abbreviations include: "deg c" indicates degrees Celsius; "ft" indicates feet; "ft bmp" indicates feet below reference measuring point; "gal" indicates gallons; "in" indicates inches; "mg/l" indicates milligrams per liter; "ml/min" indicates milliliters per minute; "mV" indicates millivolts; "NA" indicates not applicable; "NR" indicates not recorded; "ntu" indicates Nephelometric Turbidity units; "su" indicates standard units; "us/cm" indicates microsiemens per centimeter; and "+" indicates the parameter(s) may be used for stabilization calculations but cannot be used for other purposes.
2) Weather temperature units are in degrees Fahrenheit, unless otherwise noted.
3) Did indicator parameters reach stabilization? Yes
4) Was the two hour time limit reached? No
5) Calculations:
   - Head Above Pump Intake (ft) 75.20
   - Total Drawdown (ft) 0.23
   - Calculated Final Purge Volume (gal) NA
6) If Drawdown Did Not Stabilize or Stabilized Drawdown >0.3 ft, is Total Purge Volume > Calculated Final Purge Volume? NA

Well Sampling Worksheet
WWW RAP Field Data
PERIMETER 2023-Q2 - HS-MW-32C
Kent County, MI

Well	HS-MW-32C / 2 in Diameter PVC
Sample Quarter	2023-Q2
Date	06/12/2023
Weather	57F Cloudy
Sampler Initials	JET
Purging Device	Bladder-Pump: NA, Peristaltic-Pump: PER-3, Centrifugal-Pump: NA
Meters Used	YSI: Agile Rental 3, Turbidimeter: Agile Rental 3, Water-Level-Meter: WLM-2
Reference Measuring Point	PVC
Well Screen (ft bmp)	111.4 - 116.0
Expected Well Bottom Depth (ft bmp)	116
Measured Bottom Depth (ft bmp)	116
Sample Comment	YSI Connected at 13:25.
Initial Water Level Date/Time	06/12/2023 12:05
Initial Water Level Depth (ft bmp)	8.40
Pump/Tubing Intake Depth (ft bmp)	113.5
Tubing Length (ft)	116
Tubing Inner Diameter (in)	0.17
Purging Initiation Date/Time	06/12/2023 12:05
Total Purge Volume (gal)	3
Modified Sample	No
If Modified, Reasoning	
Sample Collection Information	Bottling-Start: 06/12/2023 13:50:00, Bottling-Stop: 06/12/2023 13:55:00, Parameters-Sampled: PFAS

Reading Time	Depth To Water (ft)	Cumulative Drawdown (ft)	Purge Rate (ml/min)	Temperature (deg c)	Specific Conductivity (us/cm)	Dissolved Oxygen (mg/l)	pH (su)	Oxidation-Reduction Potential (mV)	Turbidity (ntu)
12:15	8.47	0.07	160	NR	NR	NR	NR	NR	NR
12:25	8.47	0.07	160	NR	NR	NR	NR	NR	25
12:35	8.47	0.07	160	NR	NR	NR	NR	NR	13
12:55	8.47	0.07	160	NR	NR	NR	NR	NR	9
13:15	8.47	0.07	160	NR	NR	NR	NR	NR	<5
13:25	8.47	0.07	160	11 +	1,119 +	<0.5	7.5	-88	<5
13:30	8.47	0.07	160	11 +	1,117 +	<0.5	7.5	-102	<5

Well Sampling Worksheet
WWW RAP Field Data
PERIMETER 2023-Q2 - HS-MW-32C
Kent County, MI

Well	HS-MW-32C / 2 in Diameter PVC
Sample Quarter	2023-Q2
Date	06/12/2023
Weather	57F Cloudy
Sampler Initials	JET
Purging Device	Bladder-Pump: NA, Peristaltic-Pump: PER-3, Centrifugal-Pump: NA
Meters Used	YSI: Agile Rental 3, Turbidimeter: Agile Rental 3, Water-Level-Meter: WLM-2
Reference Measuring Point	PVC
Well Screen (ft bmp)	111.4 - 116.0
Expected Well Bottom Depth (ft bmp)	116
Measured Bottom Depth (ft bmp)	116
Sample Comment	YSI Connected at 13:25.
Initial Water Level Date/Time	06/12/2023 12:05
Initial Water Level Depth (ft bmp)	8.40
Pump/Tubing Intake Depth (ft bmp)	113.5
Tubing Length (ft)	116
Tubing Inner Diameter (in)	0.17
Purging Initiation Date/Time	06/12/2023 12:05
Total Purge Volume (gal)	3
Modified Sample	No
If Modified, Reasoning	
Sample Collection Information	Bottling-Start: 06/12/2023 13:50:00, Bottling-Stop: 06/12/2023 13:55:00, Parameters-Sampled: PFAS

Reading Time	Depth To Water (ft)	Cumulative Drawdown (ft)	Purge Rate (ml/min)	Temperature (deg c)	Specific Conductivity (us/cm)	Dissolved Oxygen (mg/l)	pH (su)	Oxidation-Reduction Potential (mV)	Turbidity (ntu)
13:35	8.47	0.07	160	11 +	1,119 +	<0.5	7.5	-111	<5
13:40	8.47	0.07	160	11 +	1,118 +	<0.5	7.5	-115	<5
13:45	8.47	0.07	160	11 +	1,118 +	<0.5	7.5	-117	<5

Notes:

1) Abbreviations include: "deg c" indicates degrees Celsius; "ft" indicates feet; "ft bmp" indicates feet below reference measuring point; "gal" indicates gallons; "in" indicates inches; "mg/l" indicates milligrams per liter; "ml/min" indicates milliliters per minute; "mV" indicates millivolts; "NA" indicates not applicable; "NR" indicates not recorded; "ntu" indicates Nephelometric Turbidity units; "su" indicates standard units; "us/cm" indicates microsiemens per centimeter; and "+" indicates the parameter(s) may be used for stabilization calculations but cannot be used for other purposes.
2) Weather temperature units are in degrees Fahrenheit, unless otherwise noted.
3) Did indicator parameters reach stabilization? Yes
4) Was the two hour time limit reached? No
5) Calculations:
   - Head Above Pump Intake (ft) 105.10
   - Total Drawdown (ft) 0.07
   - Calculated Final Purge Volume (gal) NA
6) If Drawdown Did Not Stabilize or Stabilized Drawdown >0.3 ft, is Total Purge Volume > Calculated Final Purge Volume? NA

Well Sampling Worksheet
WWW RAP Field Data
PERIMETER 2023-Q2 - HS-MW-32D
Kent County, MI

Well	HS-MW-32D / 2 in Diameter PVC
Sample Quarter	2023-Q2
Date	06/12/2023
Weather	Overcast
Sampler Initials	MKM
Purging Device	Bladder-Pump: NA, Peristaltic-Pump: PER-1, Centrifugal-Pump: NA
Meters Used	YSI: Agile Rental 1, Turbidimeter: Agile Rental 1, Water-Level-Meter: WLM-3
Reference Measuring Point	PVC
Well Screen (ft bmp)	144.8 - 149.4
Expected Well Bottom Depth (ft bmp)	149.4
Measured Bottom Depth (ft bmp)	149.8
Sample Comment	13:00 - Depth to Water = 9.12 ft bmp at a purge rate of 60 mL/ min. Purge rate lowered to 50mL/ min. 13:10 - Depth to Water = 9.26 ft bmp. 13:20 - Depth to Water = 9.34 ft bmp. Depth to Water stabilized at 9.41 ft bmp. 13:30 - YSI Connected. 13:40 - Dissolved oxygen rapidly changing and oxidation-reduction potential was decreasing, recorded minimum readings.
Initial Water Level Date/Time	06/12/2023 12:30
Initial Water Level Depth (ft bmp)	8.46
Pump/Tubing Intake Depth (ft bmp)	147.3
Tubing Length (ft)	150
Tubing Inner Diameter (in)	0.17
Purging Initiation Date/Time	06/12/2023 12:47
Total Purge Volume (gal)	2
Modified Sample	No
If Modified, Reasoning	
Sample Collection Information	Bottling-Start: 06/12/2023 14:10:00, Bottling-Stop: 06/12/2023 14:20:00, Parameters-Sampled: PFAS

Reading Time	Depth To Water (ft)	Cumulative Drawdown (ft)	Purge Rate (ml/min)	Temperature (deg c)	Specific Conductivity (us/cm)	Dissolved Oxygen (mg/l)	pH (su)	Oxidation-Reduction Potential (mV)	Turbidity (ntu)
13:00	9.12	0.66	60	NR	NR	NR	NR	NR	NR
13:10	9.28	0.82	50	NR	NR	NR	NR	NR	NR
13:20	9.34	0.88	50	NR	NR	NR	NR	NR	NR
13:30	9.40	0.94	50	11 +	2,740 +	<0.5	7.3	-193	<5
13:35	9.40	0.94	50	11 +	2,734 +	<0.5	7.3	-208	<5
13:40	9.41	0.95	50	11 +	2,737 +	<0.5	7.3	-214	<5
13:45	9.41	0.95	50	11 +	2,735 +	<0.5	7.3	-219	<5

Well Sampling Worksheet
WWW RAP Field Data
PERIMETER 2023-Q2 - HS-MW-32D
Kent County, MI

Well	HS-MW-32D / 2 in Diameter PVC
Sample Quarter	2023-Q2
Date	06/12/2023
Weather	Overcast
Sampler Initials	MKM
Purging Device	Bladder-Pump: NA, Peristaltic-Pump: PER-1, Centrifugal-Pump: NA
Meters Used	YSI: Agile Rental 1, Turbidimeter: Agile Rental 1, Water-Level-Meter: WLM-3
Reference Measuring Point	PVC
Well Screen (ft bmp)	144.8 - 149.4
Expected Well Bottom Depth (ft bmp)	149.4
Measured Bottom Depth (ft bmp)	149.8
Sample Comment	13:00 - Depth to Water = 9.12 ft bmp at a purge rate of 60 mL/ min. Purge rate lowered to 50mL/ min. 13:10 - Depth to Water = 9.26 ft bmp. 13:20 - Depth to Water = 9.34 ft bmp. Depth to Water stabilized at 9.41 ft bmp. 13:30 - YSI Connected. 13:40 - Dissolved oxygen rapidly changing and oxidation-reduction potential was decreasing, recorded minimum readings.
Initial Water Level Date/Time	06/12/2023 12:30
Initial Water Level Depth (ft bmp)	8.46
Pump/Tubing Intake Depth (ft bmp)	147.3
Tubing Length (ft)	150
Tubing Inner Diameter (in)	0.17
Purging Initiation Date/Time	06/12/2023 12:47
Total Purge Volume (gal)	2
Modified Sample	No
If Modified, Reasoning	
Sample Collection Information	Bottling-Start: 06/12/2023 14:10:00, Bottling-Stop: 06/12/2023 14:20:00, Parameters-Sampled: PFAS

Reading Time	Depth To Water (ft)	Cumulative Drawdown (ft)	Purge Rate (ml/min)	Temperature (deg c)	Specific Conductivity (us/cm)	Dissolved Oxygen (mg/l)	pH (su)	Oxidation-Reduction Potential (mV)	Turbidity (ntu)
13:55	9.41	0.95	50	11 +	2,730 +	<0.5	7.3	-227	<5
14:00	9.41	0.95	50	11 +	2,733 +	<0.5	7.3	-230	<5
14:05	9.41	0.95	50	11 +	2,730 +	<0.5	7.3	-233	<5

Notes:

1) Abbreviations include: "deg c" indicates degrees Celsius; "ft" indicates feet; "ft bmp" indicates feet below reference measuring point; "gal" indicates gallons; "in" indicates inches; "mg/l" indicates milligrams per liter; "ml/min" indicates milliliters per minute; "mV" indicates millivolts; "NA" indicates not applicable; "NR" indicates not recorded; "ntu" indicates Nephelometric Turbidity units; "su" indicates standard units; "us/cm" indicates microsiemens per centimeter; and "+" indicates the parameter(s) may be used for stabilization calculations but cannot be used for other purposes.
2) Weather temperature units are in degrees Fahrenheit, unless otherwise noted.
3) Did indicator parameters reach stabilization? Yes
4) Was the two hour time limit reached? No
5) Calculations:
   - Head Above Pump Intake (ft) 138.84
   - Total Drawdown (ft) 0.95
   - Calculated Final Purge Volume (gal) 0.33
6) If Drawdown Did Not Stabilize or Stabilized Drawdown >0.3 ft, is Total Purge Volume > Calculated Final Purge Volume? Yes

Well Sampling Worksheet
WWW RAP Field Data
AREA 6 2023-Q2 - HS-PMW-16A
Kent County, MI

Well	HS-PMW-16A / 2 in Diameter PVC
Sample Quarter	2023-Q2
Date	04/24/2023
Weather	40F Snowy
Sampler Initials	JET
Purging Device	Bladder-Pump: NA, Peristaltic-Pump: NA, Centrifugal-Pump: Mega Monsoon #1
Meters Used	YSI: Agile Rental 2, Turbidimeter: Agile Rental 2, Water-Level-Meter: WLM-4
Reference Measuring Point	PVC
Well Screen (ft bmp)	89.0 - 94.0
Measured Bottom Depth (ft bmp)	NR
Sample Comment	YSI Connected at 15:40.
Initial Water Level Date/Time	04/24/2023 15:10
Initial Water Level Depth (ft bmp)	73.85
Pump/Tubing Intake Depth (ft bmp)	91.5
Tubing Length (ft)	94
Tubing Inner Diameter (in)	0.17
Purging Initiation Date/Time	04/24/2023 15:10
Total Purge Volume (gal)	7.85
Modified Sample	No
If Modified, Reasoning	
Sample Collection Information	Bottling-Start: 04/24/2023 16:40:00, Bottling-Stop: 04/24/2023 16:45:00, Parameters-Sampled: PFAS

Reading Time	Depth To Water (ft)	Cumulative Drawdown (ft)	Purge Rate (ml/min)	Temperature (deg c)	Specific Conductivity (us/cm)	Dissolved Oxygen (mg/l)	pH (su)	Oxidation-Reduction Potential (mV)	Turbidity (ntu)
15:20	73.92	0.07	400	NR	NR	NR	NR	NR	NR
15:30	73.89	0.04	330	NR	NR	NR	NR	NR	NR
15:40	73.89	0.04	330	12 +	779 +	9.3	7.1	181	20
15:50	73.89	0.04	330	12 +	776 +	9.3	7.1	168	28
16:00	73.89	0.04	330	12 +	774 +	9.3	7.1	161	15
16:10	73.89	0.04	330	12 +	774 +	9.3	7.1	155	9
16:20	73.89	0.04	330	12 +	773 +	9.2	7.1	155	<5
16:25	73.89	0.04	330	12 +	772 +	9.2	7.1	155	<5
16:30	73.89	0.04	330	12 +	772 +	9.2	7.1	155	<5
16:35	73.89	0.04	330	12 +	772 +	9.2	7.1	155	<5

Notes:

1) Abbreviations include: "deg c" indicates degrees Celsius; "ft" indicates feet; "ft bmp" indicates feet below reference measuring point; "gal" indicates gallons; "in" indicates inches; "mg/l" indicates milligrams per liter; "ml/min" indicates milliliters per minute; "mV" indicates millivolts; "NA" indicates not applicable; "NR" indicates not recorded; "ntu" indicates Nephelometric Turbidity units; "su" indicates standard units; "us/cm" indicates microsiemens per centimeter; and "+" indicates the parameter(s) may be used for stabilization calculations but cannot be used for other purposes.
2) Weather temperature units are in degrees Fahrenheit, unless otherwise noted.
3) Did indicator parameters reach stabilization? Yes
4) Was the two hour time limit reached? No
5) Calculations:
   - Head Above Pump Intake (ft) 17.65
   - Total Drawdown (ft) 0.04
   - Calculated Final Purge Volume (gal) NA
6) If Drawdown Did Not Stabilize or Stabilized Drawdown >0.3 ft, is Total Purge Volume > Calculated Final Purge Volume? NA

Well Sampling Worksheet
WWW RAP Field Data
AREA 6 2023-Q2 - HS-PMW-16B
Kent County, MI

Well	HS-PMW-16B / 2 in Diameter PVC
Sample Quarter	2023-Q2
Date	04/24/2023
Weather	40F Cloudy
Sampler Initials	BLW
Purging Device	Bladder-Pump: NA, Peristaltic-Pump: NA, Centrifugal-Pump: Mega Monsoon #2
Meters Used	YSI: Agile Rental 1, Turbidimeter: Agile Rental 1, Water-Level-Meter: WLM-3
Reference Measuring Point	PVC
Well Screen (ft bmp)	118.1 - 123.1
Measured Bottom Depth (ft bmp)	NR
Sample Comment	YSI Connected at 15:20. Battery in YSI was changed at 15:50.
Initial Water Level Date/Time	04/24/2023 14:45
Initial Water Level Depth (ft bmp)	73.69
Pump/Tubing Intake Depth (ft bmp)	120.6
Tubing Length (ft)	124
Tubing Inner Diameter (in)	0.17
Purging Initiation Date/Time	04/24/2023 15:00
Total Purge Volume (gal)	3
Modified Sample	No
If Modified, Reasoning	
Sample Collection Information	Bottling-Start: 04/24/2023 16:45:00, Bottling-Stop: 04/24/2023 16:50:00, Parameters-Sampled: PFAS

Reading Time	Depth To Water (ft)	Cumulative Drawdown (ft)	Purge Rate (ml/min)	Temperature (deg c)	Specific Conductivity (us/cm)	Dissolved Oxygen (mg/l)	pH (su)	Oxidation-Reduction Potential (mV)	Turbidity (ntu)
15:10	73.71	0.02	100	NR	NR	NR	NR	NR	NR
15:20	73.71	0.02	100	9 +	950 +	5.3	7.0	176	938
15:30	73.71	0.02	100	10 +	946 +	5.3	7.0	122	414
15:50	73.71	0.02	100	10 +	943 +	6.0	7.1	130	74
16:00	73.71	0.02	100	10 +	942 +	5.9	7.0	143	43
16:10	73.71	0.02	100	10 +	943 +	5.8	7.0	152	24
16:20	73.71	0.02	100	10 +	942 +	6.0	7.0	157	15
16:25	73.71	0.02	100	10 +	942 +	5.6	7.0	158	15
16:30	73.71	0.02	100	10 +	941 +	5.6	7.0	159	15

Notes:

1) Abbreviations include: "deg c" indicates degrees Celsius; "ft" indicates feet; "ft bmp" indicates feet below reference measuring point; "gal" indicates gallons; "in" indicates inches; "mg/l" indicates milligrams per liter; "ml/min" indicates milliliters per minute; "mV" indicates millivolts; "NA" indicates not applicable; "NR" indicates not recorded; "ntu" indicates Nephelometric Turbidity units; "su" indicates standard units; "us/cm" indicates microsiemens per centimeter; and "+" indicates the parameter(s) may be used for stabilization calculations but cannot be used for other purposes.
2) Weather temperature units are in degrees Fahrenheit, unless otherwise noted.
3) Did indicator parameters reach stabilization? Yes
4) Was the two hour time limit reached? No
5) Calculations:
   - Head Above Pump Intake (ft) 46.91
   - Total Drawdown (ft) 0.02
   - Calculated Final Purge Volume (gal) NA
6) If Drawdown Did Not Stabilize or Stabilized Drawdown >0.3 ft, is Total Purge Volume > Calculated Final Purge Volume? NA

Well Sampling Worksheet
WWW RAP Field Data
AREA 6 2023-Q2 - HS-PMW-16C
Kent County, MI

Well	HS-PMW-16C / 2 in Diameter PVC
Sample Quarter	2023-Q2
Date	04/25/2023
Weather	34F Cloudy
Sampler Initials	NCK
Purging Device	Bladder-Pump: BP-11, Peristaltic-Pump: NA, Centrifugal-Pump: NA
Meters Used	YSI: Agile Rental 1, Turbidimeter: Agile Rental 1, Water-Level-Meter: WLM-3
Reference Measuring Point	PVC
Well Screen (ft bmp)	161.3 - 166.3
Measured Bottom Depth (ft bmp)	NR
Sample Comment	10:00-10:20 – Static Water Level: 77.10 ft bmp. 1030 – Static Water Level: 77.02 ft bmp. 1040-11:10 – Static Water Level: 77.12 ft bmp. Water level measured at the lowest point (after discharge). Water was visibly turbid at the beginning of purge. Compressor issues were noted at 10:40. YSI Connected at 11:10.
Initial Water Level Date/Time	04/25/2023 09:50
Initial Water Level Depth (ft bmp)	76.98
Pump/Tubing Intake Depth (ft bmp)	163.8
Tubing Length (ft)	167
Tubing Inner Diameter (in)	0.25
Purging Initiation Date/Time	04/25/2023 09:50
Total Purge Volume (gal)	1.9
Modified Sample	No
If Modified, Reasoning	
Sample Collection Information	Bottling-Start: 04/25/2023 11:50:00, Bottling-Stop: 04/25/2023 11:58:00, Parameters-Sampled: PFAS

Reading Time	Depth To Water (ft)	Cumulative Drawdown (ft)	Purge Rate (ml/min)	Temperature (deg c)	Specific Conductivity (us/cm)	Dissolved Oxygen (mg/l)	pH (su)	Oxidation-Reduction Potential (mV)	Turbidity (ntu)
10:00	77.10	0.12	60	NR	NR	NR	NR	NR	NR
10:20	77.10	0.12	60	NR	NR	NR	NR	NR	NR
10:30	77.02	0.04	50	NR	NR	NR	NR	NR	NR
10:40	77.12	0.14	65	NR	NR	NR	NR	NR	NR
10:50	77.12	0.14	65	NR	NR	NR	NR	NR	754
11:10	77.12	0.14	65	8 +	813 +	3.7	7.2	233	128
11:20	77.15	0.17	65	8 +	811 +	3.9	7.1	238	72
11:30	77.15	0.17	65	8 +	806 +	3.8	7.1	240	152

Well Sampling Worksheet
WWW RAP Field Data
AREA 6 2023-Q2 - HS-PMW-16C
Kent County, MI

Well	HS-PMW-16C / 2 in Diameter PVC
Sample Quarter	2023-Q2
Date	04/25/2023
Weather	34F Cloudy
Sampler Initials	NCK
Purging Device	Bladder-Pump: BP-11, Peristaltic-Pump: NA, Centrifugal-Pump: NA
Meters Used	YSI: Agile Rental 1, Turbidimeter: Agile Rental 1, Water-Level-Meter: WLM-3
Reference Measuring Point	PVC
Well Screen (ft bmp)	161.3 - 166.3
Measured Bottom Depth (ft bmp)	NR
Sample Comment	10:00-10:20 – Static Water Level: 77.10 ft bmp. 1030 – Static Water Level: 77.02 ft bmp. 1040-11:10 – Static Water Level: 77.12 ft bmp. Water level measured at the lowest point (after discharge). Water was visibly turbid at the beginning of purge. Compressor issues were noted at 10:40. YSI Connected at 11:10.
Initial Water Level Date/Time	04/25/2023 09:50
Initial Water Level Depth (ft bmp)	76.98
Pump/Tubing Intake Depth (ft bmp)	163.8
Tubing Length (ft)	167
Tubing Inner Diameter (in)	0.25
Purging Initiation Date/Time	04/25/2023 09:50
Total Purge Volume (gal)	1.9
Modified Sample	No
If Modified, Reasoning	
Sample Collection Information	Bottling-Start: 04/25/2023 11:50:00, Bottling-Stop: 04/25/2023 11:58:00, Parameters-Sampled: PFAS

Reading Time	Depth To Water (ft)	Cumulative Drawdown (ft)	Purge Rate (ml/min)	Temperature (deg c)	Specific Conductivity (us/cm)	Dissolved Oxygen (mg/l)	pH (su)	Oxidation-Reduction Potential (mV)	Turbidity (ntu)
11:40	77.15	0.17	65	8 +	801 +	3.6	7.1	242	165
11:45	77.15	0.17	65	8 +	797 +	3.5	7.1	242	136
11:50	77.15	0.17	65	8 +	794 +	3.4	7.1	242	108

Notes:

1) Abbreviations include: "deg c" indicates degrees Celsius; "ft" indicates feet; "ft bmp" indicates feet below reference measuring point; "gal" indicates gallons; "in" indicates inches; "mg/l" indicates milligrams per liter; "ml/min" indicates milliliters per minute; "mV" indicates millivolts; "NA" indicates not applicable; "NR" indicates not recorded; "ntu" indicates Nephelometric Turbidity units; "su" indicates standard units; "us/cm" indicates microsiemens per centimeter; and "+" indicates the parameter(s) may be used for stabilization calculations but cannot be used for other purposes.
2) Weather temperature units are in degrees Fahrenheit, unless otherwise noted.
3) Did indicator parameters reach stabilization? No
4) Was the two hour time limit reached? Yes
5) Calculations:
   - Head Above Pump Intake (ft) 86.82
   - Total Drawdown (ft) 0.17
   - Calculated Final Purge Volume (gal) NA
6) If Drawdown Did Not Stabilize or Stabilized Drawdown >0.3 ft, is Total Purge Volume > Calculated Final Purge Volume? NA

Well Sampling Worksheet
WWW RAP Field Data
PERIMETER 2023-Q2 - HS-PMW-22
Kent County, MI

Well	HS-PMW-22 / 2 in Diameter PVC
Sample Quarter	2023-Q2
Date	06/21/2023
Weather	Sunny 80F
Sampler Initials	RCP
Purging Device	Bladder-Pump: BP-12, Peristaltic-Pump: NA, Centrifugal-Pump: NA
Meters Used	YSI: Agile Rental 1, Turbidimeter: Agile Rental 1, Water-Level-Meter: WLM-2
Reference Measuring Point	PVC
Well Screen (ft bmp)	171.6 - 176.6
Expected Well Bottom Depth (ft bmp)	176.6
Measured Bottom Depth (ft bmp)	NR
Sample Comment	YSI Connected at 11:40.
Initial Water Level Date/Time	06/21/2023 10:45
Initial Water Level Depth (ft bmp)	101.65
Pump/Tubing Intake Depth (ft bmp)	174.1
Tubing Length (ft)	176
Tubing Inner Diameter (in)	0.25
Purging Initiation Date/Time	06/21/2023 10:50
Total Purge Volume (gal)	3
Modified Sample	No
If Modified, Reasoning	
Sample Collection Information	Bottling-Start: 06/21/2023 12:20:00, Bottling-Stop: 06/21/2023 12:25:00, Parameters-Sampled: PFAS

Reading Time	Depth To Water (ft)	Cumulative Drawdown (ft)	Purge Rate (ml/min)	Temperature (deg c)	Specific Conductivity (us/cm)	Dissolved Oxygen (mg/l)	pH (su)	Oxidation-Reduction Potential (mV)	Turbidity (ntu)
11:15	101.60	-0.05	220	NR	NR	NR	NR	NR	NR
11:25	101.67	0.02	190	NR	NR	NR	NR	NR	11
11:40	101.67	0.02	150	12 +	1,425 +	8.7	7.3	120	7
11:50	101.68	0.03	150	12 +	1,415 +	2.9	7.3	24	<5
11:55	101.70	0.05	170	12 +	1,412 +	2.4	7.3	8	<5
12:00	101.70	0.05	170	11 +	1,421 +	2.2	7.3	-1	<5
12:05	101.70	0.05	170	11 +	1,426 +	2.0	7.3	-6	<5

Well Sampling Worksheet
WWW RAP Field Data
PERIMETER 2023-Q2 - HS-PMW-22
Kent County, MI

Well	HS-PMW-22 / 2 in Diameter PVC
Sample Quarter	2023-Q2
Date	06/21/2023
Weather	Sunny 80F
Sampler Initials	RCP
Purging Device	Bladder-Pump: BP-12, Peristaltic-Pump: NA, Centrifugal-Pump: NA
Meters Used	YSI: Agile Rental 1, Turbidimeter: Agile Rental 1, Water-Level-Meter: WLM-2
Reference Measuring Point	PVC
Well Screen (ft bmp)	171.6 - 176.6
Expected Well Bottom Depth (ft bmp)	176.6
Measured Bottom Depth (ft bmp)	NR
Sample Comment	YSI Connected at 11:40.
Initial Water Level Date/Time	06/21/2023 10:45
Initial Water Level Depth (ft bmp)	101.65
Pump/Tubing Intake Depth (ft bmp)	174.1
Tubing Length (ft)	176
Tubing Inner Diameter (in)	0.25
Purging Initiation Date/Time	06/21/2023 10:50
Total Purge Volume (gal)	3
Modified Sample	No
If Modified, Reasoning	
Sample Collection Information	Bottling-Start: 06/21/2023 12:20:00, Bottling-Stop: 06/21/2023 12:25:00, Parameters-Sampled: PFAS

Reading Time	Depth To Water (ft)	Cumulative Drawdown (ft)	Purge Rate (ml/min)	Temperature (deg c)	Specific Conductivity (us/cm)	Dissolved Oxygen (mg/l)	pH (su)	Oxidation-Reduction Potential (mV)	Turbidity (ntu)
12:10	101.70	0.05	170	11 +	1,426 +	1.9	7.3	-11	<5
12:15	101.70	0.05	170	11 +	1,425 +	1.8	7.3	-13	<5
12:20	101.70	0.05	170	11 +	1,423 +	1.8	7.3	-15	<5

Notes:

1) Abbreviations include: "deg c" indicates degrees Celsius; "ft" indicates feet; "ft bmp" indicates feet below reference measuring point; "gal" indicates gallons; "in" indicates inches; "mg/l" indicates milligrams per liter; "ml/min" indicates milliliters per minute; "mV" indicates millivolts; "NA" indicates not applicable; "NR" indicates not recorded; "ntu" indicates Nephelometric Turbidity units; "su" indicates standard units; "us/cm" indicates microsiemens per centimeter; and "+" indicates the parameter(s) may be used for stabilization calculations but cannot be used for other purposes.
2) Weather temperature units are in degrees Fahrenheit, unless otherwise noted.
3) Did indicator parameters reach stabilization? Yes
4) Was the two hour time limit reached? No
5) Calculations:
   - Head Above Pump Intake (ft) 72.45
   - Total Drawdown (ft) 0.05
   - Calculated Final Purge Volume (gal) NA
6) If Drawdown Did Not Stabilize or Stabilized Drawdown >0.3 ft, is Total Purge Volume > Calculated Final Purge Volume? NA

Well Sampling Worksheet
WWW RAP Field Data
PERIMETER 2023-Q2 - HS-PMW-RI-101A
Kent County, MI

Well	HS-PMW-RI-101A / 2 in Diameter PVC
Sample Quarter	2023-Q2
Date	06/14/2023
Weather	Cloudy, 60s
Sampler Initials	AW
Purging Device	Bladder-Pump: NA, Peristaltic-Pump: PER-2, Centrifugal-Pump: NA
Meters Used	YSI: Agile Rental 2, Turbidimeter: Agile Rental 2, Water-Level-Meter: GeoTech Rental
Reference Measuring Point	PVC
Well Screen (ft bmp)	10.1 - 15.1
Expected Well Bottom Depth (ft bmp)	15.1
Measured Bottom Depth (ft bmp)	15.08
Sample Comment	10:30 - Depth to Water = 7.74 ft bmp, 10:35 - Depth to Water = 7.79 ft bmp and remained constant for duration of purge. YSI not connected yet. 10:45 - YSI connected.
Initial Water Level Date/Time	06/14/2023 10:30
Initial Water Level Depth (ft bmp)	7.74
Pump/Tubing Intake Depth (ft bmp)	12.5
Tubing Length (ft)	15
Tubing Inner Diameter (in)	0.17
Purging Initiation Date/Time	06/14/2023 10:30
Total Purge Volume (gal)	2.1
Modified Sample	No
If Modified, Reasoning	
Sample Collection Information	Bottling-Start: 06/14/2023 11:10:00, Bottling-Stop: 06/14/2023 11:20:00, Parameters-Sampled: PFAS

Reading Time	Depth To Water (ft)	Cumulative Drawdown (ft)	Purge Rate (ml/min)	Temperature (deg c)	Specific Conductivity (us/cm)	Dissolved Oxygen (mg/l)	pH (su)	Oxidation-Reduction Potential (mV)	Turbidity (ntu)
10:35	7.79	0.05	200	NR	NR	NR	NR	NR	<5
10:40	7.79	0.05	200	NR	NR	NR	NR	NR	<5
10:45	7.79	0.05	200	12 +	315 +	4.8	6.4	206	<5
10:50	7.79	0.05	200	12 +	317 +	4.6	6.1	219	<5
10:55	7.79	0.05	200	12 +	316 +	4.2	6.1	223	<5
11:00	7.79	0.05	200	12 +	317 +	4.2	6.1	228	<5

Notes:

1) Abbreviations include: "deg c" indicates degrees Celsius; "ft" indicates feet; "ft bmp" indicates feet below reference measuring point; "gal" indicates gallons; "in" indicates inches; "mg/l" indicates milligrams per liter; "ml/min" indicates milliliters per minute; "mV" indicates millivolts; "NA" indicates not applicable; "NR" indicates not recorded; "ntu" indicates Nephelometric Turbidity units; "su" indicates standard units; "us/cm" indicates microsiemens per centimeter; and "+" indicates the parameter(s) may be used for stabilization calculations but cannot be used for other purposes.
2) Weather temperature units are in degrees Fahrenheit, unless otherwise noted.
3) Did indicator parameters reach stabilization? Yes
4) Was the two hour time limit reached? No
5) Calculations:
   - Head Above Pump Intake (ft) 4.76
   - Total Drawdown (ft) 0.05
   - Calculated Final Purge Volume (gal) NA
6) If Drawdown Did Not Stabilize or Stabilized Drawdown >0.3 ft, is Total Purge Volume > Calculated Final Purge Volume? NA

Well Sampling Worksheet
WWW RAP Field Data
PERIMETER 2023-Q2 - HS-PMW-RI-101B
Kent County, MI

Well	HS-PMW-RI-101B / 2 in Diameter PVC
Sample Quarter	2023-Q2
Date	06/14/2023
Weather	Clear, 70s
Sampler Initials	AW
Purging Device	Bladder-Pump: LIV-1, Peristaltic-Pump: NA, Centrifugal-Pump: NA
Meters Used	YSI: Agile Rental 2, Turbidimeter: Agile Rental 2, Water-Level-Meter: GeoTech Rental
Reference Measuring Point	PVC
Well Screen (ft bmp)	79.8 - 84.8
Expected Well Bottom Depth (ft bmp)	84.8
Measured Bottom Depth (ft bmp)	NR
Sample Comment	11:45 - Allowed turbidity to clear before connecting YSI. 11:50 - Decreased flow rate to control draw down. 11:55 - Increased flow rate to bring water to surface. 12:25 - Bubbles noted on dissolved oxygen probe, try to knock free. 13:20 - Connected Agile Rental 3 to confirm high pH readings.
Initial Water Level Date/Time	06/14/2023 11:15
Initial Water Level Depth (ft bmp)	9.69
Pump/Tubing Intake Depth (ft bmp)	82.5
Tubing Length (ft)	85
Tubing Inner Diameter (in)	0.25
Purging Initiation Date/Time	06/14/2023 11:20
Total Purge Volume (gal)	4
Modified Sample	No
If Modified, Reasoning	
Sample Collection Information	Bottling-Start: 06/14/2023 13:20:00, Bottling-Stop: 06/14/2023 13:30:00, Parameters-Sampled: PFAS

Reading Time	Depth To Water (ft)	Cumulative Drawdown (ft)	Purge Rate (ml/min)	Temperature (deg c)	Specific Conductivity (us/cm)	Dissolved Oxygen (mg/l)	pH (su)	Oxidation-Reduction Potential (mV)	Turbidity (ntu)
11:45	9.69	0.00	175	NR	NR	NR	NR	NR	>999
11:50	10.22	0.53	250	NR	NR	NR	NR	NR	>999
11:55	9.75	0.06	0	NR	NR	NR	NR	NR	NR
12:00	9.69	0.00	50	NR	NR	NR	NR	NR	496
12:05	9.69	0.00	100	NR	NR	NR	NR	NR	518
12:10	9.69	0.00	100	NR	NR	NR	NR	NR	407
12:15	9.69	0.00	100	NR	NR	NR	NR	NR	331
12:20	10.07	0.38	80	NR	NR	NR	NR	NR	234
12:25	9.97	0.28	80	19 +	1,174 +	1.1	11.6	-104	214
12:30	9.73	0.04	80	16 +	1,194 +	0.6	11.7	-192	287
12:35	9.69	0.00	80	15 +	1,202 +	0.5	11.8	-234	215
12:40	9.69	0.00	80	15 +	1,198 +	<0.5	11.8	-299	389
12:45	9.69	0.00	80	15 +	1,238 +	<0.5	11.9	-353	392
12:50	9.69	0.00	80	15 +	1,318 +	<0.5	11.9	-407	330
12:55	9.69	0.00	80	15 +	1,334 +	<0.5	11.9	-431	320
13:00	9.69	0.00	80	15 +	1,326 +	<0.5	12.0	-462	263
13:05	9.69	0.00	80	16 +	1,335 +	<0.5	12.0	-491	302

Well Sampling Worksheet
WWW RAP Field Data
PERIMETER 2023-Q2 - HS-PMW-RI-101B
Kent County, MI

Well	HS-PMW-RI-101B / 2 in Diameter PVC
Sample Quarter	2023-Q2
Date	06/14/2023
Weather	Clear, 70s
Sampler Initials	AW
Purging Device	Bladder-Pump: LIV-1, Peristaltic-Pump: NA, Centrifugal-Pump: NA
Meters Used	YSI: Agile Rental 2, Turbidimeter: Agile Rental 2, Water-Level-Meter: GeoTech Rental
Reference Measuring Point	PVC
Well Screen (ft bmp)	79.8 - 84.8
Expected Well Bottom Depth (ft bmp)	84.8
Measured Bottom Depth (ft bmp)	NR
Sample Comment	11:45 - Allowed turbidity to clear before connecting YSI. 11:50 - Decreased flow rate to control draw down. 11:55 - Increased flow rate to bring water to surface. 12:25 - Bubbles noted on dissolved oxygen probe, try to knock free. 13:20 - Connected Agile Rental 3 to confirm high pH readings.
Initial Water Level Date/Time	06/14/2023 11:15
Initial Water Level Depth (ft bmp)	9.69
Pump/Tubing Intake Depth (ft bmp)	82.5
Tubing Length (ft)	85
Tubing Inner Diameter (in)	0.25
Purging Initiation Date/Time	06/14/2023 11:20
Total Purge Volume (gal)	4
Modified Sample	No
If Modified, Reasoning	
Sample Collection Information	Bottling-Start: 06/14/2023 13:20:00, Bottling-Stop: 06/14/2023 13:30:00, Parameters-Sampled: PFAS

Reading Time	Depth To Water (ft)	Cumulative Drawdown (ft)	Purge Rate (ml/min)	Temperature (deg c)	Specific Conductivity (us/cm)	Dissolved Oxygen (mg/l)	pH (su)	Oxidation-Reduction Potential (mV)	Turbidity (ntu)
13:10	9.69	0.00	80	15 +	1,334 +	<0.5	12.0	-506	242
13:15	9.69	0.00	80	16 +	1,324 +	<0.5	12.0	-510	217
13:20	9.69	0.00	80	16 +	1,299 +	<0.5	11.6	-5	NR
13:25	NR	NR	NR	NR	NR	NR	11.6	NR	NR

Notes:

1) Abbreviations include: "deg c" indicates degrees Celsius; "ft" indicates feet; "ft bmp" indicates feet below reference measuring point; "gal" indicates gallons; "in" indicates inches; "mg/l" indicates milligrams per liter; "ml/min" indicates milliliters per minute; "mV" indicates millivolts; "NA" indicates not applicable; "NR" indicates not recorded; "ntu" indicates Nephelometric Turbidity units; "su" indicates standard units; "us/cm" indicates microsiemens per centimeter; and "+" indicates the parameter(s) may be used for stabilization calculations but cannot be used for other purposes.
2) Weather temperature units are in degrees Fahrenheit, unless otherwise noted.
3) Did indicator parameters reach stabilization? No
4) Was the two hour time limit reached? Yes
5) Calculations:
   - Head Above Pump Intake (ft) 72.81
   - Total Drawdown (ft) 0.00
   - Calculated Final Purge Volume (gal) NA
6) If Drawdown Did Not Stabilize or Stabilized Drawdown >0.3 ft, is Total Purge Volume > Calculated Final Purge Volume? NA

Well Sampling Worksheet
WWW RAP Field Data
PERIMETER 2023-Q2 - HS-PMW-RI-102A
Kent County, MI

Well	HS-PMW-RI-102A / 2 in Diameter PVC
Sample Quarter	2023-Q2
Date	06/14/2023
Weather	Cloudy, 60F
Sampler Initials	RCP
Purging Device	Bladder-Pump: NA, Peristaltic-Pump: NA, Centrifugal-Pump: Mega Monsoon #1
Meters Used	YSI: Agile Rental 2, Turbidimeter: Agile Rental 2, Water-Level-Meter: WLM-1
Reference Measuring Point	PVC
Well Screen (ft bmp)	47.5 - 52.5
Expected Well Bottom Depth (ft bmp)	52.5
Measured Bottom Depth (ft bmp)	52.5
Sample Comment	10:55 - Increase pump speed. 11:35 - YSI Connected.
Initial Water Level Date/Time	06/14/2023 10:25
Initial Water Level Depth (ft bmp)	43.15
Pump/Tubing Intake Depth (ft bmp)	50
Tubing Length (ft)	52
Tubing Inner Diameter (in)	0.25
Purging Initiation Date/Time	06/14/2023 10:25
Total Purge Volume (gal)	10
Modified Sample	No
If Modified, Reasoning	
Sample Collection Information	Bottling-Start: 06/14/2023 12:10:00, Bottling-Stop: 06/14/2023 12:15:00, Parameters-Sampled: PFAS

Reading Time	Depth To Water (ft)	Cumulative Drawdown (ft)	Purge Rate (ml/min)	Temperature (deg c)	Specific Conductivity (us/cm)	Dissolved Oxygen (mg/l)	pH (su)	Oxidation-Reduction Potential (mV)	Turbidity (ntu)
10:30	43.19	0.04	200	NR	NR	NR	NR	NR	NR
10:35	43.19	0.04	200	NR	NR	NR	NR	NR	NR
10:40	43.19	0.04	200	NR	NR	NR	NR	NR	132
10:45	43.19	0.04	200	NR	NR	NR	NR	NR	155
10:50	43.19	0.04	180	NR	NR	NR	NR	NR	141
10:55	43.20	0.05	120	NR	NR	NR	NR	NR	104
11:00	43.21	0.06	240	NR	NR	NR	NR	NR	85
11:05	43.21	0.06	240	NR	NR	NR	NR	NR	67
11:10	43.21	0.06	240	NR	NR	NR	NR	NR	54
11:15	43.21	0.06	200	NR	NR	NR	NR	NR	39
11:20	43.21	0.06	340	NR	NR	NR	NR	NR	30
11:25	43.21	0.06	420	NR	NR	NR	NR	NR	22
11:30	43.23	0.08	420	NR	NR	NR	NR	NR	14
11:35	43.23	0.08	420	13 +	551 +	10.6	7.4	208	10
11:40	43.23	0.08	420	13 +	547 +	9.8	7.2	206	6
11:45	43.23	0.08	420	13 +	547 +	9.7	7.2	208	5
11:50	43.23	0.08	420	12 +	547 +	9.7	7.3	215	<5

Well Sampling Worksheet
WWW RAP Field Data
PERIMETER 2023-Q2 - HS-PMW-RI-102A
Kent County, MI

Well	HS-PMW-RI-102A / 2 in Diameter PVC
Sample Quarter	2023-Q2
Date	06/14/2023
Weather	Cloudy, 60F
Sampler Initials	RCP
Purging Device	Bladder-Pump: NA, Peristaltic-Pump: NA, Centrifugal-Pump: Mega Monsoon #1
Meters Used	YSI: Agile Rental 2, Turbidimeter: Agile Rental 2, Water-Level-Meter: WLM-1
Reference Measuring Point	PVC
Well Screen (ft bmp)	47.5 - 52.5
Expected Well Bottom Depth (ft bmp)	52.5
Measured Bottom Depth (ft bmp)	52.5
Sample Comment	10:55 - Increase pump speed. 11:35 - YSI Connected.
Initial Water Level Date/Time	06/14/2023 10:25
Initial Water Level Depth (ft bmp)	43.15
Pump/Tubing Intake Depth (ft bmp)	50
Tubing Length (ft)	52
Tubing Inner Diameter (in)	0.25
Purging Initiation Date/Time	06/14/2023 10:25
Total Purge Volume (gal)	10
Modified Sample	No
If Modified, Reasoning	
Sample Collection Information	Bottling-Start: 06/14/2023 12:10:00, Bottling-Stop: 06/14/2023 12:15:00, Parameters-Sampled: PFAS

Reading Time	Depth To Water (ft)	Cumulative Drawdown (ft)	Purge Rate (ml/min)	Temperature (deg c)	Specific Conductivity (us/cm)	Dissolved Oxygen (mg/l)	pH (su)	Oxidation-Reduction Potential (mV)	Turbidity (ntu)
11:55	43.23	0.08	420	12 +	547 +	9.6	7.2	220	<5
12:00	43.23	0.08	420	12 +	547 +	9.7	7.2	227	<5
12:05	43.23	0.08	420	12 +	546 +	9.7	7.2	230	<5

Notes:

1) Abbreviations include: "deg c" indicates degrees Celsius; "ft" indicates feet; "ft bmp" indicates feet below reference measuring point; "gal" indicates gallons; "in" indicates inches; "mg/l" indicates milligrams per liter; "ml/min" indicates milliliters per minute; "mV" indicates millivolts; "NA" indicates not applicable; "NR" indicates not recorded; "ntu" indicates Nephelometric Turbidity units; "su" indicates standard units; "us/cm" indicates microsiemens per centimeter; and "+" indicates the parameter(s) may be used for stabilization calculations but cannot be used for other purposes.
2) Weather temperature units are in degrees Fahrenheit, unless otherwise noted.
3) Did indicator parameters reach stabilization? Yes
4) Was the two hour time limit reached? No
5) Calculations:
   - Head Above Pump Intake (ft) 6.85
   - Total Drawdown (ft) 0.08
   - Calculated Final Purge Volume (gal) NA
6) If Drawdown Did Not Stabilize or Stabilized Drawdown >0.3 ft, is Total Purge Volume > Calculated Final Purge Volume? NA

Well Sampling Worksheet
WWW RAP Field Data
PERIMETER 2023-Q2 - HS-PMW-RI-102B
Kent County, MI

Well	HS-PMW-RI-102B / 2 in Diameter PVC
Sample Quarter	2023-Q2
Date	06/14/2023
Weather	Sunny 65
Sampler Initials	MKM
Purging Device	Bladder-Pump: NA, Peristaltic-Pump: NA, Centrifugal-Pump: Mega Monsoon #2
Meters Used	YSI: Agile Rental 1, Turbidimeter: Agile Rental 1, Water-Level-Meter: WLM-3
Reference Measuring Point	PVC
Well Screen (ft bmp)	101.5 - 106.5
Expected Well Bottom Depth (ft bmp)	106.5
Measured Bottom Depth (ft bmp)	NR
Sample Comment	11:05 - Depth to Water = 42.96 ft bmp and remained stable during purge. YSI Connected at 11:20.
Initial Water Level Date/Time	06/14/2023 10:45
Initial Water Level Depth (ft bmp)	42.94
Pump/Tubing Intake Depth (ft bmp)	104
Tubing Length (ft)	105
Tubing Inner Diameter (in)	0.17
Purging Initiation Date/Time	06/14/2023 10:50
Total Purge Volume (gal)	8
Modified Sample	No
If Modified, Reasoning	
Sample Collection Information	Bottling-Start: 06/14/2023 11:55:00, Bottling-Stop: 06/14/2023 11:57:00, Parameters-Sampled: PFAS

Reading Time	Depth To Water (ft)	Cumulative Drawdown (ft)	Purge Rate (ml/min)	Temperature (deg c)	Specific Conductivity (us/cm)	Dissolved Oxygen (mg/l)	pH (su)	Oxidation-Reduction Potential (mV)	Turbidity (ntu)
10:55	42.96	0.02	400	NR	NR	NR	NR	NR	NR
11:00	42.96	0.02	400	NR	NR	NR	NR	NR	NR
11:10	42.96	0.02	400	NR	NR	NR	NR	NR	NR
11:20	42.96	0.02	400	11 +	496 +	8.1	7.5	129	5
11:30	42.96	0.02	400	11 +	495 +	8.2	7.3	130	<5
11:35	42.96	0.02	400	11 +	496 +	7.7	7.1	129	<5
11:40	42.96	0.02	400	11 +	495 +	8.3	7.2	125	<5
11:45	42.96	0.02	400	11 +	495 +	8.3	7.2	121	<5
11:50	42.96	0.02	400	11 +	496 +	8.3	7.2	119	<5

Notes:

1) Abbreviations include: "deg c" indicates degrees Celsius; "ft" indicates feet; "ft bmp" indicates feet below reference measuring point; "gal" indicates gallons; "in" indicates inches; "mg/l" indicates milligrams per liter; "ml/min" indicates milliliters per minute; "mV" indicates millivolts; "NA" indicates not applicable; "NR" indicates not recorded; "ntu" indicates Nephelometric Turbidity units; "su" indicates standard units; "us/cm" indicates microsiemens per centimeter; and "+" indicates the parameter(s) may be used for stabilization calculations but cannot be used for other purposes.
2) Weather temperature units are in degrees Fahrenheit, unless otherwise noted.
3) Did indicator parameters reach stabilization? Yes
4) Was the two hour time limit reached? No
5) Calculations:
   - Head Above Pump Intake (ft) 61.06
   - Total Drawdown (ft) 0.02
   - Calculated Final Purge Volume (gal) NA
6) If Drawdown Did Not Stabilize or Stabilized Drawdown >0.3 ft, is Total Purge Volume > Calculated Final Purge Volume? NA

Well Sampling Worksheet
WWW RAP Field Data
PERIMETER 2023-Q2 - HS-PMW-RI-102C
Kent County, MI

Well	HS-PMW-RI-102C / 2 in Diameter PVC
Sample Quarter	2023-Q2
Date	06/14/2023
Weather	Sunny 70
Sampler Initials	JET
Purging Device	Bladder-Pump: NA, Peristaltic-Pump: NA, Centrifugal-Pump: Mega Monsoon #2
Meters Used	YSI: Agile Rental 1, Turbidimeter: Agile Rental 1, Water-Level-Meter: WLM-2
Reference Measuring Point	PVC
Well Screen (ft bmp)	136.5 - 141.5
Expected Well Bottom Depth (ft bmp)	141.5
Measured Bottom Depth (ft bmp)	NR
Sample Comment	YSI Connected at 15:30.
Initial Water Level Date/Time	06/14/2023 14:00
Initial Water Level Depth (ft bmp)	42.97
Pump/Tubing Intake Depth (ft bmp)	139
Tubing Length (ft)	141
Tubing Inner Diameter (in)	0.17
Purging Initiation Date/Time	06/14/2023 14:00
Total Purge Volume (gal)	8
Modified Sample	No
If Modified, Reasoning	
Sample Collection Information	Bottling-Start: 06/14/2023 16:00:00, Bottling-Stop: 06/14/2023 16:05:00, Parameters-Sampled: PFAS

Reading Time	Depth To Water (ft)	Cumulative Drawdown (ft)	Purge Rate (ml/min)	Temperature (deg c)	Specific Conductivity (us/cm)	Dissolved Oxygen (mg/l)	pH (su)	Oxidation-Reduction Potential (mV)	Turbidity (ntu)
14:10	43.00	0.03	250	NR	NR	NR	NR	NR	NR
14:20	43.00	0.03	250	NR	NR	NR	NR	NR	NR
14:30	43.00	0.03	250	NR	NR	NR	NR	NR	71
14:50	43.00	0.03	250	NR	NR	NR	NR	NR	26
15:10	43.00	0.03	250	NR	NR	NR	NR	NR	19
15:30	43.00	0.03	250	11 +	429 +	<0.5	7.3	-114	14
15:40	43.00	0.03	250	11 +	430 +	<0.5	7.5	-121	11

Well Sampling Worksheet
WWW RAP Field Data
PERIMETER 2023-Q2 - HS-PMW-RI-102C
Kent County, MI

Well	HS-PMW-RI-102C / 2 in Diameter PVC
Sample Quarter	2023-Q2
Date	06/14/2023
Weather	Sunny 70
Sampler Initials	JET
Purging Device	Bladder-Pump: NA, Peristaltic-Pump: NA, Centrifugal-Pump: Mega Monsoon #2
Meters Used	YSI: Agile Rental 1, Turbidimeter: Agile Rental 1, Water-Level-Meter: WLM-2
Reference Measuring Point	PVC
Well Screen (ft bmp)	136.5 - 141.5
Expected Well Bottom Depth (ft bmp)	141.5
Measured Bottom Depth (ft bmp)	NR
Sample Comment	YSI Connected at 15:30.
Initial Water Level Date/Time	06/14/2023 14:00
Initial Water Level Depth (ft bmp)	42.97
Pump/Tubing Intake Depth (ft bmp)	139
Tubing Length (ft)	141
Tubing Inner Diameter (in)	0.17
Purging Initiation Date/Time	06/14/2023 14:00
Total Purge Volume (gal)	8
Modified Sample	No
If Modified, Reasoning	
Sample Collection Information	Bottling-Start: 06/14/2023 16:00:00, Bottling-Stop: 06/14/2023 16:05:00, Parameters-Sampled: PFAS

Reading Time	Depth To Water (ft)	Cumulative Drawdown (ft)	Purge Rate (ml/min)	Temperature (deg c)	Specific Conductivity (us/cm)	Dissolved Oxygen (mg/l)	pH (su)	Oxidation-Reduction Potential (mV)	Turbidity (ntu)
15:45	43.00	0.03	250	11 +	430 +	<0.5	7.5	-124	9
15:50	43.00	0.03	250	11 +	430 +	<0.5	7.5	-126	9
15:55	43.00	0.03	250	11 +	431 +	<0.5	7.5	-127	9

Notes:

1) Abbreviations include: "deg c" indicates degrees Celsius; "ft" indicates feet; "ft bmp" indicates feet below reference measuring point; "gal" indicates gallons; "in" indicates inches; "mg/l" indicates milligrams per liter; "ml/min" indicates milliliters per minute; "mV" indicates millivolts; "NA" indicates not applicable; "NR" indicates not recorded; "ntu" indicates Nephelometric Turbidity units; "su" indicates standard units; "us/cm" indicates microsiemens per centimeter; and "+" indicates the parameter(s) may be used for stabilization calculations but cannot be used for other purposes.
2) Weather temperature units are in degrees Fahrenheit, unless otherwise noted.
3) Did indicator parameters reach stabilization? Yes
4) Was the two hour time limit reached? Yes
5) Calculations:
   - Head Above Pump Intake (ft) 96.03
   - Total Drawdown (ft) 0.03
   - Calculated Final Purge Volume (gal) NA
6) If Drawdown Did Not Stabilize or Stabilized Drawdown >0.3 ft, is Total Purge Volume > Calculated Final Purge Volume? NA

Well Sampling Worksheet
WWW RAP Field Data
PERIMETER 2023-Q2 - HS-PMW-RI-102D
Kent County, MI

Well	HS-PMW-RI-102D / 2 in Diameter PVC
Sample Quarter	2023-Q2
Date	06/14/2023
Weather	70F Sunny
Sampler Initials	JET
Purging Device	Bladder-Pump: BP-11, Peristaltic-Pump: NA, Centrifugal-Pump: NA
Meters Used	YSI: Agile Rental 1, Turbidimeter: Agile Rental 1, Water-Level-Meter: WLM-2
Reference Measuring Point	PVC
Well Screen (ft bmp)	176.5 - 181.5
Expected Well Bottom Depth (ft bmp)	181.5
Measured Bottom Depth (ft bmp)	NR
Sample Comment	YSI Connected at 12:00.
Initial Water Level Date/Time	06/14/2023 11:30
Initial Water Level Depth (ft bmp)	43.01
Pump/Tubing Intake Depth (ft bmp)	179
Tubing Length (ft)	184
Tubing Inner Diameter (in)	0.25
Purging Initiation Date/Time	06/14/2023 11:30
Total Purge Volume (gal)	4
Modified Sample	No
If Modified, Reasoning	
Sample Collection Information	Bottling-Start: 06/14/2023 12:45:00, Bottling-Stop: 06/14/2023 12:50:00, Parameters-Sampled: PFAS

Reading Time	Depth To Water (ft)	Cumulative Drawdown (ft)	Purge Rate (ml/min)	Temperature (deg c)	Specific Conductivity (us/cm)	Dissolved Oxygen (mg/l)	pH (su)	Oxidation-Reduction Potential (mV)	Turbidity (ntu)
11:40	43.15	0.14	NR	NR	NR	NR	NR	NR	NR
11:45	43.13	0.12	120	NR	NR	NR	NR	NR	NR
11:50	43.12	0.11	120	NR	NR	NR	NR	NR	NR
12:00	43.12	0.11	120	11 +	579 +	1.7	7.3	-50	28
12:10	43.12	0.11	120	11 +	574 +	0.5	7.3	-97	18
12:20	43.12	0.11	120	11 +	571 +	<0.5	7.3	-106	13
12:30	43.12	0.11	120	11 +	570 +	<0.5	7.3	-112	9
12:35	43.12	0.11	120	11 +	568 +	<0.5	7.3	-114	8
12:40	43.12	0.11	120	11 +	568 +	<0.5	7.3	-116	7

Notes:

1) Abbreviations include: "deg c" indicates degrees Celsius; "ft" indicates feet; "ft bmp" indicates feet below reference measuring point; "gal" indicates gallons; "in" indicates inches; "mg/l" indicates milligrams per liter; "ml/min" indicates milliliters per minute; "mV" indicates millivolts; "NA" indicates not applicable; "NR" indicates not recorded; "ntu" indicates Nephelometric Turbidity units; "su" indicates standard units; "us/cm" indicates microsiemens per centimeter; and "+" indicates the parameter(s) may be used for stabilization calculations but cannot be used for other purposes.
2) Weather temperature units are in degrees Fahrenheit, unless otherwise noted.
3) Did indicator parameters reach stabilization? Yes
4) Was the two hour time limit reached? No
5) Calculations:
   - Head Above Pump Intake (ft) 135.99
   - Total Drawdown (ft) 0.11
   - Calculated Final Purge Volume (gal) NA
6) If Drawdown Did Not Stabilize or Stabilized Drawdown >0.3 ft, is Total Purge Volume > Calculated Final Purge Volume? NA

Well Sampling Worksheet
WWW RAP Field Data
AREA 5 2023-Q2 - HS-PMW-RI-103A
Kent County, MI

Well	HS-PMW-RI-103A / 2 in Diameter PVC
Sample Quarter	2023-Q2
Date	04/21/2023
Weather	46F Cloudy
Sampler Initials	JET
Purging Device	Bladder-Pump: NA, Peristaltic-Pump: NA, Centrifugal-Pump: Mega Monsoon #1
Meters Used	YSI: Agile Rental 1, Turbidimeter: Agile Rental 1, Water-Level-Meter: WLM-3
Reference Measuring Point	PVC
Well Screen (ft bmp)	89.6 - 94.6
Measured Bottom Depth (ft bmp)	NR
Sample Comment	YSI Connected at 10:50. Dissolved Oxygen reading from 10:50 was recorded as 19.4%.
Initial Water Level Date/Time	04/21/2023 10:10
Initial Water Level Depth (ft bmp)	75.18
Pump/Tubing Intake Depth (ft bmp)	92.1
Tubing Length (ft)	95
Tubing Inner Diameter (in)	0.17
Purging Initiation Date/Time	04/21/2023 10:10
Total Purge Volume (gal)	5.7
Modified Sample	No
If Modified, Reasoning	
Sample Collection Information	Bottling-Start: 04/21/2023 11:15:00, Bottling-Stop: 04/21/2023 11:20:00, Parameters-Sampled: PFAS

Reading Time	Depth To Water (ft)	Cumulative Drawdown (ft)	Purge Rate (ml/min)	Temperature (deg c)	Specific Conductivity (us/cm)	Dissolved Oxygen (mg/l)	pH (su)	Oxidation-Reduction Potential (mV)	Turbidity (ntu)
10:10	75.20	0.02	330	NR	NR	NR	NR	NR	NR
10:20	75.20	0.02	330	NR	NR	NR	NR	NR	NR
10:50	75.20	0.02	330	12 +	786 +	NR	7.1	133	<5
11:00	75.20	0.02	330	12 +	785 +	2.3	7.2	135	<5
11:05	75.20	0.02	330	12 +	786 +	2.3	7.2	135	<5
11:10	75.20	0.02	330	12 +	785 +	2.2	7.2	136	<5

Notes:

1) Abbreviations include: "deg c" indicates degrees Celsius; "ft" indicates feet; "ft bmp" indicates feet below reference measuring point; "gal" indicates gallons; "in" indicates inches; "mg/l" indicates milligrams per liter; "ml/min" indicates milliliters per minute; "mV" indicates millivolts; "NA" indicates not applicable; "NR" indicates not recorded; "ntu" indicates Nephelometric Turbidity units; "su" indicates standard units; "us/cm" indicates microsiemens per centimeter; and "+" indicates the parameter(s) may be used for stabilization calculations but cannot be used for other purposes.
2) Weather temperature units are in degrees Fahrenheit, unless otherwise noted.
3) Did indicator parameters reach stabilization? Yes
4) Was the two hour time limit reached? No
5) Calculations:
   - Head Above Pump Intake (ft): 16.92
   - Total Drawdown (ft): 0.02
   - Calculated Final Purge Volume (gal): NA
6) If Drawdown Did Not Stabilize or Stabilized Drawdown >0.3 ft, is Total Purge Volume > Calculated Final Purge Volume? NA

Well Sampling Worksheet
WWW RAP Field Data
AREA 5 2023-Q2 - HS-PMW-RI-103B
Kent County, MI

Well	HS-PMW-RI-103B / 2 in Diameter PVC
Sample Quarter	2023-Q2
Date	04/21/2023
Weather	46F Cloudy
Sampler Initials	JET
Purging Device	Bladder-Pump: NA, Peristaltic-Pump: NA, Centrifugal-Pump: Mega Monsoon #2
Meters Used	YSI: Agile Rental 1, Turbidimeter: Agile Rental 1, Water-Level-Meter: WLM-4
Reference Measuring Point	PVC
Well Screen (ft bmp)	108.7 - 113.7
Measured Bottom Depth (ft bmp)	NR
Sample Comment	Water was turbid at the beginning of the purge. Connected YSI at 12:35.
Initial Water Level Date/Time	04/21/2023 11:15
Initial Water Level Depth (ft bmp)	76.69
Pump/Tubing Intake Depth (ft bmp)	111.2
Tubing Length (ft)	113
Tubing Inner Diameter (in)	0.17
Purging Initiation Date/Time	04/21/2023 11:15
Total Purge Volume (gal)	3.8
Modified Sample	No
If Modified, Reasoning	
Sample Collection Information	Bottling-Start: 04/21/2023 13:20:00, Bottling-Stop: 04/21/2023 13:25:00, Parameters-Sampled: PFAS

Reading Time	Depth To Water (ft)	Cumulative Drawdown (ft)	Purge Rate (ml/min)	Temperature (deg c)	Specific Conductivity (us/cm)	Dissolved Oxygen (mg/l)	pH (su)	Oxidation-Reduction Potential (mV)	Turbidity (ntu)
11:20	76.81	0.12	120	NR	NR	NR	NR	NR	NR
11:30	76.81	0.12	120	NR	NR	NR	NR	NR	NR
11:40	76.81	0.12	120	NR	NR	NR	NR	NR	553
12:00	76.81	0.12	120	NR	NR	NR	NR	NR	91
12:15	76.81	0.12	120	NR	NR	NR	NR	NR	33
12:35	76.81	0.12	120	11 +	801 +	<0.5	7.2	-20	20
12:50	76.81	0.12	120	11 +	801 +	<0.5	7.2	-60	15
13:00	76.81	0.12	120	11 +	801 +	<0.5	7.2	-65	13
13:05	76.81	0.12	120	11 +	801 +	<0.5	7.2	-66	11
13:10	76.81	0.12	120	11 +	800 +	<0.5	7.2	-67	10
13:15	76.81	0.12	120	11 +	800 +	<0.5	7.2	-66	10

Notes:

1) Abbreviations include: "deg c" indicates degrees Celsius; "ft" indicates feet; "ft bmp" indicates feet below reference measuring point; "gal" indicates gallons; "in" indicates inches; "mg/l" indicates milligrams per liter; "ml/min" indicates milliliters per minute; "mV" indicates millivolts; "NA" indicates not applicable; "NR" indicates not recorded; "ntu" indicates Nephelometric Turbidity units; "su" indicates standard units; "us/cm" indicates microsiemens per centimeter; and "+" indicates the parameter(s) may be used for stabilization calculations but cannot be used for other purposes.
2) Weather temperature units are in degrees Fahrenheit, unless otherwise noted.
3) Did indicator parameters reach stabilization? No
4) Was the two hour time limit reached? Yes
5) Calculations:
   - Head Above Pump Intake (ft) 34.51
   - Total Drawdown (ft) 0.12
   - Calculated Final Purge Volume (gal) NA
6) If Drawdown Did Not Stabilize or Stabilized Drawdown >0.3 ft, is Total Purge Volume > Calculated Final Purge Volume? NA

Well Sampling Worksheet
WWW RAP Field Data
AREA 5 2023-Q2 - HS-PMW-RI-104A
Kent County, MI

Well	HS-PMW-RI-104A / 2 in Diameter PVC
Sample Quarter	2023-Q2
Date	04/20/2023
Weather	66 Cloudy
Sampler Initials	JET
Purging Device	Bladder-Pump: NA, Peristaltic-Pump: PER-2, Centrifugal-Pump: NA
Meters Used	YSI: Agile Rental 2, Turbidimeter: Agile Rental 2, Water-Level-Meter: WLM-4
Reference Measuring Point	PVC
Well Screen (ft bmp)	14.6 - 19.6
Measured Bottom Depth (ft bmp)	NR
Sample Comment	YSI Connected at 14:00.
Initial Water Level Date/Time	04/20/2023 13:30
Initial Water Level Depth (ft bmp)	13.10
Pump/Tubing Intake Depth (ft bmp)	17.1
Tubing Length (ft)	19
Tubing Inner Diameter (in)	0.17
Purging Initiation Date/Time	04/20/2023 13:30
Total Purge Volume (gal)	4.8
Modified Sample	No
If Modified, Reasoning	
Sample Collection Information	Bottling-Start: 04/20/2023 14:40:00, Bottling-Stop: 04/20/2023 14:45:00, Parameters-Sampled: PFAS

Reading Time	Depth To Water (ft)	Cumulative Drawdown (ft)	Purge Rate (ml/min)	Temperature (deg c)	Specific Conductivity (us/cm)	Dissolved Oxygen (mg/l)	pH (su)	Oxidation-Reduction Potential (mV)	Turbidity (ntu)
13:40	13.12	0.02	250	NR	NR	NR	NR	NR	NR
13:50	13.12	0.02	350	NR	NR	NR	NR	NR	<5
14:00	13.12	0.02	350	9 +	694 +	9.3	7.3	144	<5
14:10	13.12	0.02	350	9 +	708 +	9.2	7.3	177	<5
14:20	13.12	0.02	350	9 +	727 +	9.3	7.3	197	<5
14:25	13.12	0.02	350	9 +	731 +	9.3	7.3	201	<5
14:30	13.12	0.02	350	9 +	735 +	9.3	7.3	208	<5
14:35	13.12	0.02	350	9 +	739 +	9.3	7.3	211	<5

Notes:

1) Abbreviations include: "deg c" indicates degrees Celsius; "ft" indicates feet; "ft bmp" indicates feet below reference measuring point; "gal" indicates gallons; "in" indicates inches; "mg/l" indicates milligrams per liter; "ml/min" indicates milliliters per minute; "mV" indicates millivolts; "NA" indicates not applicable; "NR" indicates not recorded; "ntu" indicates Nephelometric Turbidity units; "su" indicates standard units; "us/cm" indicates microsiemens per centimeter; and "+" indicates the parameter(s) may be used for stabilization calculations but cannot be used for other purposes.
2) Weather temperature units are in degrees Fahrenheit, unless otherwise noted.
3) Did indicator parameters reach stabilization? Yes
4) Was the two hour time limit reached? No
5) Calculations:
   - Head Above Pump Intake (ft) 4.00
   - Total Drawdown (ft) 0.02
   - Calculated Final Purge Volume (gal) NA
6) If Drawdown Did Not Stabilize or Stabilized Drawdown >0.3 ft, is Total Purge Volume > Calculated Final Purge Volume? NA

Well Sampling Worksheet
WWW RAP Field Data
AREA 5 2023-Q2 - HS-PMW-RI-104B
Kent County, MI

Well	HS-PMW-RI-104B / 2 in Diameter PVC
Sample Quarter	2023-Q2
Date	04/20/2023
Weather	Cloudy 50s
Sampler Initials	NCK
Purging Device	Bladder-Pump: NA, Peristaltic-Pump: PER-3, Centrifugal-Pump: NA
Meters Used	YSI: Agile Rental 1, Turbidimeter: Agile Rental 1, Water-Level-Meter: WLM-3
Reference Measuring Point	PVC
Well Screen (ft bmp)	45.4 - 50.4
Measured Bottom Depth (ft bmp)	NR
Sample Comment	Allowed drawdown to stabilize and turbidity to clear before connecting YSI. Water level quickly stabilized at 13.23 ft bmp. Connected YSI at 14:55.
Initial Water Level Date/Time	04/20/2023 14:35
Initial Water Level Depth (ft bmp)	13.21
Pump/Tubing Intake Depth (ft bmp)	47.9
Tubing Length (ft)	51
Tubing Inner Diameter (in)	0.17
Purging Initiation Date/Time	04/20/2023 14:35
Total Purge Volume (gal)	4
Modified Sample	No
If Modified, Reasoning	
Sample Collection Information	Bottling-Start: 04/20/2023 15:10:00, Bottling-Stop: 04/20/2023 15:14:00, Parameters-Sampled: PFAS

Reading Time	Depth To Water (ft)	Cumulative Drawdown (ft)	Purge Rate (ml/min)	Temperature (deg c)	Specific Conductivity (us/cm)	Dissolved Oxygen (mg/l)	pH (su)	Oxidation-Reduction Potential (mV)	Turbidity (ntu)
14:45	13.23	0.02	390	NR	NR	NR	NR	NR	1
14:55	13.23	0.02	390	10 +	637 +	<0.5	7.2	113	<5
15:00	13.23	0.02	390	10 +	637 +	<0.5	7.1	101	<5
15:05	13.23	0.02	390	10 +	637 +	<0.5	7.2	95	<5
15:10	13.23	0.02	390	10 +	637 +	<0.5	7.1	92	<5

Notes:

1) Abbreviations include: "deg c" indicates degrees Celsius; "ft" indicates feet; "ft bmp" indicates feet below reference measuring point; "gal" indicates gallons; "in" indicates inches; "mg/l" indicates milligrams per liter; "ml/min" indicates milliliters per minute; "mV" indicates millivolts; "NA" indicates not applicable; "NR" indicates not recorded; "ntu" indicates Nephelometric Turbidity units; "su" indicates standard units; "us/cm" indicates microsiemens per centimeter; and "+" indicates the parameter(s) may be used for stabilization calculations but cannot be used for other purposes.
2) Weather temperature units are in degrees Fahrenheit, unless otherwise noted.
3) Did indicator parameters reach stabilization? Yes
4) Was the two hour time limit reached? No
5) Calculations:
   - Head Above Pump Intake (ft) 34.69
   - Total Drawdown (ft) 0.02
   - Calculated Final Purge Volume (gal) NA
6) If Drawdown Did Not Stabilize or Stabilized Drawdown >0.3 ft, is Total Purge Volume > Calculated Final Purge Volume? NA

Well Sampling Worksheet
WWW RAP Field Data
AREA 5 2023-Q2 - HS-PMW-RI-104C
Kent County, MI

Well	HS-PMW-RI-104C / 2 in Diameter PVC
Sample Quarter	2023-Q2
Date	04/20/2023
Weather	Cloudy Mid 60s
Sampler Initials	DMW
Purging Device	Bladder-Pump: NA, Peristaltic-Pump: PER-1, Centrifugal-Pump: NA
Meters Used	YSI: Agile Rental 3, Turbidimeter: Agile Rental 1, Water-Level-Meter: WLM-2
Reference Measuring Point	PVC
Well Screen (ft bmp)	74.3 - 79.3
Measured Bottom Depth (ft bmp)	79.3
Sample Comment	13:35 - 300 mL/min (per previous sampling event) and SWL = 13.28 ft bmp. 13:37 - 300 mL/min and SWL = 13.28 ft bmp. YSI Connected at 13:43. 13:45 - 300 mL/min and SWL = 13.28 ft bmp.
Initial Water Level Date/Time	04/20/2023 13:32
Initial Water Level Depth (ft bmp)	13.26
Pump/Tubing Intake Depth (ft bmp)	76.8
Tubing Length (ft)	80
Tubing Inner Diameter (in)	0.17
Purging Initiation Date/Time	04/20/2023 13:35
Total Purge Volume (gal)	10
Modified Sample	No
If Modified, Reasoning	
Sample Collection Information	Bottling-Start: 04/20/2023 15:30:00, Bottling-Stop: 04/20/2023 15:33:00, Parameters-Sampled: PFAS

Reading Time	Depth To Water (ft)	Cumulative Drawdown (ft)	Purge Rate (ml/min)	Temperature (deg c)	Specific Conductivity (us/cm)	Dissolved Oxygen (mg/l)	pH (su)	Oxidation-Reduction Potential (mV)	Turbidity (ntu)
13:50	13.28	0.02	300	11 +	684 +	0.6	7.3	195	<5
13:55	13.28	0.02	300	11 +	754 +	0.5	7.3	182	<5
14:00	13.30	0.04	300	11 +	811 +	<0.5	7.3	151	<5
14:10	13.30	0.04	300	11 +	812 +	<0.5	7.3	77	<5
14:15	13.30	0.04	300	11 +	808 +	<0.5	7.3	51	<5
14:20	13.30	0.04	300	11 +	813 +	<0.5	7.3	29	<5
14:25	13.30	0.04	300	11 +	814 +	<0.5	7.3	7	<5
14:30	13.30	0.04	300	11 +	819 +	<0.5	7.3	-10	<5
14:35	13.30	0.04	300	11 +	839 +	<0.5	7.3	-22	<5
14:40	13.30	0.04	300	11 +	862 +	<0.5	7.3	-36	<5
14:45	13.30	0.04	300	11 +	940 +	<0.5	7.3	-45	<5
14:50	13.30	0.04	300	11 +	972 +	<0.5	7.3	-56	<5
14:55	13.30	0.04	300	11 +	990 +	<0.5	7.3	-64	<5
15:00	13.30	0.04	300	11 +	993 +	<0.5	7.3	-71	<5
15:05	13.30	0.04	300	11 +	994 +	<0.5	7.3	-79	<5
15:10	13.30	0.04	300	11 +	997 +	<0.5	7.3	-85	<5

Well Sampling Worksheet
WWW RAP Field Data
AREA 5 2023-Q2 - HS-PMW-RI-104C
Kent County, MI

Well	HS-PMW-RI-104C / 2 in Diameter PVC
Sample Quarter	2023-Q2
Date	04/20/2023
Weather	Cloudy Mid 60s
Sampler Initials	DMW
Purging Device	Bladder-Pump: NA, Peristaltic-Pump: PER-1, Centrifugal-Pump: NA
Meters Used	YSI: Agile Rental 3, Turbidimeter: Agile Rental 1, Water-Level-Meter: WLM-2
Reference Measuring Point	PVC
Well Screen (ft bmp)	74.3 - 79.3
Measured Bottom Depth (ft bmp)	79.3
Sample Comment	13:35 - 300 mL/min (per previous sampling event) and SWL = 13.28 ft bmp. 13:37 - 300 mL/min and SWL = 13.28 ft bmp. YSI Connected at 13:43. 13:45 - 300 mL/min and SWL = 13.28 ft bmp.
Initial Water Level Date/Time	04/20/2023 13:32
Initial Water Level Depth (ft bmp)	13.26
Pump/Tubing Intake Depth (ft bmp)	76.8
Tubing Length (ft)	80
Tubing Inner Diameter (in)	0.17
Purging Initiation Date/Time	04/20/2023 13:35
Total Purge Volume (gal)	10
Modified Sample	No
If Modified, Reasoning	
Sample Collection Information	Bottling-Start: 04/20/2023 15:30:00, Bottling-Stop: 04/20/2023 15:33:00, Parameters-Sampled: PFAS

Reading Time	Depth To Water (ft)	Cumulative Drawdown (ft)	Purge Rate (ml/min)	Temperature (deg c)	Specific Conductivity (us/cm)	Dissolved Oxygen (mg/l)	pH (su)	Oxidation-Reduction Potential (mV)	Turbidity (ntu)
15:15	13.30	0.04	300	11 +	993 +	<0.5	7.3	-91	<5
15:20	13.30	0.04	300	11 +	998 +	<0.5	7.3	-97	<5
15:25	13.30	0.04	300	11 +	991 +	<0.5	7.3	-101	<5

Notes:

1) Abbreviations include: "deg c" indicates degrees Celsius; "ft" indicates feet; "ft bmp" indicates feet below reference measuring point; "gal" indicates gallons; "in" indicates inches; "mg/l" indicates milligrams per liter; "ml/min" indicates milliliters per minute; "mV" indicates millivolts; "NA" indicates not applicable; "NR" indicates not recorded; "ntu" indicates Nephelometric Turbidity units; "su" indicates standard units; "us/cm" indicates microsiemens per centimeter; and "+" indicates the parameter(s) may be used for stabilization calculations but cannot be used for other purposes.
2) Weather temperature units are in degrees Fahrenheit, unless otherwise noted.
3) Did indicator parameters reach stabilization? Yes
4) Was the two hour time limit reached? No
5) Calculations:
   - Head Above Pump Intake (ft): 63.54
   - Total Drawdown (ft): 0.04
   - Calculated Final Purge Volume (gal): NA
6) If Drawdown Did Not Stabilize or Stabilized Drawdown >0.3 ft, is Total Purge Volume > Calculated Final Purge Volume? NA

Well Sampling Worksheet
WWW RAP Field Data
AREA 5 2023-Q2 - HS-PMW-RI-104D
Kent County, MI

Well	HS-PMW-RI-104D / 2 in Diameter PVC
Sample Quarter	2023-Q2
Date	04/20/2023
Weather	Cloudy 50s
Sampler Initials	NCK
Purging Device	Bladder-Pump: NA, Peristaltic-Pump: PER-3, Centrifugal-Pump: NA
Meters Used	YSI: Agile Rental 1, Turbidimeter: Agile Rental 1, Water-Level-Meter: WLM-3
Reference Measuring Point	PVC
Well Screen (ft bmp)	111.4 - 116.4
Measured Bottom Depth (ft bmp)	NR
Sample Comment	Allowed turbidity to clear before connecting YSI. Connected YSI at 14:00. Water level quickly stabilized at 7.20 ft bmp. YSI Connected at 14:00.
Initial Water Level Date/Time	04/20/2023 13:40
Initial Water Level Depth (ft bmp)	7.15
Pump/Tubing Intake Depth (ft bmp)	113.9
Tubing Length (ft)	117
Tubing Inner Diameter (in)	0.17
Purging Initiation Date/Time	04/20/2023 13:40
Total Purge Volume (gal)	4
Modified Sample	No
If Modified, Reasoning	
Sample Collection Information	Bottling-Start: 04/20/2023 14:15:00, Bottling-Stop: 04/20/2023 14:19:00, Parameters-Sampled: PFAS

Reading Time	Depth To Water (ft)	Cumulative Drawdown (ft)	Purge Rate (ml/min)	Temperature (deg c)	Specific Conductivity (us/cm)	Dissolved Oxygen (mg/l)	pH (su)	Oxidation-Reduction Potential (mV)	Turbidity (ntu)
13:50	7.20	0.05	380	NR	NR	NR	NR	NR	NR
14:00	7.20	0.05	350	10 +	1,301 +	<0.5	6.8	-94	7
14:05	7.20	0.05	350	10 +	1,300 +	<0.5	7.1	-100	<5
14:10	7.20	0.05	350	10 +	1,301 +	<0.5	7.1	-104	<5
14:15	7.20	0.05	350	10 +	1,297 +	<0.5	7.1	-108	<5

Notes:

1) Abbreviations include: "deg c" indicates degrees Celsius; "ft" indicates feet; "ft bmp" indicates feet below reference measuring point; "gal" indicates gallons; "in" indicates inches; "mg/l" indicates milligrams per liter; "ml/min" indicates milliliters per minute; "mV" indicates millivolts; "NA" indicates not applicable; "NR" indicates not recorded; "ntu" indicates Nephelometric Turbidity units; "su" indicates standard units; "us/cm" indicates microsiemens per centimeter; and "+" indicates the parameter(s) may be used for stabilization calculations but cannot be used for other purposes.
2) Weather temperature units are in degrees Fahrenheit, unless otherwise noted.
3) Did indicator parameters reach stabilization? Yes
4) Was the two hour time limit reached? No
5) Calculations:
   - Head Above Pump Intake (ft) 106.75
   - Total Drawdown (ft) 0.05
   - Calculated Final Purge Volume (gal) NA
6) If Drawdown Did Not Stabilize or Stabilized Drawdown >0.3 ft, is Total Purge Volume > Calculated Final Purge Volume? NA

Well Sampling Worksheet
WWW RAP Field Data
PERIMETER 2023-Q2 - HS-PMW-RI-105A
Kent County, MI

Well	HS-PMW-RI-105A / 2 in Diameter PVC
Sample Quarter	2023-Q2
Date	06/12/2023
Weather	Mostly Cloudy
Sampler Initials	AW
Purging Device	Bladder-Pump: NA, Peristaltic-Pump: PER-2, Centrifugal-Pump: NA
Meters Used	YSI: Agile Rental 2, Turbidimeter: Agile Rental 2, Water-Level-Meter: GeoTech Rental
Reference Measuring Point	PVC
Well Screen (ft bmp)	24.5 - 29.5
Expected Well Bottom Depth (ft bmp)	29.5
Measured Bottom Depth (ft bmp)	29.55
Sample Comment	10:00 - Depth to Water = 22.47 ft bmp. 10:10 - Depth to Water = 22.44 ft bmp. 10:25 - YSI Connected. 10:30 - Depth to Water = 24.45 ft bmp and remained constant for duration of purge.
Initial Water Level Date/Time	06/12/2023 10:00
Initial Water Level Depth (ft bmp)	22.47
Pump/Tubing Intake Depth (ft bmp)	27.5
Tubing Length (ft)	30
Tubing Inner Diameter (in)	0.17
Purging Initiation Date/Time	06/12/2023 10:10
Total Purge Volume (gal)	2
Modified Sample	No
If Modified, Reasoning	
Sample Collection Information	Bottling-Start: 06/12/2023 11:00:00, Bottling-Stop: 06/12/2023 11:10:00, Parameters-Sampled: PFAS

Reading Time	Depth To Water (ft)	Cumulative Drawdown (ft)	Purge Rate (ml/min)	Temperature (deg c)	Specific Conductivity (us/cm)	Dissolved Oxygen (mg/l)	pH (su)	Oxidation-Reduction Potential (mV)	Turbidity (ntu)
10:15	22.44	-0.03	150	NR	NR	NR	NR	NR	43
10:20	22.44	-0.03	150	NR	NR	NR	NR	NR	27
10:25	22.44	-0.03	150	10 +	748 +	7.7	7.5	156	18
10:30	22.45	-0.02	150	11 +	746 +	7.6	7.3	177	15
10:35	22.45	-0.02	150	11 +	742 +	7.7	7.3	188	11
10:40	22.45	-0.02	150	11 +	736 +	7.5	7.3	204	12
10:45	22.45	-0.02	150	10 +	733 +	7.4	7.3	210	11
10:50	22.45	-0.02	150	10 +	732 +	7.2	7.3	214	12

Notes:

1) Abbreviations include: "deg c" indicates degrees Celsius; "ft" indicates feet; "ft bmp" indicates feet below reference measuring point; "gal" indicates gallons; "in" indicates inches; "mg/l" indicates milligrams per liter; "ml/min" indicates milliliters per minute; "mV" indicates millivolts; "NA" indicates not applicable; "NR" indicates not recorded; "ntu" indicates Nephelometric Turbidity units; "su" indicates standard units; "us/cm" indicates microsiemens per centimeter; and "+" indicates the parameter(s) may be used for stabilization calculations but cannot be used for other purposes.
2) Weather temperature units are in degrees Fahrenheit, unless otherwise noted.
3) Did indicator parameters reach stabilization? Yes
4) Was the two hour time limit reached? No
5) Calculations:
   - Head Above Pump Intake (ft): 5.03
   - Total Drawdown (ft): -0.02
   - Calculated Final Purge Volume (gal): NA
6) If Drawdown Did Not Stabilize or Stabilized Drawdown >0.3 ft, is Total Purge Volume > Calculated Final Purge Volume? NA

Well Sampling Worksheet
WWW RAP Field Data
PERIMETER 2023-Q2 - HS-PMW-RI-105B
Kent County, MI

Well	HS-PMW-RI-105B / 2 in Diameter PVC
Sample Quarter	2023-Q2
Date	06/12/2023
Weather	Mostly Cloudy
Sampler Initials	AW
Purging Device	Bladder-Pump: NA, Peristaltic-Pump: PER-2, Centrifugal-Pump: NA
Meters Used	YSI: Agile Rental 2, Turbidimeter: Agile Rental 2, Water-Level-Meter: GeoTech Rental
Reference Measuring Point	PVC
Well Screen (ft bmp)	152.8 - 157.8
Expected Well Bottom Depth (ft bmp)	157.8
Measured Bottom Depth (ft bmp)	157.8
Sample Comment	12:15 - Depth to Water = 13.06 ft bmp and remained constant for duration of purge. YSI Connected.
Initial Water Level Date/Time	06/12/2023 11:55
Initial Water Level Depth (ft bmp)	13.06
Pump/Tubing Intake Depth (ft bmp)	154.9
Tubing Length (ft)	157
Tubing Inner Diameter (in)	0.17
Purging Initiation Date/Time	06/12/2023 11:55
Total Purge Volume (gal)	2.8
Modified Sample	No
If Modified, Reasoning	
Sample Collection Information	Bottling-Start: 06/12/2023 13:05:00, Bottling-Stop: 06/12/2023 13:10:00, Parameters-Sampled: PFAS

Reading Time	Depth To Water (ft)	Cumulative Drawdown (ft)	Purge Rate (ml/min)	Temperature (deg c)	Specific Conductivity (us/cm)	Dissolved Oxygen (mg/l)	pH (su)	Oxidation-Reduction Potential (mV)	Turbidity (ntu)
12:00	13.06	0.00	150	NR	NR	NR	NR	NR	>999
12:05	13.06	0.00	150	NR	NR	NR	NR	NR	332
12:10	13.06	0.00	150	NR	NR	NR	NR	NR	80
12:15	13.06	0.00	150	11 +	1,409 +	<0.5	7.5	-92	38
12:20	13.06	0.00	150	11 +	1,412 +	<0.5	7.4	-98	27
12:25	13.06	0.00	150	11 +	1,408 +	<0.5	7.4	-99	26
12:30	13.06	0.00	150	11 +	1,411 +	<0.5	7.4	-99	19
12:35	13.06	0.00	150	11 +	1,408 +	<0.5	7.4	-102	13
12:40	13.06	0.00	150	11 +	1,403 +	<0.5	7.4	-102	11

Well Sampling Worksheet
WWW RAP Field Data
PERIMETER 2023-Q2 - HS-PMW-RI-105B
Kent County, MI

Well	HS-PMW-RI-105B / 2 in Diameter PVC
Sample Quarter	2023-Q2
Date	06/12/2023
Weather	Mostly Cloudy
Sampler Initials	AW
Purging Device	Bladder-Pump: NA, Peristaltic-Pump: PER-2, Centrifugal-Pump: NA
Meters Used	YSI: Agile Rental 2, Turbidimeter: Agile Rental 2, Water-Level-Meter: GeoTech Rental
Reference Measuring Point	PVC
Well Screen (ft bmp)	152.8 - 157.8
Expected Well Bottom Depth (ft bmp)	157.8
Measured Bottom Depth (ft bmp)	157.8
Sample Comment	12:15 - Depth to Water = 13.06 ft bmp and remained constant for duration of purge. YSI Connected.
Initial Water Level Date/Time	06/12/2023 11:55
Initial Water Level Depth (ft bmp)	13.06
Pump/Tubing Intake Depth (ft bmp)	154.9
Tubing Length (ft)	157
Tubing Inner Diameter (in)	0.17
Purging Initiation Date/Time	06/12/2023 11:55
Total Purge Volume (gal)	2.8
Modified Sample	No
If Modified, Reasoning	
Sample Collection Information	Bottling-Start: 06/12/2023 13:05:00, Bottling-Stop: 06/12/2023 13:10:00, Parameters-Sampled: PFAS

Reading Time	Depth To Water (ft)	Cumulative Drawdown (ft)	Purge Rate (ml/min)	Temperature (deg c)	Specific Conductivity (us/cm)	Dissolved Oxygen (mg/l)	pH (su)	Oxidation-Reduction Potential (mV)	Turbidity (ntu)
12:45	13.06	0.00	150	11 +	1,406 +	<0.5	7.4	-102	9
12:50	13.06	0.00	150	11 +	1,404 +	<0.5	7.4	-101	9
12:55	13.06	0.00	150	11 +	1,409 +	<0.5	7.4	-100	9

Notes:

1) Abbreviations include: "deg c" indicates degrees Celsius; "ft" indicates feet; "ft bmp" indicates feet below reference measuring point; "gal" indicates gallons; "in" indicates inches; "mg/l" indicates milligrams per liter; "ml/min" indicates milliliters per minute; "mV" indicates millivolts; "NA" indicates not applicable; "NR" indicates not recorded; "ntu" indicates Nephelometric Turbidity units; "su" indicates standard units; "us/cm" indicates microsiemens per centimeter; and "+" indicates the parameter(s) may be used for stabilization calculations but cannot be used for other purposes.
2) Weather temperature units are in degrees Fahrenheit, unless otherwise noted.
3) Did indicator parameters reach stabilization? Yes
4) Was the two hour time limit reached? No
5) Calculations:
   - Head Above Pump Intake (ft) 141.84
   - Total Drawdown (ft) 0.00
   - Calculated Final Purge Volume (gal) NA
6) If Drawdown Did Not Stabilize or Stabilized Drawdown >0.3 ft, is Total Purge Volume > Calculated Final Purge Volume? NA

Well Sampling Worksheet
WWW RAP Field Data
PERIMETER 2023-Q2 - HS-PMW-RI-106A
Kent County, MI

Well	HS-PMW-RI-106A / 2 in Diameter PVC
Sample Quarter	2023-Q2
Date	06/20/2023
Weather	Sunny 87F
Sampler Initials	RCP
Purging Device	Bladder-Pump: NA, Peristaltic-Pump: NA, Centrifugal-Pump: Mega Monsoon #1
Meters Used	YSI: Agile Rental 3, Turbidimeter: Agile Rental 3, Water-Level-Meter: WLM-2
Reference Measuring Point	PVC
Well Screen (ft bmp)	44.7 - 49.7
Expected Well Bottom Depth (ft bmp)	49.7
Measured Bottom Depth (ft bmp)	NR
Sample Comment	15:25 - Reduced pump speed. 15:45 - YSI Connected.
Initial Water Level Date/Time	06/20/2023 15:10
Initial Water Level Depth (ft bmp)	37.04
Pump/Tubing Intake Depth (ft bmp)	47.2
Tubing Length (ft)	50
Tubing Inner Diameter (in)	0.17
Purging Initiation Date/Time	06/20/2023 15:15
Total Purge Volume (gal)	8
Modified Sample	No
If Modified, Reasoning	
Sample Collection Information	Bottling-Start: 06/20/2023 16:30:00, Bottling-Stop: 06/20/2023 16:35:00, Parameters-Sampled: PFAS

Reading Time	Depth To Water (ft)	Cumulative Drawdown (ft)	Purge Rate (ml/min)	Temperature (deg c)	Specific Conductivity (us/cm)	Dissolved Oxygen (mg/l)	pH (su)	Oxidation-Reduction Potential (mV)	Turbidity (ntu)
15:25	37.09	0.05	500	NR	NR	NR	NR	NR	83
15:30	37.07	0.03	220	NR	NR	NR	NR	NR	19
15:45	37.06	0.02	220	13 +	554 +	0.6	7.5	157	20
15:55	37.06	0.02	220	13 +	553 +	<0.5	7.3	131	13
16:00	37.06	0.02	220	12 +	553 +	<0.5	7.3	126	8
16:05	37.06	0.02	220	12 +	553 +	<0.5	7.3	123	6
16:10	37.06	0.02	220	12 +	553 +	<0.5	7.3	119	6

Well Sampling Worksheet
WWW RAP Field Data
PERIMETER 2023-Q2 - HS-PMW-RI-106A
Kent County, MI

Well	HS-PMW-RI-106A / 2 in Diameter PVC
Sample Quarter	2023-Q2
Date	06/20/2023
Weather	Sunny 87F
Sampler Initials	RCP
Purging Device	Bladder-Pump: NA, Peristaltic-Pump: NA, Centrifugal-Pump: Mega Monsoon #1
Meters Used	YSI: Agile Rental 3, Turbidimeter: Agile Rental 3, Water-Level-Meter: WLM-2
Reference Measuring Point	PVC
Well Screen (ft bmp)	44.7 - 49.7
Expected Well Bottom Depth (ft bmp)	49.7
Measured Bottom Depth (ft bmp)	NR
Sample Comment	15:25 - Reduced pump speed. 15:45 - YSI Connected.
Initial Water Level Date/Time	06/20/2023 15:10
Initial Water Level Depth (ft bmp)	37.04
Pump/Tubing Intake Depth (ft bmp)	47.2
Tubing Length (ft)	50
Tubing Inner Diameter (in)	0.17
Purging Initiation Date/Time	06/20/2023 15:15
Total Purge Volume (gal)	8
Modified Sample	No
If Modified, Reasoning	
Sample Collection Information	Bottling-Start: 06/20/2023 16:30:00, Bottling-Stop: 06/20/2023 16:35:00, Parameters-Sampled: PFAS

Reading Time	Depth To Water (ft)	Cumulative Drawdown (ft)	Purge Rate (ml/min)	Temperature (deg c)	Specific Conductivity (us/cm)	Dissolved Oxygen (mg/l)	pH (su)	Oxidation-Reduction Potential (mV)	Turbidity (ntu)
16:15	37.06	0.02	220	12 +	553 +	<0.5	7.3	116	<5
16:20	37.06	0.02	220	12 +	554 +	<0.5	7.3	112	<5
16:25	37.06	0.02	220	13 +	554 +	<0.5	7.3	109	<5

Notes:

1) Abbreviations include: "deg c" indicates degrees Celsius; "ft" indicates feet; "ft bmp" indicates feet below reference measuring point; "gal" indicates gallons; "in" indicates inches; "mg/l" indicates milligrams per liter; "ml/min" indicates milliliters per minute; "mV" indicates millivolts; "NA" indicates not applicable; "NR" indicates not recorded; "ntu" indicates Nephelometric Turbidity units; "su" indicates standard units; "us/cm" indicates microsiemens per centimeter; and "+" indicates the parameter(s) may be used for stabilization calculations but cannot be used for other purposes.
2) Weather temperature units are in degrees Fahrenheit, unless otherwise noted.
3) Did indicator parameters reach stabilization? Yes
4) Was the two hour time limit reached? No
5) Calculations:
   - Head Above Pump Intake (ft) 10.16
   - Total Drawdown (ft) 0.02
   - Calculated Final Purge Volume (gal) NA
6) If Drawdown Did Not Stabilize or Stabilized Drawdown >0.3 ft, is Total Purge Volume > Calculated Final Purge Volume? NA

Well Sampling Worksheet
WWW RAP Field Data
PERIMETER 2023-Q2 - HS-PMW-RI-106B
Kent County, MI

Well	HS-PMW-RI-106B / 2 in Diameter PVC
Sample Quarter	2023-Q2
Date	06/20/2023
Weather	Sunny 87
Sampler Initials	NCK
Purging Device	Bladder-Pump: BP-12, Peristaltic-Pump: NA, Centrifugal-Pump: NA
Meters Used	YSI: Agile Rental 1, Turbidimeter: Agile Rental 1, Water-Level-Meter: WLM-2
Reference Measuring Point	PVC
Well Screen (ft bmp)	204.7 - 209.7
Expected Well Bottom Depth (ft bmp)	209.7
Measured Bottom Depth (ft bmp)	NR
Sample Comment	Pump shut-off during first hour of pumping for approximately 5 minutes at 15:45 due to power cord failure. YSI Connected at 16:00
Initial Water Level Date/Time	06/20/2023 15:00
Initial Water Level Depth (ft bmp)	37.39
Pump/Tubing Intake Depth (ft bmp)	203.5
Tubing Length (ft)	206
Tubing Inner Diameter (in)	0.25
Purging Initiation Date/Time	06/20/2023 15:05
Total Purge Volume (gal)	5
Modified Sample	No
If Modified, Reasoning	
Sample Collection Information	Bottling-Start: 06/20/2023 16:25:00, Bottling-Stop: 06/20/2023 16:30:00, Parameters-Sampled: PFAS

Reading Time	Depth To Water (ft)	Cumulative Drawdown (ft)	Purge Rate (ml/min)	Temperature (deg c)	Specific Conductivity (us/cm)	Dissolved Oxygen (mg/l)	pH (su)	Oxidation-Reduction Potential (mV)	Turbidity (ntu)
15:10	37.49	0.10	250	NR	NR	NR	NR	NR	NR
15:20	37.49	0.10	250	NR	NR	NR	NR	NR	NR
15:30	37.49	0.10	250	NR	NR	NR	NR	NR	NR
15:45	37.49	0.10	250	NR	NR	NR	NR	NR	NR
16:00	37.49	0.10	250	10 +	2,265 +	<0.5	7.0	-53	8
16:05	37.49	0.10	250	10 +	2,268 +	<0.5	7.0	-53	6
16:10	37.49	0.10	250	10 +	2,271 +	0.5	7.0	-52	7

Well Sampling Worksheet
WWW RAP Field Data
PERIMETER 2023-Q2 - HS-PMW-RI-106B
Kent County, MI

Well	HS-PMW-RI-106B / 2 in Diameter PVC
Sample Quarter	2023-Q2
Date	06/20/2023
Weather	Sunny 87
Sampler Initials	NCK
Purging Device	Bladder-Pump: BP-12, Peristaltic-Pump: NA, Centrifugal-Pump: NA
Meters Used	YSI: Agile Rental 1, Turbidimeter: Agile Rental 1, Water-Level-Meter: WLM-2
Reference Measuring Point	PVC
Well Screen (ft bmp)	204.7 - 209.7
Expected Well Bottom Depth (ft bmp)	209.7
Measured Bottom Depth (ft bmp)	NR
Sample Comment	Pump shut-off during first hour of pumping for approximately 5 minutes at 15:45 due to power cord failure. YSI Connected at 16:00
Initial Water Level Date/Time	06/20/2023 15:00
Initial Water Level Depth (ft bmp)	37.39
Pump/Tubing Intake Depth (ft bmp)	203.5
Tubing Length (ft)	206
Tubing Inner Diameter (in)	0.25
Purging Initiation Date/Time	06/20/2023 15:05
Total Purge Volume (gal)	5
Modified Sample	No
If Modified, Reasoning	
Sample Collection Information	Bottling-Start: 06/20/2023 16:25:00, Bottling-Stop: 06/20/2023 16:30:00, Parameters-Sampled: PFAS

Reading Time	Depth To Water (ft)	Cumulative Drawdown (ft)	Purge Rate (ml/min)	Temperature (deg c)	Specific Conductivity (us/cm)	Dissolved Oxygen (mg/l)	pH (su)	Oxidation-Reduction Potential (mV)	Turbidity (ntu)
16:15	37.49	0.10	250	10 +	2,275 +	<0.5	7.1	-52	<5
16:20	37.49	0.10	250	10 +	2,269 +	<0.5	7.1	-51	<5
16:25	37.49	0.10	250	10 +	2,266 +	<0.5	7.0	-49	<5

Notes:

1) Abbreviations include: "deg c" indicates degrees Celsius; "ft" indicates feet; "ft bmp" indicates feet below reference measuring point; "gal" indicates gallons; "in" indicates inches; "mg/l" indicates milligrams per liter; "ml/min" indicates milliliters per minute; "mV" indicates millivolts; "NA" indicates not applicable; "NR" indicates not recorded; "ntu" indicates Nephelometric Turbidity units; "su" indicates standard units; "us/cm" indicates microsiemens per centimeter; and "+" indicates the parameter(s) may be used for stabilization calculations but cannot be used for other purposes.
2) Weather temperature units are in degrees Fahrenheit, unless otherwise noted.
3) Did indicator parameters reach stabilization? Yes
4) Was the two hour time limit reached? No
5) Calculations:
   - Head Above Pump Intake (ft) 166.11
   - Total Drawdown (ft) 0.10
   - Calculated Final Purge Volume (gal) NA
6) If Drawdown Did Not Stabilize or Stabilized Drawdown >0.3 ft, is Total Purge Volume > Calculated Final Purge Volume? NA

Well Sampling Worksheet
WWW RAP Field Data
AREA 5 2023-Q2 - HS-PMW-RI-107A
Kent County, MI

Well	HS-PMW-RI-107A / 2 in Diameter PVC
Sample Quarter	2023-Q2
Date	05/01/2023
Weather	40 Rain
Sampler Initials	BPT
Purging Device	Bladder-Pump: NA, Peristaltic-Pump: NA, Centrifugal-Pump: Mega Monsoon #2
Meters Used	YSI: Agile Rental 1, Turbidimeter: Agile Rental 1, Water-Level-Meter: WLM-3
Reference Measuring Point	PVC
Well Screen (ft bmp)	79.2 - 84.2
Measured Bottom Depth (ft bmp)	NR
Sample Comment	Well was open without J-plug upon arrival. Rain water was entering well prior to purge. YSI connected at 11:50. Duplicate collected.
Initial Water Level Date/Time	05/01/2023 11:20
Initial Water Level Depth (ft bmp)	48.49
Pump/Tubing Intake Depth (ft bmp)	81.7
Tubing Length (ft)	84
Tubing Inner Diameter (in)	0.17
Purging Initiation Date/Time	05/01/2023 11:20
Total Purge Volume (gal)	12.7
Modified Sample	No
If Modified, Reasoning	
Sample Collection Information	Bottling-Start: 05/01/2023 13:25:00, Bottling-Stop: 05/01/2023 13:35:00, Parameters-Sampled: PFAS

Reading Time	Depth To Water (ft)	Cumulative Drawdown (ft)	Purge Rate (ml/min)	Temperature (deg c)	Specific Conductivity (us/cm)	Dissolved Oxygen (mg/l)	pH (su)	Oxidation-Reduction Potential (mV)	Turbidity (ntu)
11:30	48.53	0.04	400	NR	NR	NR	NR	NR	NR
11:40	48.53	0.04	400	NR	NR	NR	NR	NR	5
11:50	48.53	0.04	400	10 +	649 +	<0.5	7.1	195	21
12:00	48.53	0.04	400	10 +	650 +	<0.5	7.2	164	5
12:10	48.53	0.04	400	10 +	650 +	<0.5	7.2	133	<5
12:20	48.53	0.04	400	10 +	646 +	<0.5	7.2	103	<5
12:30	48.53	0.04	400	10 +	645 +	<0.5	7.2	79	<5
12:40	48.53	0.04	400	10 +	645 +	<0.5	7.2	54	<5
12:45	48.53	0.04	400	10 +	645 +	<0.5	7.2	44	<5
12:50	48.53	0.04	400	10 +	645 +	<0.5	7.2	39	<5
12:55	48.53	0.04	400	10 +	645 +	<0.5	7.2	33	<5
13:00	48.53	0.04	400	10 +	645 +	<0.5	7.2	23	<5
13:05	48.53	0.04	400	10 +	645 +	<0.5	7.2	18	<5

Well Sampling Worksheet
WWW RAP Field Data
AREA 5 2023-Q2 - HS-PMW-RI-107A
Kent County, MI

Well	HS-PMW-RI-107A / 2 in Diameter PVC
Sample Quarter	2023-Q2
Date	05/01/2023
Weather	40 Rain
Sampler Initials	BPT
Purging Device	Bladder-Pump: NA, Peristaltic-Pump: NA, Centrifugal-Pump: Mega Monsoon #2
Meters Used	YSI: Agile Rental 1, Turbidimeter: Agile Rental 1, Water-Level-Meter: WLM-3
Reference Measuring Point	PVC
Well Screen (ft bmp)	79.2 - 84.2
Measured Bottom Depth (ft bmp)	NR
Sample Comment	Well was open without J-plug upon arrival. Rain water was entering well prior to purge. YSI connected at 11:50. Duplicate collected.
Initial Water Level Date/Time	05/01/2023 11:20
Initial Water Level Depth (ft bmp)	48.49
Pump/Tubing Intake Depth (ft bmp)	81.7
Tubing Length (ft)	84
Tubing Inner Diameter (in)	0.17
Purging Initiation Date/Time	05/01/2023 11:20
Total Purge Volume (gal)	12.7
Modified Sample	No
If Modified, Reasoning	
Sample Collection Information	Bottling-Start: 05/01/2023 13:25:00, Bottling-Stop: 05/01/2023 13:35:00, Parameters-Sampled: PFAS

Reading Time	Depth To Water (ft)	Cumulative Drawdown (ft)	Purge Rate (ml/min)	Temperature (deg c)	Specific Conductivity (us/cm)	Dissolved Oxygen (mg/l)	pH (su)	Oxidation-Reduction Potential (mV)	Turbidity (ntu)
13:10	48.53	0.04	400	10 +	645 +	<0.5	7.2	13	<5
13:15	48.53	0.04	400	10 +	645 +	<0.5	7.2	9	<5
13:20	48.53	0.04	400	10 +	645 +	<0.5	7.2	6	<5

Notes:

1) Abbreviations include: "deg c" indicates degrees Celsius; "ft" indicates feet; "ft bmp" indicates feet below reference measuring point; "gal" indicates gallons; "in" indicates inches; "mg/l" indicates milligrams per liter; "ml/min" indicates milliliters per minute; "mV" indicates millivolts; "NA" indicates not applicable; "NR" indicates not recorded; "ntu" indicates Nephelometric Turbidity units; "su" indicates standard units; "us/cm" indicates microsiemens per centimeter; and "+" indicates the parameter(s) may be used for stabilization calculations but cannot be used for other purposes.
2) Weather temperature units are in degrees Fahrenheit, unless otherwise noted.
3) Did indicator parameters reach stabilization? Yes
4) Was the two hour time limit reached? Yes
5) Calculations:
   - Head Above Pump Intake (ft) 33.21
   - Total Drawdown (ft) 0.04
   - Calculated Final Purge Volume (gal) NA
6) If Drawdown Did Not Stabilize or Stabilized Drawdown >0.3 ft, is Total Purge Volume > Calculated Final Purge Volume? NA

Well Sampling Worksheet
WWW RAP Field Data
AREA 5 2023-Q2 - HS-PMW-RI-107B
Kent County, MI

Well	HS-PMW-RI-107B / 2 in Diameter PVC
Sample Quarter	2023-Q2
Date	05/01/2023
Weather	40F Rain
Sampler Initials	JET
Purging Device	Bladder-Pump: BP-11, Peristaltic-Pump: NA, Centrifugal-Pump: NA
Meters Used	YSI: Agile Rental 2, Turbidimeter: Agile Rental 2, Water-Level-Meter: WLM-2
Reference Measuring Point	PVC
Well Screen (ft bmp)	175.2 - 180.2
Measured Bottom Depth (ft bmp)	NR
Sample Comment	YSI Connected at 13:45. YSI turned off at 14:15 and was restarted. Collected MS/MSD.
Initial Water Level Date/Time	05/01/2023 12:30
Initial Water Level Depth (ft bmp)	62.32
Pump/Tubing Intake Depth (ft bmp)	177.7
Tubing Length (ft)	180
Tubing Inner Diameter (in)	0.25
Purging Initiation Date/Time	05/01/2023 12:30
Total Purge Volume (gal)	6.3
Modified Sample	No
If Modified, Reasoning	
Sample Collection Information	Bottling-Start: 05/01/2023 14:45:00, Bottling-Stop: 05/01/2023 14:55:00, Parameters-Sampled: PFAS

Reading Time	Depth To Water (ft)	Cumulative Drawdown (ft)	Purge Rate (ml/min)	Temperature (deg c)	Specific Conductivity (us/cm)	Dissolved Oxygen (mg/l)	pH (su)	Oxidation-Reduction Potential (mV)	Turbidity (ntu)
12:50	62.36	0.04	200	NR	NR	NR	NR	NR	NR
13:05	62.36	0.04	200	NR	NR	NR	NR	NR	NR
13:25	62.36	0.04	200	NR	NR	NR	NR	NR	11
13:45	62.36	0.04	200	9 +	1,129 +	1.1	7.3	278	14
13:55	62.36	0.04	200	9 +	1,146 +	1.0	7.2	274	13
14:05	62.36	0.04	200	9 +	1,150 +	0.9	7.2	270	12
14:15	62.36	0.04	200	9 +	1,157 +	1.0	7.2	139	13
14:20	62.36	0.04	200	9 +	1,158 +	1.1	7.2	151	12
14:25	62.36	0.04	200	9 +	1,162 +	1.1	7.2	157	12
14:30	62.36	0.04	200	9 +	1,161 +	1.2	7.2	159	12

Notes:

1) Abbreviations include: "deg c" indicates degrees Celsius; "ft" indicates feet; "ft bmp" indicates feet below reference measuring point; "gal" indicates gallons; "in" indicates inches; "mg/l" indicates milligrams per liter; "ml/min" indicates milliliters per minute; "mV" indicates millivolts; "NA" indicates not applicable; "NR" indicates not recorded; "ntu" indicates Nephelometric Turbidity units; "su" indicates standard units; "us/cm" indicates microsiemens per centimeter; and "+" indicates the parameter(s) may be used for stabilization calculations but cannot be used for other purposes.
2) Weather temperature units are in degrees Fahrenheit, unless otherwise noted.
3) Did indicator parameters reach stabilization? Yes
4) Was the two hour time limit reached? Yes
5) Calculations:
   - Head Above Pump Intake (ft) 115.38
   - Total Drawdown (ft) 0.04
   - Calculated Final Purge Volume (gal) NA
6) If Drawdown Did Not Stabilize or Stabilized Drawdown >0.3 ft, is Total Purge Volume > Calculated Final Purge Volume? NA

Well Sampling Worksheet
WWW RAP Field Data
AREA 5 2023-Q2 - HS-PMW-RI-107C
Kent County, MI

Well	HS-PMW-RI-107C / 2 in Diameter PVC
Sample Quarter	2023-Q2
Date	05/03/2023
Weather	45F Cloudy
Sampler Initials	JET
Purging Device	Bladder-Pump: BP-11, Peristaltic-Pump: NA, Centrifugal-Pump: NA
Meters Used	YSI: Agile Rental 1, Turbidimeter: Agile Rental 1, Water-Level-Meter: WLM-3
Reference Measuring Point	PVC
Well Screen (ft bmp)	184.7 - 189.7
Measured Bottom Depth (ft bmp)	NR
Sample Comment	YSI Connected at 9:05.
Initial Water Level Date/Time	05/03/2023 08:45
Initial Water Level Depth (ft bmp)	62.53
Pump/Tubing Intake Depth (ft bmp)	187.2
Tubing Length (ft)	190
Tubing Inner Diameter (in)	0.25
Purging Initiation Date/Time	05/03/2023 08:45
Total Purge Volume (gal)	2.8
Modified Sample	No
If Modified, Reasoning	
Sample Collection Information	Bottling-Start: 05/03/2023 09:50:00, Bottling-Stop: 05/03/2023 10:00:00, Parameters-Sampled: PFAS

Reading Time	Depth To Water (ft)	Cumulative Drawdown (ft)	Purge Rate (ml/min)	Temperature (deg c)	Specific Conductivity (us/cm)	Dissolved Oxygen (mg/l)	pH (su)	Oxidation-Reduction Potential (mV)	Turbidity (ntu)
09:00	62.53	0.00	150	NR	NR	NR	NR	NR	<5
09:10	62.53	0.00	150	9 +	1,194 +	0.9	6.9	132	<5
09:20	62.53	0.00	150	8 +	1,200 +	0.8	7.0	143	<5
09:30	62.53	0.00	150	8 +	1,199 +	0.8	6.8	147	<5
09:35	62.53	0.00	150	8 +	1,200 +	0.8	6.9	149	<5
09:40	62.53	0.00	150	8 +	1,202 +	0.8	6.9	151	<5

Notes:

1) Abbreviations include: "deg c" indicates degrees Celsius; "ft" indicates feet; "ft bmp" indicates feet below reference measuring point; "gal" indicates gallons; "in" indicates inches; "mg/l" indicates milligrams per liter; "ml/min" indicates milliliters per minute; "mV" indicates millivolts; "NA" indicates not applicable; "NR" indicates not recorded; "ntu" indicates Nephelometric Turbidity units; "su" indicates standard units; "us/cm" indicates microsiemens per centimeter; and "+" indicates the parameter(s) may be used for stabilization calculations but cannot be used for other purposes.
2) Weather temperature units are in degrees Fahrenheit, unless otherwise noted.
3) Did indicator parameters reach stabilization? Yes
4) Was the two hour time limit reached? No
5) Calculations:
   - Head Above Pump Intake (ft) 124.67
   - Total Drawdown (ft) 0.00
   - Calculated Final Purge Volume (gal) NA
6) If Drawdown Did Not Stabilize or Stabilized Drawdown >0.3 ft, is Total Purge Volume > Calculated Final Purge Volume? NA

Well Sampling Worksheet
WWW RAP Field Data
AREA 5 2023-Q2 - HS-PMW-RI-107D
Kent County, MI

Well	HS-PMW-RI-107D / 2 in Diameter PVC
Sample Quarter	2023-Q2
Date	05/03/2023
Weather	Cloudy
Sampler Initials	BPT
Purging Device	Bladder-Pump: BP-10, Peristaltic-Pump: NA, Centrifugal-Pump: NA
Meters Used	YSI: Agile Rental 2, Turbidimeter: Agile Rental 2, Water-Level-Meter: WLM-LAV
Reference Measuring Point	PVC
Well Screen (ft bmp)	198.7 - 203.7
Measured Bottom Depth (ft bmp)	203.7
Sample Comment	Connected YSI at 10:10.
Initial Water Level Date/Time	05/03/2023 09:05
Initial Water Level Depth (ft bmp)	62.93
Pump/Tubing Intake Depth (ft bmp)	201.3
Tubing Length (ft)	205
Tubing Inner Diameter (in)	0.25
Purging Initiation Date/Time	05/03/2023 09:05
Total Purge Volume (gal)	5.085
Modified Sample	No
If Modified, Reasoning	
Sample Collection Information	Bottling-Start: 05/03/2023 11:05:00, Bottling-Stop: 05/03/2023 11:10:00, Parameters-Sampled: PFAS

Reading Time	Depth To Water (ft)	Cumulative Drawdown (ft)	Purge Rate (ml/min)	Temperature (deg c)	Specific Conductivity (us/cm)	Dissolved Oxygen (mg/l)	pH (su)	Oxidation-Reduction Potential (mV)	Turbidity (ntu)
09:20	62.92	-0.01	175	NR	NR	NR	NR	NR	NR
09:30	62.92	-0.01	175	NR	NR	NR	NR	NR	NR
09:40	62.92	-0.01	175	NR	NR	NR	NR	NR	584
09:50	62.92	-0.01	175	NR	NR	NR	NR	NR	422
10:00	62.92	-0.01	175	NR	NR	NR	NR	NR	265
10:10	62.92	-0.01	175	9 +	1,558 +	1.3	7.0	-3 +	216
10:20	62.92	-0.01	175	9 +	1,554 +	<0.5	7.0	-24 +	195
10:25	62.92	-0.01	175	9 +	1,547 +	<0.5	7.0	-29 +	152
10:35	62.92	-0.01	175	9 +	1,545 +	<0.5	7.0	-33 +	109

Well Sampling Worksheet
WWW RAP Field Data
AREA 5 2023-Q2 - HS-PMW-RI-107D
Kent County, MI

Well	HS-PMW-RI-107D / 2 in Diameter PVC
Sample Quarter	2023-Q2
Date	05/03/2023
Weather	Cloudy
Sampler Initials	BPT
Purging Device	Bladder-Pump: BP-10, Peristaltic-Pump: NA, Centrifugal-Pump: NA
Meters Used	YSI: Agile Rental 2, Turbidimeter: Agile Rental 2, Water-Level-Meter: WLM-LAV
Reference Measuring Point	PVC
Well Screen (ft bmp)	198.7 - 203.7
Measured Bottom Depth (ft bmp)	203.7
Sample Comment	Connected YSI at 10:10.
Initial Water Level Date/Time	05/03/2023 09:05
Initial Water Level Depth (ft bmp)	62.93
Pump/Tubing Intake Depth (ft bmp)	201.3
Tubing Length (ft)	205
Tubing Inner Diameter (in)	0.25
Purging Initiation Date/Time	05/03/2023 09:05
Total Purge Volume (gal)	5.085
Modified Sample	No
If Modified, Reasoning	
Sample Collection Information	Bottling-Start: 05/03/2023 11:05:00, Bottling-Stop: 05/03/2023 11:10:00, Parameters-Sampled: PFAS

Reading Time	Depth To Water (ft)	Cumulative Drawdown (ft)	Purge Rate (ml/min)	Temperature (deg c)	Specific Conductivity (us/cm)	Dissolved Oxygen (mg/l)	pH (su)	Oxidation-Reduction Potential (mV)	Turbidity (ntu)
10:45	62.92	-0.01	175	9 +	1,543 +	<0.5	7.0	-35 +	103
10:50	62.92	-0.01	175	9 +	1,543 +	<0.5	7.0	-36 +	111
10:55	62.92	-0.01	175	9 +	1,543 +	<0.5	7.0	-36 +	101

Notes:

1) Abbreviations include: "deg c" indicates degrees Celsius; "ft" indicates feet; "ft bmp" indicates feet below reference measuring point; "gal" indicates gallons; "in" indicates inches; "mg/l" indicates milligrams per liter; "ml/min" indicates milliliters per minute; "mV" indicates millivolts; "NA" indicates not applicable; "NR" indicates not recorded; "ntu" indicates Nephelometric Turbidity units; "su" indicates standard units; "us/cm" indicates microsiemens per centimeter; and "+" indicates the parameter(s) may be used for stabilization calculations but cannot be used for other purposes.
2) Weather temperature units are in degrees Fahrenheit, unless otherwise noted.
3) Did indicator parameters reach stabilization? Yes
4) Was the two hour time limit reached? Yes
5) Calculations:
   - Head Above Pump Intake (ft): 138.37
   - Total Drawdown (ft): -0.01
   - Calculated Final Purge Volume (gal): NA
6) If Drawdown Did Not Stabilize or Stabilized Drawdown >0.3 ft, is Total Purge Volume > Calculated Final Purge Volume? NA

Well Sampling Worksheet
WWW RAP Field Data
AREA 6 2023-Q2 - HS-PMW-RI-108A
Kent County, MI

Well	HS-PMW-RI-108A / 2 in Diameter PVC
Sample Quarter	2023-Q2
Date	04/26/2023
Weather	48F Sunny
Sampler Initials	JET
Purging Device	Bladder-Pump: NA, Peristaltic-Pump: PER-1, Centrifugal-Pump: NA
Meters Used	YSI: Agile Rental 1, Turbidimeter: Agile Rental 1, Water-Level-Meter: WLM-4
Reference Measuring Point	PVC
Well Screen (ft bmp)	65.2 - 70.2
Measured Bottom Depth (ft bmp)	NR
Sample Comment	YSI Connected at 16:20.
Initial Water Level Date/Time	04/26/2023 15:00
Initial Water Level Depth (ft bmp)	15.65
Pump/Tubing Intake Depth (ft bmp)	67.7
Tubing Length (ft)	70
Tubing Inner Diameter (in)	0.17
Purging Initiation Date/Time	04/26/2023 15:00
Total Purge Volume (gal)	4.6
Modified Sample	No
If Modified, Reasoning	
Sample Collection Information	Bottling-Start: 04/26/2023 16:55:00, Bottling-Stop: 04/26/2023 17:00:00, Parameters-Sampled: PFAS

Reading Time	Depth To Water (ft)	Cumulative Drawdown (ft)	Purge Rate (ml/min)	Temperature (deg c)	Specific Conductivity (us/cm)	Dissolved Oxygen (mg/l)	pH (su)	Oxidation-Reduction Potential (mV)	Turbidity (ntu)
15:10	15.75	0.10	150	NR	NR	NR	NR	NR	75
15:30	15.75	0.10	150	NR	NR	NR	NR	NR	33
15:40	15.75	0.10	150	NR	NR	NR	NR	NR	26
16:00	15.75	0.10	150	NR	NR	NR	NR	NR	22
16:20	15.75	0.10	150	11 +	733 +	1.5	7.4	-122 +	15
16:30	15.75	0.10	150	11 +	736 +	<0.5	7.4	-158 +	19
16:35	15.75	0.10	150	11 +	734 +	<0.5	7.4	-163 +	15
16:40	15.75	0.10	150	11 +	736 +	<0.5	7.4	-167 +	15
16:45	15.75	0.10	150	11 +	734 +	<0.5	7.4	-172 +	14

Notes:

1) Abbreviations include: "deg c" indicates degrees Celsius; "ft" indicates feet; "ft bmp" indicates feet below reference measuring point; "gal" indicates gallons; "in" indicates inches; "mg/l" indicates milligrams per liter; "ml/min" indicates milliliters per minute; "mV" indicates millivolts; "NA" indicates not applicable; "NR" indicates not recorded; "ntu" indicates Nephelometric Turbidity units; "su" indicates standard units; "us/cm" indicates microsiemens per centimeter; and "+" indicates the parameter(s) may be used for stabilization calculations but cannot be used for other purposes.
2) Weather temperature units are in degrees Fahrenheit, unless otherwise noted.
3) Did indicator parameters reach stabilization? Yes
4) Was the two hour time limit reached? No
5) Calculations:
   - Head Above Pump Intake (ft) 52.05
   - Total Drawdown (ft) 0.10
   - Calculated Final Purge Volume (gal) NA
6) If Drawdown Did Not Stabilize or Stabilized Drawdown >0.3 ft, is Total Purge Volume > Calculated Final Purge Volume? NA

Well Sampling Worksheet
WWW RAP Field Data
AREA 6 2023-Q2 - HS-PMW-RI-108B
Kent County, MI

Well	HS-PMW-RI-108B / 2 in Diameter PVC
Sample Quarter	2023-Q2
Date	04/26/2023
Weather	48F Sunny
Sampler Initials	BLW
Purging Device	Bladder-Pump: BP-12, Peristaltic-Pump: NA, Centrifugal-Pump: NA
Meters Used	YSI: Agile Rental 3, Turbidimeter: Agile Rental 1, Water-Level-Meter: WLM-3
Reference Measuring Point	PVC
Well Screen (ft bmp)	131.6 - 136.6
Measured Bottom Depth (ft bmp)	NR
Sample Comment	Large water level displacement observed at beginning of purge. YSI Connected at 16:00.
Initial Water Level Date/Time	04/26/2023 14:45
Initial Water Level Depth (ft bmp)	74.25
Pump/Tubing Intake Depth (ft bmp)	134
Tubing Length (ft)	137
Tubing Inner Diameter (in)	0.25
Purging Initiation Date/Time	04/26/2023 14:55
Total Purge Volume (gal)	1.34
Modified Sample	No
If Modified, Reasoning	
Sample Collection Information	Bottling-Start: 04/26/2023 17:00:00, Bottling-Stop: 04/26/2023 17:10:00, Parameters-Sampled: PFAS

Reading Time	Depth To Water (ft)	Cumulative Drawdown (ft)	Purge Rate (ml/min)	Temperature (deg c)	Specific Conductivity (us/cm)	Dissolved Oxygen (mg/l)	pH (su)	Oxidation-Reduction Potential (mV)	Turbidity (ntu)
15:15	72.45	-1.80	<50	NR	NR	NR	NR	NR	NR
15:25	72.28	-1.97	65	NR	NR	NR	NR	NR	NR
15:30	71.61	-2.64	56	NR	NR	NR	NR	NR	NR
15:40	71.12	-3.13	56	NR	NR	NR	NR	NR	NR
16:00	71.22	-3.03	56	11 +	904 +	2.7	7.4	248	6
16:10	72.08	-2.17	56	12 +	893 +	2.2	7.5	233	6
16:15	72.12	-2.13	56	11 +	892 +	1.8	7.6	224	7
16:20	73.75	-0.50	56	11 +	888 +	1.8	7.6	217	9
16:25	71.77	-2.48	56	12 +	886 +	2.9	7.7	210	9
16:30	70.30	-3.95	56	11 +	884 +	3.6	7.7	207	11
16:35	74.01	-0.24	56	11 +	893 +	3.2	7.8	202	11
16:40	73.49	-0.76	56	11 +	890 +	3.3	7.8	197	18

Well Sampling Worksheet
WWW RAP Field Data
AREA 6 2023-Q2 - HS-PMW-RI-108B
Kent County, MI

Well	HS-PMW-RI-108B / 2 in Diameter PVC
Sample Quarter	2023-Q2
Date	04/26/2023
Weather	48F Sunny
Sampler Initials	BLW
Purging Device	Bladder-Pump: BP-12, Peristaltic-Pump: NA, Centrifugal-Pump: NA
Meters Used	YSI: Agile Rental 3, Turbidimeter: Agile Rental 1, Water-Level-Meter: WLM-3
Reference Measuring Point	PVC
Well Screen (ft bmp)	131.6 - 136.6
Measured Bottom Depth (ft bmp)	NR
Sample Comment	Large water level displacement observed at beginning of purge. YSI Connected at 16:00.
Initial Water Level Date/Time	04/26/2023 14:45
Initial Water Level Depth (ft bmp)	74.25
Pump/Tubing Intake Depth (ft bmp)	134
Tubing Length (ft)	137
Tubing Inner Diameter (in)	0.25
Purging Initiation Date/Time	04/26/2023 14:55
Total Purge Volume (gal)	1.34
Modified Sample	No
If Modified, Reasoning	
Sample Collection Information	Bottling-Start: 04/26/2023 17:00:00, Bottling-Stop: 04/26/2023 17:10:00, Parameters-Sampled: PFAS

Reading Time	Depth To Water (ft)	Cumulative Drawdown (ft)	Purge Rate (ml/min)	Temperature (deg c)	Specific Conductivity (us/cm)	Dissolved Oxygen (mg/l)	pH (su)	Oxidation-Reduction Potential (mV)	Turbidity (ntu)
16:45	74.95	0.70	56	11 +	886 +	3.5	7.9	188	22
16:50	74.48	0.23	56	11 +	883 +	3.6	8.0	182	25
16:55	74.50	0.25	56	11 +	879 +	3.7	8.0	117	38

Notes:

1) Abbreviations include: "deg c" indicates degrees Celsius; "ft" indicates feet; "ft bmp" indicates feet below reference measuring point; "gal" indicates gallons; "in" indicates inches; "mg/l" indicates milligrams per liter; "ml/min" indicates milliliters per minute; "mV" indicates millivolts; "NA" indicates not applicable; "NR" indicates not recorded; "ntu" indicates Nephelometric Turbidity units; "su" indicates standard units; "us/cm" indicates microsiemens per centimeter; and "+" indicates the parameter(s) may be used for stabilization calculations but cannot be used for other purposes.
2) Weather temperature units are in degrees Fahrenheit, unless otherwise noted.
3) Did indicator parameters reach stabilization? No
4) Was the two hour time limit reached? Yes
5) Calculations:
   - Head Above Pump Intake (ft) 59.75
   - Total Drawdown (ft) 0.25
   - Calculated Final Purge Volume (gal) 0.40
6) If Drawdown Did Not Stabilize or Stabilized Drawdown >0.3 ft, is Total Purge Volume > Calculated Final Purge Volume? Yes

Well Sampling Worksheet
WWW RAP Field Data
AREA 6 2023-Q2 - HS-PMW-RI-108D
Kent County, MI

Well	HS-PMW-RI-108D / 2 in Diameter PVC
Sample Quarter	2023-Q2
Date	05/04/2023
Weather	45F Cloudy
Sampler Initials	BPT
Purging Device	Bladder-Pump: BP-12, Peristaltic-Pump: NA, Centrifugal-Pump: NA
Meters Used	YSI: Agile Rental 2, Turbidimeter: Agile Rental 2, Water-Level-Meter: WLM-3
Reference Measuring Point	PVC
Well Screen (ft bmp)	223.0 - 228.0
Measured Bottom Depth (ft bmp)	228
Sample Comment	YSI Connected at 10:50.
Initial Water Level Date/Time	05/04/2023 09:00
Initial Water Level Depth (ft bmp)	73.81
Pump/Tubing Intake Depth (ft bmp)	225.5
Tubing Length (ft)	230
Tubing Inner Diameter (in)	0.25
Purging Initiation Date/Time	05/04/2023 09:25
Total Purge Volume (gal)	3.33
Modified Sample	No
If Modified, Reasoning	
Sample Collection Information	Bottling-Start: 05/04/2023 11:35, Bottling-Stop: 05/04/2023 11:40, Parameters-Sampled: PFAS

Reading Time	Depth To Water (ft)	Cumulative Drawdown (ft)	Purge Rate (ml/min)	Temperature (deg c)	Specific Conductivity (us/cm)	Dissolved Oxygen (mg/l)	pH (su)	Oxidation-Reduction Potential (mV)	Turbidity (ntu)
09:30	73.95	0.14	105	NR	NR	NR	NR	NR	NR
09:40	73.95	0.14	105	NR	NR	NR	NR	NR	NR
09:50	73.96	0.15	105	NR	NR	NR	NR	NR	357
10:00	73.96	0.15	105	NR	NR	NR	NR	NR	276
10:20	73.96	0.15	105	NR	NR	NR	NR	NR	105
10:40	73.96	0.15	105	NR	NR	NR	NR	NR	75
10:50	73.96	0.15	105	11 +	604 +	3.2	7.4	-9 +	40
11:00	73.96	0.15	105	11 +	603 +	1.5	7.5	-112 +	44
11:05	73.96	0.15	105	11 +	604 +	1.3	7.5	-124 +	111
11:10	73.96	0.15	105	12 +	603 +	1.4	7.5	-126 +	55

Well Sampling Worksheet
WWW RAP Field Data
AREA 6 2023-Q2 - HS-PMW-RI-108D
Kent County, MI

Well	HS-PMW-RI-108D / 2 in Diameter PVC
Sample Quarter	2023-Q2
Date	05/04/2023
Weather	45F Cloudy
Sampler Initials	BPT
Purging Device	Bladder-Pump: BP-12, Peristaltic-Pump: NA, Centrifugal-Pump: NA
Meters Used	YSI: Agile Rental 2, Turbidimeter: Agile Rental 2, Water-Level-Meter: WLM-3
Reference Measuring Point	PVC
Well Screen (ft bmp)	223.0 - 228.0
Measured Bottom Depth (ft bmp)	228
Sample Comment	YSI Connected at 10:50.
Initial Water Level Date/Time	05/04/2023 09:00
Initial Water Level Depth (ft bmp)	73.81
Pump/Tubing Intake Depth (ft bmp)	225.5
Tubing Length (ft)	230
Tubing Inner Diameter (in)	0.25
Purging Initiation Date/Time	05/04/2023 09:25
Total Purge Volume (gal)	3.33
Modified Sample	No
If Modified, Reasoning	
Sample Collection Information	Bottling-Start: 05/04/2023 11:35, Bottling-Stop: 05/04/2023 11:40, Parameters-Sampled: PFAS

Reading Time	Depth To Water (ft)	Cumulative Drawdown (ft)	Purge Rate (ml/min)	Temperature (deg c)	Specific Conductivity (us/cm)	Dissolved Oxygen (mg/l)	pH (su)	Oxidation-Reduction Potential (mV)	Turbidity (ntu)
11:15	73.96	0.15	105	11 +	603 +	1.3	7.5	-124 +	51
11:20	73.96	0.15	105	11 +	608 +	1.2	7.5	-124 +	44
11:25	73.96	0.15	105	11 +	605 +	1.1	7.5	-125 +	58

Notes:

1) Abbreviations include: "deg c" indicates degrees Celsius; "ft" indicates feet; "ft bmp" indicates feet below reference measuring point; "gal" indicates gallons; "in" indicates inches; "mg/l" indicates milligrams per liter; "ml/min" indicates milliliters per minute; "mV" indicates millivolts; "NA" indicates not applicable; "NR" indicates not recorded; "ntu" indicates Nephelometric Turbidity units; "su" indicates standard units; "us/cm" indicates microsiemens per centimeter; and "+" indicates the parameter(s) may be used for stabilization calculations but cannot be used for other purposes.
2) Weather temperature units are in degrees Fahrenheit, unless otherwise noted.
3) Did indicator parameters reach stabilization? No
4) Was the two hour time limit reached? Yes
5) Calculations:
   - Head Above Pump Intake (ft) 151.69
   - Total Drawdown (ft) 0.15
   - Calculated Final Purge Volume (gal) NA
6) If Drawdown Did Not Stabilize or Stabilized Drawdown >0.3 ft, is Total Purge Volume > Calculated Final Purge Volume? NA

Well Sampling Worksheet
WWW RAP Field Data
AREA 6 2023-Q2 - HS-PMW-RI-109A
Kent County, MI

Well	HS-PMW-RI-109A / 2 in Diameter PVC
Sample Quarter	2023-Q2
Date	04/24/2023
Weather	45F Partly Cloudy
Sampler Initials	JET
Purging Device	Bladder-Pump: NA, Peristaltic-Pump: PER-1, Centrifugal-Pump: NA
Meters Used	YSI: Agile Rental 2, Turbidimeter: Agile Rental 2, Water-Level-Meter: WLM-2
Reference Measuring Point	PVC
Well Screen (ft bmp)	13.6 - 18.6
Measured Bottom Depth (ft bmp)	NR
Sample Comment	Pump settings were adjusted during the first 30 minutes of the purge but the pump could not purge at a lower flow rate than 100 ml/min. YSI Connected at 11:40. Last 3 water level readings were not the same per Standard Operating Procedure (SOP). Drawdown was leveling off at the end of the purge but was not stable per the SOP. Depth to water did not stabilize but other indicator parametes were stable
Initial Water Level Date/Time	04/24/2023 11:10
Initial Water Level Depth (ft bmp)	8.91
Pump/Tubing Intake Depth (ft bmp)	16.1
Tubing Length (ft)	19.5
Tubing Inner Diameter (in)	0.17
Purging Initiation Date/Time	04/24/2023 11:10
Total Purge Volume (gal)	2.11
Modified Sample	No
If Modified, Reasoning	
Sample Collection Information	Bottling-Start: 04/24/2023 12:40:00, Bottling-Stop: 04/24/2023 12:50:00, Parameters-Sampled: PFAS

Reading Time	Depth To Water (ft)	Cumulative Drawdown (ft)	Purge Rate (ml/min)	Temperature (deg c)	Specific Conductivity (us/cm)	Dissolved Oxygen (mg/l)	pH (su)	Oxidation-Reduction Potential (mV)	Turbidity (ntu)
11:30	9.45 +	0.54	100	NR	NR	NR	NR	NR	NR
11:40	9.73 +	0.82	100	8 +	533 +	9.8	7.5	112	<5
11:50	9.97 +	1.06	100	8 +	531 +	10.0	7.5	135	<5
12:00	10.11 +	1.20	100	8 +	532 +	9.9	7.5	148	<5
12:10	10.30 +	1.39	100	8 +	531 +	9.6	7.5	163	<5
12:20	10.46 +	1.55	100	8 +	534 +	9.7	7.5	174	<5
12:25	10.48 +	1.57	100	8 +	535 +	10.4	7.5	176	<5
12:30	10.48 +	1.57	100	8 +	534 +	10.5	7.5	182	<5

Notes:

1) Abbreviations include: "deg c" indicates degrees Celsius; "ft" indicates feet; "ft bmp" indicates feet below reference measuring point; "gal" indicates gallons; "in" indicates inches; "mg/l" indicates milligrams per liter; "ml/min" indicates milliliters per minute; "mV" indicates millivolts; "NA" indicates not applicable; "NR" indicates not recorded; "ntu" indicates Nephelometric Turbidity units; "su" indicates standard units; "us/cm" indicates microsiemens per centimeter; and "+" indicates the parameter(s) may be used for stabilization calculations but cannot be used for other purposes.
2) Weather temperature units are in degrees Fahrenheit, unless otherwise noted.
3) Did indicator parameters reach stabilization? Yes
4) Was the two hour time limit reached? No
5) Calculations:
   - Head Above Pump Intake (ft) 7.19
   - Total Drawdown (ft) 1.57
   - Calculated Final Purge Volume (gal) 0.27
6) If Drawdown Did Not Stabilize or Stabilized Drawdown >0.3 ft, is Total Purge Volume > Calculated Final Purge Volume? Yes

Well Sampling Worksheet
WWW RAP Field Data
AREA 6 2023-Q2 - HS-PMW-RI-109B
Kent County, MI

Well	HS-PMW-RI-109B / 2 in Diameter PVC
Sample Quarter	2023-Q2
Date	04/24/2023
Weather	Partly Cloudy 45
Sampler Initials	NCK
Purging Device	Bladder-Pump: NA, Peristaltic-Pump: NA, Centrifugal-Pump: Mega Monsoon #1
Meters Used	YSI: Agile Rental 1, Turbidimeter: Agile Rental 1, Water-Level-Meter: WLM-3
Reference Measuring Point	PVC
Well Screen (ft bmp)	124.6 - 129.6
Measured Bottom Depth (ft bmp)	NR
Sample Comment	Water level quickly stabilized at 64.71 ft bmp. Water was observed to be visibly turbid at the beginning of purge. YSI Connected at 11:40.
Initial Water Level Date/Time	04/24/2023 11:05
Initial Water Level Depth (ft bmp)	64.68
Pump/Tubing Intake Depth (ft bmp)	127.1
Tubing Length (ft)	130
Tubing Inner Diameter (in)	0.17
Purging Initiation Date/Time	04/24/2023 11:05
Total Purge Volume (gal)	12
Modified Sample	No
If Modified, Reasoning	
Sample Collection Information	Bottling-Start: 04/24/2023 12:45:00, Bottling-Stop: 04/24/2023 12:49:00, Parameters-Sampled: PFAS

Reading Time	Depth To Water (ft)	Cumulative Drawdown (ft)	Purge Rate (ml/min)	Temperature (deg c)	Specific Conductivity (us/cm)	Dissolved Oxygen (mg/l)	pH (su)	Oxidation-Reduction Potential (mV)	Turbidity (ntu)
11:10	64.71	0.03	360	NR	NR	NR	NR	NR	NR
11:20	64.71	0.03	360	NR	NR	NR	NR	NR	NR
11:30	64.71	0.03	360	NR	NR	NR	NR	NR	NR
11:40	64.71	0.03	360	11 +	914 +	2.7	6.8	166	32
11:50	64.71	0.03	360	11 +	913 +	2.9	6.9	111	15
12:00	64.71	0.03	360	11 +	913 +	2.9	7.0	106	13
12:10	64.71	0.03	360	11 +	913 +	2.9	7.0	103	11
12:15	64.71	0.03	360	11 +	913 +	2.9	6.9	104	7
12:25	64.71	0.03	360	11 +	914 +	2.9	6.9	104	8
12:30	64.71	0.03	360	11 +	913 +	2.9	6.9	105	8

Well Sampling Worksheet
WWW RAP Field Data
AREA 6 2023-Q2 - HS-PMW-RI-109B
Kent County, MI

Well	HS-PMW-RI-109B / 2 in Diameter PVC
Sample Quarter	2023-Q2
Date	04/24/2023
Weather	Partly Cloudy 45
Sampler Initials	NCK
Purging Device	Bladder-Pump: NA, Peristaltic-Pump: NA, Centrifugal-Pump: Mega Monsoon #1
Meters Used	YSI: Agile Rental 1, Turbidimeter: Agile Rental 1, Water-Level-Meter: WLM-3
Reference Measuring Point	PVC
Well Screen (ft bmp)	124.6 - 129.6
Measured Bottom Depth (ft bmp)	NR
Sample Comment	Water level quickly stabilized at 64.71 ft bmp. Water was observed to be visibly turbid at the beginning of purge. YSI Connected at 11:40.
Initial Water Level Date/Time	04/24/2023 11:05
Initial Water Level Depth (ft bmp)	64.68
Pump/Tubing Intake Depth (ft bmp)	127.1
Tubing Length (ft)	130
Tubing Inner Diameter (in)	0.17
Purging Initiation Date/Time	04/24/2023 11:05
Total Purge Volume (gal)	12
Modified Sample	No
If Modified, Reasoning	
Sample Collection Information	Bottling-Start: 04/24/2023 12:45:00, Bottling-Stop: 04/24/2023 12:49:00, Parameters-Sampled: PFAS

Reading Time	Depth To Water (ft)	Cumulative Drawdown (ft)	Purge Rate (ml/min)	Temperature (deg c)	Specific Conductivity (us/cm)	Dissolved Oxygen (mg/l)	pH (su)	Oxidation-Reduction Potential (mV)	Turbidity (ntu)
12:35	64.71	0.03	360	11 +	914 +	2.9	6.9	106	7
12:40	64.71	0.03	360	11 +	913 +	2.9	7.0	105	7
12:45	64.71	0.03	360	11 +	913 +	2.9	6.9	107	7

Notes:

1) Abbreviations include: "deg c" indicates degrees Celsius; "ft" indicates feet; "ft bmp" indicates feet below reference measuring point; "gal" indicates gallons; "in" indicates inches; "mg/l" indicates milligrams per liter; "ml/min" indicates milliliters per minute; "mV" indicates millivolts; "NA" indicates not applicable; "NR" indicates not recorded; "ntu" indicates Nephelometric Turbidity units; "su" indicates standard units; "us/cm" indicates microsiemens per centimeter; and "+" indicates the parameter(s) may be used for stabilization calculations but cannot be used for other purposes.
2) Weather temperature units are in degrees Fahrenheit, unless otherwise noted.
3) Did indicator parameters reach stabilization? Yes
4) Was the two hour time limit reached? No
5) Calculations:
   - Head Above Pump Intake (ft): 62.42
   - Total Drawdown (ft): 0.03
   - Calculated Final Purge Volume (gal): NA
6) If Drawdown Did Not Stabilize or Stabilized Drawdown >0.3 ft, is Total Purge Volume > Calculated Final Purge Volume? NA

Well Sampling Worksheet
WWW RAP Field Data
AREA 6 2023-Q2 - HS-PMW-RI-109C
Kent County, MI

Well	HS-PMW-RI-109C / 2 in Diameter PVC
Sample Quarter	2023-Q2
Date	04/24/2023
Weather	45F Partly Cloudy
Sampler Initials	BLW
Purging Device	Bladder-Pump: BP-12, Peristaltic-Pump: NA, Centrifugal-Pump: NA
Meters Used	YSI: Agile Rental 3, Turbidimeter: Agile Rental 1, Water-Level-Meter: WLM-4
Reference Measuring Point	PVC
Well Screen (ft bmp)	143.7 - 148.7
Measured Bottom Depth (ft bmp)	NR
Sample Comment	11:30-12:09: only water level data collected. YSI Connected at 12:14. Unclear what caused water level fluctuations between readings or why final water level ended higher than initial water level. FPV calculation not required because final water level higher than initial water level.
Initial Water Level Date/Time	04/24/2023 11:30
Initial Water Level Depth (ft bmp)	64.40
Pump/Tubing Intake Depth (ft bmp)	146.2
Tubing Length (ft)	149
Tubing Inner Diameter (in)	0.25
Purging Initiation Date/Time	04/24/2023 11:30
Total Purge Volume (gal)	2.37
Modified Sample	No
If Modified, Reasoning	
Sample Collection Information	Bottling-Start: 04/24/2023 13:35:00, Bottling-Stop: 04/24/2023 13:45:00, Parameters-Sampled: PFAS

Reading Time	Depth To Water (ft)	Cumulative Drawdown (ft)	Purge Rate (ml/min)	Temperature (deg c)	Specific Conductivity (us/cm)	Dissolved Oxygen (mg/l)	pH (su)	Oxidation-Reduction Potential (mV)	Turbidity (ntu)
11:30	61.74	-2.66	30	NR	NR	NR	NR	NR	NR
11:45	60.29	-4.11	45	NR	NR	NR	NR	NR	NR
11:55	62.10	-2.30	75	NR	NR	NR	NR	NR	NR
12:09	60.15	-4.25	75	NR	NR	NR	NR	NR	NR
12:14	61.12	-3.28	75	9 +	470 +	10.1	7.5	153	44
12:22	62.03	-2.37	75	9 +	467 +	8.8	7.6	123	44
12:27	61.75	-2.65	50	10 +	466 +	7.8	7.8	95	46
12:32	59.91	-4.49	75	10 +	466 +	7.2	7.8	83	49
12:37	59.86	-4.54	75	10 +	466 +	6.8	7.8	74	49
12:42	60.58	-3.82	75	10 +	465 +	6.2	7.8	64	54
12:46	61.31	-3.09	75	10 +	466 +	6.0	7.8	56	56
12:51	60.70	-3.70	75	10 +	465 +	5.6	7.8	47	67
12:56	61.75	-2.65	75	10 +	465 +	5.2	7.8	38	71
13:01	61.23	-3.17	75	10 +	464 +	4.7	7.8	26	87
13:06	62.00	-2.40	75	10 +	465 +	4.4	7.7	18	86
13:13	62.73	-1.67	75	10 +	465 +	4.1	7.7	5	86

Well Sampling Worksheet
WWW RAP Field Data
AREA 6 2023-Q2 - HS-PMW-RI-109C
Kent County, MI

Well	HS-PMW-RI-109C / 2 in Diameter PVC
Sample Quarter	2023-Q2
Date	04/24/2023
Weather	45F Partly Cloudy
Sampler Initials	BLW
Purging Device	Bladder-Pump: BP-12, Peristaltic-Pump: NA, Centrifugal-Pump: NA
Meters Used	YSI: Agile Rental 3, Turbidimeter: Agile Rental 1, Water-Level-Meter: WLM-4
Reference Measuring Point	PVC
Well Screen (ft bmp)	143.7 - 148.7
Measured Bottom Depth (ft bmp)	NR
Sample Comment	11:30-12:09: only water level data collected. YSI Connected at 12:14. Unclear what caused water level fluctuations between readings or why final water level ended higher than initial water level. FPV calculation not required because final water level higher than initial water level.
Initial Water Level Date/Time	04/24/2023 11:30
Initial Water Level Depth (ft bmp)	64.40
Pump/Tubing Intake Depth (ft bmp)	146.2
Tubing Length (ft)	149
Tubing Inner Diameter (in)	0.25
Purging Initiation Date/Time	04/24/2023 11:30
Total Purge Volume (gal)	2.37
Modified Sample	No
If Modified, Reasoning	
Sample Collection Information	Bottling-Start: 04/24/2023 13:35:00, Bottling-Stop: 04/24/2023 13:45:00, Parameters-Sampled: PFAS

Reading Time	Depth To Water (ft)	Cumulative Drawdown (ft)	Purge Rate (ml/min)	Temperature (deg c)	Specific Conductivity (us/cm)	Dissolved Oxygen (mg/l)	pH (su)	Oxidation-Reduction Potential (mV)	Turbidity (ntu)
13:20	62.50	-1.90	75	10 +	464 +	3.8	7.7	-6	86
13:25	60.45	-3.95	75	10 +	464 +	4.1	7.7	-8	82
13:30	63.36	-1.04	75	10 +	464 +	4.1	7.7	-8	77

Notes:

1) Abbreviations include: "deg c" indicates degrees Celsius; "ft" indicates feet; "ft bmp" indicates feet below reference measuring point; "gal" indicates gallons; "in" indicates inches; "mg/l" indicates milligrams per liter; "ml/min" indicates milliliters per minute; "mV" indicates millivolts; "NA" indicates not applicable; "NR" indicates not recorded; "ntu" indicates Nephelometric Turbidity units; "su" indicates standard units; "us/cm" indicates microsiemens per centimeter; and "+" indicates the parameter(s) may be used for stabilization calculations but cannot be used for other purposes.
2) Weather temperature units are in degrees Fahrenheit, unless otherwise noted.
3) Did indicator parameters reach stabilization? No
4) Was the two hour time limit reached? Yes
5) Calculations:
   - Head Above Pump Intake (ft) 81.80
   - Total Drawdown (ft) -1.04
   - Calculated Final Purge Volume (gal) NA
6) If Drawdown Did Not Stabilize or Stabilized Drawdown >0.3 ft, is Total Purge Volume > Calculated Final Purge Volume? NA

Well Sampling Worksheet
WWW RAP Field Data
AREA 11/12 2023-Q2 - HS-PMW-RI-111A
Kent County, MI

Well	HS-PMW-RI-111A / 2 in Diameter PVC
Sample Quarter	2023-Q2
Date	04/11/2023
Weather	68F Sunny
Sampler Initials	JET
Purging Device	Bladder-Pump: NA, Peristaltic-Pump: PER-2, Centrifugal-Pump: NA
Meters Used	YSI: Agile Rental 2, Turbidimeter: Agile Rental 2, Water-Level-Meter: WLM-3
Reference Measuring Point	PVC
Well Screen (ft bmp)	12.9 - 17.9
Measured Bottom Depth (ft bmp)	17.9
Sample Comment	13:20 - Pump speed was adjusted. YSI Connected at 13:30.
Initial Water Level Date/Time	04/11/2023 13:00
Initial Water Level Depth (ft bmp)	5.53
Pump/Tubing Intake Depth (ft bmp)	15.4
Tubing Length (ft)	19
Tubing Inner Diameter (in)	0.17
Purging Initiation Date/Time	04/11/2023 13:00
Total Purge Volume (gal)	4
Modified Sample	No
If Modified, Reasoning	
Sample Collection Information	Bottling-Start: 04/11/2023 14:00:00, Bottling-Stop: 04/11/2023 14:05:00, Parameters-Sampled: PFAS

Reading Time	Depth To Water (ft)	Cumulative Drawdown (ft)	Purge Rate (ml/min)	Temperature (deg c)	Specific Conductivity (us/cm)	Dissolved Oxygen (mg/l)	pH (su)	Oxidation-Reduction Potential (mV)	Turbidity (ntu)
13:10	5.53	0.00	250	NR	NR	NR	NR	NR	NR
13:20	5.55	0.02	250	NR	NR	NR	NR	NR	NR
13:30	5.53	0.00	250	11 +	594 +	2.7	7.2	260	6
13:40	5.53	0.00	250	10 +	593 +	2.6	7.2	269	<5
13:45	5.53	0.00	250	10 +	599 +	2.7	7.2	272	<5
13:50	5.53	0.00	250	10 +	599 +	2.6	7.2	275	<5

Notes:

1) Abbreviations include: "deg c" indicates degrees Celsius; "ft" indicates feet; "ft bmp" indicates feet below reference measuring point; "gal" indicates gallons; "in" indicates inches; "mg/l" indicates milligrams per liter; "ml/min" indicates milliliters per minute; "mV" indicates millivolts; "NA" indicates not applicable; "NR" indicates not recorded; "ntu" indicates Nephelometric Turbidity units; "su" indicates standard units; "us/cm" indicates microsiemens per centimeter; and "+" indicates the parameter(s) may be used for stabilization calculations but cannot be used for other purposes.
2) Weather temperature units are in degrees Fahrenheit, unless otherwise noted.
3) Did indicator parameters reach stabilization? Yes
4) Was the two hour time limit reached? No
5) Calculations:
   - Head Above Pump Intake (ft) 9.87
   - Total Drawdown (ft) 0.00
   - Calculated Final Purge Volume (gal) NA
6) If Drawdown Did Not Stabilize or Stabilized Drawdown >0.3 ft, is Total Purge Volume > Calculated Final Purge Volume? NA

Well Sampling Worksheet
WWW RAP Field Data
AREA 11/12 2023-Q2 - HS-PMW-RI-111B
Kent County, MI

Well	HS-PMW-RI-111B / 2 in Diameter PVC
Sample Quarter	2023-Q2
Date	04/11/2023
Weather	Overcast; 68°; light breeze
Sampler Initials	MKM
Purging Device	Bladder-Pump: NA, Peristaltic-Pump: PER-1, Centrifugal-Pump: NA
Meters Used	YSI: Agile Rental 1, Turbidimeter: Agile Rental 1, Water-Level-Meter: WLM-2
Reference Measuring Point	PVC
Well Screen (ft bmp)	47.9 - 52.9
Measured Bottom Depth (ft bmp)	NR
Sample Comment	No drawdown observed. YSI Connected at 13:35.
Initial Water Level Date/Time	04/11/2023 13:00
Initial Water Level Depth (ft bmp)	5.85
Pump/Tubing Intake Depth (ft bmp)	50.4
Tubing Length (ft)	54
Tubing Inner Diameter (in)	0.17
Purging Initiation Date/Time	04/11/2023 13:00
Total Purge Volume (gal)	4
Modified Sample	No
If Modified, Reasoning	
Sample Collection Information	Bottling-Start: 04/11/2023 13:50:00, Bottling-Stop: 04/11/2023 13:53:00, Parameters-Sampled: PFAS

Reading Time	Depth To Water (ft)	Cumulative Drawdown (ft)	Purge Rate (ml/min)	Temperature (deg c)	Specific Conductivity (us/cm)	Dissolved Oxygen (mg/l)	pH (su)	Oxidation-Reduction Potential (mV)	Turbidity (ntu)
13:10	5.85	0.00	200	NR	NR	NR	NR	NR	NR
13:35	5.85	0.00	200	13 +	776 +	6.0	7.2	329	<5
13:40	5.85	0.00	200	12 +	776 +	6.1	7.2	332	<5
13:45	5.85	0.00	200	12 +	777 +	6.0	7.2	334	<5

Notes:

1) Abbreviations include: "deg c" indicates degrees Celsius; "ft" indicates feet; "ft bmp" indicates feet below reference measuring point; "gal" indicates gallons; "in" indicates inches; "mg/l" indicates milligrams per liter; "ml/min" indicates milliliters per minute; "mV" indicates millivolts; "NA" indicates not applicable; "NR" indicates not recorded; "ntu" indicates Nephelometric Turbidity units; "su" indicates standard units; "us/cm" indicates microsiemens per centimeter; and "+" indicates the parameter(s) may be used for stabilization calculations but cannot be used for other purposes.
2) Weather temperature units are in degrees Fahrenheit, unless otherwise noted.
3) Did indicator parameters reach stabilization? Yes
4) Was the two hour time limit reached? No
5) Calculations:
   - Head Above Pump Intake (ft) 44.55
   - Total Drawdown (ft) 0.00
   - Calculated Final Purge Volume (gal) NA
6) If Drawdown Did Not Stabilize or Stabilized Drawdown >0.3 ft, is Total Purge Volume > Calculated Final Purge Volume? NA

Well Sampling Worksheet
WWW RAP Field Data
AREA 11/12 2023-Q2 - HS-PMW-RI-112A
Kent County, MI

Well	HS-PMW-RI-112A / 2 in Diameter PVC
Sample Quarter	2023-Q2
Date	04/11/2023
Weather	64F Sunny/Cloudy
Sampler Initials	JET
Purging Device	Bladder-Pump: NA, Peristaltic-Pump: PER-3, Centrifugal-Pump: NA
Meters Used	YSI: Agile Rental 2, Turbidimeter: Agile Rental 2, Water-Level-Meter: WLM-3
Reference Measuring Point	PVC
Well Screen (ft bmp)	24.3 - 29.3
Measured Bottom Depth (ft bmp)	29.3
Sample Comment	Water level was stable.
Initial Water Level Date/Time	04/11/2023 11:15
Initial Water Level Depth (ft bmp)	3.17
Pump/Tubing Intake Depth (ft bmp)	26.8
Tubing Length (ft)	29.3
Tubing Inner Diameter (in)	0.17
Purging Initiation Date/Time	04/11/2023 11:15
Total Purge Volume (gal)	2.9
Modified Sample	No
If Modified, Reasoning	
Sample Collection Information	Bottling-Start: 04/11/2023 12:10:00, Bottling-Stop: 04/11/2023 12:20:00, Parameters-Sampled: PFAS

Reading Time	Depth To Water (ft)	Cumulative Drawdown (ft)	Purge Rate (ml/min)	Temperature (deg c)	Specific Conductivity (us/cm)	Dissolved Oxygen (mg/l)	pH (su)	Oxidation-Reduction Potential (mV)	Turbidity (ntu)
11:35	3.17	0.00	200	9 +	652 +	8.4	7.3	262	8
11:45	3.17	0.00	200	9 +	653 +	8.3	7.3	279	6
11:55	3.17	0.00	200	9 +	653 +	8.3	7.3	287	<5
12:00	3.17	0.00	200	10 +	653 +	8.2	7.3	291	<5
12:05	3.17	0.00	200	10 +	653 +	8.3	7.3	294	<5

Notes:

1) Abbreviations include: "deg c" indicates degrees Celsius; "ft" indicates feet; "ft bmp" indicates feet below reference measuring point; "gal" indicates gallons; "in" indicates inches; "mg/l" indicates milligrams per liter; "ml/min" indicates milliliters per minute; "mV" indicates millivolts; "NA" indicates not applicable; "NR" indicates not recorded; "ntu" indicates Nephelometric Turbidity units; "su" indicates standard units; "us/cm" indicates microsiemens per centimeter; and "+" indicates the parameter(s) may be used for stabilization calculations but cannot be used for other purposes.
2) Weather temperature units are in degrees Fahrenheit, unless otherwise noted.
3) Did indicator parameters reach stabilization? Yes
4) Was the two hour time limit reached? No
5) Calculations:
   - Head Above Pump Intake (ft) 23.63
   - Total Drawdown (ft) 0.00
   - Calculated Final Purge Volume (gal) NA
6) If Drawdown Did Not Stabilize or Stabilized Drawdown >0.3 ft, is Total Purge Volume > Calculated Final Purge Volume? NA

Well Sampling Worksheet
WWW RAP Field Data
AREA 11/12 2023-Q2 - HS-PMW-RI-112B
Kent County, MI

Well	HS-PMW-RI-112B / 2 in Diameter PVC
Sample Quarter	2023-Q2
Date	04/11/2023
Weather	Mostly Cloudy, Breezy, mid 60s
Sampler Initials	MKM
Purging Device	Bladder-Pump: NA, Peristaltic-Pump: PER-2, Centrifugal-Pump: NA
Meters Used	YSI: Agile Rental 1, Turbidimeter: Agile Rental 1, Water-Level-Meter: WLM-2
Reference Measuring Point	PVC
Well Screen (ft bmp)	69.4 - 74.4
Measured Bottom Depth (ft bmp)	NR
Sample Comment	11:15 - Adjust pump speed from 225 to 150 to lower flow rate. YSI Connected at 11:30.
Initial Water Level Date/Time	04/11/2023 11:05
Initial Water Level Depth (ft bmp)	3.04
Pump/Tubing Intake Depth (ft bmp)	71.9
Tubing Length (ft)	74
Tubing Inner Diameter (in)	0.17
Purging Initiation Date/Time	04/11/2023 11:10
Total Purge Volume (gal)	3.5
Modified Sample	No
If Modified, Reasoning	
Sample Collection Information	Bottling-Start: 04/11/2023 12:15:00, Bottling-Stop: 04/11/2023 12:20:00, Parameters-Sampled: PFAS

Reading Time	Depth To Water (ft)	Cumulative Drawdown (ft)	Purge Rate (ml/min)	Temperature (deg c)	Specific Conductivity (us/cm)	Dissolved Oxygen (mg/l)	pH (su)	Oxidation-Reduction Potential (mV)	Turbidity (ntu)
11:15	3.09	0.05	NR	NR	NR	NR	NR	NR	NR
11:20	3.08	0.04	NR	NR	NR	NR	NR	NR	NR
11:30	3.08	0.04	300	9 +	1,088 +	<0.5	6.9	103	17
11:40	3.08	0.04	300	10 +	1,086 +	<0.5	7.0	63	10
11:50	3.08	0.04	300	10 +	1,084 +	<0.5	7.0	39	7
12:00	3.08	0.04	300	10 +	1,086 +	<0.5	7.0	27	<5
12:05	3.08	0.04	300	10 +	1,084 +	<0.5	7.0	22	<5
12:10	3.08	0.04	300	10 +	1,085 +	<0.5	7.0	18	<5

Notes:

1) Abbreviations include: "deg c" indicates degrees Celsius; "ft" indicates feet; "ft bmp" indicates feet below reference measuring point; "gal" indicates gallons; "in" indicates inches; "mg/l" indicates milligrams per liter; "ml/min" indicates milliliters per minute; "mV" indicates millivolts; "NA" indicates not applicable; "NR" indicates not recorded; "ntu" indicates Nephelometric Turbidity units; "su" indicates standard units; "us/cm" indicates microsiemens per centimeter; and "+" indicates the parameter(s) may be used for stabilization calculations but cannot be used for other purposes.
2) Weather temperature units are in degrees Fahrenheit, unless otherwise noted.
3) Did indicator parameters reach stabilization? Yes
4) Was the two hour time limit reached? No
5) Calculations:
   - Head Above Pump Intake (ft): 68.86
   - Total Drawdown (ft): 0.04
   - Calculated Final Purge Volume (gal): NA
6) If Drawdown Did Not Stabilize or Stabilized Drawdown >0.3 ft, is Total Purge Volume > Calculated Final Purge Volume? NA

Well Sampling Worksheet
WWW RAP Field Data
PERIMETER 2023-Q2 - WV-MW-4
Kent County, MI

Well	WV-MW-4 / 2 in Diameter PVC
Sample Quarter	2023-Q2
Date	06/21/2023
Weather	80 and Sunny
Sampler Initials	WVK
Purging Device	Bladder-Pump: NA, Peristaltic-Pump: NA, Centrifugal-Pump: Mega Monsoon #2
Meters Used	YSI: Agile Rental 2, Turbidimeter: Agile Rental 2, Water-Level-Meter: WLM-4
Reference Measuring Point	PVC
Well Screen (ft bmp)	132.7 - 137.7
Expected Well Bottom Depth (ft bmp)	137.7
Measured Bottom Depth (ft bmp)	137.7
Sample Comment	14:10 - Purge water observed to be turbid. 15:00 - YSI Connected.
Initial Water Level Date/Time	06/21/2023 14:05
Initial Water Level Depth (ft bmp)	110.26
Pump/Tubing Intake Depth (ft bmp)	135.2
Tubing Length (ft)	140
Tubing Inner Diameter (in)	0.17
Purging Initiation Date/Time	06/21/2023 14:05
Total Purge Volume (gal)	2
Modified Sample	No
If Modified, Reasoning	
Sample Collection Information	Bottling-Start: 06/21/2023 16:05:00, Bottling-Stop: 06/21/2023 16:15:00, Parameters-Sampled: PFAS

Reading Time	Depth To Water (ft)	Cumulative Drawdown (ft)	Purge Rate (ml/min)	Temperature (deg c)	Specific Conductivity (us/cm)	Dissolved Oxygen (mg/l)	pH (su)	Oxidation-Reduction Potential (mV)	Turbidity (ntu)
14:10	110.44	0.18	70	NR	NR	NR	NR	NR	NR
14:20	110.65	0.39	70	NR	NR	NR	NR	NR	NR
14:30	110.60	0.34	50	NR	NR	NR	NR	NR	NR
14:40	110.68	0.42	50	NR	NR	NR	NR	NR	NR
14:50	110.53	0.27	50	NR	NR	NR	NR	NR	NR
15:00	110.50	0.24	50	17 +	338 +	0.8	7.7	-133	114
15:10	110.55	0.29	50	18 +	340 +	0.8	7.7	-112	99
15:20	110.59	0.33	50	14 +	335 +	0.8	7.6	-93	59
15:30	110.60	0.34	50	14 +	333 +	0.7	7.7	-85	51
15:45	110.82	0.56	50	13 +	333 +	0.7	7.6	-80	30
15:50	110.62	0.36	50	15 +	337 +	0.7	7.6	-84	26

Well Sampling Worksheet
WWW RAP Field Data
PERIMETER 2023-Q2 - WV-MW-4
Kent County, MI

Well	WV-MW-4 / 2 in Diameter PVC
Sample Quarter	2023-Q2
Date	06/21/2023
Weather	80 and Sunny
Sampler Initials	WVK
Purging Device	Bladder-Pump: NA, Peristaltic-Pump: NA, Centrifugal-Pump: Mega Monsoon #2
Meters Used	YSI: Agile Rental 2, Turbidimeter: Agile Rental 2, Water-Level-Meter: WLM-4
Reference Measuring Point	PVC
Well Screen (ft bmp)	132.7 - 137.7
Expected Well Bottom Depth (ft bmp)	137.7
Measured Bottom Depth (ft bmp)	137.7
Sample Comment	14:10 - Purge water observed to be turbid. 15:00 - YSI Connected.
Initial Water Level Date/Time	06/21/2023 14:05
Initial Water Level Depth (ft bmp)	110.26
Pump/Tubing Intake Depth (ft bmp)	135.2
Tubing Length (ft)	140
Tubing Inner Diameter (in)	0.17
Purging Initiation Date/Time	06/21/2023 14:05
Total Purge Volume (gal)	2
Modified Sample	No
If Modified, Reasoning	
Sample Collection Information	Bottling-Start: 06/21/2023 16:05:00, Bottling-Stop: 06/21/2023 16:15:00, Parameters-Sampled: PFAS

Reading Time	Depth To Water (ft)	Cumulative Drawdown (ft)	Purge Rate (ml/min)	Temperature (deg c)	Specific Conductivity (us/cm)	Dissolved Oxygen (mg/l)	pH (su)	Oxidation-Reduction Potential (mV)	Turbidity (ntu)
15:55	110.52	0.26	50	17 +	338 +	0.7	7.8	-85	25
16:00	110.74	0.48	50	13 +	338 +	0.7	7.6	-83	22
16:05	110.70	0.44	50	14 +	340 +	0.7	7.6	-83	20

Notes:

1) Abbreviations include: "deg c" indicates degrees Celsius; "ft" indicates feet; "ft bmp" indicates feet below reference measuring point; "gal" indicates gallons; "in" indicates inches; "mg/l" indicates milligrams per liter; "ml/min" indicates milliliters per minute; "mV" indicates millivolts; "NA" indicates not applicable; "NR" indicates not recorded; "ntu" indicates Nephelometric Turbidity units; "su" indicates standard units; "us/cm" indicates microsiemens per centimeter; and "+" indicates the parameter(s) may be used for stabilization calculations but cannot be used for other purposes.
2) Weather temperature units are in degrees Fahrenheit, unless otherwise noted.
3) Did indicator parameters reach stabilization? No
4) Was the two hour time limit reached? Yes
5) Calculations:
   - Head Above Pump Intake (ft) 24.94
   - Total Drawdown (ft) 0.44
   - Calculated Final Purge Volume (gal) 0.24
6) If Drawdown Did Not Stabilize or Stabilized Drawdown >0.3 ft, is Total Purge Volume > Calculated Final Purge Volume? Yes

Well Sampling Worksheet
WWW RAP Field Data
PERIMETER 2023-Q3 - WV-MW-4
Kent County, MI

Well	WV-MW-4 / 2 in Diameter PVC
Sample Quarter	2023-Q3
Date	08/29/2023
Weather	70F Cloudy
Sampler Initials	JET
Purging Device	Bladder-Pump: BP-10, Peristaltic-Pump: NA, Centrifugal-Pump: NA
Meters Used	YSI: Agile Rental 3, Turbidimeter: Agile Rental 3, Water-Level-Meter: WLM-2
Reference Measuring Point	PVC
Well Screen (ft bmp)	132.7 - 137.7
Measured Bottom Depth (ft bmp)	NR
Sample Comment	YSI Connected at 17:15.
Initial Water Level Date/Time	08/29/2023 16:00
Initial Water Level Depth (ft bmp)	106.04
Pump/Tubing Intake Depth (ft bmp)	135.2
Tubing Length (ft)	140
Tubing Inner Diameter (in)	0.25
Purging Initiation Date/Time	08/29/2023 16:00
Total Purge Volume (gal)	3
Modified Sample	No
If Modified, Reasoning	
Sample Collection Information	Bottling-Start: 08/29/2023 18:05:00, Bottling-Stop: 08/29/2023 18:10:00, Parameters-Sampled: PFAS

Reading Time	Depth To Water (ft)	Cumulative Drawdown (ft)	Purge Rate (ml/min)	Temperature (deg c)	Specific Conductivity (us/cm)	Dissolved Oxygen (mg/l)	pH (su)	Oxidation-Reduction Potential (mV)	Turbidity (ntu)
16:20	106.51	0.47	75	NR	NR	NR	NR	NR	188
16:30	106.30	0.26	75	NR	NR	NR	NR	NR	253
16:50	106.30	0.26	75	NR	NR	NR	NR	NR	175
17:15	106.30	0.26	75	16 +	332 +	1.0	7.2	52	86
17:30	106.30	0.26	75	16 +	331 +	0.8	7.2	-1	59
17:45	106.30	0.26	75	16 +	333 +	0.7	7.2	-24	48
17:50	106.30	0.26	75	16 +	336 +	0.8	7.2	-24	46
17:55	106.30	0.26	75	12 +	330 +	0.8	7.1	-28	41
18:00	106.30	0.26	75	12 +	330 +	0.7	7.1	-40	37

Notes:

1) Abbreviations include: "deg c" indicates degrees Celsius; "ft" indicates feet; "ft bmp" indicates feet below reference measuring point; "gal" indicates gallons; "in" indicates inches; "mg/l" indicates milligrams per liter; "ml/min" indicates milliliters per minute; "mV" indicates millivolts; "NA" indicates not applicable; "NR" indicates not recorded; "ntu" indicates Nephelometric Turbidity units; "su" indicates standard units; "us/cm" indicates microsiemens per centimeter; and "+" indicates the parameter(s) may be used for stabilization calculations but cannot be used for other purposes.
2) Weather temperature units are in degrees Fahrenheit, unless otherwise noted.
3) Did indicator parameters reach stabilization? No
4) Was the two hour time limit reached? Yes
5) Calculations:
   - Head Above Pump Intake (ft) 29.16
   - Total Drawdown (ft) 0.26
   - Calculated Final Purge Volume (gal) NA
6) If Drawdown Did Not Stabilize or Stabilized Drawdown >0.3 ft, is Total Purge Volume > Calculated Final Purge Volume? NA

Well Sampling Worksheet
WWW RAP Field Data
PERIMETER 2023-Q3 - WV-MW-5D
Kent County, MI

Well	WV-MW-5D / 2 in Diameter PVC
Sample Quarter	2023-Q3
Date	08/28/2023
Weather	75F Sunny
Sampler Initials	JMS
Purging Device	Bladder-Pump: NA, Peristaltic-Pump: NA, Centrifugal-Pump: Mega Monsoon #2
Meters Used	YSI: Agile Rental 1, Turbidimeter: Agile Rental 1, Water-Level-Meter: WLM-2
Reference Measuring Point	PVC
Well Screen (ft bmp)	71.8 - 76.8
Measured Bottom Depth (ft bmp)	NR
Sample Comment	YSI Connected at 16:45.
Initial Water Level Date/Time	08/28/2023 15:45
Initial Water Level Depth (ft bmp)	65.01
Pump/Tubing Intake Depth (ft bmp)	74.3
Tubing Length (ft)	78
Tubing Inner Diameter (in)	0.17
Purging Initiation Date/Time	08/28/2023 15:50
Total Purge Volume (gal)	6
Modified Sample	No
If Modified, Reasoning	
Sample Collection Information	Bottling-Start: 08/28/2023 17:10:00, Bottling-Stop: 08/28/2023 17:15:00, Parameters-Sampled: PFAS

Reading Time	Depth To Water (ft)	Cumulative Drawdown (ft)	Purge Rate (ml/min)	Temperature (deg c)	Specific Conductivity (us/cm)	Dissolved Oxygen (mg/l)	pH (su)	Oxidation-Reduction Potential (mV)	Turbidity (ntu)
16:05	65.05	0.04	500	NR	NR	NR	NR	NR	NR
16:15	65.05	0.04	500	NR	NR	NR	NR	NR	18
16:25	65.05	0.04	500	NR	NR	NR	NR	NR	6
16:35	65.05	0.04	500	NR	NR	NR	NR	NR	<5
16:45	65.05	0.04	500	13	596 +	7.6	7.3	280	<5
16:50	65.05	0.04	500	13	596 +	7.5	7.3	286	<5
16:55	65.05	0.04	500	13	596 +	7.4	7.3	292	<5
17:00	65.05	0.04	500	13	596 +	7.4	7.3	297	<5
17:05	65.05	0.04	500	13	596 +	7.4	7.3	302	<5

Notes:

1) Abbreviations include: "deg c" indicates degrees Celsius; "ft" indicates feet; "ft bmp" indicates feet below reference measuring point; "gal" indicates gallons; "in" indicates inches; "mg/l" indicates milligrams per liter; "ml/min" indicates milliliters per minute; "mV" indicates millivolts; "NA" indicates not applicable; "NR" indicates not recorded; "ntu" indicates Nephelometric Turbidity units; "su" indicates standard units; "us/cm" indicates microsiemens per centimeter; and "+" indicates the parameter(s) may be used for stabilization calculations but cannot be used for other purposes.
2) Weather temperature units are in degrees Fahrenheit, unless otherwise noted.
3) Did indicator parameters reach stabilization? Yes
4) Was the two hour time limit reached? No
5) Calculations:
   - Head Above Pump Intake (ft) 9.29
   - Total Drawdown (ft) 0.04
   - Calculated Final Purge Volume (gal) NA
6) If Drawdown Did Not Stabilize or Stabilized Drawdown >0.3 ft, is Total Purge Volume > Calculated Final Purge Volume? NA

Well Sampling Worksheet
WWW RAP Field Data
PERIMETER 2023-Q3 - WV-MW-5S
Kent County, MI

Well	WV-MW-5S / 2 in Diameter PVC
Sample Quarter	2023-Q3
Date	08/28/2023
Weather	75F Sunny
Sampler Initials	BPT
Purging Device	Bladder-Pump: NA, Peristaltic-Pump: NA, Centrifugal-Pump: Mega Monsoon #1
Meters Used	YSI: Agile Rental 2, Turbidimeter: Agile Rental 2, Water-Level-Meter: WLM-1
Reference Measuring Point	PVC
Well Screen (ft bmp)	64.4 - 69.4
Measured Bottom Depth (ft bmp)	NR
Sample Comment	Tubing intake was adjusted to midway between the initial depth to water and the bottom of the well. YSI Connected at 17:05.
Initial Water Level Date/Time	08/28/2023 15:55
Initial Water Level Depth (ft bmp)	64.82
Pump/Tubing Intake Depth (ft bmp)	67.11
Tubing Length (ft)	70
Tubing Inner Diameter (in)	0.17
Purging Initiation Date/Time	08/28/2023 16:00
Total Purge Volume (gal)	2
Modified Sample	Yes
If Modified, Reasoning	Initial Water Level Below the Top of the Well Screen.
Sample Collection Information	Bottling-Start: 08/28/2023 17:25:00, Bottling-Stop: 08/28/2023 17:30:00, Parameters-Sampled: PFAS

Reading Time	Depth To Water (ft)	Cumulative Drawdown (ft)	Purge Rate (ml/min)	Temperature (deg c)	Specific Conductivity (us/cm)	Dissolved Oxygen (mg/l)	pH (su)	Oxidation-Reduction Potential (mV)	Turbidity (ntu)
16:15	64.83	0.01	100	NR	NR	NR	NR	NR	248
16:30	64.83	0.01	100	NR	NR	NR	NR	NR	98
16:40	64.82	0.00	100	NR	NR	NR	NR	NR	45
16:50	64.82	0.00	100	NR	NR	NR	NR	NR	25
17:00	64.82	0.00	100	NR	NR	NR	NR	NR	19
17:05	64.82	0.00	100	17	710 +	7.0	7.4 +	149	14
17:10	64.82	0.00	100	17	710 +	6.9	7.4 +	148	14
17:15	64.82	0.00	100	17	709 +	6.9	7.4 +	145	14
17:20	64.82	0.00	100	17	709 +	6.9	7.4 +	143	13

Notes:

1) Abbreviations include: "deg c" indicates degrees Celsius; "ft" indicates feet; "ft bmp" indicates feet below reference measuring point; "gal" indicates gallons; "in" indicates inches; "mg/l" indicates milligrams per liter; "ml/min" indicates milliliters per minute; "mV" indicates millivolts; "NA" indicates not applicable; "NR" indicates not recorded; "ntu" indicates Nephelometric Turbidity units; "su" indicates standard units; "us/cm" indicates microsiemens per centimeter; and "+" indicates the parameter(s) may be used for stabilization calculations but cannot be used for other purposes.
2) Weather temperature units are in degrees Fahrenheit, unless otherwise noted.
3) Did indicator parameters reach stabilization? Yes
4) Was the two hour time limit reached? No
5) Calculations:
   - Head Above Pump Intake (ft) 2.29
   - Total Drawdown (ft) 0.00
   - Calculated Final Purge Volume (gal) NA
6) If Drawdown Did Not Stabilize or Stabilized Drawdown >0.3 ft, is Total Purge Volume > Calculated Final Purge Volume? NA

Well Sampling Worksheet
WWW RAP Field Data
PERIMETER 2023-Q3 - WV-MW-11D
Kent County, MI

Well	WV-MW-11D / 2 in Diameter PVC
Sample Quarter	2023-Q3
Date	08/22/2023
Weather	Sunny 75F
Sampler Initials	JET
Purging Device	Bladder-Pump: NA, Peristaltic-Pump: PER-3, Centrifugal-Pump: NA
Meters Used	YSI: Agile Rental 2, Turbidimeter: Agile Rental 2, Water-Level-Meter: NA
Reference Measuring Point	PVC
Well Screen (ft bmp)	161.9 - 166.9
Measured Bottom Depth (ft bmp)	NR
Sample Comment	Artesian. Flow of artesian well could not overcome the head in the tubing, a peristaltic pump with a pumping rate of 500 mL/min was used to maintain the static depth of water at the top of the PVC. MS/MSD Collected.
Initial Water Level Date/Time	08/22/2023 14:10
Initial Water Level Depth (ft bmp)	Artesian
Pump/Tubing Intake Depth (ft bmp)	164.4
Tubing Length (ft)	168
Tubing Inner Diameter (in)	0.17
Purging Initiation Date/Time	08/22/2023 14:10
Total Purge Volume (gal)	10
Modified Sample	No
If Modified, Reasoning	
Sample Collection Information	Bottling-Start: 08/22/2023 15:05:00, Bottling-Stop: 08/22/2023 15:10:00, Parameters-Sampled: PFAS

Reading Time	Depth To Water (ft)	Cumulative Drawdown (ft)	Purge Rate (ml/min)	Temperature (deg c)	Specific Conductivity (us/cm)	Dissolved Oxygen (mg/l)	pH (su)	Oxidation-Reduction Potential (mV)	Turbidity (ntu)
14:15	0.00	NR	500	NR	NR	NR	NR	NR	<5
14:30	0.00	NR	500	11	522 +	2.2	7.6	-68	<5
14:50	0.00	NR	500	11	521 +	<0.5	7.6	-97	<5
14:55	0.00	NR	500	11	520 +	<0.5	7.6	-99	<5
15:00	0.00	NR	500	11	520 +	<0.5	7.6	-101	<5

Notes:

1) Abbreviations include: "deg c" indicates degrees Celsius; "ft" indicates feet; "ft bmp" indicates feet below reference measuring point; "gal" indicates gallons; "in" indicates inches; "mg/l" indicates milligrams per liter; "ml/min" indicates milliliters per minute; "mV" indicates millivolts; "NA" indicates not applicable; "NR" indicates not recorded; "ntu" indicates Nephelometric Turbidity units; "su" indicates standard units; "us/cm" indicates microsiemens per centimeter; and "+" indicates the parameter(s) may be used for stabilization calculations but cannot be used for other purposes.
2) Weather temperature units are in degrees Fahrenheit, unless otherwise noted.
3) Did indicator parameters reach stabilization? Yes
4) Was the two hour time limit reached? No
5) Calculations:
   - Head Above Pump Intake (ft) 164.40
   - Total Drawdown (ft) 0.00
   - Calculated Final Purge Volume (gal) NA
6) If Drawdown Did Not Stabilize or Stabilized Drawdown >0.3 ft, is Total Purge Volume > Calculated Final Purge Volume? NA

Well Sampling Worksheet
WWW RAP Field Data
PERIMETER 2023-Q3 - WV-MW-11S
Kent County, MI

Well	WV-MW-11S / 2 in Diameter PVC
Sample Quarter	2023-Q3
Date	08/22/2023
Weather	75 Sunny
Sampler Initials	BPT
Purging Device	Bladder-Pump: NA, Peristaltic-Pump: PER-01, Centrifugal-Pump: NA
Meters Used	YSI: Agile Rental 1, Turbidimeter: Agile Rental 1, Water-Level-Meter: WLM-1
Reference Measuring Point	PVC
Well Screen (ft bmp)	32.5 - 37.5
Measured Bottom Depth (ft bmp)	NR
Sample Comment	Collected DUP
Initial Water Level Date/Time	08/22/2023 14:10
Initial Water Level Depth (ft bmp)	12.11
Pump/Tubing Intake Depth (ft bmp)	35
Tubing Length (ft)	38
Tubing Inner Diameter (in)	0.17
Purging Initiation Date/Time	08/22/2023 14:15
Total Purge Volume (gal)	2
Modified Sample	No
If Modified, Reasoning	
Sample Collection Information	Bottling-Start: 08/22/2023 15:05:00, Bottling-Stop: 08/22/2023 15:10:00, Parameters-Sampled: PFAS

Reading Time	Depth To Water (ft)	Cumulative Drawdown (ft)	Purge Rate (ml/min)	Temperature (deg c)	Specific Conductivity (us/cm)	Dissolved Oxygen (mg/l)	pH (su)	Oxidation-Reduction Potential (mV)	Turbidity (ntu)
14:30	12.11	0.00	190	15	468 +	1.2	7.3	304	6
14:35	12.12	0.01	190	15	470 +	1.3	7.3	296	<5
14:40	12.12	0.01	190	15	474 +	1.2	7.2	290	<5
14:45	12.11	0.00	190	15	468 +	1.2	7.3	273	<5
14:50	12.11	0.00	190	15	471 +	1.2	7.3	261	<5
14:55	12.11	0.00	190	15	471 +	1.2	7.3	256	<5
15:00	12.11	0.00	190	15	470 +	1.2	7.3	252	<5

Notes:

1) Abbreviations include: "deg c" indicates degrees Celsius; "ft" indicates feet; "ft bmp" indicates feet below reference measuring point; "gal" indicates gallons; "in" indicates inches; "mg/l" indicates milligrams per liter; "ml/min" indicates milliliters per minute; "mV" indicates millivolts; "NA" indicates not applicable; "NR" indicates not recorded; "ntu" indicates Nephelometric Turbidity units; "su" indicates standard units; "us/cm" indicates microsiemens per centimeter; and "+" indicates the parameter(s) may be used for stabilization calculations but cannot be used for other purposes.
2) Weather temperature units are in degrees Fahrenheit, unless otherwise noted.
3) Did indicator parameters reach stabilization? Yes
4) Was the two hour time limit reached? No
5) Calculations:
   - Head Above Pump Intake (ft) 22.89
   - Total Drawdown (ft) 0.00
   - Calculated Final Purge Volume (gal) NA
6) If Drawdown Did Not Stabilize or Stabilized Drawdown >0.3 ft, is Total Purge Volume > Calculated Final Purge Volume? NA

Well Sampling Worksheet
WWW RAP Field Data
PERIMETER 2023-Q3 - WV-MW-15A
Kent County, MI

Well	WV-MW-15A / 2 in Diameter PVC
Sample Quarter	2023-Q3
Date	08/31/2023
Weather	66F Sunny
Sampler Initials	MKM
Purging Device	Bladder-Pump: NA, Peristaltic-Pump: PER-3, Centrifugal-Pump: NA
Meters Used	YSI: Agile Rental 1, Turbidimeter: Agile Rental 1, Water-Level-Meter: WLM-1
Reference Measuring Point	PVC
Well Screen (ft bmp)	8.8 - 13.8
Measured Bottom Depth (ft bmp)	NR
Sample Comment	Dissolved oxygen did not stabilize per the Standard Operating Procedure (SOP).
Initial Water Level Date/Time	08/31/2023 11:25
Initial Water Level Depth (ft bmp)	5.11
Pump/Tubing Intake Depth (ft bmp)	11.3
Tubing Length (ft)	13.8
Tubing Inner Diameter (in)	0.17
Purging Initiation Date/Time	08/31/2023 11:33
Total Purge Volume (gal)	5
Modified Sample	No
If Modified, Reasoning	
Sample Collection Information	Bottling-Start: 08/31/2023 12:25:00, Bottling-Stop: 08/31/2023 12:30:00, Parameters-Sampled: PFAS

Reading Time	Depth To Water (ft)	Cumulative Drawdown (ft)	Purge Rate (ml/min)	Temperature (deg c)	Specific Conductivity (us/cm)	Dissolved Oxygen (mg/l)	pH (su)	Oxidation-Reduction Potential (mV)	Turbidity (ntu)
11:45	5.13	0.02	300	12	270 +	1.0 +	7.8	-109	11
11:55	5.13	0.02	300	12	267 +	0.7 +	7.6	-124	8
12:05	5.13	0.02	300	12	267 +	0.6 +	7.5	-126	6
12:10	5.13	0.02	300	12	267 +	0.6 +	7.5	-127	<5
12:15	5.13	0.02	300	12	268 +	0.6 +	7.5	-127	<5
12:20	5.13	0.02	300	12	268 +	<0.5 +	7.6	-127	<5

Notes:

1) Abbreviations include: "deg c" indicates degrees Celsius; "ft" indicates feet; "ft bmp" indicates feet below reference measuring point; "gal" indicates gallons; "in" indicates inches; "mg/l" indicates milligrams per liter; "ml/min" indicates milliliters per minute; "mV" indicates millivolts; "NA" indicates not applicable; "NR" indicates not recorded; "ntu" indicates Nephelometric Turbidity units; "su" indicates standard units; "us/cm" indicates microsiemens per centimeter; and "+" indicates the parameter(s) may be used for stabilization calculations but cannot be used for other purposes.
2) Weather temperature units are in degrees Fahrenheit, unless otherwise noted.
3) Did indicator parameters reach stabilization? No
4) Was the two hour time limit reached? No
5) Calculations:
   - Head Above Pump Intake (ft) 6.19
   - Total Drawdown (ft) 0.02
   - Calculated Final Purge Volume (gal) NA
6) If Drawdown Did Not Stabilize or Stabilized Drawdown >0.3 ft, is Total Purge Volume > Calculated Final Purge Volume? NA

Well Sampling Worksheet
WWW RAP Field Data
PERIMETER 2023-Q3 - WV-MW-15B
Kent County, MI

Well	WV-MW-15B / 2 in Diameter PVC
Sample Quarter	2023-Q3
Date	08/31/2023
Weather	66°F Sunny
Sampler Initials	JMS
Purging Device	Bladder-Pump: NA, Peristaltic-Pump: PER-1, Centrifugal-Pump: NA
Meters Used	YSI: Agile Rental 2, Turbidimeter: Agile Rental 2, Water-Level-Meter: WLM-2
Reference Measuring Point	PVC
Well Screen (ft bmp)	32.8 - 37.8
Measured Bottom Depth (ft bmp)	NR
Sample Comment	YSI Connected 12:10.
Initial Water Level Date/Time	08/31/2023 11:30
Initial Water Level Depth (ft bmp)	5.09
Pump/Tubing Intake Depth (ft bmp)	35.3
Tubing Length (ft)	38
Tubing Inner Diameter (in)	0.17
Purging Initiation Date/Time	08/31/2023 11:35
Total Purge Volume (gal)	5
Modified Sample	No
If Modified, Reasoning	
Sample Collection Information	Bottling-Start: 08/31/2023 12:45:00, Bottling-Stop: 08/31/2023 12:50:00, Parameters-Sampled: PFAS

Reading Time	Depth To Water (ft)	Cumulative Drawdown (ft)	Purge Rate (ml/min)	Temperature (deg c)	Specific Conductivity (us/cm)	Dissolved Oxygen (mg/l)	pH (su)	Oxidation-Reduction Potential (mV)	Turbidity (ntu)
11:40	5.42	0.33	300	NR	NR	NR	NR	NR	6
11:50	5.35	0.26	250	NR	NR	NR	NR	NR	<5
12:00	5.34	0.25	210	NR	NR	NR	NR	NR	<5
12:10	5.34	0.25	210	11	322 +	<0.5	8.0	-44	<5
12:20	5.36	0.27	210	11	322 +	<0.5	8.0	-89	<5
12:30	5.34	0.25	210	12	322 +	<0.5	8.0	-106	<5
12:35	5.34	0.25	210	11	322 +	<0.5	8.0	-110	<5
12:40	5.34	0.25	210	12	322 +	<0.5	8.0	-114	<5

Notes:

1) Abbreviations include: "deg c" indicates degrees Celsius; "ft" indicates feet; "ft bmp" indicates feet below reference measuring point; "gal" indicates gallons; "in" indicates inches; "mg/l" indicates milligrams per liter; "ml/min" indicates milliliters per minute; "mV" indicates millivolts; "NA" indicates not applicable; "NR" indicates not recorded; "ntu" indicates Nephelometric Turbidity units; "su" indicates standard units; "us/cm" indicates microsiemens per centimeter; and "+" indicates the parameter(s) may be used for stabilization calculations but cannot be used for other purposes.
2) Weather temperature units are in degrees Fahrenheit, unless otherwise noted.
3) Did indicator parameters reach stabilization? Yes
4) Was the two hour time limit reached? No
5) Calculations:
   - Head Above Pump Intake (ft) 30.21
   - Total Drawdown (ft) 0.25
   - Calculated Final Purge Volume (gal) NA
6) If Drawdown Did Not Stabilize or Stabilized Drawdown >0.3 ft, is Total Purge Volume > Calculated Final Purge Volume? NA

Well Sampling Worksheet
WWW RAP Field Data
PERIMETER 2023-Q3 - WV-MW-15C
Kent County, MI

Well	WV-MW-15C / 2 in Diameter PVC
Sample Quarter	2023-Q3
Date	08/31/2023
Weather	66F Sunny
Sampler Initials	BPT
Purging Device	Bladder-Pump: NA, Peristaltic-Pump: NA, Centrifugal-Pump: Mega Monsoon #1
Meters Used	YSI: Agile Rental 4, Turbidimeter: Agile Rental 3, Water-Level-Meter: WLM-3
Reference Measuring Point	PVC
Well Screen (ft bmp)	43.2 - 48.0
Measured Bottom Depth (ft bmp)	NR
Sample Comment	12:25: YSI connected
Initial Water Level Date/Time	08/31/2023 11:45
Initial Water Level Depth (ft bmp)	4.92
Pump/Tubing Intake Depth (ft bmp)	45.6
Tubing Length (ft)	50
Tubing Inner Diameter (in)	0.17
Purging Initiation Date/Time	08/31/2023 11:50
Total Purge Volume (gal)	8
Modified Sample	No
If Modified, Reasoning	
Sample Collection Information	Bottling-Start: 08/31/2023 12:55:00, Bottling-Stop: 08/31/2023 13:00:00, Parameters-Sampled: PFAS

Reading Time	Depth To Water (ft)	Cumulative Drawdown (ft)	Purge Rate (ml/min)	Temperature (deg c)	Specific Conductivity (us/cm)	Dissolved Oxygen (mg/l)	pH (su)	Oxidation-Reduction Potential (mV)	Turbidity (ntu)
12:05	5.02	0.01	500	NR	NR	NR	NR	NR	14
12:15	5.02	0.01	500	NR	NR	NR	NR	NR	<5
12:25	5.02	0.10	500	11	643 +	1.8	7.6	-50	<5
12:30	5.02	0.10	500	11	641 +	<0.5	7.6	-90	<5
12:35	5.02	0.10	500	11	634 +	<0.5	7.7	-115	<5
12:40	5.02	0.10	500	11	630 +	<0.5	7.7	-123	<5
12:45	5.02	0.10	500	11	627 +	<0.5	7.7	-128	<5
12:50	5.02	0.10	500	11	623 +	<0.5	7.7	-132	<5

Notes:

1) Abbreviations include: "deg c" indicates degrees Celsius; "ft" indicates feet; "ft bmp" indicates feet below reference measuring point; "gal" indicates gallons; "in" indicates inches; "mg/l" indicates milligrams per liter; "ml/min" indicates milliliters per minute; "mV" indicates millivolts; "NA" indicates not applicable; "NR" indicates not recorded; "ntu" indicates Nephelometric Turbidity units; "su" indicates standard units; "us/cm" indicates microsiemens per centimeter; and "+" indicates the parameter(s) may be used for stabilization calculations but cannot be used for other purposes.
2) Weather temperature units are in degrees Fahrenheit, unless otherwise noted.
3) Did indicator parameters reach stabilization? Yes
4) Was the two hour time limit reached? No
5) Calculations:
   - Head Above Pump Intake (ft) 40.68
   - Total Drawdown (ft) 0.10
   - Calculated Final Purge Volume (gal) NA
6) If Drawdown Did Not Stabilize or Stabilized Drawdown >0.3 ft, is Total Purge Volume > Calculated Final Purge Volume? NA

Well Sampling Worksheet
WWW RAP Field Data
PERIMETER 2023-Q3 - WV-MW-15D
Kent County, MI

Well	WV-MW-15D / 2 in Diameter PVC
Sample Quarter	2023-Q3
Date	08/31/2023
Weather	67F Sunny
Sampler Initials	JET
Purging Device	Bladder-Pump: NA, Peristaltic-Pump: Rental, Centrifugal-Pump: NA
Meters Used	YSI: Agile Rental 3, Turbidimeter: Agile Rental 3, Water-Level-Meter: NA
Reference Measuring Point	PVC
Well Screen (ft bmp)	134.9 - 137.6
Measured Bottom Depth (ft bmp)	NR
Sample Comment	Artesian. Flow of artesian well could not overcome the head in the tubing, a peristaltic pump with a pumping rate of 300 mL/min was used to maintain the static depth of water at the top of the PVC. YSI Connected prior to 13:10 reading.
Initial Water Level Date/Time	08/31/2023 11:50
Initial Water Level Depth (ft bmp)	Artesian
Pump/Tubing Intake Depth (ft bmp)	136.2
Tubing Length (ft)	139
Tubing Inner Diameter (in)	0.17
Purging Initiation Date/Time	08/31/2023 11:50
Total Purge Volume (gal)	5
Modified Sample	No
If Modified, Reasoning	
Sample Collection Information	Bottling-Start: 08/31/2023 13:25:00, Bottling-Stop: 08/31/2023 13:30:00, Parameters-Sampled: PFAS

Reading Time	Depth To Water (ft)	Cumulative Drawdown (ft)	Purge Rate (ml/min)	Temperature (deg c)	Specific Conductivity (us/cm)	Dissolved Oxygen (mg/l)	pH (su)	Oxidation-Reduction Potential (mV)	Turbidity (ntu)
12:05	0.00	NR	300	NR	NR	NR	NR	NR	NR
12:25	0.00	NR	300	NR	NR	NR	NR	NR	38
12:35	0.00	NR	300	NR	NR	NR	NR	NR	7
12:45	0.00	NR	300	NR	NR	NR	NR	NR	<5
13:10	0.00	NR	300	11	878 +	0.6	6.7	-51	<5
13:15	0.00	NR	300	11	878 +	0.6	6.7	-54	<5
13:20	0.00	NR	300	11	878 +	0.6	6.7	-55	<5

Notes:

1) Abbreviations include: "deg c" indicates degrees Celsius; "ft" indicates feet; "ft bmp" indicates feet below reference measuring point; "gal" indicates gallons; "in" indicates inches; "mg/l" indicates milligrams per liter; "ml/min" indicates milliliters per minute; "mV" indicates millivolts; "NA" indicates not applicable; "NR" indicates not recorded; "ntu" indicates Nephelometric Turbidity units; "su" indicates standard units; "us/cm" indicates microsiemens per centimeter; and "+" indicates the parameter(s) may be used for stabilization calculations but cannot be used for other purposes.
2) Weather temperature units are in degrees Fahrenheit, unless otherwise noted.
3) Did indicator parameters reach stabilization? Yes
4) Was the two hour time limit reached? No
5) Calculations:
   - Head Above Pump Intake (ft) 136.20
   - Total Drawdown (ft) 0.00
   - Calculated Final Purge Volume (gal) NA
6) If Drawdown Did Not Stabilize or Stabilized Drawdown >0.3 ft, is Total Purge Volume > Calculated Final Purge Volume? NA

Well Sampling Worksheet
WWW RAP Field Data
PERIMETER 2023-Q3 - WV-PMW-RI-101A
Kent County, MI

Well	WV-PMW-RI-101A / 2 in Diameter PVC
Sample Quarter	2023-Q3
Date	08/29/2023
Weather	70F Partly Cloudy
Sampler Initials	JMS
Purging Device	Bladder-Pump: NA, Peristaltic-Pump: NA, Centrifugal-Pump: Mega Monsoon #1
Meters Used	YSI: Agile Rental 1, Turbidimeter: Agile Rental 1, Water-Level-Meter: WLM-1
Reference Measuring Point	PVC
Well Screen (ft bmp)	42.6 - 47.6
Measured Bottom Depth (ft bmp)	NR
Sample Comment	YSI connected after 11:40.
Initial Water Level Date/Time	08/29/2023 11:05
Initial Water Level Depth (ft bmp)	38.39
Pump/Tubing Intake Depth (ft bmp)	45.1
Tubing Length (ft)	49
Tubing Inner Diameter (in)	0.17
Purging Initiation Date/Time	08/29/2023 11:10
Total Purge Volume (gal)	7
Modified Sample	No
If Modified, Reasoning	
Sample Collection Information	Bottling-Start: 08/29/2023 12:15:00, Bottling-Stop: 08/29/2023 12:20:00, Parameters-Sampled: PFAS

Reading Time	Depth To Water (ft)	Cumulative Drawdown (ft)	Purge Rate (ml/min)	Temperature (deg c)	Specific Conductivity (us/cm)	Dissolved Oxygen (mg/l)	pH (su)	Oxidation-Reduction Potential (mV)	Turbidity (ntu)
11:25	38.50	0.11	460	NR	NR	NR	NR	NR	8
11:40	38.50	0.11	460	NR	NR	NR	NR	NR	<5
12:00	38.50	0.11	460	11	734 +	9.7	7.1	340	<5
12:05	38.50	0.11	460	11	734 +	9.4	7.1	340	<5
12:10	38.50	0.11	460	11	734 +	9.2	7.1	341	<5

Notes:

1) Abbreviations include: "deg c" indicates degrees Celsius; "ft" indicates feet; "ft bmp" indicates feet below reference measuring point; "gal" indicates gallons; "in" indicates inches; "mg/l" indicates milligrams per liter; "ml/min" indicates milliliters per minute; "mV" indicates millivolts; "NA" indicates not applicable; "NR" indicates not recorded; "ntu" indicates Nephelometric Turbidity units; "su" indicates standard units; "us/cm" indicates microsiemens per centimeter; and "+" indicates the parameter(s) may be used for stabilization calculations but cannot be used for other purposes.
2) Weather temperature units are in degrees Fahrenheit, unless otherwise noted.
3) Did indicator parameters reach stabilization? Yes
4) Was the two hour time limit reached? No
5) Calculations:
   - Head Above Pump Intake (ft) 6.71
   - Total Drawdown (ft) 0.11
   - Calculated Final Purge Volume (gal) NA
6) If Drawdown Did Not Stabilize or Stabilized Drawdown >0.3 ft, is Total Purge Volume > Calculated Final Purge Volume? NA

Well Sampling Worksheet
WWW RAP Field Data
PERIMETER 2023-Q3 - WV-PMW-RI-101B
Kent County, MI

Well	WV-PMW-RI-101B / 2 in Diameter PVC
Sample Quarter	2023-Q3
Date	08/29/2023
Weather	70F Partly Cloudy
Sampler Initials	BPT
Purging Device	Bladder-Pump: BP-11, Peristaltic-Pump: NA, Centrifugal-Pump: NA
Meters Used	YSI: Agile Rental 2, Turbidimeter: Agile Rental 2, Water-Level-Meter: WLM-4
Reference Measuring Point	PVC
Well Screen (ft bmp)	281.5 - 286.5
Measured Bottom Depth (ft bmp)	286.8
Sample Comment	
Initial Water Level Date/Time	08/29/2023 11:45
Initial Water Level Depth (ft bmp)	119.52
Pump/Tubing Intake Depth (ft bmp)	284
Tubing Length (ft)	288
Tubing Inner Diameter (in)	0.25
Purging Initiation Date/Time	08/29/2023 11:50
Total Purge Volume (gal)	2
Modified Sample	No
If Modified, Reasoning	
Sample Collection Information	Bottling-Start: 08/29/2023 12:50:00, Bottling-Stop: 08/29/2023 12:55:00, Parameters-Sampled: PFAS

Reading Time	Depth To Water (ft)	Cumulative Drawdown (ft)	Purge Rate (ml/min)	Temperature (deg c)	Specific Conductivity (us/cm)	Dissolved Oxygen (mg/l)	pH (su)	Oxidation-Reduction Potential (mV)	Turbidity (ntu)
12:10	119.42	-0.10	125	12	414 +	1.1	7.6	-25	33
12:20	119.32	-0.20	125	13	413 +	0.8	7.7	-60	38
12:25	119.25	-0.27	125	13	416 +	0.8	7.7	-67	36
12:30	119.25	-0.27	125	12	419 +	0.6	7.7	-74	31
12:35	119.25	-0.27	125	12	419 +	0.6	7.7	-75	31
12:40	119.25	-0.27	125	12	420 +	0.6	7.7	-78	31

Notes:

1) Abbreviations include: "deg c" indicates degrees Celsius; "ft" indicates feet; "ft bmp" indicates feet below reference measuring point; "gal" indicates gallons; "in" indicates inches; "mg/l" indicates milligrams per liter; "ml/min" indicates milliliters per minute; "mV" indicates millivolts; "NA" indicates not applicable; "NR" indicates not recorded; "ntu" indicates Nephelometric Turbidity units; "su" indicates standard units; "us/cm" indicates microsiemens per centimeter; and "+" indicates the parameter(s) may be used for stabilization calculations but cannot be used for other purposes.
2) Weather temperature units are in degrees Fahrenheit, unless otherwise noted.
3) Did indicator parameters reach stabilization? Yes
4) Was the two hour time limit reached? No
5) Calculations:
   - Head Above Pump Intake (ft) 164.48
   - Total Drawdown (ft) -0.27
   - Calculated Final Purge Volume (gal) NA
6) If Drawdown Did Not Stabilize or Stabilized Drawdown >0.3 ft, is Total Purge Volume > Calculated Final Purge Volume? NA

Well Sampling Worksheet
WWW RAP Field Data
PERIMETER 2023-Q3 - WV-PMW-RI-102
Kent County, MI

Well	WV-PMW-RI-102 / 2 in Diameter PVC
Sample Quarter	2023-Q3
Date	08/22/2023
Weather	Sunny 80
Sampler Initials	RCP
Purging Device	Bladder-Pump: NA, Peristaltic-Pump: NA, Centrifugal-Pump: Mega Monsoon #2
Meters Used	YSI: Agile Rental 2, Turbidimeter: Agile Rental 2, Water-Level-Meter: WLM-4
Reference Measuring Point	PVC
Well Screen (ft bmp)	47.2 - 52.2
Measured Bottom Depth (ft bmp)	NR
Sample Comment	14:35: YSI connected
Initial Water Level Date/Time	08/22/2023 14:00
Initial Water Level Depth (ft bmp)	45.48
Pump/Tubing Intake Depth (ft bmp)	49.7
Tubing Length (ft)	53
Tubing Inner Diameter (in)	0.17
Purging Initiation Date/Time	08/22/2023 14:05
Total Purge Volume (gal)	6
Modified Sample	No
If Modified, Reasoning	
Sample Collection Information	Bottling-Start: 08/22/2023 14:50:00, Bottling-Stop: 08/22/2023 14:55:00, Parameters-Sampled: PFAS

Reading Time	Depth To Water (ft)	Cumulative Drawdown (ft)	Purge Rate (ml/min)	Temperature (deg c)	Specific Conductivity (us/cm)	Dissolved Oxygen (mg/l)	pH (su)	Oxidation-Reduction Potential (mV)	Turbidity (ntu)
14:15	45.51	0.03	500	NR	NR	NR	NR	NR	NR
14:25	45.51	0.03	500	NR	NR	NR	NR	NR	NR
14:35	45.51	0.03	500	NR	NR	NR	NR	NR	11
14:40	45.51	0.03	500	12	513 +	<0.5	7.5	148	<5
14:45	45.51	0.03	500	12	518 +	<0.5	7.5	153	<5
14:50	45.51	0.03	500	12	518 +	<0.5	7.4	154	<5

Notes:

1) Abbreviations include: "deg c" indicates degrees Celsius; "ft" indicates feet; "ft bmp" indicates feet below reference measuring point; "gal" indicates gallons; "in" indicates inches; "mg/l" indicates milligrams per liter; "ml/min" indicates milliliters per minute; "mV" indicates millivolts; "NA" indicates not applicable; "NR" indicates not recorded; "ntu" indicates Nephelometric Turbidity units; "su" indicates standard units; "us/cm" indicates microsiemens per centimeter; and "+" indicates the parameter(s) may be used for stabilization calculations but cannot be used for other purposes.
2) Weather temperature units are in degrees Fahrenheit, unless otherwise noted.
3) Did indicator parameters reach stabilization? Yes
4) Was the two hour time limit reached? No
5) Calculations:
   - Head Above Pump Intake (ft) 4.22
   - Total Drawdown (ft) 0.03
   - Calculated Final Purge Volume (gal) NA
6) If Drawdown Did Not Stabilize or Stabilized Drawdown >0.3 ft, is Total Purge Volume > Calculated Final Purge Volume? NA

Well Sampling Worksheet
WWW RAP Field Data
PERIMETER 2023-Q3 - WV-PMW-RI-104A
Kent County, MI

Well	WV-PMW-RI-104A / 2 in Diameter PVC
Sample Quarter	2023-Q3
Date	08/28/2023
Weather	67F Sunny
Sampler Initials	BPT
Purging Device	Bladder-Pump: NA, Peristaltic-Pump: PER-03, Centrifugal-Pump: NA
Meters Used	YSI: Agile Rental 2, Turbidimeter: Agile Rental 2, Water-Level-Meter: WLM-1
Reference Measuring Point	PVC
Well Screen (ft bmp)	25.6 - 30.6
Measured Bottom Depth (ft bmp)	NR
Sample Comment	
Initial Water Level Date/Time	08/28/2023 11:30
Initial Water Level Depth (ft bmp)	21.29
Pump/Tubing Intake Depth (ft bmp)	28.1
Tubing Length (ft)	31
Tubing Inner Diameter (in)	0.17
Purging Initiation Date/Time	08/28/2023 11:35
Total Purge Volume (gal)	2
Modified Sample	No
If Modified, Reasoning	
Sample Collection Information	Bottling-Start: 08/28/2023 12:15:00, Bottling-Stop: 08/28/2023 12:20:00, Parameters-Sampled: PFAS

Reading Time	Depth To Water (ft)	Cumulative Drawdown (ft)	Purge Rate (ml/min)	Temperature (deg c)	Specific Conductivity (us/cm)	Dissolved Oxygen (mg/l)	pH (su)	Oxidation-Reduction Potential (mV)	Turbidity (ntu)
11:50	21.31	0.02	225	12	653 +	9.3	8.0 +	79	<5
11:55	21.31	0.02	225	11	631 +	5.1	7.6 +	82	<5
12:00	21.31	0.02	225	11	626 +	5.1	7.6 +	83	<5
12:05	21.31	0.02	225	11	621 +	5.1	7.6 +	84	<5
12:10	21.31	0.02	225	11	618 +	5.1	7.6 +	86	<5

Notes:

1) Abbreviations include: "deg c" indicates degrees Celsius; "ft" indicates feet; "ft bmp" indicates feet below reference measuring point; "gal" indicates gallons; "in" indicates inches; "mg/l" indicates milligrams per liter; "ml/min" indicates milliliters per minute; "mV" indicates millivolts; "NA" indicates not applicable; "NR" indicates not recorded; "ntu" indicates Nephelometric Turbidity units; "su" indicates standard units; "us/cm" indicates microsiemens per centimeter; and "+" indicates the parameter(s) may be used for stabilization calculations but cannot be used for other purposes.
2) Weather temperature units are in degrees Fahrenheit, unless otherwise noted.
3) Did indicator parameters reach stabilization? Yes
4) Was the two hour time limit reached? No
5) Calculations:
   - Head Above Pump Intake (ft) 6.81
   - Total Drawdown (ft) 0.02
   - Calculated Final Purge Volume (gal) NA
6) If Drawdown Did Not Stabilize or Stabilized Drawdown >0.3 ft, is Total Purge Volume > Calculated Final Purge Volume? NA

Well Sampling Worksheet
WWW RAP Field Data
PERIMETER 2023-Q3 - WV-PMW-RI-104B
Kent County, MI

Well	WV-PMW-RI-104B / 2 in Diameter PVC
Sample Quarter	2023-Q3
Date	08/28/2023
Weather	67F Sunny
Sampler Initials	JET
Purging Device	Bladder-Pump: NA, Peristaltic-Pump: PER-01, Centrifugal-Pump: NA
Meters Used	YSI: Agile Rental 1, Turbidimeter: Agile Rental 1, Water-Level-Meter: WLM-2
Reference Measuring Point	PVC
Well Screen (ft bmp)	130.0 - 135.0
Measured Bottom Depth (ft bmp)	NR
Sample Comment	YSI Connected at 12:40.
Initial Water Level Date/Time	08/28/2023 11:30
Initial Water Level Depth (ft bmp)	16.84
Pump/Tubing Intake Depth (ft bmp)	132.5
Tubing Length (ft)	138
Tubing Inner Diameter (in)	0.17
Purging Initiation Date/Time	08/28/2023 11:35
Total Purge Volume (gal)	6
Modified Sample	No
If Modified, Reasoning	
Sample Collection Information	Bottling-Start: 08/28/2023 13:40:00, Bottling-Stop: 08/28/2023 13:45:00, Parameters-Sampled: PFAS

Reading Time	Depth To Water (ft)	Cumulative Drawdown (ft)	Purge Rate (ml/min)	Temperature (deg c)	Specific Conductivity (us/cm)	Dissolved Oxygen (mg/l)	pH (su)	Oxidation-Reduction Potential (mV)	Turbidity (ntu)
11:50	16.93	0.09	200	NR	NR	NR	NR	NR	NR
12:15	16.93	0.09	200	NR	NR	NR	NR	NR	33
12:25	16.93	0.09	200	NR	NR	NR	NR	NR	33
12:40	16.93	0.09	200	12	697 +	0.8	7.6	-117	21
12:55	16.93	0.09	200	12	701 +	0.6	7.8	-146	24
13:10	16.93	0.09	200	12	704 +	0.5	7.9	-154	20
13:25	16.93	0.09	200	12	705 +	<0.5	7.9	-156	20
13:30	16.93	0.09	200	12	706 +	<0.5	7.9	-156	17
13:35	16.93	0.09	200	12	708 +	<0.5	7.9	-156	15

Notes:

1) Abbreviations include: "deg c" indicates degrees Celsius; "ft" indicates feet; "ft bmp" indicates feet below reference measuring point; "gal" indicates gallons; "in" indicates inches; "mg/l" indicates milligrams per liter; "ml/min" indicates milliliters per minute; "mV" indicates millivolts; "NA" indicates not applicable; "NR" indicates not recorded; "ntu" indicates Nephelometric Turbidity units; "su" indicates standard units; "us/cm" indicates microsiemens per centimeter; and "+" indicates the parameter(s) may be used for stabilization calculations but cannot be used for other purposes.
2) Weather temperature units are in degrees Fahrenheit, unless otherwise noted.
3) Did indicator parameters reach stabilization? No
4) Was the two hour time limit reached? Yes
5) Calculations:
   - Head Above Pump Intake (ft) 115.66
   - Total Drawdown (ft) 0.09
   - Calculated Final Purge Volume (gal) NA
6) If Drawdown Did Not Stabilize or Stabilized Drawdown >0.3 ft, is Total Purge Volume > Calculated Final Purge Volume? NA

Well Sampling Worksheet
WWW RAP Field Data
PERIMETER 2023-Q3 - WV-PMW-RI-105A
Kent County, MI

Well	WV-PMW-RI-105A / 2 in Diameter PVC
Sample Quarter	2023-Q3
Date	08/31/2023
Weather	73F Sunny
Sampler Initials	JMS
Purging Device	Bladder-Pump: NA, Peristaltic-Pump: PER-02, Centrifugal-Pump: NA
Meters Used	YSI: Agile Rental 3, Turbidimeter: Agile Rental 3, Water-Level-Meter: WLM-3
Reference Measuring Point	PVC
Well Screen (ft bmp)	34.5 - 39.5
Measured Bottom Depth (ft bmp)	NR
Sample Comment	YSI Connected after 15:40.
Initial Water Level Date/Time	08/31/2023 15:25
Initial Water Level Depth (ft bmp)	21.85
Pump/Tubing Intake Depth (ft bmp)	37.5
Tubing Length (ft)	41
Tubing Inner Diameter (in)	0.17
Purging Initiation Date/Time	08/31/2023 15:30
Total Purge Volume (gal)	3
Modified Sample	No
If Modified, Reasoning	
Sample Collection Information	Bottling-Start: 08/31/2023 16:10:00, Bottling-Stop: 08/31/2023 16:15:00, Parameters-Sampled: PFAS

Reading Time	Depth To Water (ft)	Cumulative Drawdown (ft)	Purge Rate (ml/min)	Temperature (deg c)	Specific Conductivity (us/cm)	Dissolved Oxygen (mg/l)	pH (su)	Oxidation-Reduction Potential (mV)	Turbidity (ntu)
15:40	21.85	0.00	300	NR	NR	NR	NR	NR	<5
15:50	21.85	0.00	300	11	588 +	3.8	6.8	120	<5
15:55	21.85	0.00	300	11	588 +	3.8	6.8	117	<5
16:00	21.85	0.00	300	11	586 +	3.8	6.8	116	<5

Notes:

1) Abbreviations include: "deg c" indicates degrees Celsius; "ft" indicates feet; "ft bmp" indicates feet below reference measuring point; "gal" indicates gallons; "in" indicates inches; "mg/l" indicates milligrams per liter; "ml/min" indicates milliliters per minute; "mV" indicates millivolts; "NA" indicates not applicable; "NR" indicates not recorded; "ntu" indicates Nephelometric Turbidity units; "su" indicates standard units; "us/cm" indicates microsiemens per centimeter; and "+" indicates the parameter(s) may be used for stabilization calculations but cannot be used for other purposes.
2) Weather temperature units are in degrees Fahrenheit, unless otherwise noted.
3) Did indicator parameters reach stabilization? Yes
4) Was the two hour time limit reached? No
5) Calculations:
   - Head Above Pump Intake (ft) 15.65
   - Total Drawdown (ft) 0.00
   - Calculated Final Purge Volume (gal) NA
6) If Drawdown Did Not Stabilize or Stabilized Drawdown >0.3 ft, is Total Purge Volume > Calculated Final Purge Volume? NA

Well Sampling Worksheet
WWW RAP Field Data
PERIMETER 2023-Q3 - WV-PMW-RI-105B
Kent County, MI

Well	WV-PMW-RI-105B / 2 in Diameter PVC
Sample Quarter	2023-Q3
Date	08/31/2023
Weather	73F Sunny
Sampler Initials	BPT
Purging Device	Bladder-Pump: NA, Peristaltic-Pump: NA, Centrifugal-Pump: Mega Monsoon #1
Meters Used	YSI: Agile Rental 2, Turbidimeter: Agile Rental 2, Water-Level-Meter: WLM-1
Reference Measuring Point	PVC
Well Screen (ft bmp)	79.1 - 84.1
Measured Bottom Depth (ft bmp)	84.2
Sample Comment	17:05: YSI connected
Initial Water Level Date/Time	08/31/2023 15:30
Initial Water Level Depth (ft bmp)	18.71
Pump/Tubing Intake Depth (ft bmp)	81.7
Tubing Length (ft)	85
Tubing Inner Diameter (in)	0.17
Purging Initiation Date/Time	08/31/2023 15:35
Total Purge Volume (gal)	11
Modified Sample	No
If Modified, Reasoning	
Sample Collection Information	Bottling-Start: 08/31/2023 17:40:00, Bottling-Stop: 08/31/2023 17:45:00, Parameters-Sampled: PFAS

Reading Time	Depth To Water (ft)	Cumulative Drawdown (ft)	Purge Rate (ml/min)	Temperature (deg c)	Specific Conductivity (us/cm)	Dissolved Oxygen (mg/l)	pH (su)	Oxidation-Reduction Potential (mV)	Turbidity (ntu)
15:50	18.72	0.01	350	NR	NR	NR	NR	NR	>999
16:05	18.72	0.01	350	NR	NR	NR	NR	NR	355
16:20	18.72	0.01	350	NR	NR	NR	NR	NR	153
16:35	18.72	0.01	350	NR	NR	NR	NR	NR	88
16:45	18.73	0.02	350	NR	NR	NR	NR	NR	49
16:55	18.73	0.02	350	NR	NR	NR	NR	NR	35
17:05	18.73	0.02	350	11	453 +	<0.5	7.8	-66	22
17:15	18.73	0.02	350	11	452 +	<0.5	7.9	-104	15
17:25	18.73	0.02	350	11	452 +	<0.5	7.9	-116	9
17:30	18.73	0.02	350	12	451 +	<0.5	7.9	-119	7
17:35	18.73	0.02	350	12	451 +	<0.5	7.9	-121	6

Notes:

1) Abbreviations include: "deg c" indicates degrees Celsius; "ft" indicates feet; "ft bmp" indicates feet below reference measuring point; "gal" indicates gallons; "in" indicates inches; "mg/l" indicates milligrams per liter; "ml/min" indicates milliliters per minute; "mV" indicates millivolts; "NA" indicates not applicable; "NR" indicates not recorded; "ntu" indicates Nephelometric Turbidity units; "su" indicates standard units; "us/cm" indicates microsiemens per centimeter; and "+" indicates the parameter(s) may be used for stabilization calculations but cannot be used for other purposes.
2) Weather temperature units are in degrees Fahrenheit, unless otherwise noted.
3) Did indicator parameters reach stabilization? No
4) Was the two hour time limit reached? Yes
5) Calculations:
   - Head Above Pump Intake (ft) 62.99
   - Total Drawdown (ft) 0.02
   - Calculated Final Purge Volume (gal) NA
6) If Drawdown Did Not Stabilize or Stabilized Drawdown >0.3 ft, is Total Purge Volume > Calculated Final Purge Volume? NA

Well Sampling Worksheet
WWW RAP Field Data
PERIMETER 2023-Q3 - WV-PMW-RI-106A
Kent County, MI

Well	WV-PMW-RI-106A / 2 in Diameter PVC
Sample Quarter	2023-Q3
Date	08/23/2023
Weather	Cloudy 75
Sampler Initials	BPT
Purging Device	Bladder-Pump: NA, Peristaltic-Pump: PER-1, Centrifugal-Pump: NA
Meters Used	YSI: Agile Rental 1, Turbidimeter: Agile Rental 1, Water-Level-Meter: WLM-1
Reference Measuring Point	PVC
Well Screen (ft bmp)	18.5 - 23.5
Measured Bottom Depth (ft bmp)	23.5
Sample Comment	10:00: YSI connected
Initial Water Level Date/Time	08/23/2023 09:35
Initial Water Level Depth (ft bmp)	9.07
Pump/Tubing Intake Depth (ft bmp)	21
Tubing Length (ft)	24
Tubing Inner Diameter (in)	0.17
Purging Initiation Date/Time	08/23/2023 09:40
Total Purge Volume (gal)	2
Modified Sample	No
If Modified, Reasoning	
Sample Collection Information	Bottling-Start: 08/23/2023 10:30:00, Bottling-Stop: 08/23/2023 10:35:00, Parameters-Sampled: PFAS

Reading Time	Depth To Water (ft)	Cumulative Drawdown (ft)	Purge Rate (ml/min)	Temperature (deg c)	Specific Conductivity (us/cm)	Dissolved Oxygen (mg/l)	pH (su)	Oxidation-Reduction Potential (mV)	Turbidity (ntu)
09:55	9.18	0.11	200	NR	NR	NR	NR	NR	<5
10:00	9.18	0.11	200	12	232 +	4.0	7.9	308	<5
10:05	9.18	0.11	200	12	227 +	3.2	7.9	309	<5
10:10	9.18	0.11	200	12	226 +	3.1	7.7	316	<5
10:15	9.18	0.11	200	11	225 +	3.0	7.5	322	<5
10:20	9.18	0.11	200	11	225 +	3.0	7.5	320	<5
10:25	9.18	0.11	200	11	225 +	3.0	7.5	317	<5

Notes:

1) Abbreviations include: "deg c" indicates degrees Celsius; "ft" indicates feet; "ft bmp" indicates feet below reference measuring point; "gal" indicates gallons; "in" indicates inches; "mg/l" indicates milligrams per liter; "ml/min" indicates milliliters per minute; "mV" indicates millivolts; "NA" indicates not applicable; "NR" indicates not recorded; "ntu" indicates Nephelometric Turbidity units; "su" indicates standard units; "us/cm" indicates microsiemens per centimeter; and "+" indicates the parameter(s) may be used for stabilization calculations but cannot be used for other purposes.
2) Weather temperature units are in degrees Fahrenheit, unless otherwise noted.
3) Did indicator parameters reach stabilization? Yes
4) Was the two hour time limit reached? No
5) Calculations:
   - Head Above Pump Intake (ft) 11.93
   - Total Drawdown (ft) 0.11
   - Calculated Final Purge Volume (gal) NA
6) If Drawdown Did Not Stabilize or Stabilized Drawdown >0.3 ft, is Total Purge Volume > Calculated Final Purge Volume? NA

Well Sampling Worksheet
WWW RAP Field Data
PERIMETER 2023-Q3 - WV-PMW-RI-106B
Kent County, MI

Well	WV-PMW-RI-106B / 2 in Diameter PVC
Sample Quarter	2023-Q3
Date	08/23/2023
Weather	Cloudy 75
Sampler Initials	BPT
Purging Device	Bladder-Pump: NA, Peristaltic-Pump: PER-1, Centrifugal-Pump: NA
Meters Used	YSI: Agile Rental 1, Turbidimeter: Agile Rental 1, Water-Level-Meter: WLM-1
Reference Measuring Point	PVC
Well Screen (ft bmp)	34.0 - 39.0
Measured Bottom Depth (ft bmp)	NR
Sample Comment	11:30: YSI connected
Initial Water Level Date/Time	08/23/2023 11:00
Initial Water Level Depth (ft bmp)	8.65
Pump/Tubing Intake Depth (ft bmp)	36.5
Tubing Length (ft)	40
Tubing Inner Diameter (in)	0.17
Purging Initiation Date/Time	08/23/2023 11:10
Total Purge Volume (gal)	2
Modified Sample	No
If Modified, Reasoning	
Sample Collection Information	Bottling-Start: 08/23/2023 11:55:00, Bottling-Stop: 08/23/2023 12:00:00, Parameters-Sampled: PFAS

Reading Time	Depth To Water (ft)	Cumulative Drawdown (ft)	Purge Rate (ml/min)	Temperature (deg c)	Specific Conductivity (us/cm)	Dissolved Oxygen (mg/l)	pH (su)	Oxidation-Reduction Potential (mV)	Turbidity (ntu)
11:20	8.65	0.00	200	NR	NR	NR	NR	NR	<5
11:30	8.66	0.01	200	13	375 +	6.1	7.6	319	<5
11:35	8.66	0.01	200	12	380 +	6.3	7.7	315	<5
11:40	8.66	0.01	200	12	378 +	6.3	7.7	314	<5
11:45	8.66	0.01	200	12	378 +	6.3	7.7	311	<5

Notes:

1) Abbreviations include: "deg c" indicates degrees Celsius; "ft" indicates feet; "ft bmp" indicates feet below reference measuring point; "gal" indicates gallons; "in" indicates inches; "mg/l" indicates milligrams per liter; "ml/min" indicates milliliters per minute; "mV" indicates millivolts; "NA" indicates not applicable; "NR" indicates not recorded; "ntu" indicates Nephelometric Turbidity units; "su" indicates standard units; "us/cm" indicates microsiemens per centimeter; and "+" indicates the parameter(s) may be used for stabilization calculations but cannot be used for other purposes.
2) Weather temperature units are in degrees Fahrenheit, unless otherwise noted.
3) Did indicator parameters reach stabilization? Yes
4) Was the two hour time limit reached? No
5) Calculations:
   - Head Above Pump Intake (ft) 27.85
   - Total Drawdown (ft) 0.01
   - Calculated Final Purge Volume (gal) NA
6) If Drawdown Did Not Stabilize or Stabilized Drawdown >0.3 ft, is Total Purge Volume > Calculated Final Purge Volume? NA

Well Sampling Worksheet
WWW RAP Field Data
PERIMETER 2023-Q3 - WV-PMW-RI-106C
Kent County, MI

Well	WV-PMW-RI-106C / 2 in Diameter PVC
Sample Quarter	2023-Q3
Date	08/23/2023
Weather	Sunny 75
Sampler Initials	NCK
Purging Device	Bladder-Pump: NA, Peristaltic-Pump: PER-3, Centrifugal-Pump: NA
Meters Used	YSI: Agile Rental 2, Turbidimeter: Agile Rental 2, Water-Level-Meter: WLM-2
Reference Measuring Point	PVC
Well Screen (ft bmp)	53.9 - 58.9
Measured Bottom Depth (ft bmp)	NR
Sample Comment	YSI Connected after 12:30.
Initial Water Level Date/Time	08/23/2023 11:55
Initial Water Level Depth (ft bmp)	8.90
Pump/Tubing Intake Depth (ft bmp)	56.4
Tubing Length (ft)	60
Tubing Inner Diameter (in)	0.17
Purging Initiation Date/Time	08/23/2023 12:00
Total Purge Volume (gal)	3
Modified Sample	No
If Modified, Reasoning	
Sample Collection Information	Bottling-Start: 08/23/2023 12:55:00, Bottling-Stop: 08/23/2023 13:00:00, Parameters-Sampled: PFAS

Reading Time	Depth To Water (ft)	Cumulative Drawdown (ft)	Purge Rate (ml/min)	Temperature (deg c)	Specific Conductivity (us/cm)	Dissolved Oxygen (mg/l)	pH (su)	Oxidation-Reduction Potential (mV)	Turbidity (ntu)
12:15	9.05	0.15	275	NR	NR	NR	NR	NR	NR
12:30	9.05	0.15	275	NR	NR	NR	NR	NR	NR
12:35	9.05	0.15	275	11	2,130 +	<0.5	7.8	83	<5
12:40	9.05	0.15	275	11	2,250 +	<0.5	7.7	83	<5
12:45	9.05	0.15	275	12	2,709 +	<0.5	7.6	82	<5
12:50	9.05	0.15	275	12	2,750 +	<0.5	7.6	81	<5
12:55	9.05	0.15	275	12	2,760 +	<0.5	7.6	80	<5

Notes:

1) Abbreviations include: "deg c" indicates degrees Celsius; "ft" indicates feet; "ft bmp" indicates feet below reference measuring point; "gal" indicates gallons; "in" indicates inches; "mg/l" indicates milligrams per liter; "ml/min" indicates milliliters per minute; "mV" indicates millivolts; "NA" indicates not applicable; "NR" indicates not recorded; "ntu" indicates Nephelometric Turbidity units; "su" indicates standard units; "us/cm" indicates microsiemens per centimeter; and "+" indicates the parameter(s) may be used for stabilization calculations but cannot be used for other purposes.
2) Weather temperature units are in degrees Fahrenheit, unless otherwise noted.
3) Did indicator parameters reach stabilization? Yes
4) Was the two hour time limit reached? No
5) Calculations:
   - Head Above Pump Intake (ft) 47.50
   - Total Drawdown (ft) 0.15
   - Calculated Final Purge Volume (gal) NA
6) If Drawdown Did Not Stabilize or Stabilized Drawdown >0.3 ft, is Total Purge Volume > Calculated Final Purge Volume? NA

Well Sampling Worksheet
WWW RAP Field Data
PERIMETER 2023-Q3 - WV-PMW-RI-106D
Kent County, MI

Well	WV-PMW-RI-106D / 2 in Diameter PVC
Sample Quarter	2023-Q3
Date	08/23/2023
Weather	Cloudy 75
Sampler Initials	NCK
Purging Device	Bladder-Pump: NA, Peristaltic-Pump: PER-3, Centrifugal-Pump: NA
Meters Used	YSI: Agile Rental 2, Turbidimeter: Agile Rental 2, Water-Level-Meter: WLM-2
Reference Measuring Point	PVC
Well Screen (ft bmp)	70.2 - 75.2
Measured Bottom Depth (ft bmp)	NR
Sample Comment	YSI Connected After 10:30.
Initial Water Level Date/Time	08/23/2023 09:35
Initial Water Level Depth (ft bmp)	17.82
Pump/Tubing Intake Depth (ft bmp)	72.7
Tubing Length (ft)	75
Tubing Inner Diameter (in)	0.17
Purging Initiation Date/Time	08/23/2023 09:45
Total Purge Volume (gal)	6
Modified Sample	No
If Modified, Reasoning	
Sample Collection Information	Bottling-Start: 08/23/2023 11:30:00, Bottling-Stop: 08/23/2023 11:35:00, Parameters-Sampled: PFAS

Reading Time	Depth To Water (ft)	Cumulative Drawdown (ft)	Purge Rate (ml/min)	Temperature (deg c)	Specific Conductivity (us/cm)	Dissolved Oxygen (mg/l)	pH (su)	Oxidation-Reduction Potential (mV)	Turbidity (ntu)
10:00	17.96	0.14	275	NR	NR	NR	NR	NR	NR
10:15	17.96	0.14	275	NR	NR	NR	NR	NR	NR
10:30	17.96	0.14	275	NR	NR	NR	NR	NR	NR
10:50	17.96	0.14	275	11	356 +	<0.5	8.1	-13	11
11:00	17.96	0.14	275	11	355 +	<0.5	8.1	-40	<5
11:15	17.96	0.14	275	11	356 +	<0.5	8.1	-72	<5
11:20	17.96	0.14	275	12	356 +	<0.5	8.1	-84	<5
11:25	17.96	0.14	275	12	356 +	<0.5	8.0	-86	<5
11:30	17.96	0.14	275	12	356 +	<0.5	8.0	-90	<5

Notes:

1) Abbreviations include: "deg c" indicates degrees Celsius; "ft" indicates feet; "ft bmp" indicates feet below reference measuring point; "gal" indicates gallons; "in" indicates inches; "mg/l" indicates milligrams per liter; "ml/min" indicates milliliters per minute; "mV" indicates millivolts; "NA" indicates not applicable; "NR" indicates not recorded; "ntu" indicates Nephelometric Turbidity units; "su" indicates standard units; "us/cm" indicates microsiemens per centimeter; and "+" indicates the parameter(s) may be used for stabilization calculations but cannot be used for other purposes.
2) Weather temperature units are in degrees Fahrenheit, unless otherwise noted.
3) Did indicator parameters reach stabilization? Yes
4) Was the two hour time limit reached? No
5) Calculations:
   - Head Above Pump Intake (ft) 54.88
   - Total Drawdown (ft) 0.14
   - Calculated Final Purge Volume (gal) NA
6) If Drawdown Did Not Stabilize or Stabilized Drawdown >0.3 ft, is Total Purge Volume > Calculated Final Purge Volume? NA

Well Sampling Worksheet
WWW RAP Field Data
PERIMETER 2023-Q3 - WV-PMW-RI-106E
Kent County, MI

Well	WV-PMW-RI-106E / 2 in Diameter PVC
Sample Quarter	2023-Q3
Date	08/23/2023
Weather	Cloudy 75
Sampler Initials	JET
Purging Device	Bladder-Pump: BP-10, Peristaltic-Pump: NA, Centrifugal-Pump: NA
Meters Used	YSI: Agile Rental 3, Turbidimeter: Agile Rental 3, Water-Level-Meter: WLM-4
Reference Measuring Point	PVC
Well Screen (ft bmp)	176.0 - 181.0
Measured Bottom Depth (ft bmp)	NR
Sample Comment	Connected YSI after 11:40.
Initial Water Level Date/Time	08/23/2023 10:30
Initial Water Level Depth (ft bmp)	141.52
Pump/Tubing Intake Depth (ft bmp)	178.5
Tubing Length (ft)	180
Tubing Inner Diameter (in)	0.25
Purging Initiation Date/Time	08/23/2023 10:35
Total Purge Volume (gal)	3
Modified Sample	No
If Modified, Reasoning	
Sample Collection Information	Bottling-Start: 08/23/2023 12:25:00, Bottling-Stop: 08/23/2023 12:30:00, Parameters-Sampled: PFAS

Reading Time	Depth To Water (ft)	Cumulative Drawdown (ft)	Purge Rate (ml/min)	Temperature (deg c)	Specific Conductivity (us/cm)	Dissolved Oxygen (mg/l)	pH (su)	Oxidation-Reduction Potential (mV)	Turbidity (ntu)
11:00	143.00	1.48	100	NR	NR	NR	NR	NR	266
11:20	143.00	1.48	100	NR	NR	NR	NR	NR	60
11:40	143.00	1.48	100	NR	NR	NR	NR	NR	34
12:00	143.00	1.48	100	14 +	533 +	9.6	7.6	125	23
12:10	143.00	1.48	100	14 +	525 +	9.6	7.6	126	23
12:15	143.00	1.48	100	14 +	523 +	9.6	7.6	126	23
12:20	143.00	1.48	100	14 +	523 +	9.6	7.6	126	23

Notes:

1) Abbreviations include: "deg c" indicates degrees Celsius; "ft" indicates feet; "ft bmp" indicates feet below reference measuring point; "gal" indicates gallons; "in" indicates inches; "mg/l" indicates milligrams per liter; "ml/min" indicates milliliters per minute; "mV" indicates millivolts; "NA" indicates not applicable; "NR" indicates not recorded; "ntu" indicates Nephelometric Turbidity units; "su" indicates standard units; "us/cm" indicates microsiemens per centimeter; and "+" indicates the parameter(s) may be used for stabilization calculations but cannot be used for other purposes.
2) Weather temperature units are in degrees Fahrenheit, unless otherwise noted.
3) Did indicator parameters reach stabilization? Yes
4) Was the two hour time limit reached? No
5) Calculations:
   - Head Above Pump Intake (ft) 36.98
   - Total Drawdown (ft) 1.48
   - Calculated Final Purge Volume (gal) 0.7
6) If Drawdown Did Not Stabilize or Stabilized Drawdown >0.3 ft, is Total Purge Volume > Calculated Final Purge Volume? Yes

Well Sampling Worksheet
WWW RAP Field Data
PERIMETER 2023-Q3 - WV-PMW-RI-107
Kent County, MI

Well	WV-PMW-RI-107 / 2 in Diameter PVC
Sample Quarter	2023-Q3
Date	08/30/2023
Weather	70F Sunny
Sampler Initials	JMS
Purging Device	Bladder-Pump: BP-11, Peristaltic-Pump: NA, Centrifugal-Pump: NA
Meters Used	YSI: Agile Rental 3, Turbidimeter: Agile Rental 3, Water-Level-Meter: WLM-2
Reference Measuring Point	PVC
Well Screen (ft bmp)	189.5 - 194.5
Measured Bottom Depth (ft bmp)	NR
Sample Comment	YSI Connected at 16:15.
Initial Water Level Date/Time	08/30/2023 14:45
Initial Water Level Depth (ft bmp)	101.34
Pump/Tubing Intake Depth (ft bmp)	192
Tubing Length (ft)	195
Tubing Inner Diameter (in)	0.25
Purging Initiation Date/Time	08/30/2023 14:50
Total Purge Volume (gal)	6.5
Modified Sample	No
If Modified, Reasoning	
Sample Collection Information	Bottling-Start: 08/30/2023 16:55:00, Bottling-Stop: 08/30/2023 17:00:00, Parameters-Sampled: PFAS

Reading Time	Depth To Water (ft)	Cumulative Drawdown (ft)	Purge Rate (ml/min)	Temperature (deg c)	Specific Conductivity (us/cm)	Dissolved Oxygen (mg/l)	pH (su)	Oxidation-Reduction Potential (mV)	Turbidity (ntu)
15:15	102.64	1.30	200	NR	NR	NR	NR	NR	NR
15:45	102.36	1.02	200	NR	NR	NR	NR	NR	88
16:15	102.36	1.02	200	13 +	420 +	<0.5	7.4	-77	19
16:25	102.36	1.02	200	12 +	419 +	<0.5	7.3	-99	14
16:30	102.36	1.02	200	12 +	418 +	<0.5	7.3	-103	12
16:35	102.36	1.02	200	12 +	418 +	<0.5	7.3	-105	10
16:40	102.36	1.02	200	12 +	416 +	<0.5	7.2	-107	8
16:45	102.36	1.02	200	12 +	417 +	<0.5	7.2	-109	7
16:50	102.36	1.02	200	12 +	417 +	<0.5	7.2	-111	7

Notes:

1) Abbreviations include: "deg c" indicates degrees Celsius; "ft" indicates feet; "ft bmp" indicates feet below reference measuring point; "gal" indicates gallons; "in" indicates inches; "mg/l" indicates milligrams per liter; "ml/min" indicates milliliters per minute; "mV" indicates millivolts; "NA" indicates not applicable; "NR" indicates not recorded; "ntu" indicates Nephelometric Turbidity units; "su" indicates standard units; "us/cm" indicates microsiemens per centimeter; and "+" indicates the parameter(s) may be used for stabilization calculations but cannot be used for other purposes.
2) Weather temperature units are in degrees Fahrenheit, unless otherwise noted.
3) Did indicator parameters reach stabilization? Yes
4) Was the two hour time limit reached? Yes
5) Calculations:
   - Head Above Pump Intake (ft) 90.66
   - Total Drawdown (ft) 1.02
   - Calculated Final Purge Volume (gal) 0.67
6) If Drawdown Did Not Stabilize or Stabilized Drawdown >0.3 ft, is Total Purge Volume > Calculated Final Purge Volume? Yes

Well Sampling Worksheet
WWW RAP Field Data
PERIMETER 2023-Q3 - WV-PMW-RI-108
Kent County, MI

Well	WV-PMW-RI-108 / 2 in Diameter PVC
Sample Quarter	2023-Q3
Date	08/29/2023
Weather	70F Cloudy
Sampler Initials	JET
Purging Device	Bladder-Pump: NA, Peristaltic-Pump: PER-1, Centrifugal-Pump: NA
Meters Used	YSI: Agile Rental 3, Turbidimeter: Agile Rental 3, Water-Level-Meter: WLM-2
Reference Measuring Point	PVC
Well Screen (ft bmp)	12.9 - 17.9
Measured Bottom Depth (ft bmp)	NR
Sample Comment	12:20: YSI connected.
Initial Water Level Date/Time	08/29/2023 12:00
Initial Water Level Depth (ft bmp)	11.51
Pump/Tubing Intake Depth (ft bmp)	15.4
Tubing Length (ft)	16
Tubing Inner Diameter (in)	0.17
Purging Initiation Date/Time	08/29/2023 12:00
Total Purge Volume (gal)	3.5
Modified Sample	No
If Modified, Reasoning	
Sample Collection Information	Bottling-Start: 08/29/2023 12:50:00, Bottling-Stop: 08/29/2023 12:55:00, Parameters-Sampled: PFAS

Reading Time	Depth To Water (ft)	Cumulative Drawdown (ft)	Purge Rate (ml/min)	Temperature (deg c)	Specific Conductivity (us/cm)	Dissolved Oxygen (mg/l)	pH (su)	Oxidation-Reduction Potential (mV)	Turbidity (ntu)
12:20	11.65	0.14	325	NR	NR	NR	NR	NR	<5
12:35	11.65	0.14	325	12 +	448 +	5.1	6.8	187	<5
12:40	11.65	0.14	325	12 +	451 +	5.1	6.8	185	<5
12:45	11.65	0.14	325	12 +	458 +	5.1	6.8	183	<5

Notes:

1) Abbreviations include: "deg c" indicates degrees Celsius; "ft" indicates feet; "ft bmp" indicates feet below reference measuring point; "gal" indicates gallons; "in" indicates inches; "mg/l" indicates milligrams per liter; "ml/min" indicates milliliters per minute; "mV" indicates millivolts; "NA" indicates not applicable; "NR" indicates not recorded; "ntu" indicates Nephelometric Turbidity units; "su" indicates standard units; "us/cm" indicates microsiemens per centimeter; and "+" indicates the parameter(s) may be used for stabilization calculations but cannot be used for other purposes.
2) Weather temperature units are in degrees Fahrenheit, unless otherwise noted.
3) Did indicator parameters reach stabilization? Yes
4) Was the two hour time limit reached? No
5) Calculations:
   - Head Above Pump Intake (ft) 3.89
   - Total Drawdown (ft) 0.14
   - Calculated Final Purge Volume (gal) NA
6) If Drawdown Did Not Stabilize or Stabilized Drawdown >0.3 ft, is Total Purge Volume > Calculated Final Purge Volume? NA

Well Sampling Worksheet
WWW RAP Field Data
AREA 5 2023-Q3 - AREA5-RI-3A
Kent County, MI

Well	AREA5-RI-3A / 2 in Diameter PVC
Sample Quarter	2023-Q3
Date	07/27/2023
Weather	75F Sunny
Sampler Initials	JET
Purging Device	Bladder-Pump: BP-11, Peristaltic-Pump: NA, Centrifugal-Pump: NA
Meters Used	YSI: Agile Rental 2, Turbidimeter: Agile Rental 2, Water-Level-Meter: WLM-2
Reference Measuring Point	PVC
Well Screen (ft bmp)	61.8 - 66.8
Measured Bottom Depth (ft bmp)	NR
Sample Comment	YSI Connected at 11:30.
Initial Water Level Date/Time	07/27/2023 10:30
Initial Water Level Depth (ft bmp)	31.98
Pump/Tubing Intake Depth (ft bmp)	64.3
Tubing Length (ft)	66
Tubing Inner Diameter (in)	0.25
Purging Initiation Date/Time	07/27/2023 10:30
Total Purge Volume (gal)	5
Modified Sample	No
If Modified, Reasoning	
Sample Collection Information	Bottling-Start: 07/27/2023 12:25:00, Bottling-Stop: 07/27/2023 12:30:00, Parameters-Sampled: PFAS

Reading Time	Depth To Water (ft)	Cumulative Drawdown (ft)	Purge Rate (ml/min)	Temperature (deg c)	Specific Conductivity (us/cm)	Dissolved Oxygen (mg/l)	pH (su)	Oxidation-Reduction Potential (mV)	Turbidity (ntu)
10:40	32.05	0.07	150	NR	NR	NR	NR	NR	NR
10:50	32.05	0.07	150	NR	NR	NR	NR	NR	NR
11:00	32.05	0.07	150	NR	NR	NR	NR	NR	NR
11:20	32.05	0.07	150	NR	NR	NR	NR	NR	<5
11:30	32.05	0.07	150	13	628 +	5.4	7.3	262	<5
11:40	32.05	0.07	150	13	625 +	5.2	7.3	257	<5
11:50	32.05	0.07	150	13	630 +	5.3	7.3	247	<5
12:00	32.05	0.07	150	13	628 +	5.3	7.3	242	<5
12:10	32.05	0.07	150	13	626 +	5.3	7.3	235	<5
12:15	32.05	0.07	150	13	626 +	5.3	7.3	230	<5
12:20	32.05	0.07	150	13	627 +	5.3	7.3	225	<5

Notes:

1) Abbreviations include: "deg c" indicates degrees Celsius; "ft" indicates feet; "ft bmp" indicates feet below reference measuring point; "gal" indicates gallons; "in" indicates inches; "mg/l" indicates milligrams per liter; "ml/min" indicates milliliters per minute; "mV" indicates millivolts; "NA" indicates not applicable; "NR" indicates not recorded; "ntu" indicates Nephelometric Turbidity units; "su" indicates standard units; "us/cm" indicates microsiemens per centimeter; and "+" indicates the parameter(s) may be used for stabilization calculations but cannot be used for other purposes.
2) Weather temperature units are in degrees Fahrenheit, unless otherwise noted.
3) Did indicator parameters reach stabilization? Yes
4) Was the two hour time limit reached? No
5) Calculations:
   - Head Above Pump Intake (ft): 32.32
   - Total Drawdown (ft): 0.07
   - Calculated Final Purge Volume (gal): NA
6) If Drawdown Did Not Stabilize or Stabilized Drawdown >0.3 ft, is Total Purge Volume > Calculated Final Purge Volume? NA

Well Sampling Worksheet
WWW RAP Field Data
AREA 5 2023-Q3 - AREA5-RI-3B
Kent County, MI

Well	AREA5-RI-3B / 2 in Diameter PVC
Sample Quarter	2023-Q3
Date	07/27/2023
Weather	75°F Sunny
Sampler Initials	WVK
Purging Device	Bladder-Pump: BP-12, Peristaltic-Pump: NA, Centrifugal-Pump: NA
Meters Used	YSI: Agile Rental 3, Turbidimeter: Agile Rental 3, Water-Level-Meter: WLM-1
Reference Measuring Point	PVC
Well Screen (ft bmp)	109.0 - 114.0
Measured Bottom Depth (ft bmp)	NR
Sample Comment	YSI Connected at 12:00.
Initial Water Level Date/Time	07/27/2023 10:20
Initial Water Level Depth (ft bmp)	33.76
Pump/Tubing Intake Depth (ft bmp)	111.5
Tubing Length (ft)	115
Tubing Inner Diameter (in)	0.25
Purging Initiation Date/Time	07/27/2023 10:20
Total Purge Volume (gal)	1.5
Modified Sample	No
If Modified, Reasoning	
Sample Collection Information	Bottling-Start: 07/27/2023 12:25:00, Bottling-Stop: 07/27/2023 12:30:00, Parameters-Sampled: PFAS

Reading Time	Depth To Water (ft)	Cumulative Drawdown (ft)	Purge Rate (ml/min)	Temperature (deg c)	Specific Conductivity (us/cm)	Dissolved Oxygen (mg/l)	pH (su)	Oxidation-Reduction Potential (mV)	Turbidity (ntu)
10:30	33.84	0.08	40	NR	NR	NR	NR	NR	78
10:40	33.82	0.06	40	NR	NR	NR	NR	NR	51
10:50	33.88	0.12	40	NR	NR	NR	NR	NR	60
11:00	33.84	0.08	40	NR	NR	NR	NR	NR	124
11:10	33.81	0.05	40	NR	NR	NR	NR	NR	188
11:20	33.80	0.04	40	NR	NR	NR	NR	NR	240
11:30	33.80	0.04	40	NR	NR	NR	NR	NR	264
11:40	33.85	0.09	40	NR	NR	NR	NR	NR	218
11:50	33.82	0.06	40	NR	NR	NR	NR	NR	207
12:00	33.82	0.06	50	20	2,211 +	<0.5	7.0	39	211
12:05	33.85	0.09	50	19	2,210 +	<0.5	7.0	29	204

Well Sampling Worksheet
WWW RAP Field Data
AREA 5 2023-Q3 - AREA5-RI-3B
Kent County, MI

Well	AREA5-RI-3B / 2 in Diameter PVC
Sample Quarter	2023-Q3
Date	07/27/2023
Weather	75°F Sunny
Sampler Initials	WVK
Purging Device	Bladder-Pump: BP-12, Peristaltic-Pump: NA, Centrifugal-Pump: NA
Meters Used	YSI: Agile Rental 3, Turbidimeter: Agile Rental 3, Water-Level-Meter: WLM-1
Reference Measuring Point	PVC
Well Screen (ft bmp)	109.0 - 114.0
Measured Bottom Depth (ft bmp)	NR
Sample Comment	YSI Connected at 12:00.
Initial Water Level Date/Time	07/27/2023 10:20
Initial Water Level Depth (ft bmp)	33.76
Pump/Tubing Intake Depth (ft bmp)	111.5
Tubing Length (ft)	115
Tubing Inner Diameter (in)	0.25
Purging Initiation Date/Time	07/27/2023 10:20
Total Purge Volume (gal)	1.5
Modified Sample	No
If Modified, Reasoning	
Sample Collection Information	Bottling-Start: 07/27/2023 12:25:00, Bottling-Stop: 07/27/2023 12:30:00, Parameters-Sampled: PFAS

Reading Time	Depth To Water (ft)	Cumulative Drawdown (ft)	Purge Rate (ml/min)	Temperature (deg c)	Specific Conductivity (us/cm)	Dissolved Oxygen (mg/l)	pH (su)	Oxidation-Reduction Potential (mV)	Turbidity (ntu)
12:10	33.85	0.09	50	19	2,201 +	<0.5	7.0	25	180
12:15	33.85	0.09	50	19	2,196 +	<0.5	7.0	18	191
12:20	33.85	0.09	50	19	2,198 +	<0.5	7.0	17	168

Notes:

1) Abbreviations include: "deg c" indicates degrees Celsius; "ft" indicates feet; "ft bmp" indicates feet below reference measuring point; "gal" indicates gallons; "in" indicates inches; "mg/l" indicates milligrams per liter; "ml/min" indicates milliliters per minute; "mV" indicates millivolts; "NA" indicates not applicable; "NR" indicates not recorded; "ntu" indicates Nephelometric Turbidity units; "su" indicates standard units; "us/cm" indicates microsiemens per centimeter; and "+" indicates the parameter(s) may be used for stabilization calculations but cannot be used for other purposes.
2) Weather temperature units are in degrees Fahrenheit, unless otherwise noted.
3) Did indicator parameters reach stabilization? No
4) Was the two hour time limit reached? Yes
5) Calculations:
   - Head Above Pump Intake (ft) 77.74
   - Total Drawdown (ft) 0.09
   - Calculated Final Purge Volume (gal) NA
6) If Drawdown Did Not Stabilize or Stabilized Drawdown >0.3 ft, is Total Purge Volume > Calculated Final Purge Volume? NA

Well Sampling Worksheet
WWW RAP Field Data
AREA 5 2023-Q3 - AREA5-RI-8A
Kent County, MI

Well	AREA5-RI-8A / 2 in Diameter PVC
Sample Quarter	2023-Q3
Date	07/20/2023
Weather	Sunny, 70°F
Sampler Initials	RCP
Purging Device	Bladder-Pump: NA, Peristaltic-Pump: NA, Centrifugal-Pump: Mega Monsoon #1
Meters Used	YSI: Agile Rental 2, Turbidimeter: Agile Rental 2, Water-Level-Meter: WLM-2
Reference Measuring Point	PVC
Well Screen (ft bmp)	85.1 - 90.1
Measured Bottom Depth (ft bmp)	90.1
Sample Comment	10:45 - Low turbidity observed. YSI Connected at 10:45. DUP and MS/MSD collected
Initial Water Level Date/Time	07/20/2023 10:10
Initial Water Level Depth (ft bmp)	80.52
Pump/Tubing Intake Depth (ft bmp)	87.6
Tubing Length (ft)	90
Tubing Inner Diameter (in)	0.17
Purging Initiation Date/Time	07/20/2023 10:10
Total Purge Volume (gal)	6.5
Modified Sample	No
If Modified, Reasoning	
Sample Collection Information	Bottling-Start: 07/20/2023 11:40:00, Bottling-Stop: 07/20/2023 11:45:00, Parameters-Sampled: PFAS

Reading Time	Depth To Water (ft)	Cumulative Drawdown (ft)	Purge Rate (ml/min)	Temperature (deg c)	Specific Conductivity (us/cm)	Dissolved Oxygen (mg/l)	pH (su)	Oxidation-Reduction Potential (mV)	Turbidity (ntu)
10:15	80.56	0.04	300	NR	NR	NR	NR	NR	NR
10:45	80.56	0.04	300	NR	NR	NR	NR	NR	18
10:55	80.56	0.04	300	15 +	845 +	9.8	7.2	310	9
11:00	80.56	0.04	300	15 +	844 +	9.7	7.2	308	8
11:05	80.56	0.04	300	15 +	844 +	9.4	7.2	296	6
11:10	80.56	0.04	300	15 +	844 +	9.2	7.2	287	5
11:15	80.56	0.04	300	15 +	844 +	9.2	7.3	280	<5
11:20	80.56	0.04	300	15 +	847 +	9.2	7.3	272	<5
11:25	80.56	0.04	300	15 +	846 +	9.1	7.3	264	<5
11:30	80.56	0.04	300	15 +	847 +	9.1	7.3	258	<5
11:35	80.56	0.04	300	15 +	848 +	9.1	7.4	255	<5

Notes:

1) Abbreviations include: "deg c" indicates degrees Celsius; "ft" indicates feet; "ft bmp" indicates feet below reference measuring point; "gal" indicates gallons; "in" indicates inches; "mg/l" indicates milligrams per liter; "ml/min" indicates milliliters per minute; "mV" indicates millivolts; "NA" indicates not applicable; "NR" indicates not recorded; "ntu" indicates Nephelometric Turbidity units; "su" indicates standard units; "us/cm" indicates microsiemens per centimeter; and "+" indicates the parameter(s) may be used for stabilization calculations but cannot be used for other purposes.
2) Weather temperature units are in degrees Fahrenheit, unless otherwise noted.
3) Did indicator parameters reach stabilization? Yes
4) Was the two hour time limit reached? No
5) Calculations:
   - Head Above Pump Intake (ft): 7.08
   - Total Drawdown (ft): 0.04
   - Calculated Final Purge Volume (gal): NA
6) If Drawdown Did Not Stabilize or Stabilized Drawdown >0.3 ft, is Total Purge Volume > Calculated Final Purge Volume? NA

Well Sampling Worksheet
WWW RAP Field Data
AREA 5 2023-Q3 - AREA5-RI-8B
Kent County, MI

Well	AREA5-RI-8B / 2 in Diameter PVC
Sample Quarter	2023-Q3
Date	07/20/2023
Weather	Sunny 75
Sampler Initials	NCK
Purging Device	Bladder-Pump: NA, Peristaltic-Pump: NA, Centrifugal-Pump: Mega Monsoon #2
Meters Used	YSI: Agile Rental 2, Turbidimeter: Agile Rental 2, Water-Level-Meter: WLM-1
Reference Measuring Point	PVC
Well Screen (ft bmp)	156.5 - 161.5
Measured Bottom Depth (ft bmp)	161.5
Sample Comment	Turbidity and Dissolved Oxygen did not stabilize per the Standard Operating Procedure (SOP). 10:55 - Purge water observed to be turbid. 11:15 - Purge water still silty. 11:30 - Cannot use YSI-3, wait for YSI-2 to be available. YSI Connected at 11:45.
Initial Water Level Date/Time	07/20/2023 10:30
Initial Water Level Depth (ft bmp)	80.27
Pump/Tubing Intake Depth (ft bmp)	159
Tubing Length (ft)	163
Tubing Inner Diameter (in)	0.17
Purging Initiation Date/Time	07/20/2023 10:30
Total Purge Volume (gal)	6
Modified Sample	No
If Modified, Reasoning	
Sample Collection Information	Bottling-Start: 07/20/2023 12:25:00, Bottling-Stop: 07/20/2023 12:30:00, Parameters-Sampled: PFAS

Reading Time	Depth To Water (ft)	Cumulative Drawdown (ft)	Purge Rate (ml/min)	Temperature (deg c)	Specific Conductivity (us/cm)	Dissolved Oxygen (mg/l)	pH (su)	Oxidation-Reduction Potential (mV)	Turbidity (ntu)
10:35	80.28	0.01	180	NR	NR	NR	NR	NR	NR
10:55	80.28	0.01	180	NR	NR	NR	NR	NR	NR
11:15	80.28	0.01	180	NR	NR	NR	NR	NR	NR
11:30	80.28	0.01	180	NR	NR	NR	NR	NR	NR
11:45	80.28	0.01	180	13 +	1,037 +	0.6 +	7.3	120	157 +
12:00	80.28	0.01	180	13 +	1,042 +	0.5 +	7.3	-54	20 +
12:10	80.28	0.01	180	13 +	1,041 +	<0.5 +	7.3	-83	16 +
12:15	80.28	0.01	180	13 +	1,040 +	0.5 +	7.3	-93	18 +
12:20	80.28	0.01	180	13 +	1,040 +	<0.5 +	7.3	-98	16 +
12:25	80.28	0.01	180	13 +	1,038 +	<0.5 +	7.3	-101	18 +

Notes:

1) Abbreviations include: "deg c" indicates degrees Celsius; "ft" indicates feet; "ft bmp" indicates feet below reference measuring point; "gal" indicates gallons; "in" indicates inches; "mg/l" indicates milligrams per liter; "ml/min" indicates milliliters per minute; "mV" indicates millivolts; "NA" indicates not applicable; "NR" indicates not recorded; "ntu" indicates Nephelometric Turbidity units; "su" indicates standard units; "us/cm" indicates microsiemens per centimeter; and "+" indicates the parameter(s) may be used for stabilization calculations but cannot be used for other purposes.
2) Weather temperature units are in degrees Fahrenheit, unless otherwise noted.
3) Did indicator parameters reach stabilization? No
4) Was the two hour time limit reached? No
5) Calculations:
   - Head Above Pump Intake (ft) 78.73
   - Total Drawdown (ft) 0.01
   - Calculated Final Purge Volume (gal) NA
6) If Drawdown Did Not Stabilize or Stabilized Drawdown >0.3 ft, is Total Purge Volume > Calculated Final Purge Volume? NA

Well Sampling Worksheet
WWW RAP Field Data
AREA 5 2023-Q3 - AREA5-RI-8C
Kent County, MI

Well	AREA5-RI-8C / 2 in Diameter PVC
Sample Quarter	2023-Q3
Date	07/20/2023
Weather	Sunny 70
Sampler Initials	WVK
Purging Device	Bladder-Pump: BP-12, Peristaltic-Pump: NA, Centrifugal-Pump: NA
Meters Used	YSI: Agile Rental 1, Turbidimeter: Agile Rentals 1 & 2, Water-Level-Meter: WLM-4
Reference Measuring Point	PVC
Well Screen (ft bmp)	174.4 - 179.4
Measured Bottom Depth (ft bmp)	179.4
Sample Comment	Readings from 10:50 to 11:30 were using Turbidimeter: Agile Rental 1. 11:00 - Purge water suddenly became turbid. 11:20 - Purge water observed to be clearing. 11:30 - Purge rate suddenly decreased. 11:40 - Switched to Turbidimeter: Agile Rental 2. 11:55 - Turbidimeter: Agile Rental 1 was confirmed to work after being restarted. Used Turbidimeter: Agile Rental 1 for remainder of purge. YSI Connected at 12:00.
Initial Water Level Date/Time	07/20/2023 10:40
Initial Water Level Depth (ft bmp)	84.25
Pump/Tubing Intake Depth (ft bmp)	176.9
Tubing Length (ft)	190
Tubing Inner Diameter (in)	0.25
Purging Initiation Date/Time	07/20/2023 10:40
Total Purge Volume (gal)	2.5
Modified Sample	No
If Modified, Reasoning	
Sample Collection Information	Bottling-Start: 07/20/2023 12:45:00, Bottling-Stop: 07/20/2023 12:50:00, Parameters-Sampled: PFAS

Reading Time	Depth To Water (ft)	Cumulative Drawdown (ft)	Purge Rate (ml/min)	Temperature (deg c)	Specific Conductivity (us/cm)	Dissolved Oxygen (mg/l)	pH (su)	Oxidation-Reduction Potential (mV)	Turbidity (ntu)
10:50	84.25	0.00	175	NR	NR	NR	NR	NR	32
11:00	84.25	0.00	175	NR	NR	NR	NR	NR	>999
11:10	84.25	0.00	175	NR	NR	NR	NR	NR	>999
11:20	84.25	0.00	175	NR	NR	NR	NR	NR	>999
11:30	84.25	0.00	100	NR	NR	NR	NR	NR	>999
11:40	84.25	0.00	100	NR	NR	NR	NR	NR	158
11:50	84.25	0.00	100	NR	NR	NR	NR	NR	89
12:00	84.25	0.00	100	NR	NR	NR	NR	NR	76
12:10	84.25	0.00	100	14 +	1,022 +	3.1	7.4	152	62
12:20	84.25	0.00	100	14 +	1,016 +	1.9	7.3	158	53

Well Sampling Worksheet
WWW RAP Field Data
AREA 5 2023-Q3 - AREA5-RI-8C
Kent County, MI

Well	AREA5-RI-8C / 2 in Diameter PVC
Sample Quarter	2023-Q3
Date	07/20/2023
Weather	Sunny 70
Sampler Initials	WVK
Purging Device	Bladder-Pump: BP-12, Peristaltic-Pump: NA, Centrifugal-Pump: NA
Meters Used	YSI: Agile Rental 1, Turbidimeter: Agile Rentals 1 & 2, Water-Level-Meter: WLM-4
Reference Measuring Point	PVC
Well Screen (ft bmp)	174.4 - 179.4
Measured Bottom Depth (ft bmp)	179.4
Sample Comment	Readings from 10:50 to 11:30 were using Turbidimeter: Agile Rental 1. 11:00 - Purge water suddenly became turbid. 11:20 - Purge water observed to be clearing. 11:30 - Purge rate suddenly decreased. 11:40 - Switched to Turbidimeter: Agile Rental 2. 11:55 - Turbidimeter: Agile Rental 1 was confirmed to work after being restarted. Used Turbidimeter: Agile Rental 1 for remainder of purge. YSI Connected at 12:00.
Initial Water Level Date/Time	07/20/2023 10:40
Initial Water Level Depth (ft bmp)	84.25
Pump/Tubing Intake Depth (ft bmp)	176.9
Tubing Length (ft)	190
Tubing Inner Diameter (in)	0.25
Purging Initiation Date/Time	07/20/2023 10:40
Total Purge Volume (gal)	2.5
Modified Sample	No
If Modified, Reasoning	
Sample Collection Information	Bottling-Start: 07/20/2023 12:45:00, Bottling-Stop: 07/20/2023 12:50:00, Parameters-Sampled: PFAS

Reading Time	Depth To Water (ft)	Cumulative Drawdown (ft)	Purge Rate (ml/min)	Temperature (deg c)	Specific Conductivity (us/cm)	Dissolved Oxygen (mg/l)	pH (su)	Oxidation-Reduction Potential (mV)	Turbidity (ntu)
12:30	84.25	0.00	100	14 +	1,024 +	1.8	7.3	160	46
12:35	84.25	0.00	100	14 +	1,020 +	1.4	7.3	160	36
12:40	84.25	0.00	100	14 +	1,019 +	1.1	7.3	160	28

Notes:

1) Abbreviations include: "deg c" indicates degrees Celsius; "ft" indicates feet; "ft bmp" indicates feet below reference measuring point; "gal" indicates gallons; "in" indicates inches; "mg/l" indicates milligrams per liter; "ml/min" indicates milliliters per minute; "mV" indicates millivolts; "NA" indicates not applicable; "NR" indicates not recorded; "ntu" indicates Nephelometric Turbidity units; "su" indicates standard units; "us/cm" indicates microsiemens per centimeter; and "+" indicates the parameter(s) may be used for stabilization calculations but cannot be used for other purposes.
2) Weather temperature units are in degrees Fahrenheit, unless otherwise noted.
3) Did indicator parameters reach stabilization? No
4) Was the two hour time limit reached? Yes
5) Calculations:
   - Head Above Pump Intake (ft) 92.65
   - Total Drawdown (ft) 0.00
   - Calculated Final Purge Volume (gal) NA
6) If Drawdown Did Not Stabilize or Stabilized Drawdown >0.3 ft, is Total Purge Volume > Calculated Final Purge Volume? NA

Well Sampling Worksheet
WWW RAP Field Data
AREA 5 2023-Q3 - AREA5-RI-9A
Kent County, MI

Well	AREA5-RI-9A / 2 in Diameter PVC
Sample Quarter	2023-Q3
Date	08/03/2023
Weather	Sunny 70°
Sampler Initials	WVK
Purging Device	Bladder-Pump: GeoTech Rental, Peristaltic-Pump: NA, Centrifugal-Pump: NA
Meters Used	YSI: Agile Rental 2, Turbidimeter: Agile Rental 2, Water-Level-Meter: WLM-1
Reference Measuring Point	PVC
Well Screen (ft bmp)	98.5 - 103.5
Measured Bottom Depth (ft bmp)	
Sample Comment	10:00 - Purge water observed to be turbid. Decreased flow rate. YSI Connected at 11:10. 11:25 - Flow stopped and then suddenly started again in 1 minute interval high powered bursts. NCK has video.
Initial Water Level Date/Time	08/03/2023 09:50
Initial Water Level Depth (ft bmp)	94.90
Pump/Tubing Intake Depth (ft bmp)	101
Tubing Length (ft)	105
Tubing Inner Diameter (in)	0.25
Purging Initiation Date/Time	08/03/2023 09:50
Total Purge Volume (gal)	4
Modified Sample	No
If Modified, Reasoning	
Sample Collection Information	Bottling-Start: 08/03/2023 11:55:00, Bottling-Stop: 08/03/2023 12:00:00, Parameters-Sampled: PFAS

Reading Time	Depth To Water (ft)	Cumulative Drawdown (ft)	Purge Rate (ml/min)	Temperature (deg c)	Specific Conductivity (us/cm)	Dissolved Oxygen (mg/l)	pH (su)	Oxidation-Reduction Potential (mV)	Turbidity (ntu)
10:00	95.05	0.15	100	NR	NR	NR	NR	NR	NR
10:10	95.00	0.10	50	NR	NR	NR	NR	NR	NR
10:20	94.98	0.08	50	NR	NR	NR	NR	NR	439
10:30	94.95	0.05	50	NR	NR	NR	NR	NR	315
10:40	94.97	0.07	100	NR	NR	NR	NR	NR	230
10:50	94.95	0.05	77	NR	NR	NR	NR	NR	112
11:00	94.91	0.01	75	NR	NR	NR	NR	NR	81
11:10	94.93	0.03	75	NR	NR	NR	NR	NR	78
11:20	95.10	0.20	75	13	640 +	3.2	7.2	356	71
11:30	95.10	0.20	75	15	645 +	3.9	7.2	345	62

Well Sampling Worksheet
WWW RAP Field Data
AREA 5 2023-Q3 - AREA5-RI-9A
Kent County, MI

Well	AREA5-RI-9A / 2 in Diameter PVC
Sample Quarter	2023-Q3
Date	08/03/2023
Weather	Sunny 70°
Sampler Initials	WVK
Purging Device	Bladder-Pump: GeoTech Rental, Peristaltic-Pump: NA, Centrifugal-Pump: NA
Meters Used	YSI: Agile Rental 2, Turbidimeter: Agile Rental 2, Water-Level-Meter: WLM-1
Reference Measuring Point	PVC
Well Screen (ft bmp)	98.5 - 103.5
Measured Bottom Depth (ft bmp)	
Sample Comment	10:00 - Purge water observed to be turbid. Decreased flow rate. YSI Connected at 11:10. 11:25 - Flow stopped and then suddenly started again in 1 minute interval high powered bursts. NCK has video.
Initial Water Level Date/Time	08/03/2023 09:50
Initial Water Level Depth (ft bmp)	94.90
Pump/Tubing Intake Depth (ft bmp)	101
Tubing Length (ft)	105
Tubing Inner Diameter (in)	0.25
Purging Initiation Date/Time	08/03/2023 09:50
Total Purge Volume (gal)	4
Modified Sample	No
If Modified, Reasoning	
Sample Collection Information	Bottling-Start: 08/03/2023 11:55:00, Bottling-Stop: 08/03/2023 12:00:00, Parameters-Sampled: PFAS

Reading Time	Depth To Water (ft)	Cumulative Drawdown (ft)	Purge Rate (ml/min)	Temperature (deg c)	Specific Conductivity (us/cm)	Dissolved Oxygen (mg/l)	pH (su)	Oxidation-Reduction Potential (mV)	Turbidity (ntu)
11:40	95.10	0.20	75	13	16 +	10.0	8.0	313	507
11:45	95.10	0.20	75	14	202 +	9.0	8.0	310	621
11:50	95.10	0.20	75	14	245 +	8.6	8.1	30	308

Notes:

1) Abbreviations include: "deg c" indicates degrees Celsius; "ft" indicates feet; "ft bmp" indicates feet below reference measuring point; "gal" indicates gallons; "in" indicates inches; "mg/l" indicates milligrams per liter; "ml/min" indicates milliliters per minute; "mV" indicates millivolts; "NA" indicates not applicable; "NR" indicates not recorded; "ntu" indicates Nephelometric Turbidity units; "su" indicates standard units; "us/cm" indicates microsiemens per centimeter; and "+" indicates the parameter(s) may be used for stabilization calculations but cannot be used for other purposes.
2) Weather temperature units are in degrees Fahrenheit, unless otherwise noted.
3) Did indicator parameters reach stabilization? No
4) Was the two hour time limit reached? Yes
5) Calculations:
   - Head Above Pump Intake (ft) 6.10
   - Total Drawdown (ft) 0.20
   - Calculated Final Purge Volume (gal) NA
6) If Drawdown Did Not Stabilize or Stabilized Drawdown >0.3 ft, is Total Purge Volume > Calculated Final Purge Volume? NA

Well Sampling Worksheet
WWW RAP Field Data
AREA 5 2023-Q3 - AREA5-RI-9B
Kent County, MI

Well	AREA5-RI-9B / 2 in Diameter PVC
Sample Quarter	2023-Q3
Date	08/03/2023
Weather	Sunny 75
Sampler Initials	Nck
Purging Device	Bladder-Pump: NA, Peristaltic-Pump: NA, Centrifugal-Pump: Mega Monsoon #1
Meters Used	YSI: Agile Rental 3, Turbidimeter: Agile Rental 3, Water-Level-Meter: WLM-4
Reference Measuring Point	PVC
Well Screen (ft bmp)	151.6 - 156.6
Measured Bottom Depth (ft bmp)	156.4
Sample Comment	10:00 to 10:20 - Purge water observed to be turbid. YSI Connected at 10:40.
Initial Water Level Date/Time	08/03/2023 09:45
Initial Water Level Depth (ft bmp)	109.39
Pump/Tubing Intake Depth (ft bmp)	154.6
Tubing Length (ft)	160
Tubing Inner Diameter (in)	0.17
Purging Initiation Date/Time	08/03/2023 09:50
Total Purge Volume (gal)	2.5
Modified Sample	No
If Modified, Reasoning	
Sample Collection Information	Bottling-Start: 08/03/2023 11:05:00, Bottling-Stop: 08/03/2023 11:10:00, Parameters-Sampled: PFAS

Reading Time	Depth To Water (ft)	Cumulative Drawdown (ft)	Purge Rate (ml/min)	Temperature (deg c)	Specific Conductivity (us/cm)	Dissolved Oxygen (mg/l)	pH (su)	Oxidation-Reduction Potential (mV)	Turbidity (ntu)
10:00	109.43	0.04	300	NR	NR	NR	NR	NR	NR
10:10	109.43	0.04	300	NR	NR	NR	NR	NR	NR
10:20	109.43	0.04	300	NR	NR	NR	NR	NR	NR
10:30	109.43	0.04	300	NR	NR	NR	NR	NR	NR
10:40	109.43	0.04	300	NR	NR	NR	NR	NR	NR
10:50	109.43	0.04	300	13	819 +	<0.5	7.4	-64	12
10:55	109.43	0.04	300	13	818 +	<0.5	7.4	-66	10
11:00	109.43	0.04	300	13	818 +	<0.5	7.4	-68	10
11:05	109.43	0.04	300	13	818 +	<0.5	7.4	-70	9

Notes:

1) Abbreviations include: "deg c" indicates degrees Celsius; "ft" indicates feet; "ft bmp" indicates feet below reference measuring point; "gal" indicates gallons; "in" indicates inches; "mg/l" indicates milligrams per liter; "ml/min" indicates milliliters per minute; "mV" indicates millivolts; "NA" indicates not applicable; "NR" indicates not recorded; "ntu" indicates Nephelometric Turbidity units; "su" indicates standard units; "us/cm" indicates microsiemens per centimeter; and "+" indicates the parameter(s) may be used for stabilization calculations but cannot be used for other purposes.
2) Weather temperature units are in degrees Fahrenheit, unless otherwise noted.
3) Did indicator parameters reach stabilization? Yes
4) Was the two hour time limit reached? No
5) Calculations:
   - Head Above Pump Intake (ft) 45.21
   - Total Drawdown (ft) 0.04
   - Calculated Final Purge Volume (gal) NA
6) If Drawdown Did Not Stabilize or Stabilized Drawdown >0.3 ft, is Total Purge Volume > Calculated Final Purge Volume? NA

Well Sampling Worksheet
WWW RAP Field Data
AREA 5 2023-Q3 - AREA5-RI-9C
Kent County, MI

Well	AREA5-RI-9C / 2 in Diameter PVC
Sample Quarter	2023-Q3
Date	08/03/2023
Weather	Sunny 80
Sampler Initials	NCK
Purging Device	Bladder-Pump: GeoTech Rental, Peristaltic-Pump: NA, Centrifugal-Pump: NA
Meters Used	YSI: Agile Rental 3, Turbidimeter: Agile Rental 3, Water-Level-Meter: WLM-4
Reference Measuring Point	PVC
Well Screen (ft bmp)	221.9 - 226.9
Measured Bottom Depth (ft bmp)	NR
Sample Comment	Purge water observed to be very turbid. Turbidity was over range of the meter for the duration of the purge. YSI Connected at 15:25.
Initial Water Level Date/Time	08/03/2023 13:40
Initial Water Level Depth (ft bmp)	109.89
Pump/Tubing Intake Depth (ft bmp)	224.4
Tubing Length (ft)	230
Tubing Inner Diameter (in)	0.25
Purging Initiation Date/Time	08/03/2023 13:40
Total Purge Volume (gal)	3
Modified Sample	No
If Modified, Reasoning	
Sample Collection Information	Bottling-Start: 08/03/2023 15:40:00, Bottling-Stop: 08/03/2023 15:45:00, Parameters-Sampled: PFAS

Reading Time	Depth To Water (ft)	Cumulative Drawdown (ft)	Purge Rate (ml/min)	Temperature (deg c)	Specific Conductivity (us/cm)	Dissolved Oxygen (mg/l)	pH (su)	Oxidation-Reduction Potential (mV)	Turbidity (ntu)
14:00	109.91	0.02	100	NR	NR	NR	NR	NR	NR
14:20	109.91	0.02	100	NR	NR	NR	NR	NR	NR
14:40	109.91	0.02	100	NR	NR	NR	NR	NR	>999
15:00	109.91	0.02	100	NR	NR	NR	NR	NR	>999
15:20	109.91	0.02	100	NR	NR	NR	NR	NR	>999
15:25	109.91	0.02	100	16	1,270 +	0.8	7.4	18	>999
15:30	109.91	0.02	100	16	1,245 +	0.7	7.3	-8	>999
15:35	109.91	0.02	100	15	1,284 +	0.7	7.2	-17	>999
15:40	109.91	0.02	100	16	1,243 +	0.6	7.2	-16	>999

Notes:

1) Abbreviations include: "deg c" indicates degrees Celsius; "ft" indicates feet; "ft bmp" indicates feet below reference measuring point; "gal" indicates gallons; "in" indicates inches; "mg/l" indicates milligrams per liter; "ml/min" indicates milliliters per minute; "mV" indicates millivolts; "NA" indicates not applicable; "NR" indicates not recorded; "ntu" indicates Nephelometric Turbidity units; "su" indicates standard units; "us/cm" indicates microsiemens per centimeter; and "+" indicates the parameter(s) may be used for stabilization calculations but cannot be used for other purposes.
2) Weather temperature units are in degrees Fahrenheit, unless otherwise noted.
3) Did indicator parameters reach stabilization? No * Turbidity Out of Range
4) Was the two hour time limit reached? Yes
5) Calculations:
   - Head Above Pump Intake (ft) 114.51
   - Total Drawdown (ft) 0.02
   - Calculated Final Purge Volume (gal) NA
6) If Drawdown Did Not Stabilize or Stabilized Drawdown >0.3 ft, is Total Purge Volume > Calculated Final Purge Volume? NA

Well Sampling Worksheet
WWW RAP Field Data
AREA 5 2023-Q3 - AREA5-RI-11A
Kent County, MI

Well	AREA5-RI-11A / 2 in Diameter PVC
Sample Quarter	2023-Q3
Date	07/19/2023
Weather	70°F Sunny in Shade
Sampler Initials	RCP
Purging Device	Bladder-Pump: NA, Peristaltic-Pump: NA, Centrifugal-Pump: Mega Monsoon #1
Meters Used	YSI: Agile Rental 1, Turbidimeter: Agile Rental 1, Water-Level-Meter: WLM-1
Reference Measuring Point	PVC
Well Screen (ft bmp)	110.0 - 115.0
Measured Bottom Depth (ft bmp)	115
Sample Comment	10:30 - Decreased voltage. Water observed to be very turbid at start of purge. 10:40 - Purge water is slightly less turbid. YSI Connected at 11:00.
Initial Water Level Date/Time	07/19/2023 10:15
Initial Water Level Depth (ft bmp)	95.98
Pump/Tubing Intake Depth (ft bmp)	112.5
Tubing Length (ft)	114
Tubing Inner Diameter (in)	0.17
Purging Initiation Date/Time	07/19/2023 10:25
Total Purge Volume (gal)	8
Modified Sample	No
If Modified, Reasoning	
Sample Collection Information	Bottling-Start: 07/19/2023 11:45:00, Bottling-Stop: 07/19/2023 11:50:00, Parameters-Sampled: PFAS

Reading Time	Depth To Water (ft)	Cumulative Drawdown (ft)	Purge Rate (ml/min)	Temperature (deg c)	Specific Conductivity (us/cm)	Dissolved Oxygen (mg/l)	pH (su)	Oxidation-Reduction Potential (mV)	Turbidity (ntu)
10:30	96.01	0.03	500	NR	NR	NR	NR	NR	NR
10:40	96.01	0.03	480	NR	NR	NR	NR	NR	NR
10:45	96.01	0.03	480	NR	NR	NR	NR	NR	>999
10:50	96.01	0.03	480	NR	NR	NR	NR	NR	60
11:00	96.01	0.03	480	NR	NR	NR	NR	NR	19
11:15	96.01	0.03	480	12 +	720 +	<0.5	7.3	52	10
11:30	96.01	0.03	480	13 +	712 +	<0.5	7.3	-31	<5
11:35	96.01	0.03	480	12 +	710 +	<0.5	7.3	-38	<5
11:40	96.01	0.03	480	12 +	709 +	<0.5	7.3	-41	<5

Notes:

1) Abbreviations include: "deg c" indicates degrees Celsius; "ft" indicates feet; "ft bmp" indicates feet below reference measuring point; "gal" indicates gallons; "in" indicates inches; "mg/l" indicates milligrams per liter; "ml/min" indicates milliliters per minute; "mV" indicates millivolts; "NA" indicates not applicable; "NR" indicates not recorded; "ntu" indicates Nephelometric Turbidity units; "su" indicates standard units; "us/cm" indicates microsiemens per centimeter; and "+" indicates the parameter(s) may be used for stabilization calculations but cannot be used for other purposes.
2) Weather temperature units are in degrees Fahrenheit, unless otherwise noted.
3) Did indicator parameters reach stabilization? Yes
4) Was the two hour time limit reached? No
5) Calculations:
   - Head Above Pump Intake (ft) 16.52
   - Total Drawdown (ft) 0.03
   - Calculated Final Purge Volume (gal) NA
6) If Drawdown Did Not Stabilize or Stabilized Drawdown >0.3 ft, is Total Purge Volume > Calculated Final Purge Volume? NA

Well Sampling Worksheet
WWW RAP Field Data
AREA 5 2023-Q3 - AREA5-RI-11B
Kent County, MI

Well	AREA5-RI-11B / 2 in Diameter PVC
Sample Quarter	2023-Q3
Date	07/19/2023
Weather	Sunny 70
Sampler Initials	NCK
Purging Device	Bladder-Pump: NA, Peristaltic-Pump: NA, Centrifugal-Pump: Mega Monsoon #1
Meters Used	YSI: Agile Rental 3, Turbidimeter: Agile Rental 3, Water-Level-Meter: WLM-2
Reference Measuring Point	PVC
Well Screen (ft bmp)	140.0 - 145.0
Measured Bottom Depth (ft bmp)	NR
Sample Comment	Purge water was observed to be turbid at the beginning of purge. YSI not hooked up until turbidity visually dropped. YSI Connected at 11:00. 11:10 - ORP was observed to be dropping rapidly.
Initial Water Level Date/Time	07/19/2023 10:25
Initial Water Level Depth (ft bmp)	95.61
Pump/Tubing Intake Depth (ft bmp)	142.5
Tubing Length (ft)	147
Tubing Inner Diameter (in)	0.17
Purging Initiation Date/Time	07/19/2023 10:30
Total Purge Volume (gal)	10.5
Modified Sample	No
If Modified, Reasoning	
Sample Collection Information	Bottling-Start: 07/19/2023 11:50:00, Bottling-Stop: 07/19/2023 11:54:00, Parameters-Sampled: PFAS

Reading Time	Depth To Water (ft)	Cumulative Drawdown (ft)	Purge Rate (ml/min)	Temperature (deg c)	Specific Conductivity (us/cm)	Dissolved Oxygen (mg/l)	pH (su)	Oxidation-Reduction Potential (mV)	Turbidity (ntu)
10:40	95.63	0.02	500	NR	NR	NR	NR	NR	NR
10:50	95.63	0.02	500	NR	NR	NR	NR	NR	NR
11:00	95.63	0.02	500	NR	NR	NR	NR	NR	NR
11:10	95.63	0.02	500	12 +	772 +	<0.5	7.4	112	47
11:20	95.63	0.02	500	12 +	773 +	<0.5	7.4	73	27
11:30	95.63	0.02	500	12 +	773 +	<0.5	7.4	56	17
11:40	95.63	0.02	500	12 +	774 +	<0.5	7.4	44	7
11:45	95.63	0.02	500	12 +	774 +	<0.5	7.4	41	7
11:50	95.63	0.02	500	12 +	774 +	<0.5	7.4	37	6

Notes:

1) Abbreviations include: "deg c" indicates degrees Celsius; "ft" indicates feet; "ft bmp" indicates feet below reference measuring point; "gal" indicates gallons; "in" indicates inches; "mg/l" indicates milligrams per liter; "ml/min" indicates milliliters per minute; "mV" indicates millivolts; "NA" indicates not applicable; "NR" indicates not recorded; "ntu" indicates Nephelometric Turbidity units; "su" indicates standard units; "us/cm" indicates microsiemens per centimeter; and "+" indicates the parameter(s) may be used for stabilization calculations but cannot be used for other purposes.
2) Weather temperature units are in degrees Fahrenheit, unless otherwise noted.
3) Did indicator parameters reach stabilization? Yes
4) Was the two hour time limit reached? No
5) Calculations:
   - Head Above Pump Intake (ft) 46.89
   - Total Drawdown (ft) 0.02
   - Calculated Final Purge Volume (gal) NA
6) If Drawdown Did Not Stabilize or Stabilized Drawdown >0.3 ft, is Total Purge Volume > Calculated Final Purge Volume? NA

Well Sampling Worksheet
WWW RAP Field Data
AREA 5 2023-Q3 - AREA5-RI-11C
Kent County, MI

Well	AREA5-RI-11C / 2 in Diameter PVC
Sample Quarter	2023-Q3
Date	07/28/2023
Weather	80 F Sunny
Sampler Initials	JET
Purging Device	Bladder-Pump: BP-10, Peristaltic-Pump: NA, Centrifugal-Pump: NA
Meters Used	YSI: Agile Rental 2, Turbidimeter: Agile Rental 2, Water-Level-Meter: WLM-2
Reference Measuring Point	PVC
Well Screen (ft bmp)	232.5 - 237.5
Measured Bottom Depth (ft bmp)	NR
Sample Comment	Water was observed to be turbid at the beginning of purge. YSI Connected at 12:00.
Initial Water Level Date/Time	07/28/2023 10:50
Initial Water Level Depth (ft bmp)	105.71
Pump/Tubing Intake Depth (ft bmp)	235
Tubing Length (ft)	238
Tubing Inner Diameter (in)	0.25
Purging Initiation Date/Time	07/28/2023 10:50
Total Purge Volume (gal)	5
Modified Sample	No
If Modified, Reasoning	
Sample Collection Information	Bottling-Start: 07/28/2023 12:55:00, Bottling-Stop: 07/28/2023 13:00:00, Parameters-Sampled: PFAS

Reading Time	Depth To Water (ft)	Cumulative Drawdown (ft)	Purge Rate (ml/min)	Temperature (deg c)	Specific Conductivity (us/cm)	Dissolved Oxygen (mg/l)	pH (su)	Oxidation-Reduction Potential (mV)	Turbidity (ntu)
11:00	105.73	0.02	150	NR	NR	NR	NR	NR	NR
11:10	105.73	0.02	150	NR	NR	NR	NR	NR	NR
11:20	105.73	0.02	150	NR	NR	NR	NR	NR	NR
11:30	105.73	0.02	150	NR	NR	NR	NR	NR	NR
11:40	105.73	0.02	150	NR	NR	NR	NR	NR	130
12:00	105.73	0.02	150	12	1,409 +	1.5	7.1	252	72
12:10	105.73	0.02	150	12	1,410 +	1.1	7.2	225	57
12:20	105.73	0.02	150	12	1,407 +	1.0	7.2	205	55
12:30	105.73	0.02	150	12	1,415 +	1.0	7.2	190	50
12:35	105.73	0.02	150	12	1,410 +	1.0	7.2	182	50

Well Sampling Worksheet
WWW RAP Field Data
AREA 5 2023-Q3 - AREA5-RI-11C
Kent County, MI

Well	AREA5-RI-11C / 2 in Diameter PVC
Sample Quarter	2023-Q3
Date	07/28/2023
Weather	80 F Sunny
Sampler Initials	JET
Purging Device	Bladder-Pump: BP-10, Peristaltic-Pump: NA, Centrifugal-Pump: NA
Meters Used	YSI: Agile Rental 2, Turbidimeter: Agile Rental 2, Water-Level-Meter: WLM-2
Reference Measuring Point	PVC
Well Screen (ft bmp)	232.5 - 237.5
Measured Bottom Depth (ft bmp)	NR
Sample Comment	Water was observed to be turbid at the beginning of purge. YSI Connected at 12:00.
Initial Water Level Date/Time	07/28/2023 10:50
Initial Water Level Depth (ft bmp)	105.71
Pump/Tubing Intake Depth (ft bmp)	235
Tubing Length (ft)	238
Tubing Inner Diameter (in)	0.25
Purging Initiation Date/Time	07/28/2023 10:50
Total Purge Volume (gal)	5
Modified Sample	No
If Modified, Reasoning	
Sample Collection Information	Bottling-Start: 07/28/2023 12:55:00, Bottling-Stop: 07/28/2023 13:00:00, Parameters-Sampled: PFAS

Reading Time	Depth To Water (ft)	Cumulative Drawdown (ft)	Purge Rate (ml/min)	Temperature (deg c)	Specific Conductivity (us/cm)	Dissolved Oxygen (mg/l)	pH (su)	Oxidation-Reduction Potential (mV)	Turbidity (ntu)
12:40	105.73	0.02	150	12	1,413 +	1.0	7.2	176	49
12:45	105.73	0.02	150	12	1,406 +	1.0	7.2	171	48
12:50	105.73	0.02	150	12	1,416 +	1.0	7.2	167	48

Notes:

1) Abbreviations include: "deg c" indicates degrees Celsius; "ft" indicates feet; "ft bmp" indicates feet below reference measuring point; "gal" indicates gallons; "in" indicates inches; "mg/l" indicates milligrams per liter; "ml/min" indicates milliliters per minute; "mV" indicates millivolts; "NA" indicates not applicable; "NR" indicates not recorded; "ntu" indicates Nephelometric Turbidity units; "su" indicates standard units; "us/cm" indicates microsiemens per centimeter; and "+" indicates the parameter(s) may be used for stabilization calculations but cannot be used for other purposes.
2) Weather temperature units are in degrees Fahrenheit, unless otherwise noted.
3) Did indicator parameters reach stabilization? Yes
4) Was the two hour time limit reached? Yes
5) Calculations:
   - Head Above Pump Intake (ft) 129.29
   - Total Drawdown (ft) 0.02
   - Calculated Final Purge Volume (gal) NA
6) If Drawdown Did Not Stabilize or Stabilized Drawdown >0.3 ft, is Total Purge Volume > Calculated Final Purge Volume? NA

Well Sampling Worksheet
WWW RAP Field Data
AREA 5 2023-Q3 - AREA5-RI-11D
Kent County, MI

Well	AREA5-RI-11D / 2 in Diameter PVC
Sample Quarter	2023-Q3
Date	07/28/2023
Weather	Sunny 80
Sampler Initials	WVK
Purging Device	Bladder-Pump: BP-12, Peristaltic-Pump: NA, Centrifugal-Pump: NA
Meters Used	YSI: Agile Rental 3, Turbidimeter: Agile Rental 3, Water-Level-Meter: WLM-4
Reference Measuring Point	PVC
Well Screen (ft bmp)	262.0 - 267.0
Measured Bottom Depth (ft bmp)	NR
Sample Comment	Purge water was observed to be turbid (brown) at the beginning of purge. 12:05 - Purge water is slowly clearing up. YSI Connected at 12:25.
Initial Water Level Date/Time	07/28/2023 11:45
Initial Water Level Depth (ft bmp)	107.16
Pump/Tubing Intake Depth (ft bmp)	264.5
Tubing Length (ft)	267
Tubing Inner Diameter (in)	0.25
Purging Initiation Date/Time	07/28/2023 11:45
Total Purge Volume (gal)	5
Modified Sample	No
If Modified, Reasoning	
Sample Collection Information	Bottling-Start: 07/28/2023 13:50:00, Bottling-Stop: 07/28/2023 13:55:00, Parameters-Sampled: PFAS

Reading Time	Depth To Water (ft)	Cumulative Drawdown (ft)	Purge Rate (ml/min)	Temperature (deg c)	Specific Conductivity (us/cm)	Dissolved Oxygen (mg/l)	pH (su)	Oxidation-Reduction Potential (mV)	Turbidity (ntu)
11:55	107.18	0.02	225	NR	NR	NR	NR	NR	NR
12:05	107.18	0.02	225	NR	NR	NR	NR	NR	NR
12:15	107.18	0.02	225	NR	NR	NR	NR	NR	678
12:25	107.18	0.02	225	NR	NR	NR	NR	NR	346
12:35	107.18	0.02	225	13	1,860 +	0.7	7.2 +	56	287
12:45	107.18	0.02	225	13	1,845 +	0.6	7.2 +	42	164
12:55	107.18	0.02	225	12	1,849 +	0.7	7.2 +	38	112
13:05	107.18	0.02	225	12	1,834 +	0.7	7.1 +	37	76
13:15	107.18	0.02	225	13	1,818 +	0.6	7.1 +	36	53
13:25	107.18	0.02	225	12	1,827 +	0.7	7.1 +	36	45

Well Sampling Worksheet
WWW RAP Field Data
AREA 5 2023-Q3 - AREA5-RI-11D
Kent County, MI

Well	AREA5-RI-11D / 2 in Diameter PVC
Sample Quarter	2023-Q3
Date	07/28/2023
Weather	Sunny 80
Sampler Initials	WVK
Purging Device	Bladder-Pump: BP-12, Peristaltic-Pump: NA, Centrifugal-Pump: NA
Meters Used	YSI: Agile Rental 3, Turbidimeter: Agile Rental 3, Water-Level-Meter: WLM-4
Reference Measuring Point	PVC
Well Screen (ft bmp)	262.0 - 267.0
Measured Bottom Depth (ft bmp)	NR
Sample Comment	Purge water was observed to be turbid (brown) at the beginning of purge. 12:05 - Purge water is slowly clearing up. YSI Connected at 12:25.
Initial Water Level Date/Time	07/28/2023 11:45
Initial Water Level Depth (ft bmp)	107.16
Pump/Tubing Intake Depth (ft bmp)	264.5
Tubing Length (ft)	267
Tubing Inner Diameter (in)	0.25
Purging Initiation Date/Time	07/28/2023 11:45
Total Purge Volume (gal)	5
Modified Sample	No
If Modified, Reasoning	
Sample Collection Information	Bottling-Start: 07/28/2023 13:50:00, Bottling-Stop: 07/28/2023 13:55:00, Parameters-Sampled: PFAS

Reading Time	Depth To Water (ft)	Cumulative Drawdown (ft)	Purge Rate (ml/min)	Temperature (deg c)	Specific Conductivity (us/cm)	Dissolved Oxygen (mg/l)	pH (su)	Oxidation-Reduction Potential (mV)	Turbidity (ntu)
13:35	107.18	0.02	225	13	1,817 +	0.7	7.1 +	36	35
13:40	107.18	0.02	225	13	1,800 +	0.7	7.1 +	36	36
13:45	107.18	0.02	225	12	1,813 +	0.7	7.1 +	36	30

Notes:

1) Abbreviations include: "deg c" indicates degrees Celsius; "ft" indicates feet; "ft bmp" indicates feet below reference measuring point; "gal" indicates gallons; "in" indicates inches; "mg/l" indicates milligrams per liter; "ml/min" indicates milliliters per minute; "mV" indicates millivolts; "NA" indicates not applicable; "NR" indicates not recorded; "ntu" indicates Nephelometric Turbidity units; "su" indicates standard units; "us/cm" indicates microsiemens per centimeter; and "+" indicates the parameter(s) may be used for stabilization calculations but cannot be used for other purposes.
2) Weather temperature units are in degrees Fahrenheit, unless otherwise noted.
3) Did indicator parameters reach stabilization? No
4) Was the two hour time limit reached? Yes
5) Calculations:
   - Head Above Pump Intake (ft) 157.34
   - Total Drawdown (ft) 0.02
   - Calculated Final Purge Volume (gal) NA
6) If Drawdown Did Not Stabilize or Stabilized Drawdown >0.3 ft, is Total Purge Volume > Calculated Final Purge Volume? NA

Well Sampling Worksheet
WWW RAP Field Data
AREA 19 2023-Q3 - AREA19-MW-8A
Kent County, MI

Well	AREA19-MW-8A / 2 in Diameter PVC
Sample Quarter	2023-Q3
Date	09/08/2023
Weather	60F Cloudy
Sampler Initials	JET
Purging Device	Bladder-Pump: NA, Peristaltic-Pump: PER-1, Centrifugal-Pump: NA
Meters Used	YSI: Agile Rental 3, Turbidimeter: Agile Rental 3, Water-Level-Meter: WLM-1
Reference Measuring Point	PVC
Well Screen (ft bmp)	29.5 - 34.5
Measured Bottom Depth (ft bmp)	34.5
Sample Comment	Tubing intake adjusted to midway between the initial static water level and the bottom of the well. YSI Connected at 11:10.
Initial Water Level Date/Time	09/08/2023 10:10
Initial Water Level Depth (ft bmp)	31.61
Pump/Tubing Intake Depth (ft bmp)	33
Tubing Length (ft)	35
Tubing Inner Diameter (in)	0.17
Purging Initiation Date/Time	09/08/2023 10:10
Total Purge Volume (gal)	3
Modified Sample	Yes
If Modified, Reasoning	Initial water level below the top of the well screen.
Sample Collection Information	Bottling-Start: 09/08/2023 11:35:00, Bottling-Stop: 09/08/2023 11:40:00, Parameters-Sampled: PFAS

Reading Time	Depth To Water (ft)	Cumulative Drawdown (ft)	Purge Rate (ml/min)	Temperature (deg c)	Specific Conductivity (us/cm)	Dissolved Oxygen (mg/l)	pH (su)	Oxidation-Reduction Potential (mV)	Turbidity (ntu)
10:25	31.64	0.03	50	NR	NR	NR	NR	NR	51
10:35	31.64	0.03	50	NR	NR	NR	NR	NR	11
10:55	31.64	0.03	50	NR	NR	NR	NR	NR	<5
11:10	31.64	0.03	50	13 +	503 +	7.8	6.9	171	<5
11:20	31.64	0.03	50	13 +	500 +	7.1	6.9	163	<5
11:25	31.64	0.03	50	13 +	500 +	7.1	6.9	161	<5
11:30	31.64	0.03	50	13 +	500 +	7.1	6.9	160	<5

Notes:

1) Abbreviations include: "deg c" indicates degrees Celsius; "ft" indicates feet; "ft bmp" indicates feet below reference measuring point; "gal" indicates gallons; "in" indicates inches; "mg/l" indicates milligrams per liter; "ml/min" indicates milliliters per minute; "mV" indicates millivolts; "NA" indicates not applicable; "NR" indicates not recorded; "ntu" indicates Nephelometric Turbidity units; "su" indicates standard units; "us/cm" indicates microsiemens per centimeter; and "+" indicates the parameter(s) may be used for stabilization calculations but cannot be used for other purposes.
2) Weather temperature units are in degrees Fahrenheit, unless otherwise noted.
3) Did indicator parameters reach stabilization? Yes
4) Was the two hour time limit reached? No
5) Calculations:
   - Head Above Pump Intake (ft) 1.39
   - Total Drawdown (ft) 0.03
   - Calculated Final Purge Volume (gal) NA
6) If Drawdown Did Not Stabilize or Stabilized Drawdown >0.3 ft, is Total Purge Volume > Calculated Final Purge Volume? NA

Well Sampling Worksheet
WWW RAP Field Data
AREA 19 2023-Q3 - AREA19-MW-8B
Kent County, MI

Well	AREA19-MW-8B / 2 in Diameter PVC
Sample Quarter	2023-Q3
Date	09/08/2023
Weather	Cloudy, 60s
Sampler Initials	AJG
Purging Device	Bladder-Pump: BP-10, Peristaltic-Pump: NA, Centrifugal-Pump: NA
Meters Used	YSI: Agile Rental 1, Turbidimeter: Agile Rental 2, Water-Level-Meter: WLM-2
Reference Measuring Point	PVC
Well Screen (ft bmp)	180.8 - 185.8
Measured Bottom Depth (ft bmp)	NR
Sample Comment	10:25 - Decreased discharge time to control drawdown. YSI Connected at 11:55.
Initial Water Level Date/Time	09/08/2023 10:10
Initial Water Level Depth (ft bmp)	91.17
Pump/Tubing Intake Depth (ft bmp)	183.3
Tubing Length (ft)	187
Tubing Inner Diameter (in)	0.25
Purging Initiation Date/Time	09/08/2023 10:15
Total Purge Volume (gal)	1.5
Modified Sample	No
If Modified, Reasoning	
Sample Collection Information	Bottling-Start: 09/08/2023 12:20:00, Bottling-Stop: 09/08/2023 12:25:00, Parameters-Sampled: PFAS

Reading Time	Depth To Water (ft)	Cumulative Drawdown (ft)	Purge Rate (ml/min)	Temperature (deg c)	Specific Conductivity (us/cm)	Dissolved Oxygen (mg/l)	pH (su)	Oxidation-Reduction Potential (mV)	Turbidity (ntu)
10:25	92.75	1.58	50	NR	NR	NR	NR	NR	>999
10:35	92.59	1.42	50	NR	NR	NR	NR	NR	>999
10:45	92.54	1.37	50	NR	NR	NR	NR	NR	>999
10:55	92.54	1.37	50	NR	NR	NR	NR	NR	>999
11:05	92.54	1.37	50	NR	NR	NR	NR	NR	>999
11:15	92.54	1.37	50	NR	NR	NR	NR	NR	>999
11:25	92.54	1.37	50	NR	NR	NR	NR	NR	>999
11:35	92.54	1.37	50	NR	NR	NR	NR	NR	>999
11:45	92.54	1.37	50	NR	NR	NR	NR	NR	>999
11:55	92.54	1.37	50	13	711 +	1.0	8.3	280	>999
12:00	92.54	1.37	50	13	704 +	0.9	8.2	272	>999

Well Sampling Worksheet
WWW RAP Field Data
AREA 19 2023-Q3 - AREA19-MW-8B
Kent County, MI

Well	AREA19-MW-8B / 2 in Diameter PVC
Sample Quarter	2023-Q3
Date	09/08/2023
Weather	Cloudy, 60s
Sampler Initials	AJG
Purging Device	Bladder-Pump: BP-10, Peristaltic-Pump: NA, Centrifugal-Pump: NA
Meters Used	YSI: Agile Rental 1, Turbidimeter: Agile Rental 2, Water-Level-Meter: WLM-2
Reference Measuring Point	PVC
Well Screen (ft bmp)	180.8 - 185.8
Measured Bottom Depth (ft bmp)	NR
Sample Comment	10:25 - Decreased discharge time to control drawdown. YSI Connected at 11:55.
Initial Water Level Date/Time	09/08/2023 10:10
Initial Water Level Depth (ft bmp)	91.17
Pump/Tubing Intake Depth (ft bmp)	183.3
Tubing Length (ft)	187
Tubing Inner Diameter (in)	0.25
Purging Initiation Date/Time	09/08/2023 10:15
Total Purge Volume (gal)	1.5
Modified Sample	No
If Modified, Reasoning	
Sample Collection Information	Bottling-Start: 09/08/2023 12:20:00, Bottling-Stop: 09/08/2023 12:25:00, Parameters-Sampled: PFAS

Reading Time	Depth To Water (ft)	Cumulative Drawdown (ft)	Purge Rate (ml/min)	Temperature (deg c)	Specific Conductivity (us/cm)	Dissolved Oxygen (mg/l)	pH (su)	Oxidation-Reduction Potential (mV)	Turbidity (ntu)
12:05	92.54	1.37	50	13	700 +	0.9	8.1	267	>999
12:10	92.54	1.37	50	13	696 +	0.9	8.1	261	>999
12:15	92.54	1.37	50	13	692 +	0.9	8.0	256	>999

Notes:

1) Abbreviations include: "deg c" indicates degrees Celsius; "ft" indicates feet; "ft bmp" indicates feet below reference measuring point; "gal" indicates gallons; "in" indicates inches; "mg/l" indicates milligrams per liter; "ml/min" indicates milliliters per minute; "mV" indicates millivolts; "NA" indicates not applicable; "NR" indicates not recorded; "ntu" indicates Nephelometric Turbidity units; "su" indicates standard units; "us/cm" indicates microsiemens per centimeter; and "+" indicates the parameter(s) may be used for stabilization calculations but cannot be used for other purposes.
2) Weather temperature units are in degrees Fahrenheit, unless otherwise noted.
3) Did indicator parameters reach stabilization? Yes * Turbidity Out of Range
4) Was the two hour time limit reached? Yes
5) Calculations:
   - Head Above Pump Intake (ft) 92.13
   - Total Drawdown (ft) 1.37
   - Calculated Final Purge Volume (gal) 0.71
6) If Drawdown Did Not Stabilize or Stabilized Drawdown >0.3 ft, is Total Purge Volume > Calculated Final Purge Volume? Yes

Well Sampling Worksheet
WWW RAP Field Data
AREA 19 2023-Q3 - AREA19-MW-8C
Kent County, MI

Well	AREA19-MW-8C / 2 in Diameter PVC
Sample Quarter	2023-Q3
Date	09/08/2023
Weather	Cloudy, 60F
Sampler Initials	RCP
Purging Device	Bladder-Pump: BP-11, Peristaltic-Pump: NA, Centrifugal-Pump: NA
Meters Used	YSI: Agile Rental 2, Turbidimeter: Agile Rental 2, Water-Level-Meter: WLM-4
Reference Measuring Point	PVC
Well Screen (ft bmp)	247.0 - 252.0
Measured Bottom Depth (ft bmp)	NR
Sample Comment	10:15 - Purge water observed to be a little turbid. 10:30 - Purge water observed to be a little more turbid. 11:20 - Purge water is still turbid. 11:50 - YSI connected
Initial Water Level Date/Time	09/08/2023 10:00
Initial Water Level Depth (ft bmp)	113
Pump/Tubing Intake Depth (ft bmp)	249.5
Tubing Length (ft)	251
Tubing Inner Diameter (in)	0.25
Purging Initiation Date/Time	09/08/2023 10:05
Total Purge Volume (gal)	2
Modified Sample	No
If Modified, Reasoning	
Sample Collection Information	Bottling-Start: 09/08/2023 12:10:00, Bottling-Stop: 09/08/2023 12:25:00, Parameters-Sampled: PFAS

Reading Time	Depth To Water (ft)	Cumulative Drawdown (ft)	Purge Rate (ml/min)	Temperature (deg c)	Specific Conductivity (us/cm)	Dissolved Oxygen (mg/l)	pH (su)	Oxidation-Reduction Potential (mV)	Turbidity (ntu)
10:15	113.22	0.22	160	NR	NR	NR	NR	NR	>999
10:30	113.20	0.20	60	NR	NR	NR	NR	NR	>999
11:20	113.20	0.20	60	NR	NR	NR	NR	NR	>999
11:45	113.20	0.20	60	NR	NR	NR	NR	NR	>999
11:50	113.20	0.20	60	15	745 +	<0.5	7.4	118	>999
11:55	113.20	0.20	60	14	743 +	<0.5	7.3	40	>999
12:00	113.20	0.20	60	14	740 +	<0.5	7.4	-7	>999
12:05	113.20	0.20	60	14	740 +	<0.5	7.4	-45	>999

Notes:

1) Abbreviations include: "deg c" indicates degrees Celsius; "ft" indicates feet; "ft bmp" indicates feet below reference measuring point; "gal" indicates gallons; "in" indicates inches; "mg/l" indicates milligrams per liter; "ml/min" indicates milliliters per minute; "mV" indicates millivolts; "NA" indicates not applicable; "NR" indicates not recorded; "ntu" indicates Nephelometric Turbidity units; "su" indicates standard units; "us/cm" indicates microsiemens per centimeter; and "+" indicates the parameter(s) may be used for stabilization calculations but cannot be used for other purposes.
2) Weather temperature units are in degrees Fahrenheit, unless otherwise noted.
3) Did indicator parameters reach stabilization? No * Turbidity Out of Range
4) Was the two hour time limit reached? Yes
5) Calculations:
   - Head Above Pump Intake (ft) 136.50
   - Total Drawdown (ft) 0.20
   - Calculated Final Purge Volume (gal) NA
6) If Drawdown Did Not Stabilize or Stabilized Drawdown >0.3 ft, is Total Purge Volume > Calculated Final Purge Volume? NA

Well Sampling Worksheet
WWW RAP Field Data
AREA 19 2023-Q3 - AREA19-MW-9A
Kent County, MI

Well	AREA19-MW-9A / 2 in Diameter PVC
Sample Quarter	2023-Q3
Date	09/07/2023
Weather	Cloudy 70
Sampler Initials	NCK
Purging Device	Bladder-Pump: NA, Peristaltic-Pump: PER-1, Centrifugal-Pump: NA
Meters Used	YSI: Agile Rental 3, Turbidimeter: Agile Rental 3, Water-Level-Meter: WLM-1
Reference Measuring Point	PVC
Well Screen (ft bmp)	18.8 - 23.8
Measured Bottom Depth (ft bmp)	NR
Sample Comment	YSI Connected at 15:15.
Initial Water Level Date/Time	09/07/2023 14:20
Initial Water Level Depth (ft bmp)	5.09
Pump/Tubing Intake Depth (ft bmp)	21.3
Tubing Length (ft)	24
Tubing Inner Diameter (in)	0.17
Purging Initiation Date/Time	09/07/2023 14:25
Total Purge Volume (gal)	3
Modified Sample	No
If Modified, Reasoning	
Sample Collection Information	Bottling-Start: 09/07/2023 15:25:00, Bottling-Stop: 09/07/2023 15:30:00, Parameters-Sampled: PFAS

Reading Time	Depth To Water (ft)	Cumulative Drawdown (ft)	Purge Rate (ml/min)	Temperature (deg c)	Specific Conductivity (us/cm)	Dissolved Oxygen (mg/l)	pH (su)	Oxidation-Reduction Potential (mV)	Turbidity (ntu)
14:30	5.33	0.24	125	NR	NR	NR	NR	NR	NR
14:45	5.33	0.24	125	NR	NR	NR	NR	NR	NR
15:00	5.33	0.24	125	NR	NR	NR	NR	NR	NR
15:15	5.33	0.24	125	14 +	583 +	0.9	7.3	82	<5
15:20	5.33	0.24	125	14 +	586 +	0.9	7.3	82	<5
15:25	5.33	0.24	125	14 +	587 +	0.9	7.3	80	<5

Notes:

1) Abbreviations include: "deg c" indicates degrees Celsius; "ft" indicates feet; "ft bmp" indicates feet below reference measuring point; "gal" indicates gallons; "in" indicates inches; "mg/l" indicates milligrams per liter; "ml/min" indicates milliliters per minute; "mV" indicates millivolts; "NA" indicates not applicable; "NR" indicates not recorded; "ntu" indicates Nephelometric Turbidity units; "su" indicates standard units; "us/cm" indicates microsiemens per centimeter; and "+" indicates the parameter(s) may be used for stabilization calculations but cannot be used for other purposes.
2) Weather temperature units are in degrees Fahrenheit, unless otherwise noted.
3) Did indicator parameters reach stabilization? Yes
4) Was the two hour time limit reached? No
5) Calculations:
   - Head Above Pump Intake (ft) 16.21
   - Total Drawdown (ft) 0.24
   - Calculated Final Purge Volume (gal) NA
6) If Drawdown Did Not Stabilize or Stabilized Drawdown >0.3 ft, is Total Purge Volume > Calculated Final Purge Volume? NA

Well Sampling Worksheet
WWW RAP Field Data
AREA 19 2023-Q3 - AREA19-MW-9B
Kent County, MI

Well	AREA19-MW-9B / 2 in Diameter PVC
Sample Quarter	2023-Q3
Date	09/07/2023
Weather	70F, Cloudy
Sampler Initials	RCP
Purging Device	Bladder-Pump: NA, Peristaltic-Pump: NA, Centrifugal-Pump: Mega Monsoon #1
Meters Used	YSI: Agile Rental 1, Turbidimeter: Agile Rental 1, Water-Level-Meter: WLM-2
Reference Measuring Point	PVC
Well Screen (ft bmp)	93.0 - 98.0
Measured Bottom Depth (ft bmp)	100.32
Sample Comment	14:35 - Purge water observed to be somewhat turbid. 14:50 - Decreased flow rate/pump speed. 15:30 - YSI Connected. Bottom depth measured after sampling. Other bottom depth measurements at this well indicate that the 100.32 foot measurement was inaccurate.
Initial Water Level Date/Time	09/07/2023 14:30
Initial Water Level Depth (ft bmp)	54.85
Pump/Tubing Intake Depth (ft bmp)	95.5
Tubing Length (ft)	98.5
Tubing Inner Diameter (in)	0.17
Purging Initiation Date/Time	09/07/2023 14:30
Total Purge Volume (gal)	8
Modified Sample	No
If Modified, Reasoning	
Sample Collection Information	Bottling-Start: 09/07/2023 16:30:00, Bottling-Stop: 09/07/2023 16:35:00, Parameters-Sampled: PFAS

Reading Time	Depth To Water (ft)	Cumulative Drawdown (ft)	Purge Rate (ml/min)	Temperature (deg c)	Specific Conductivity (us/cm)	Dissolved Oxygen (mg/l)	pH (su)	Oxidation-Reduction Potential (mV)	Turbidity (ntu)
14:35	54.94	0.09	500	NR	NR	NR	NR	NR	NR
14:50	54.89	0.04	250	NR	NR	NR	NR	NR	NR
15:05	54.89	0.04	250	NR	NR	NR	NR	NR	86
15:20	54.89	0.04	250	NR	NR	NR	NR	NR	44
15:30	54.89	0.04	250	12 +	543 +	0.9	7.5	9	26
15:40	54.89	0.04	250	12 +	543 +	0.7	7.5	-68	21
15:50	54.89	0.04	250	12 +	542 +	0.6	7.5	-85	17
16:00	54.89	0.04	250	12 +	542 +	0.5	7.5	-96	13
16:05	54.89	0.04	250	12 +	542 +	<0.5	7.5	-98	9
16:10	54.89	0.04	250	12 +	542 +	<0.5	7.6	-101	8

Well Sampling Worksheet
WWW RAP Field Data
AREA 19 2023-Q3 - AREA19-MW-9B
Kent County, MI

Well	AREA19-MW-9B / 2 in Diameter PVC
Sample Quarter	2023-Q3
Date	09/07/2023
Weather	70F, Cloudy
Sampler Initials	RCP
Purging Device	Bladder-Pump: NA, Peristaltic-Pump: NA, Centrifugal-Pump: Mega Monsoon #1
Meters Used	YSI: Agile Rental 1, Turbidimeter: Agile Rental 1, Water-Level-Meter: WLM-2
Reference Measuring Point	PVC
Well Screen (ft bmp)	93.0 - 98.0
Measured Bottom Depth (ft bmp)	100.32
Sample Comment	14:35 - Purge water observed to be somewhat turbid. 14:50 - Decreased flow rate/pump speed. 15:30 - YSI Connected. Bottom depth measured after sampling. Other bottom depth measurements at this well indicate that the 100.32 foot measurement was inaccurate.
Initial Water Level Date/Time	09/07/2023 14:30
Initial Water Level Depth (ft bmp)	54.85
Pump/Tubing Intake Depth (ft bmp)	95.5
Tubing Length (ft)	98.5
Tubing Inner Diameter (in)	0.17
Purging Initiation Date/Time	09/07/2023 14:30
Total Purge Volume (gal)	8
Modified Sample	No
If Modified, Reasoning	
Sample Collection Information	Bottling-Start: 09/07/2023 16:30:00, Bottling-Stop: 09/07/2023 16:35:00, Parameters-Sampled: PFAS

Reading Time	Depth To Water (ft)	Cumulative Drawdown (ft)	Purge Rate (ml/min)	Temperature (deg c)	Specific Conductivity (us/cm)	Dissolved Oxygen (mg/l)	pH (su)	Oxidation-Reduction Potential (mV)	Turbidity (ntu)
16:15	54.89	0.04	250	12 +	542 +	<0.5	7.6	-103	6
16:20	54.89	0.04	250	12 +	542 +	<0.5	7.6	-105	5
16:25	54.89	0.04	250	12 +	542 +	<0.5	7.6	-106	<5

Notes:

1) Abbreviations include: "deg c" indicates degrees Celsius; "ft" indicates feet; "ft bmp" indicates feet below reference measuring point; "gal" indicates gallons; "in" indicates inches; "mg/l" indicates milligrams per liter; "ml/min" indicates milliliters per minute; "mV" indicates millivolts; "NA" indicates not applicable; "NR" indicates not recorded; "ntu" indicates Nephelometric Turbidity units; "su" indicates standard units; "us/cm" indicates microsiemens per centimeter; and "+" indicates the parameter(s) may be used for stabilization calculations but cannot be used for other purposes.
2) Weather temperature units are in degrees Fahrenheit, unless otherwise noted.
3) Did indicator parameters reach stabilization? No
4) Was the two hour time limit reached? Yes
5) Calculations:
   - Head Above Pump Intake (ft) 40.65
   - Total Drawdown (ft) 0.04
   - Calculated Final Purge Volume (gal) NA
6) If Drawdown Did Not Stabilize or Stabilized Drawdown >0.3 ft, is Total Purge Volume > Calculated Final Purge Volume? NA

Well Sampling Worksheet
WWW RAP Field Data
AREA 19 2023-Q3 - AREA19-MW-9C
Kent County, MI

Well	AREA19-MW-9C / 2 in Diameter PVC
Sample Quarter	2023-Q3
Date	09/07/2023
Weather	Cloudy, 70s
Sampler Initials	AJG
Purging Device	Bladder-Pump: BP-12, Peristaltic-Pump: NA, Centrifugal-Pump: NA
Meters Used	YSI: Agile Rental 2, Turbidimeter: Agile Rental 2, Water-Level-Meter: WLM-4
Reference Measuring Point	PVC
Well Screen (ft bmp)	157.0 - 162.0
Measured Bottom Depth (ft bmp)	162
Sample Comment	YSI Connected at 15:55.
Initial Water Level Date/Time	09/07/2023 14:30
Initial Water Level Depth (ft bmp)	53.42
Pump/Tubing Intake Depth (ft bmp)	159.5
Tubing Length (ft)	165
Tubing Inner Diameter (in)	0.25
Purging Initiation Date/Time	09/07/2023 14:35
Total Purge Volume (gal)	4.5
Modified Sample	No
If Modified, Reasoning	
Sample Collection Information	Bottling-Start: 09/07/2023 16:40:00, Bottling-Stop: 09/07/2023 16:45:00, Parameters-Sampled: PFAS

Reading Time	Depth To Water (ft)	Cumulative Drawdown (ft)	Purge Rate (ml/min)	Temperature (deg c)	Specific Conductivity (us/cm)	Dissolved Oxygen (mg/l)	pH (su)	Oxidation-Reduction Potential (mV)	Turbidity (ntu)
14:50	54.23	0.81	150	NR	NR	NR	NR	NR	>999
15:00	54.23	0.81	150	NR	NR	NR	NR	NR	939
15:20	54.23	0.81	150	NR	NR	NR	NR	NR	344
15:35	54.23	0.81	150	NR	NR	NR	NR	NR	169
15:45	54.23	0.81	150	NR	NR	NR	NR	NR	138
15:55	54.23	0.81	150	12 +	306 +	<0.5	7.9	-101	111
16:05	54.23	0.81	150	12 +	304 +	<0.5	7.9	-117	83
16:15	54.23	0.81	150	12 +	304 +	<0.5	7.9	-129	55
16:20	54.23	0.81	150	12 +	306 +	<0.5	7.9	-130	39

Well Sampling Worksheet
WWW RAP Field Data
AREA 19 2023-Q3 - AREA19-MW-9C
Kent County, MI

Well	AREA19-MW-9C / 2 in Diameter PVC
Sample Quarter	2023-Q3
Date	09/07/2023
Weather	Cloudy, 70s
Sampler Initials	AJG
Purging Device	Bladder-Pump: BP-12, Peristaltic-Pump: NA, Centrifugal-Pump: NA
Meters Used	YSI: Agile Rental 2, Turbidimeter: Agile Rental 2, Water-Level-Meter: WLM-4
Reference Measuring Point	PVC
Well Screen (ft bmp)	157.0 - 162.0
Measured Bottom Depth (ft bmp)	162
Sample Comment	YSI Connected at 15:55.
Initial Water Level Date/Time	09/07/2023 14:30
Initial Water Level Depth (ft bmp)	53.42
Pump/Tubing Intake Depth (ft bmp)	159.5
Tubing Length (ft)	165
Tubing Inner Diameter (in)	0.25
Purging Initiation Date/Time	09/07/2023 14:35
Total Purge Volume (gal)	4.5
Modified Sample	No
If Modified, Reasoning	
Sample Collection Information	Bottling-Start: 09/07/2023 16:40:00, Bottling-Stop: 09/07/2023 16:45:00, Parameters-Sampled: PFAS

Reading Time	Depth To Water (ft)	Cumulative Drawdown (ft)	Purge Rate (ml/min)	Temperature (deg c)	Specific Conductivity (us/cm)	Dissolved Oxygen (mg/l)	pH (su)	Oxidation-Reduction Potential (mV)	Turbidity (ntu)
16:25	54.23	0.81	150	12 +	307 +	<0.5	7.9	-131	28
16:30	54.23	0.81	150	12 +	307 +	<0.5	7.9	-132	23
16:35	54.23	0.81	150	12 +	307 +	<0.5	7.9	-133	22

Notes:

1) Abbreviations include: "deg c" indicates degrees Celsius; "ft" indicates feet; "ft bmp" indicates feet below reference measuring point; "gal" indicates gallons; "in" indicates inches; "mg/l" indicates milligrams per liter; "ml/min" indicates milliliters per minute; "mV" indicates millivolts; "NA" indicates not applicable; "NR" indicates not recorded; "ntu" indicates Nephelometric Turbidity units; "su" indicates standard units; "us/cm" indicates microsiemens per centimeter; and "+" indicates the parameter(s) may be used for stabilization calculations but cannot be used for other purposes.
2) Weather temperature units are in degrees Fahrenheit, unless otherwise noted.
3) Did indicator parameters reach stabilization? No
4) Was the two hour time limit reached? Yes
5) Calculations:
   - Head Above Pump Intake (ft) 106.08
   - Total Drawdown (ft) 0.81
   - Calculated Final Purge Volume (gal) 0.56
6) If Drawdown Did Not Stabilize or Stabilized Drawdown >0.3 ft, is Total Purge Volume > Calculated Final Purge Volume? Yes

Well Sampling Worksheet
WWW RAP Field Data
AREA 19 2023-Q3 - AREA19-MW-14A
Kent County, MI

Well	AREA19-MW-14A / 2 in Diameter PVC
Sample Quarter	2023-Q3
Date	09/15/2023
Weather	66F Sunny
Sampler Initials	JET
Purging Device	Bladder-Pump: BP-11, Peristaltic-Pump: NA, Centrifugal-Pump: NA
Meters Used	YSI: Agile Rental 1, Turbidimeter: Agile Rental 1, Water-Level-Meter: WLM-3
Reference Measuring Point	PVC
Well Screen (ft bmp)	152.2 - 157.2
Measured Bottom Depth (ft bmp)	NR
Sample Comment	10:45 - Water level continuting to rise after initial drawdown. 11:45 - YSI Connected.
Initial Water Level Date/Time	09/15/2023 10:30
Initial Water Level Depth (ft bmp)	134.35
Pump/Tubing Intake Depth (ft bmp)	154.7
Tubing Length (ft)	157
Tubing Inner Diameter (in)	0.25
Purging Initiation Date/Time	09/15/2023 10:30
Total Purge Volume (gal)	4.5
Modified Sample	No
If Modified, Reasoning	
Sample Collection Information	Bottling-Start: 09/15/2023 12:35:00, Bottling-Stop: 09/15/2023 12:40:00, Parameters-Sampled: PFAS

Reading Time	Depth To Water (ft)	Cumulative Drawdown (ft)	Purge Rate (ml/min)	Temperature (deg c)	Specific Conductivity (us/cm)	Dissolved Oxygen (mg/l)	pH (su)	Oxidation-Reduction Potential (mV)	Turbidity (ntu)
10:45	136.20	1.85	50	NR	NR	NR	NR	NR	NR
11:05	135.85	1.50	50	NR	NR	NR	NR	NR	NR
11:30	135.85	1.50	50	NR	NR	NR	NR	NR	169
11:45	135.85	1.50	50	11	548 +	<0.5	8.0	190	169
12:00	135.85	1.50	50	12	536 +	<0.5	7.9	3	151
12:20	135.85	1.50	50	13	535 +	<0.5	7.8	-91	195
12:25	135.85	1.50	50	13	356 +	<0.5	7.8	-98	184
12:30	135.85	1.50	50	13	534 +	<0.5	7.8	-100	180

Notes:

1) Abbreviations include: "deg c" indicates degrees Celsius; "ft" indicates feet; "ft bmp" indicates feet below reference measuring point; "gal" indicates gallons; "in" indicates inches; "mg/l" indicates milligrams per liter; "ml/min" indicates milliliters per minute; "mV" indicates millivolts; "NA" indicates not applicable; "NR" indicates not recorded; "ntu" indicates Nephelometric Turbidity units; "su" indicates standard units; "us/cm" indicates microsiemens per centimeter; and "+" indicates the parameter(s) may be used for stabilization calculations but cannot be used for other purposes.
2) Weather temperature units are in degrees Fahrenheit, unless otherwise noted.
3) Did indicator parameters reach stabilization? No
4) Was the two hour time limit reached? Yes
5) Calculations:
   - Head Above Pump Intake (ft) 20.35
   - Total Drawdown (ft) 1.50
   - Calculated Final Purge Volume (gal) 0.65
6) If Drawdown Did Not Stabilize or Stabilized Drawdown >0.3 ft, is Total Purge Volume > Calculated Final Purge Volume? Yes

Well Sampling Worksheet
WWW RAP Field Data
AREA 19 2023-Q3 - AREA19-MW-14B
Kent County, MI

Well	AREA19-MW-14B / 2 in Diameter PVC
Sample Quarter	2023-Q3
Date	09/15/2023
Weather	Sunny 60F
Sampler Initials	RCP
Purging Device	Bladder-Pump: BP-10, Peristaltic-Pump: NA, Centrifugal-Pump: NA
Meters Used	YSI: Agile Rental 1, Turbidimeter: Agile Rental 1, Water-Level-Meter: WLM-4
Reference Measuring Point	PVC
Well Screen (ft bmp)	166.6 - 171.6
Measured Bottom Depth (ft bmp)	169
Sample Comment	10:30 - Decreased discharge time due to drawdown. 11:20 - Will not pump water below 500 ml/min. No indicator parameters collected. Last 3 readings are not 5 minutes apart per the Standard Operating Procedure (SOP); GZA does not believe this impacts data quality because the well purged dry. Sample was collected after the well recharged.
Initial Water Level Date/Time	09/15/2023 10:25
Initial Water Level Depth (ft bmp)	134.25
Pump/Tubing Intake Depth (ft bmp)	169.1
Tubing Length (ft)	174
Tubing Inner Diameter (in)	0.25
Purging Initiation Date/Time	09/15/2023 10:25
Total Purge Volume (gal)	6
Modified Sample	Yes
If Modified, Reasoning	Drawdown >0.3 ft; Well pumped dry
Sample Collection Information	Bottling-Start: 09/15/2023 12:55:00, Bottling-Stop: 09/15/2023 13:05:00, Parameters-Sampled: PFAS

Reading Time	Depth To Water (ft)	Cumulative Drawdown (ft)	Purge Rate (ml/min)	Temperature (deg c)	Specific Conductivity (us/cm)	Dissolved Oxygen (mg/l)	pH (su)	Oxidation-Reduction Potential (mV)	Turbidity (ntu)
10:30	137.05	2.80	500	NR	NR	NR	NR	NR	NR
10:45	141.40	7.15	500	NR	NR	NR	NR	NR	NR
11:20	144.58	10.33	500	NR	NR	NR	NR	NR	NR
11:40	147.60	13.35	500	NR	NR	NR	NR	NR	NR
11:50	149.87	15.62	500	NR	NR	NR	NR	NR	NR
12:00	154.08	19.83	500	NR	NR	NR	NR	NR	NR

Well Sampling Worksheet
WWW RAP Field Data
AREA 19 2023-Q3 - AREA19-MW-14B
Kent County, MI

Well	AREA19-MW-14B / 2 in Diameter PVC
Sample Quarter	2023-Q3
Date	09/15/2023
Weather	Sunny 60F
Sampler Initials	RCP
Purging Device	Bladder-Pump: BP-10, Peristaltic-Pump: NA, Centrifugal-Pump: NA
Meters Used	YSI: Agile Rental 1, Turbidimeter: Agile Rental 1, Water-Level-Meter: WLM-4
Reference Measuring Point	PVC
Well Screen (ft bmp)	166.6 - 171.6
Measured Bottom Depth (ft bmp)	169
Sample Comment	10:30 - Decreased discharge time due to drawdown. 11:20 - Will not pump water below 500 ml/min. No indicator parameters collected. Last 3 readings are not 5 minutes apart per the Standard Operating Procedure (SOP); GZA does not believe this impacts data quality because the well purged dry. Sample was collected after the well recharged.
Initial Water Level Date/Time	09/15/2023 10:25
Initial Water Level Depth (ft bmp)	134.25
Pump/Tubing Intake Depth (ft bmp)	169.1
Tubing Length (ft)	174
Tubing Inner Diameter (in)	0.25
Purging Initiation Date/Time	09/15/2023 10:25
Total Purge Volume (gal)	6
Modified Sample	Yes
If Modified, Reasoning	Drawdown >0.3 ft; Well pumped dry
Sample Collection Information	Bottling-Start: 09/15/2023 12:55:00, Bottling-Stop: 09/15/2023 13:05:00, Parameters-Sampled: PFAS

Reading Time	Depth To Water (ft)	Cumulative Drawdown (ft)	Purge Rate (ml/min)	Temperature (deg c)	Specific Conductivity (us/cm)	Dissolved Oxygen (mg/l)	pH (su)	Oxidation-Reduction Potential (mV)	Turbidity (ntu)
12:10	158.42	24.17	500	NR	NR	NR	NR	NR	NR
12:20	162.15	27.90	500	NR	NR	NR	NR	NR	NR
12:30	163.62	29.37	500	NR	NR	NR	NR	NR	NR

Notes:

1) Abbreviations include: "deg c" indicates degrees Celsius; "ft" indicates feet; "ft bmp" indicates feet below reference measuring point; "gal" indicates gallons; "in" indicates inches; "mg/l" indicates milligrams per liter; "ml/min" indicates milliliters per minute; "mV" indicates millivolts; "NA" indicates not applicable; "NR" indicates not recorded; "ntu" indicates Nephelometric Turbidity units; "su" indicates standard units; and "us/cm" indicates microsiemens per centimeter.
2) Weather temperature units are in degrees Fahrenheit, unless otherwise noted.
3) Did indicator parameters reach stabilization? No
4) Was the two hour time limit reached? Yes
5) Calculations:
   - Head Above Pump Intake (ft) 34.85
   - Total Drawdown (ft) 29.37
   - Calculated Final Purge Volume (gal) 5.15
6) If Drawdown Did Not Stabilize or Stabilized Drawdown >0.3 ft, is Total Purge Volume > Calculated Final Purge Volume? Yes

Well Sampling Worksheet
WWW RAP Field Data
AREA 19 2023-Q3 - AREA19-MW-15B
Kent County, MI

Well	AREA19-MW-15B / 2 in Diameter PVC
Sample Quarter	2023-Q3
Date	09/07/2023
Weather	67F cloudy
Sampler Initials	JET
Purging Device	Bladder-Pump: BP-11, Peristaltic-Pump: NA, Centrifugal-Pump: NA
Meters Used	YSI: Agile Rental 3, Turbidimeter: Agile Rental 3, Water-Level-Meter: WLM-1
Reference Measuring Point	PVC
Well Screen (ft bmp)	128.6 - 133.6
Measured Bottom Depth (ft bmp)	NR
Sample Comment	YSI Connected at 12:00.
Initial Water Level Date/Time	09/07/2023 10:40
Initial Water Level Depth (ft bmp)	95.39
Pump/Tubing Intake Depth (ft bmp)	131.1
Tubing Length (ft)	135
Tubing Inner Diameter (in)	0.25
Purging Initiation Date/Time	09/07/2023 10:40
Total Purge Volume (gal)	5
Modified Sample	No
If Modified, Reasoning	
Sample Collection Information	Bottling-Start: 09/07/2023 12:45:00, Bottling-Stop: 09/07/2023 12:50:00, Parameters-Sampled: PFAS

Reading Time	Depth To Water (ft)	Cumulative Drawdown (ft)	Purge Rate (ml/min)	Temperature (deg c)	Specific Conductivity (us/cm)	Dissolved Oxygen (mg/l)	pH (su)	Oxidation-Reduction Potential (mV)	Turbidity (ntu)
10:50	95.43	0.04	125	NR	NR	NR	NR	NR	NR
11:10	95.43	0.04	125	NR	NR	NR	NR	NR	292
11:40	95.43	0.04	125	NR	NR	NR	NR	NR	49
12:00	95.43	0.04	125	12 +	649 +	<0.5	7.9	-93	20
12:10	95.43	0.04	125	11 +	644 +	<0.5	7.9	-103	17
12:20	95.43	0.04	125	11 +	631 +	<0.5	7.9	-113	15

Well Sampling Worksheet
WWW RAP Field Data
AREA 19 2023-Q3 - AREA19-MW-15B
Kent County, MI

Well	AREA19-MW-15B / 2 in Diameter PVC
Sample Quarter	2023-Q3
Date	09/07/2023
Weather	67F cloudy
Sampler Initials	JET
Purging Device	Bladder-Pump: BP-11, Peristaltic-Pump: NA, Centrifugal-Pump: NA
Meters Used	YSI: Agile Rental 3, Turbidimeter: Agile Rental 3, Water-Level-Meter: WLM-1
Reference Measuring Point	PVC
Well Screen (ft bmp)	128.6 - 133.6
Measured Bottom Depth (ft bmp)	NR
Sample Comment	YSI Connected at 12:00.
Initial Water Level Date/Time	09/07/2023 10:40
Initial Water Level Depth (ft bmp)	95.39
Pump/Tubing Intake Depth (ft bmp)	131.1
Tubing Length (ft)	135
Tubing Inner Diameter (in)	0.25
Purging Initiation Date/Time	09/07/2023 10:40
Total Purge Volume (gal)	5
Modified Sample	No
If Modified, Reasoning	
Sample Collection Information	Bottling-Start: 09/07/2023 12:45:00, Bottling-Stop: 09/07/2023 12:50:00, Parameters-Sampled: PFAS

Reading Time	Depth To Water (ft)	Cumulative Drawdown (ft)	Purge Rate (ml/min)	Temperature (deg c)	Specific Conductivity (us/cm)	Dissolved Oxygen (mg/l)	pH (su)	Oxidation-Reduction Potential (mV)	Turbidity (ntu)
12:30	95.43	0.04	125	11 +	618 +	<0.5	7.9	-117	14
12:35	95.43	0.04	125	11 +	613 +	<0.5	7.9	-118	12
12:40	95.43	0.04	125	12 +	607 +	<0.5	7.8	-120	11

Notes:

1) Abbreviations include: "deg c" indicates degrees Celsius; "ft" indicates feet; "ft bmp" indicates feet below reference measuring point; "gal" indicates gallons; "in" indicates inches; "mg/l" indicates milligrams per liter; "ml/min" indicates milliliters per minute; "mV" indicates millivolts; "NA" indicates not applicable; "NR" indicates not recorded; "ntu" indicates Nephelometric Turbidity units; "su" indicates standard units; "us/cm" indicates microsiemens per centimeter; and "+" indicates the parameter(s) may be used for stabilization calculations but cannot be used for other purposes.
2) Weather temperature units are in degrees Fahrenheit, unless otherwise noted.
3) Did indicator parameters reach stabilization? No
4) Was the two hour time limit reached? Yes
5) Calculations:
   - Head Above Pump Intake (ft) 35.71
   - Total Drawdown (ft) 0.04
   - Calculated Final Purge Volume (gal) NA
6) If Drawdown Did Not Stabilize or Stabilized Drawdown >0.3 ft, is Total Purge Volume > Calculated Final Purge Volume? NA

Well Sampling Worksheet
WWW RAP Field Data
AREA 19 2023-Q3 - AREA19-MW-15C
Kent County, MI

Well	AREA19-MW-15C / 2 in Diameter PVC
Sample Quarter	2023-Q3
Date	09/07/2023
Weather	65F and Cloudy
Sampler Initials	RCP
Purging Device	Bladder-Pump: NA, Peristaltic-Pump: NA, Centrifugal-Pump: Mega Monsoon #2
Meters Used	YSI: Agile Rental 1, Turbidimeter: Agile Rental 1, Water-Level-Meter: WLM-4
Reference Measuring Point	PVC
Well Screen (ft bmp)	164.2 - 169.2
Measured Bottom Depth (ft bmp)	169.2
Sample Comment	10:15 - Purge water observed to be very silty and turbid. 10:35 - Pump will not go any lower without shuttin goff. 11:30 - Turbidity observed to be lower. Connected YSI. 12:15 - Collected MS/MSD.
Initial Water Level Date/Time	09/07/2023 10:10
Initial Water Level Depth (ft bmp)	95.43
Pump/Tubing Intake Depth (ft bmp)	166.7
Tubing Length (ft)	168.7
Tubing Inner Diameter (in)	0.17
Purging Initiation Date/Time	09/07/2023 10:10
Total Purge Volume (gal)	3.5
Modified Sample	No
If Modified, Reasoning	
Sample Collection Information	Bottling-Start: 09/07/2023 12:10:00, Bottling-Stop: 09/07/2023 12:15:00, Parameters-Sampled: PFAS

Reading Time	Depth To Water (ft)	Cumulative Drawdown (ft)	Purge Rate (ml/min)	Temperature (deg c)	Specific Conductivity (us/cm)	Dissolved Oxygen (mg/l)	pH (su)	Oxidation-Reduction Potential (mV)	Turbidity (ntu)
10:15	95.49	0.06	120	NR	NR	NR	NR	NR	NR
10:35	95.53	0.10	120	NR	NR	NR	NR	NR	NR
11:15	95.51	0.08	120	NR	NR	NR	NR	NR	118
11:30	95.51	0.08	120	NR	NR	NR	NR	NR	49
11:40	95.51	0.08	120	13 +	430 +	6.9	7.5	-68	36
11:45	95.51	0.08	120	13 +	431 +	0.5	7.6	-106	32
11:50	95.51	0.08	120	13 +	431 +	0.5	7.7	-124	28

Well Sampling Worksheet
WWW RAP Field Data
AREA 19 2023-Q3 - AREA19-MW-15C
Kent County, MI

Well	AREA19-MW-15C / 2 in Diameter PVC
Sample Quarter	2023-Q3
Date	09/07/2023
Weather	65F and Cloudy
Sampler Initials	RCP
Purging Device	Bladder-Pump: NA, Peristaltic-Pump: NA, Centrifugal-Pump: Mega Monsoon #2
Meters Used	YSI: Agile Rental 1, Turbidimeter: Agile Rental 1, Water-Level-Meter: WLM-4
Reference Measuring Point	PVC
Well Screen (ft bmp)	164.2 - 169.2
Measured Bottom Depth (ft bmp)	169.2
Sample Comment	10:15 - Purge water observed to be very silty and turbid. 10:35 - Pump will not go any lower without shuttin goff. 11:30 - Turbidity observed to be lower. Connected YSI. 12:15 - Collected MS/MSD.
Initial Water Level Date/Time	09/07/2023 10:10
Initial Water Level Depth (ft bmp)	95.43
Pump/Tubing Intake Depth (ft bmp)	166.7
Tubing Length (ft)	168.7
Tubing Inner Diameter (in)	0.17
Purging Initiation Date/Time	09/07/2023 10:10
Total Purge Volume (gal)	3.5
Modified Sample	No
If Modified, Reasoning	
Sample Collection Information	Bottling-Start: 09/07/2023 12:10:00, Bottling-Stop: 09/07/2023 12:15:00, Parameters-Sampled: PFAS

Reading Time	Depth To Water (ft)	Cumulative Drawdown (ft)	Purge Rate (ml/min)	Temperature (deg c)	Specific Conductivity (us/cm)	Dissolved Oxygen (mg/l)	pH (su)	Oxidation-Reduction Potential (mV)	Turbidity (ntu)
11:55	95.51	0.08	120	13 +	431 +	<0.5	7.7	-136	29
12:00	95.51	0.08	120	13 +	431 +	<0.5	7.7	-142	30
12:05	95.51	0.08	120	13 +	431 +	<0.5	7.8	-143	28

Notes:

1) Abbreviations include: "deg c" indicates degrees Celsius; "ft" indicates feet; "ft bmp" indicates feet below reference measuring point; "gal" indicates gallons; "in" indicates inches; "mg/l" indicates milligrams per liter; "ml/min" indicates milliliters per minute; "mV" indicates millivolts; "NA" indicates not applicable; "NR" indicates not recorded; "ntu" indicates Nephelometric Turbidity units; "su" indicates standard units; "us/cm" indicates microsiemens per centimeter; and "+" indicates the parameter(s) may be used for stabilization calculations but cannot be used for other purposes.
2) Weather temperature units are in degrees Fahrenheit, unless otherwise noted.
3) Did indicator parameters reach stabilization? Yes
4) Was the two hour time limit reached? Yes
5) Calculations:
   - Head Above Pump Intake (ft) 71.27
   - Total Drawdown (ft) 0.08
   - Calculated Final Purge Volume (gal) NA
6) If Drawdown Did Not Stabilize or Stabilized Drawdown >0.3 ft, is Total Purge Volume > Calculated Final Purge Volume? NA

Well Sampling Worksheet
WWW RAP Field Data
AREA 19 2023-Q3 - AREA19-MW-16A
Kent County, MI

Well	AREA19-MW-16A / 2 in Diameter PVC
Sample Quarter	2023-Q3
Date	09/11/2023
Weather	Rain 65
Sampler Initials	NCK
Purging Device	Bladder-Pump: NA, Peristaltic-Pump: NA, Centrifugal-Pump: Mega Monsoon #2
Meters Used	YSI: Agile Rental 1, Turbidimeter: Agile Rental 1, Water-Level-Meter: WLM-2
Reference Measuring Point	PVC
Well Screen (ft bmp)	38.0 - 43.0
Measured Bottom Depth (ft bmp)	NR
Sample Comment	YSI Connected at 13:50.
Initial Water Level Date/Time	09/11/2023 12:20
Initial Water Level Depth (ft bmp)	32.82
Pump/Tubing Intake Depth (ft bmp)	40.5
Tubing Length (ft)	45
Tubing Inner Diameter (in)	0.25
Purging Initiation Date/Time	09/11/2023 12:25
Total Purge Volume (gal)	5.5
Modified Sample	No
If Modified, Reasoning	
Sample Collection Information	Bottling-Start: 09/11/2023 14:30:00, Bottling-Stop: 09/11/2023 14:35:00, Parameters-Sampled: PFAS

Reading Time	Depth To Water (ft)	Cumulative Drawdown (ft)	Purge Rate (ml/min)	Temperature (deg c)	Specific Conductivity (us/cm)	Dissolved Oxygen (mg/l)	pH (su)	Oxidation-Reduction Potential (mV)	Turbidity (ntu)
12:30	33.02	0.20	175	NR	NR	NR	NR	NR	NR
13:00	33.02	0.20	175	NR	NR	NR	NR	NR	NR
13:15	33.02	0.20	175	NR	NR	NR	NR	NR	NR
13:50	32.98	0.16	175	16	1,370 +	5.2	6.9	337	33
14:10	32.98	0.16	175	16	1,360 +	5.5	7.0	336	17
14:15	32.98	0.16	175	16	1,358 +	5.6	7.0	336	10
14:20	32.98	0.16	175	16	1,355 +	5.5	7.0	337	9
14:25	32.98	0.16	175	15	1,357 +	5.5	7.0	338	9

Notes:

1) Abbreviations include: "deg c" indicates degrees Celsius; "ft" indicates feet; "ft bmp" indicates feet below reference measuring point; "gal" indicates gallons; "in" indicates inches; "mg/l" indicates milligrams per liter; "ml/min" indicates milliliters per minute; "mV" indicates millivolts; "NA" indicates not applicable; "NR" indicates not recorded; "ntu" indicates Nephelometric Turbidity units; "su" indicates standard units; "us/cm" indicates microsiemens per centimeter; and "+" indicates the parameter(s) may be used for stabilization calculations but cannot be used for other purposes.
2) Weather temperature units are in degrees Fahrenheit, unless otherwise noted.
3) Did indicator parameters reach stabilization? Yes
4) Was the two hour time limit reached? Yes
5) Calculations:
   - Head Above Pump Intake (ft) 7.68
   - Total Drawdown (ft) 0.16
   - Calculated Final Purge Volume (gal) NA
6) If Drawdown Did Not Stabilize or Stabilized Drawdown >0.3 ft, is Total Purge Volume > Calculated Final Purge Volume? NA

Well Sampling Worksheet
WWW RAP Field Data
AREA 6 2023-Q3 - HS-MW-13A
Kent County, MI

Well	HS-MW-13A / 2 in Diameter PVC
Sample Quarter	2023-Q3
Date	08/01/2023
Weather	61F Cloudy
Sampler Initials	JET
Purging Device	Bladder-Pump: NA, Peristaltic-Pump: NA, Centrifugal-Pump: Mega Monsoon #2
Meters Used	YSI: Agile Rental 4, Turbidimeter: Agile Rental 1, Water-Level-Meter: WLM-4
Reference Measuring Point	PVC
Well Screen (ft bmp)	81.7 - 86.5
Measured Bottom Depth (ft bmp)	NR
Sample Comment	YSI Connected at 11:30.
Initial Water Level Date/Time	08/01/2023 10:10
Initial Water Level Depth (ft bmp)	58.15
Pump/Tubing Intake Depth (ft bmp)	84.1
Tubing Length (ft)	87
Tubing Inner Diameter (in)	0.17
Purging Initiation Date/Time	08/01/2023 10:10
Total Purge Volume (gal)	8
Modified Sample	No
If Modified, Reasoning	
Sample Collection Information	Bottling-Start: 08/01/2023 11:55:00, Bottling-Stop: 08/01/2023 12:00:00, Parameters-Sampled: PFAS

Reading Time	Depth To Water (ft)	Cumulative Drawdown (ft)	Purge Rate (ml/min)	Temperature (deg c)	Specific Conductivity (us/cm)	Dissolved Oxygen (mg/l)	pH (su)	Oxidation-Reduction Potential (mV)	Turbidity (ntu)
10:20	58.20	0.05	400	NR	NR	NR	NR	NR	77
10:50	58.20	0.05	400	NR	NR	NR	NR	NR	16
11:20	58.20	0.05	400	NR	NR	NR	NR	NR	6
11:30	58.20	0.05	400	12	518 +	5.4	7.7	284	<5
11:40	58.20	0.05	400	12	518 +	5.3	7.7	284	<5
11:45	58.20	0.05	400	12	518 +	5.3	7.7	285	<5
11:50	58.20	0.05	400	12	518 +	5.3	7.7	285	<5

Notes:

1) Abbreviations include: "deg c" indicates degrees Celsius; "ft" indicates feet; "ft bmp" indicates feet below reference measuring point; "gal" indicates gallons; "in" indicates inches; "mg/l" indicates milligrams per liter; "ml/min" indicates milliliters per minute; "mV" indicates millivolts; "NA" indicates not applicable; "NR" indicates not recorded; "ntu" indicates Nephelometric Turbidity units; "su" indicates standard units; "us/cm" indicates microsiemens per centimeter; and "+" indicates the parameter(s) may be used for stabilization calculations but cannot be used for other purposes.
2) Weather temperature units are in degrees Fahrenheit, unless otherwise noted.
3) Did indicator parameters reach stabilization? Yes
4) Was the two hour time limit reached? No
5) Calculations:
   - Head Above Pump Intake (ft) 25.95
   - Total Drawdown (ft) 0.05
   - Calculated Final Purge Volume (gal) NA
6) If Drawdown Did Not Stabilize or Stabilized Drawdown >0.3 ft, is Total Purge Volume > Calculated Final Purge Volume? NA

Well Sampling Worksheet
WWW RAP Field Data
AREA 6 2023-Q3 - HS-MW-13B
Kent County, MI

Well	HS-MW-13B / 2 in Diameter PVC
Sample Quarter	2023-Q3
Date	08/01/2023
Weather	Sunny 70°F
Sampler Initials	RCP
Purging Device	Bladder-Pump: NA, Peristaltic-Pump: NA, Centrifugal-Pump: Mega Monsoon #1
Meters Used	YSI: Agile Rental 1, Turbidimeter: Agile Rental 1, Water-Level-Meter: WLM-2
Reference Measuring Point	PVC
Well Screen (ft bmp)	151.2 - 156.0
Measured Bottom Depth (ft bmp)	156
Sample Comment	Turbidity low so YSI Connected at 10:10.
Initial Water Level Date/Time	08/01/2023 09:55
Initial Water Level Depth (ft bmp)	58.14
Pump/Tubing Intake Depth (ft bmp)	153.6
Tubing Length (ft)	156
Tubing Inner Diameter (in)	0.17
Purging Initiation Date/Time	08/01/2023 09:55
Total Purge Volume (gal)	3
Modified Sample	No
If Modified, Reasoning	
Sample Collection Information	Bottling-Start: 08/01/2023 11:05:00, Bottling-Stop: 08/01/2023 11:10:00, Parameters-Sampled: PFAS

Reading Time	Depth To Water (ft)	Cumulative Drawdown (ft)	Purge Rate (ml/min)	Temperature (deg c)	Specific Conductivity (us/cm)	Dissolved Oxygen (mg/l)	pH (su)	Oxidation-Reduction Potential (mV)	Turbidity (ntu)
10:00	58.16	0.02	100	NR	NR	NR	NR	NR	NR
10:10	58.16	0.02	100	NR	NR	NR	NR	NR	17
10:20	58.16	0.02	100	12 +	831 +	7.3	7.1	164	14
10:30	58.16	0.02	100	11 +	837 +	7.5	7.1	166	11
10:35	58.16	0.02	100	11 +	838 +	7.2	7.1	167	9
10:40	58.16	0.02	100	11 +	840 +	6.4	7.1	169	5
10:45	58.16	0.02	100	11 +	841 +	6.2	7.1	171	6
10:50	58.16	0.02	100	11 +	842 +	6.4	7.1	171	<5
10:55	58.16	0.02	100	11 +	840 +	6.3	7.1	172	<5
11:00	58.16	0.02	100	11 +	841 +	6.2	7.1	173	<5

Notes:

1) Abbreviations include: "deg c" indicates degrees Celsius; "ft" indicates feet; "ft bmp" indicates feet below reference measuring point; "gal" indicates gallons; "in" indicates inches; "mg/l" indicates milligrams per liter; "ml/min" indicates milliliters per minute; "mV" indicates millivolts; "NA" indicates not applicable; "NR" indicates not recorded; "ntu" indicates Nephelometric Turbidity units; "su" indicates standard units; "us/cm" indicates microsiemens per centimeter; and "+" indicates the parameter(s) may be used for stabilization calculations but cannot be used for other purposes.
2) Weather temperature units are in degrees Fahrenheit, unless otherwise noted.
3) Did indicator parameters reach stabilization? Yes
4) Was the two hour time limit reached? No
5) Calculations:
   - Head Above Pump Intake (ft) 95.46
   - Total Drawdown (ft) 0.02
   - Calculated Final Purge Volume (gal) NA
6) If Drawdown Did Not Stabilize or Stabilized Drawdown >0.3 ft, is Total Purge Volume > Calculated Final Purge Volume? NA

Well Sampling Worksheet
WWW RAP Field Data
AREA 6 2023-Q3 - HS-MW-13C
Kent County, MI

Well	HS-MW-13C / 2 in Diameter PVC
Sample Quarter	2023-Q3
Date	08/04/2023
Weather	73F Sunny
Sampler Initials	JET
Purging Device	Bladder-Pump: BP-12, Peristaltic-Pump: NA, Centrifugal-Pump: NA
Meters Used	YSI: Agile Rental 1, Turbidimeter: Agile Rental 1, Water-Level-Meter: WLM-3
Reference Measuring Point	PVC
Well Screen (ft bmp)	201.7 - 206.5
Measured Bottom Depth (ft bmp)	NR
Sample Comment	YSI Connected at 11:45.
Initial Water Level Date/Time	08/04/2023 09:50
Initial Water Level Depth (ft bmp)	57.43
Pump/Tubing Intake Depth (ft bmp)	204.1
Tubing Length (ft)	208
Tubing Inner Diameter (in)	0.25
Purging Initiation Date/Time	08/04/2023 09:50
Total Purge Volume (gal)	4
Modified Sample	No
If Modified, Reasoning	
Sample Collection Information	Bottling-Start: 08/04/2023 12:00:00, Bottling-Stop: 08/04/2023 12:05:00, Parameters-Sampled: PFAS

Reading Time	Depth To Water (ft)	Cumulative Drawdown (ft)	Purge Rate (ml/min)	Temperature (deg c)	Specific Conductivity (us/cm)	Dissolved Oxygen (mg/l)	pH (su)	Oxidation-Reduction Potential (mV)	Turbidity (ntu)
10:30	57.63	0.20	100	NR	NR	NR	NR	NR	NR
10:40	57.63	0.20	100	NR	NR	NR	NR	NR	NR
11:10	57.63	0.20	100	NR	NR	NR	NR	NR	NR
11:40	57.63	0.20	100	NR	NR	NR	NR	NR	11
11:45	57.63	0.20	100	13	1,754 +	0.6	7.1	-10	9
11:50	57.63	0.20	100	13	1,753 +	0.6	7.1	-28	7
11:55	57.63	0.20	100	13	1,753 +	0.5	7.1	-40	6

Notes:

1) Abbreviations include: "deg c" indicates degrees Celsius; "ft" indicates feet; "ft bmp" indicates feet below reference measuring point; "gal" indicates gallons; "in" indicates inches; "mg/l" indicates milligrams per liter; "ml/min" indicates milliliters per minute; "mV" indicates millivolts; "NA" indicates not applicable; "NR" indicates not recorded; "ntu" indicates Nephelometric Turbidity units; "su" indicates standard units; "us/cm" indicates microsiemens per centimeter; and "+" indicates the parameter(s) may be used for stabilization calculations but cannot be used for other purposes.
2) Weather temperature units are in degrees Fahrenheit, unless otherwise noted.
3) Did indicator parameters reach stabilization? No
4) Was the two hour time limit reached? Yes
5) Calculations:
   - Head Above Pump Intake (ft) 146.67
   - Total Drawdown (ft) 0.20
   - Calculated Final Purge Volume (gal) NA
6) If Drawdown Did Not Stabilize or Stabilized Drawdown >0.3 ft, is Total Purge Volume > Calculated Final Purge Volume? NA

Well Sampling Worksheet
WWW RAP Field Data
PERIMETER 2023-Q3 - HS-MW-32A
Kent County, MI

Well	HS-MW-32A / 2 in Diameter PVC
Sample Quarter	2023-Q3
Date	08/21/2023
Weather	Sunny 80
Sampler Initials	BPT
Purging Device	Bladder-Pump: NA, Peristaltic-Pump: PER-3, Centrifugal-Pump: NA
Meters Used	YSI: Agile Rental 3, Turbidimeter: Agile Rental 3, Water-Level-Meter: WLM-1
Reference Measuring Point	PVC
Well Screen (ft bmp)	63.5 - 68.1
Measured Bottom Depth (ft bmp)	NR
Sample Comment	11:50: YSI connected. Last 3 water level readings were not the same per Standard Operating Procedure (SOP). Water level meters are considered accurate to +/- 0.01 feet and last 3 readings were within this range. GZA does not believe this impacts data quality.
Initial Water Level Date/Time	08/21/2023 11:30
Initial Water Level Depth (ft bmp)	8.14
Pump/Tubing Intake Depth (ft bmp)	65.8
Tubing Length (ft)	70
Tubing Inner Diameter (in)	0.17
Purging Initiation Date/Time	08/21/2023 11:35
Total Purge Volume (gal)	2
Modified Sample	No
If Modified, Reasoning	
Sample Collection Information	Bottling-Start: 08/21/2023 12:30:00, Bottling-Stop: 08/21/2023 12:35:00, Parameters-Sampled: PFAS

Reading Time	Depth To Water (ft)	Cumulative Drawdown (ft)	Purge Rate (ml/min)	Temperature (deg c)	Specific Conductivity (us/cm)	Dissolved Oxygen (mg/l)	pH (su)	Oxidation-Reduction Potential (mV)	Turbidity (ntu)
11:45	8.15	0.01	220	NR	NR	NR	NR	NR	NR
11:50	8.15	0.01	220	14	1,176 +	0.5	7.5	-66	NR
12:05	8.15	0.01	220	13	1,145 +	<0.5	7.5	-112	NR
12:15	8.15	0.01	220	13	1,135 +	<0.5	7.5	-122	<5
12:20	8.16	0.02	220	14	1,133 +	<0.5	7.5	-124	<5
12:25	8.15	0.01	220	13	1,133 +	<0.5	7.6	-126	<5

Notes:

1) Abbreviations include: "deg c" indicates degrees Celsius; "ft" indicates feet; "ft bmp" indicates feet below reference measuring point; "gal" indicates gallons; "in" indicates inches; "mg/l" indicates milligrams per liter; "ml/min" indicates milliliters per minute; "mV" indicates millivolts; "NA" indicates not applicable; "NR" indicates not recorded; "ntu" indicates Nephelometric Turbidity units; "su" indicates standard units; "us/cm" indicates microsiemens per centimeter; and "+" indicates the parameter(s) may be used for stabilization calculations but cannot be used for other purposes.
2) Weather temperature units are in degrees Fahrenheit, unless otherwise noted.
3) Did indicator parameters reach stabilization? Yes
4) Was the two hour time limit reached? No
5) Calculations:
   - Head Above Pump Intake (ft) 57.66
   - Total Drawdown (ft) 0.01
   - Calculated Final Purge Volume (gal) NA
6) If Drawdown Did Not Stabilize or Stabilized Drawdown >0.3 ft, is Total Purge Volume > Calculated Final Purge Volume? NA

Well Sampling Worksheet
WWW RAP Field Data
PERIMETER 2023-Q3 - HS-MW-32B
Kent County, MI

Well	HS-MW-32B / 2 in Diameter PVC
Sample Quarter	2023-Q3
Date	08/21/2023
Weather	Sunny 80
Sampler Initials	RCP
Purging Device	Bladder-Pump: NA, Peristaltic-Pump: PER-01, Centrifugal-Pump: NA
Meters Used	YSI: Agile Rental 1, Turbidimeter: Agile Rental 1, Water-Level-Meter: WLM-2
Reference Measuring Point	PVC
Well Screen (ft bmp)	81.8 - 86.4
Measured Bottom Depth (ft bmp)	NR
Sample Comment	YSI Connected at 12:15.
Initial Water Level Date/Time	08/21/2023 11:30
Initial Water Level Depth (ft bmp)	8.62
Pump/Tubing Intake Depth (ft bmp)	84.1
Tubing Length (ft)	87
Tubing Inner Diameter (in)	0.17
Purging Initiation Date/Time	08/21/2023 11:35
Total Purge Volume (gal)	2
Modified Sample	No
If Modified, Reasoning	
Sample Collection Information	Bottling-Start: 08/21/2023 12:30:00, Bottling-Stop: 08/21/2023 12:35:00, Parameters-Sampled: PFAS

Reading Time	Depth To Water (ft)	Cumulative Drawdown (ft)	Purge Rate (ml/min)	Temperature (deg c)	Specific Conductivity (us/cm)	Dissolved Oxygen (mg/l)	pH (su)	Oxidation-Reduction Potential (mV)	Turbidity (ntu)
11:45	8.86	0.24	60	NR	NR	NR	NR	NR	NR
11:55	8.86	0.24	60	NR	NR	NR	NR	NR	NR
12:05	8.86	0.24	60	NR	NR	NR	NR	NR	NR
12:15	8.86	0.24	60	15	997 +	1.7	7.5	-251 +	<5
12:20	8.86	0.24	60	16	999 +	0.5	7.5	-257 +	<5
12:25	8.86	0.24	60	15	1,011 +	0.5	7.5	-261 +	<5
12:30	8.86	0.24	60	15	1,013 +	0.5	7.5	-262 +	<5

Notes:

1) Abbreviations include: "deg c" indicates degrees Celsius; "ft" indicates feet; "ft bmp" indicates feet below reference measuring point; "gal" indicates gallons; "in" indicates inches; "mg/l" indicates milligrams per liter; "ml/min" indicates milliliters per minute; "mV" indicates millivolts; "NA" indicates not applicable; "NR" indicates not recorded; "ntu" indicates Nephelometric Turbidity units; "su" indicates standard units; "us/cm" indicates microsiemens per centimeter; and "+" indicates the parameter(s) may be used for stabilization calculations but cannot be used for other purposes.
2) Weather temperature units are in degrees Fahrenheit, unless otherwise noted.
3) Did indicator parameters reach stabilization? Yes
4) Was the two hour time limit reached? No
5) Calculations:
   - Head Above Pump Intake (ft) 75.48
   - Total Drawdown (ft) 0.24
   - Calculated Final Purge Volume (gal) NA
6) If Drawdown Did Not Stabilize or Stabilized Drawdown >0.3 ft, is Total Purge Volume > Calculated Final Purge Volume? NA

Well Sampling Worksheet
WWW RAP Field Data
PERIMETER 2023-Q3 - HS-MW-32C
Kent County, MI

Well	HS-MW-32C / 2 in Diameter PVC
Sample Quarter	2023-Q3
Date	08/21/2023
Weather	Sunny 80
Sampler Initials	BPT
Purging Device	Bladder-Pump: NA, Peristaltic-Pump: PER-1, Centrifugal-Pump: NA
Meters Used	YSI: Agile Rental 2, Turbidimeter: Agile Rental 2, Water-Level-Meter: WLM-1
Reference Measuring Point	PVC
Well Screen (ft bmp)	111.4 - 116.0
Measured Bottom Depth (ft bmp)	116.4
Sample Comment	
Initial Water Level Date/Time	08/21/2023 14:15
Initial Water Level Depth (ft bmp)	8.31
Pump/Tubing Intake Depth (ft bmp)	113.7
Tubing Length (ft)	117
Tubing Inner Diameter (in)	0.17
Purging Initiation Date/Time	08/21/2023 14:20
Total Purge Volume (gal)	2.5
Modified Sample	No
If Modified, Reasoning	
Sample Collection Information	Bottling-Start: 08/21/2023 15:25:00, Bottling-Stop: 08/21/2023 15:35:00, Parameters-Sampled: PFAS

Reading Time	Depth To Water (ft)	Cumulative Drawdown (ft)	Purge Rate (ml/min)	Temperature (deg c)	Specific Conductivity (us/cm)	Dissolved Oxygen (mg/l)	pH (su)	Oxidation-Reduction Potential (mV)	Turbidity (ntu)
14:35	8.45	0.14	120	NR	NR	NR	NR	NR	31
14:45	8.45	0.14	120	15	1,095 +	<0.5	7.4	-23 +	17
14:55	8.46	0.15	120	14	1,096 +	<0.5	7.5	-81 +	12
15:05	8.46	0.15	120	14	1,092 +	<0.5	7.5	-95 +	8
15:10	8.46	0.15	120	14	1,091 +	<0.5	7.5	-100 +	6
15:15	8.46	0.15	120	14	1,086 +	<0.5	7.5	-102 +	5
15:20	8.46	0.15	120	14	1,090 +	<0.5	7.5	-104 +	4

Notes:

1) Abbreviations include: "deg c" indicates degrees Celsius; "ft" indicates feet; "ft bmp" indicates feet below reference measuring point; "gal" indicates gallons; "in" indicates inches; "mg/l" indicates milligrams per liter; "ml/min" indicates milliliters per minute; "mV" indicates millivolts; "NA" indicates not applicable; "NR" indicates not recorded; "ntu" indicates Nephelometric Turbidity units; "su" indicates standard units; "us/cm" indicates microsiemens per centimeter; and "+" indicates the parameter(s) may be used for stabilization calculations but cannot be used for other purposes.
2) Weather temperature units are in degrees Fahrenheit, unless otherwise noted.
3) Did indicator parameters reach stabilization? Yes
4) Was the two hour time limit reached? No
5) Calculations:
   - Head Above Pump Intake (ft) 105.39
   - Total Drawdown (ft) 0.15
   - Calculated Final Purge Volume (gal) NA
6) If Drawdown Did Not Stabilize or Stabilized Drawdown >0.3 ft, is Total Purge Volume > Calculated Final Purge Volume? NA

Well Sampling Worksheet
WWW RAP Field Data
PERIMETER 2023-Q3 - HS-MW-32D
Kent County, MI

Well	HS-MW-32D / 2 in Diameter PVC
Sample Quarter	2023-Q3
Date	08/21/2023
Weather	Sunny 80
Sampler Initials	BPT
Purging Device	Bladder-Pump: NA, Peristaltic-Pump: PER-3, Centrifugal-Pump: NA
Meters Used	YSI: Agile Rental 3, Turbidimeter: Agile Rental 3, Water-Level-Meter: WLM-2
Reference Measuring Point	PVC
Well Screen (ft bmp)	144.8 - 149.4
Measured Bottom Depth (ft bmp)	NR
Sample Comment	14:50 - Drawdown not stable. 15:20 - YSI Connected.
Initial Water Level Date/Time	08/21/2023 14:05
Initial Water Level Depth (ft bmp)	8.37
Pump/Tubing Intake Depth (ft bmp)	147.1
Tubing Length (ft)	150
Tubing Inner Diameter (in)	0.17
Purging Initiation Date/Time	08/21/2023 14:10
Total Purge Volume (gal)	1.2
Modified Sample	No
If Modified, Reasoning	
Sample Collection Information	Bottling-Start: 08/21/2023 15:45:00, Bottling-Stop: 08/21/2023 15:50:00, Parameters-Sampled: PFAS

Reading Time	Depth To Water (ft)	Cumulative Drawdown (ft)	Purge Rate (ml/min)	Temperature (deg c)	Specific Conductivity (us/cm)	Dissolved Oxygen (mg/l)	pH (su)	Oxidation-Reduction Potential (mV)	Turbidity (ntu)
14:20	8.55	0.18	50	NR	NR	NR	NR	NR	NR
14:30	8.97	0.60	50	NR	NR	NR	NR	NR	NR
14:40	9.32	0.95	50	NR	NR	NR	NR	NR	NR
14:50	9.38	1.01	50	NR	NR	NR	NR	NR	NR
15:00	9.57	1.20	50	NR	NR	NR	NR	NR	NR
15:10	9.72	1.35	50	NR	NR	NR	NR	NR	NR
15:20	9.76	1.39	50	NR	NR	NR	NR	NR	NR
15:30	9.72	1.35	50	15	1,946 +	<0.5	7.7	-276	<5
15:35	9.72	1.35	50	15	1,950 +	<0.5	7.7	-277	<5
15:40	9.72	1.35	50	15	1,956 +	<0.5	7.7	-279	<5

Notes:

1) Abbreviations include: "deg c" indicates degrees Celsius; "ft" indicates feet; "ft bmp" indicates feet below reference measuring point; "gal" indicates gallons; "in" indicates inches; "mg/l" indicates milligrams per liter; "ml/min" indicates milliliters per minute; "mV" indicates millivolts; "NA" indicates not applicable; "NR" indicates not recorded; "ntu" indicates Nephelometric Turbidity units; "su" indicates standard units; "us/cm" indicates microsiemens per centimeter; and "+" indicates the parameter(s) may be used for stabilization calculations but cannot be used for other purposes.
2) Weather temperature units are in degrees Fahrenheit, unless otherwise noted.
3) Did indicator parameters reach stabilization? Yes
4) Was the two hour time limit reached? No
5) Calculations:
   - Head Above Pump Intake (ft) 138.73
   - Total Drawdown (ft) 1.35
   - Calculated Final Purge Volume (gal) 0.4
6) If Drawdown Did Not Stabilize or Stabilized Drawdown >0.3 ft, is Total Purge Volume > Calculated Final Purge Volume? Yes

Well Sampling Worksheet
WWW RAP Field Data
AREA 6 2023-Q3 - HS-PMW-16A
Kent County, MI

Well	HS-PMW-16A / 2 in Diameter PVC
Sample Quarter	2023-Q3
Date	07/31/2023
Weather	78F Partly Sunny
Sampler Initials	JET
Purging Device	Bladder-Pump: NA, Peristaltic-Pump: NA, Centrifugal-Pump: Mega Monsoon #2
Meters Used	YSI: Agile Rental 1, Turbidimeter: Agile Rental 1, Water-Level-Meter: WLM-2
Reference Measuring Point	PVC
Well Screen (ft bmp)	89.0 - 94.0
Measured Bottom Depth (ft bmp)	NR
Sample Comment	YSI Connected at 16:30.
Initial Water Level Date/Time	07/31/2023 15:20
Initial Water Level Depth (ft bmp)	73.13
Pump/Tubing Intake Depth (ft bmp)	91.5
Tubing Length (ft)	94
Tubing Inner Diameter (in)	0.17
Purging Initiation Date/Time	07/31/2023 15:20
Total Purge Volume (gal)	7
Modified Sample	No
If Modified, Reasoning	
Sample Collection Information	Bottling-Start: 07/31/2023 16:45:00, Bottling-Stop: 07/31/2023 16:50:00, Parameters-Sampled: PFAS

Reading Time	Depth To Water (ft)	Cumulative Drawdown (ft)	Purge Rate (ml/min)	Temperature (deg c)	Specific Conductivity (us/cm)	Dissolved Oxygen (mg/l)	pH (su)	Oxidation-Reduction Potential (mV)	Turbidity (ntu)
15:30	73.20	0.07	500	NR	NR	NR	NR	NR	NR
15:50	73.20	0.07	500	NR	NR	NR	NR	NR	5
16:10	73.20	0.07	500	NR	NR	NR	NR	NR	<5
16:30	73.20	0.07	500	12 +	704 +	6.0	6.6	179	<5
16:35	73.20	0.07	500	12 +	704 +	6.0	6.6	180	<5
16:40	73.20	0.07	500	12 +	703 +	6.0	6.6	183	<5

Notes:

1) Abbreviations include: "deg c" indicates degrees Celsius; "ft" indicates feet; "ft bmp" indicates feet below reference measuring point; "gal" indicates gallons; "in" indicates inches; "mg/l" indicates milligrams per liter; "ml/min" indicates milliliters per minute; "mV" indicates millivolts; "NA" indicates not applicable; "NR" indicates not recorded; "ntu" indicates Nephelometric Turbidity units; "su" indicates standard units; "us/cm" indicates microsiemens per centimeter; and "+" indicates the parameter(s) may be used for stabilization calculations but cannot be used for other purposes.
2) Weather temperature units are in degrees Fahrenheit, unless otherwise noted.
3) Did indicator parameters reach stabilization? Yes
4) Was the two hour time limit reached? No
5) Calculations:
   - Head Above Pump Intake (ft) 18.37
   - Total Drawdown (ft) 0.07
   - Calculated Final Purge Volume (gal) NA
6) If Drawdown Did Not Stabilize or Stabilized Drawdown >0.3 ft, is Total Purge Volume > Calculated Final Purge Volume? NA

Well Sampling Worksheet
WWW RAP Field Data
AREA 6 2023-Q3 - HS-PMW-16B
Kent County, MI

Well	HS-PMW-16B / 2 in Diameter PVC
Sample Quarter	2023-Q3
Date	07/31/2023
Weather	78°F Partly Sunny
Sampler Initials	RCP
Purging Device	Bladder-Pump: NA, Peristaltic-Pump: NA, Centrifugal-Pump: Mega Monsoon #2
Meters Used	YSI: Agile Rental 4, Turbidimeter: Agile Rental 1, Water-Level-Meter: WLM-4
Reference Measuring Point	PVC
Well Screen (ft bmp)	118.1 - 123.1
Measured Bottom Depth (ft bmp)	123.1
Sample Comment	Took 10 minutes to get a water to the surface. Water at the beginning of the purge was observed to be very dark gray, clay rich. Low turbidity observed at 17:05, Connected YSI.
Initial Water Level Date/Time	07/31/2023 15:40
Initial Water Level Depth (ft bmp)	72.97
Pump/Tubing Intake Depth (ft bmp)	120.6
Tubing Length (ft)	123
Tubing Inner Diameter (in)	0.17
Purging Initiation Date/Time	07/31/2023 15:40
Total Purge Volume (gal)	8
Modified Sample	No
If Modified, Reasoning	
Sample Collection Information	Bottling-Start: 07/31/2023 17:45:00, Bottling-Stop: 07/31/2023 17:50:00, Parameters-Sampled: PFAS

Reading Time	Depth To Water (ft)	Cumulative Drawdown (ft)	Purge Rate (ml/min)	Temperature (deg c)	Specific Conductivity (us/cm)	Dissolved Oxygen (mg/l)	pH (su)	Oxidation-Reduction Potential (mV)	Turbidity (ntu)
15:50	73.02	0.05	NR	NR	NR	NR	NR	NR	NR
16:15	73.02	0.05	NR	NR	NR	NR	NR	NR	197
16:25	73.02	0.05	NR	NR	NR	NR	NR	NR	107
17:00	73.02	0.05	NR	NR	NR	NR	NR	NR	61
17:05	73.02	0.05	NR	NR	NR	NR	NR	NR	33
17:10	73.02	0.05	380	13	867 +	6.7	7.4	139 +	27
17:15	73.02	0.05	380	13	864 +	6.4	7.4	130 +	25
17:20	73.02	0.05	380	13	864 +	6.3	7.4	138 +	24
17:25	73.02	0.05	380	13	863 +	6.3	7.4	118 +	29

Well Sampling Worksheet
WWW RAP Field Data
AREA 6 2023-Q3 - HS-PMW-16B
Kent County, MI

Well	HS-PMW-16B / 2 in Diameter PVC
Sample Quarter	2023-Q3
Date	07/31/2023
Weather	78°F Partly Sunny
Sampler Initials	RCP
Purging Device	Bladder-Pump: NA, Peristaltic-Pump: NA, Centrifugal-Pump: Mega Monsoon #2
Meters Used	YSI: Agile Rental 4, Turbidimeter: Agile Rental 1, Water-Level-Meter: WLM-4
Reference Measuring Point	PVC
Well Screen (ft bmp)	118.1 - 123.1
Measured Bottom Depth (ft bmp)	123.1
Sample Comment	Took 10 minutes to get a water to the surface. Water at the beginning of the purge was observed to be very dark gray, clay rich. Low turbidity observed at 17:05, Connected YSI.
Initial Water Level Date/Time	07/31/2023 15:40
Initial Water Level Depth (ft bmp)	72.97
Pump/Tubing Intake Depth (ft bmp)	120.6
Tubing Length (ft)	123
Tubing Inner Diameter (in)	0.17
Purging Initiation Date/Time	07/31/2023 15:40
Total Purge Volume (gal)	8
Modified Sample	No
If Modified, Reasoning	
Sample Collection Information	Bottling-Start: 07/31/2023 17:45:00, Bottling-Stop: 07/31/2023 17:50:00, Parameters-Sampled: PFAS

Reading Time	Depth To Water (ft)	Cumulative Drawdown (ft)	Purge Rate (ml/min)	Temperature (deg c)	Specific Conductivity (us/cm)	Dissolved Oxygen (mg/l)	pH (su)	Oxidation-Reduction Potential (mV)	Turbidity (ntu)
17:30	73.02	0.05	380	12	864 +	6.3	7.4	134 +	23
17:35	73.02	0.05	380	12	863 +	6.3	7.4	134 +	24
17:40	73.02	0.05	380	12	866 +	6.3	7.4	134 +	24

Notes:

1) Abbreviations include: "deg c" indicates degrees Celsius; "ft" indicates feet; "ft bmp" indicates feet below reference measuring point; "gal" indicates gallons; "in" indicates inches; "mg/l" indicates milligrams per liter; "ml/min" indicates milliliters per minute; "mV" indicates millivolts; "NA" indicates not applicable; "NR" indicates not recorded; "ntu" indicates Nephelometric Turbidity units; "su" indicates standard units; "us/cm" indicates microsiemens per centimeter; and "+" indicates the parameter(s) may be used for stabilization calculations but cannot be used for other purposes.
2) Weather temperature units are in degrees Fahrenheit, unless otherwise noted.
3) Did indicator parameters reach stabilization? Yes
4) Was the two hour time limit reached? Yes
5) Calculations:
   - Head Above Pump Intake (ft): 47.63
   - Total Drawdown (ft): 0.05
   - Calculated Final Purge Volume (gal): NA
6) If Drawdown Did Not Stabilize or Stabilized Drawdown >0.3 ft, is Total Purge Volume > Calculated Final Purge Volume? NA

Well Sampling Worksheet
WWW RAP Field Data
AREA 6 2023-Q3 - HS-PMW-16C
Kent County, MI

Well	HS-PMW-16C / 2 in Diameter PVC
Sample Quarter	2023-Q3
Date	08/04/2023
Weather	Sunny 82°F
Sampler Initials	RCP
Purging Device	Bladder-Pump: Rental, Peristaltic-Pump: NA, Centrifugal-Pump: NA
Meters Used	YSI: Agile Rental 3, Turbidimeter: Agile Rental 3, Water-Level-Meter: WLM-2
Reference Measuring Point	PVC
Well Screen (ft bmp)	161.3 - 166.3
Measured Bottom Depth (ft bmp)	NR
Sample Comment	13:55 - Adjusted refill/discharge time for higher flow rate. 14:05 - Adjusted refill/discharge due to drawdown. 14:10 - Purge water is still very turbid (brown). 14:15 - Purge water is beginning to clear up. YSI Connected at 15:20.
Initial Water Level Date/Time	08/04/2023 13:50
Initial Water Level Depth (ft bmp)	76.53
Pump/Tubing Intake Depth (ft bmp)	163.8
Tubing Length (ft)	167
Tubing Inner Diameter (in)	0.25
Purging Initiation Date/Time	08/04/2023 13:50
Total Purge Volume (gal)	2
Modified Sample	No
If Modified, Reasoning	
Sample Collection Information	Bottling-Start: 08/04/2023 15:50:00, Bottling-Stop: 08/04/2023 15:55:00, Parameters-Sampled: PFAS

Reading Time	Depth To Water (ft)	Cumulative Drawdown (ft)	Purge Rate (ml/min)	Temperature (deg c)	Specific Conductivity (us/cm)	Dissolved Oxygen (mg/l)	pH (su)	Oxidation-Reduction Potential (mV)	Turbidity (ntu)
13:55	76.53	0.00	50	NR	NR	NR	NR	NR	NR
14:05	76.59	0.06	100	NR	NR	NR	NR	NR	NR
14:10	76.55	0.02	50	NR	NR	NR	NR	NR	NR
14:15	76.55	0.02	100	NR	NR	NR	NR	NR	139
14:25	76.57	0.04	100	NR	NR	NR	NR	NR	55
15:00	76.57	0.04	100	NR	NR	NR	NR	NR	95
15:10	76.57	0.04	100	NR	NR	NR	NR	NR	30
15:20	76.57	0.04	100	13	720 +	<0.5	7.4	141	22
15:30	76.57	0.04	100	13	712 +	<0.5	7.4	129	18

Well Sampling Worksheet
WWW RAP Field Data
AREA 6 2023-Q3 - HS-PMW-16C
Kent County, MI

Well	HS-PMW-16C / 2 in Diameter PVC
Sample Quarter	2023-Q3
Date	08/04/2023
Weather	Sunny 82°F
Sampler Initials	RCP
Purging Device	Bladder-Pump: Rental, Peristaltic-Pump: NA, Centrifugal-Pump: NA
Meters Used	YSI: Agile Rental 3, Turbidimeter: Agile Rental 3, Water-Level-Meter: WLM-2
Reference Measuring Point	PVC
Well Screen (ft bmp)	161.3 - 166.3
Measured Bottom Depth (ft bmp)	NR
Sample Comment	13:55 - Adjusted refill/discharge time for higher flow rate. 14:05 - Adjusted refill/discharge due to drawdown. 14:10 - Purge water is still very turbid (brown). 14:15 - Purge water is beginning to clear up. YSI Connected at 15:20.
Initial Water Level Date/Time	08/04/2023 13:50
Initial Water Level Depth (ft bmp)	76.53
Pump/Tubing Intake Depth (ft bmp)	163.8
Tubing Length (ft)	167
Tubing Inner Diameter (in)	0.25
Purging Initiation Date/Time	08/04/2023 13:50
Total Purge Volume (gal)	2
Modified Sample	No
If Modified, Reasoning	
Sample Collection Information	Bottling-Start: 08/04/2023 15:50:00, Bottling-Stop: 08/04/2023 15:55:00, Parameters-Sampled: PFAS

Reading Time	Depth To Water (ft)	Cumulative Drawdown (ft)	Purge Rate (ml/min)	Temperature (deg c)	Specific Conductivity (us/cm)	Dissolved Oxygen (mg/l)	pH (su)	Oxidation-Reduction Potential (mV)	Turbidity (ntu)
15:40	76.57	0.04	100	13	715 +	<0.5	7.4	120	15
15:45	76.57	0.04	100	13	713 +	<0.5	7.4	114	22
15:50	76.57	0.04	100	13	717 +	<0.5	7.4	110	13

Notes:

1) Abbreviations include: "deg c" indicates degrees Celsius; "ft" indicates feet; "ft bmp" indicates feet below reference measuring point; "gal" indicates gallons; "in" indicates inches; "mg/l" indicates milligrams per liter; "ml/min" indicates milliliters per minute; "mV" indicates millivolts; "NA" indicates not applicable; "NR" indicates not recorded; "ntu" indicates Nephelometric Turbidity units; "su" indicates standard units; "us/cm" indicates microsiemens per centimeter; and "+" indicates the parameter(s) may be used for stabilization calculations but cannot be used for other purposes.
2) Weather temperature units are in degrees Fahrenheit, unless otherwise noted.
3) Did indicator parameters reach stabilization? No
4) Was the two hour time limit reached? Yes
5) Calculations:
   - Head Above Pump Intake (ft) 87.27
   - Total Drawdown (ft) 0.04
   - Calculated Final Purge Volume (gal) NA
6) If Drawdown Did Not Stabilize or Stabilized Drawdown >0.3 ft, is Total Purge Volume > Calculated Final Purge Volume? NA

Well Sampling Worksheet
WWW RAP Field Data
PERIMETER 2023-Q3 - HS-PMW-22
Kent County, MI

Well	HS-PMW-22 / 2 in Diameter PVC
Sample Quarter	2023-Q3
Date	08/30/2023
Weather	59F Sunny
Sampler Initials	JET
Purging Device	Bladder-Pump: BP-10, Peristaltic-Pump: NA, Centrifugal-Pump: NA
Meters Used	YSI: Agile Rental 3, Turbidimeter: Agile Rental 3, Water-Level-Meter: WLM-2
Reference Measuring Point	PVC
Well Screen (ft bmp)	171.6 - 176.6
Measured Bottom Depth (ft bmp)	176.62
Sample Comment	Well is located near an orchard, potential for pump competition. YSI Connected at 12:25.
Initial Water Level Date/Time	08/30/2023 10:40
Initial Water Level Depth (ft bmp)	99.55
Pump/Tubing Intake Depth (ft bmp)	174.12
Tubing Length (ft)	178
Tubing Inner Diameter (in)	0.25
Purging Initiation Date/Time	08/30/2023 10:40
Total Purge Volume (gal)	3.5
Modified Sample	No
If Modified, Reasoning	
Sample Collection Information	Bottling-Start: 08/30/2023 12:45:00, Bottling-Stop: 08/30/2023 12:50:00, Parameters-Sampled: PFAS

Reading Time	Depth To Water (ft)	Cumulative Drawdown (ft)	Purge Rate (ml/min)	Temperature (deg c)	Specific Conductivity (us/cm)	Dissolved Oxygen (mg/l)	pH (su)	Oxidation-Reduction Potential (mV)	Turbidity (ntu)
11:05	97.50	-2.05	150	NR	NR	NR	NR	NR	15
11:25	99.20	-0.35	150	NR	NR	NR	NR	NR	8
11:35	99.20	-0.35	150	NR	NR	NR	NR	NR	6
11:55	99.20	-0.35	150	NR	NR	NR	NR	NR	8
12:25	99.20	-0.35	150	11 +	1,424 +	10.0	6.8	84	7
12:30	99.20	-0.35	150	12 +	1,422 +	4.1	6.8	48	9
12:35	99.20	-0.35	150	12 +	1,428 +	4.3	6.8	42	7
12:40	99.20	-0.35	150	11 +	1,428 +	4.3	6.8	42	7

Notes:

1) Abbreviations include: "deg c" indicates degrees Celsius; "ft" indicates feet; "ft bmp" indicates feet below reference measuring point; "gal" indicates gallons; "in" indicates inches; "mg/l" indicates milligrams per liter; "ml/min" indicates milliliters per minute; "mV" indicates millivolts; "NA" indicates not applicable; "NR" indicates not recorded; "ntu" indicates Nephelometric Turbidity units; "su" indicates standard units; "us/cm" indicates microsiemens per centimeter; and "+" indicates the parameter(s) may be used for stabilization calculations but cannot be used for other purposes.
2) Weather temperature units are in degrees Fahrenheit, unless otherwise noted.
3) Did indicator parameters reach stabilization? No
4) Was the two hour time limit reached? Yes
5) Calculations:
   - Head Above Pump Intake (ft) 74.57
   - Total Drawdown (ft) -0.35
   - Calculated Final Purge Volume (gal) 0.52
6) If Drawdown Did Not Stabilize or Stabilized Drawdown >0.3 ft, is Total Purge Volume > Calculated Final Purge Volume? Yes

Well Sampling Worksheet
WWW RAP Field Data
AREA 6 2023-Q3 - HS-PMW-RI-108A
Kent County, MI

Well	HS-PMW-RI-108A / 2 in Diameter PVC
Sample Quarter	2023-Q3
Date	08/03/2023
Weather	Sunny 77°F
Sampler Initials	RCP
Purging Device	Bladder-Pump: NA, Peristaltic-Pump: PER-3, Centrifugal-Pump: NA
Meters Used	YSI: Agile Rental 1, Turbidimeter: Agile Rental 1, Water-Level-Meter: WLM-1
Reference Measuring Point	PVC
Well Screen (ft bmp)	65.2 - 70.2
Measured Bottom Depth (ft bmp)	70.2
Sample Comment	11:25 - Adjusted pump speed due to drawdown. 12:30 - Low turbidity so connected YSI.
Initial Water Level Date/Time	08/03/2023 11:20
Initial Water Level Depth (ft bmp)	16.02
Pump/Tubing Intake Depth (ft bmp)	67.7
Tubing Length (ft)	70
Tubing Inner Diameter (in)	0.17
Purging Initiation Date/Time	08/03/2023 11:20
Total Purge Volume (gal)	3
Modified Sample	No
If Modified, Reasoning	
Sample Collection Information	Bottling-Start: 08/04/2023 13:00:00, Bottling-Stop: 08/04/2023 13:10:00, Parameters-Sampled: PFAS

Reading Time	Depth To Water (ft)	Cumulative Drawdown (ft)	Purge Rate (ml/min)	Temperature (deg c)	Specific Conductivity (us/cm)	Dissolved Oxygen (mg/l)	pH (su)	Oxidation-Reduction Potential (mV)	Turbidity (ntu)
11:25	16.10	0.08	100	NR	NR	NR	NR	NR	NR
11:30	16.07	0.05	60	NR	NR	NR	NR	NR	NR
12:10	16.10	0.08	60	NR	NR	NR	NR	NR	NR
12:30	16.10	0.08	60	NR	NR	NR	NR	NR	6
12:40	16.10	0.08	60	16	633 +	0.7	7.3	-38	<5
12:45	16.10	0.08	60	15	642 +	0.6	7.3	-45	<5
12:50	16.10	0.08	60	16	637 +	0.6	7.4	-52	<5
12:55	16.10	0.08	60	16	643 +	0.6	7.3	-55	<5

Notes:

1) Abbreviations include: "deg c" indicates degrees Celsius; "ft" indicates feet; "ft bmp" indicates feet below reference measuring point; "gal" indicates gallons; "in" indicates inches; "mg/l" indicates milligrams per liter; "ml/min" indicates milliliters per minute; "mV" indicates millivolts; "NA" indicates not applicable; "NR" indicates not recorded; "ntu" indicates Nephelometric Turbidity units; "su" indicates standard units; "us/cm" indicates microsiemens per centimeter; and "+" indicates the parameter(s) may be used for stabilization calculations but cannot be used for other purposes.
2) Weather temperature units are in degrees Fahrenheit, unless otherwise noted.
3) Did indicator parameters reach stabilization? Yes
4) Was the two hour time limit reached? Yes
5) Calculations:
   - Head Above Pump Intake (ft) 51.68
   - Total Drawdown (ft) 0.08
   - Calculated Final Purge Volume (gal) NA
6) If Drawdown Did Not Stabilize or Stabilized Drawdown >0.3 ft, is Total Purge Volume > Calculated Final Purge Volume? NA

Well Sampling Worksheet
WWW RAP Field Data
AREA 6 2023-Q3 - HS-PMW-RI-108B
Kent County, MI

Well	HS-PMW-RI-108B / 2 in Diameter PVC
Sample Quarter	2023-Q3
Date	08/03/2023
Weather	75F Sunny
Sampler Initials	JET
Purging Device	Bladder-Pump: BP-12, Peristaltic-Pump: NA, Centrifugal-Pump: NA
Meters Used	YSI: Agile Rental 4, Turbidimeter: Agile Rental 1, Water-Level-Meter: WLM-2
Reference Measuring Point	PVC
Well Screen (ft bmp)	131.6 - 136.6
Measured Bottom Depth (ft bmp)	NR
Sample Comment	10:40 - Adjusted purge rate. 11:30 - Pump slipped through the clip and hit the bottom. YSI Connected at 12:00.
Initial Water Level Date/Time	08/03/2023 10:25
Initial Water Level Depth (ft bmp)	77.70
Pump/Tubing Intake Depth (ft bmp)	134.1
Tubing Length (ft)	140
Tubing Inner Diameter (in)	0.25
Purging Initiation Date/Time	08/03/2023 10:25
Total Purge Volume (gal)	2.5
Modified Sample	No
If Modified, Reasoning	
Sample Collection Information	Bottling-Start: 08/03/2023 12:15:00, Bottling-Stop: 08/03/2023 12:20:00, Parameters-Sampled: PFAS

Reading Time	Depth To Water (ft)	Cumulative Drawdown (ft)	Purge Rate (ml/min)	Temperature (deg c)	Specific Conductivity (us/cm)	Dissolved Oxygen (mg/l)	pH (su)	Oxidation-Reduction Potential (mV)	Turbidity (ntu)
10:40	78.50	0.80	NR	NR	NR	NR	NR	NR	NR
10:55	79.15	1.45	50	NR	NR	NR	NR	NR	NR
11:30	78.45	0.75	50	NR	NR	NR	NR	NR	NR
11:50	78.45	0.75	50	NR	NR	NR	NR	NR	>999
12:00	78.45	0.75	50	17	740 +	<0.5	8.6	245	>999
12:05	78.45	0.75	50	17	736 +	<0.5	8.6	238	>999
12:10	78.45	0.75	50	17	735 +	<0.5	8.6	237	>999

Notes:

1) Abbreviations include: "deg c" indicates degrees Celsius; "ft" indicates feet; "ft bmp" indicates feet below reference measuring point; "gal" indicates gallons; "in" indicates inches; "mg/l" indicates milligrams per liter; "ml/min" indicates milliliters per minute; "mV" indicates millivolts; "NA" indicates not applicable; "NR" indicates not recorded; "ntu" indicates Nephelometric Turbidity units; "su" indicates standard units; "us/cm" indicates microsiemens per centimeter; and "+" indicates the parameter(s) may be used for stabilization calculations but cannot be used for other purposes.
2) Weather temperature units are in degrees Fahrenheit, unless otherwise noted.
3) Did indicator parameters reach stabilization? Yes * Turbidity Out of Range
4) Was the two hour time limit reached? No
5) Calculations:
   - Head Above Pump Intake (ft) 56.40
   - Total Drawdown (ft) 0.75
   - Calculated Final Purge Volume (gal) 0.48
6) If Drawdown Did Not Stabilize or Stabilized Drawdown >0.3 ft, is Total Purge Volume > Calculated Final Purge Volume? Yes

Well Sampling Worksheet
WWW RAP Field Data
AREA 6 2023-Q3 - HS-PMW-RI-108D
Kent County, MI

Well	HS-PMW-RI-108D / 2 in Diameter PVC
Sample Quarter	2023-Q3
Date	08/03/2023
Weather	75°F Sunny
Sampler Initials	RCP
Purging Device	Bladder-Pump: BP-11, Peristaltic-Pump: NA, Centrifugal-Pump: NA
Meters Used	YSI: Agile Rental 1, Turbidimeter: Agile Rental 1, Water-Level-Meter: WLM-1
Reference Measuring Point	PVC
Well Screen (ft bmp)	223.0 - 228.0
Measured Bottom Depth (ft bmp)	228
Sample Comment	10:30 - Adjusted flow rate due to drawdown. Purge water is quite turbid. 10:35 - Water level is rising and stabilizing. Purge water is still quite turbid. YSI Connected at 11:55.
Initial Water Level Date/Time	08/03/2023 10:15
Initial Water Level Depth (ft bmp)	78.00
Pump/Tubing Intake Depth (ft bmp)	225.5
Tubing Length (ft)	228
Tubing Inner Diameter (in)	0.25
Purging Initiation Date/Time	08/03/2023 10:15
Total Purge Volume (gal)	3.5
Modified Sample	No
If Modified, Reasoning	
Sample Collection Information	Bottling-Start: 08/03/2023 12:20:00, Bottling-Stop: 08/03/2023 12:25:00, Parameters-Sampled: PFAS

Reading Time	Depth To Water (ft)	Cumulative Drawdown (ft)	Purge Rate (ml/min)	Temperature (deg c)	Specific Conductivity (us/cm)	Dissolved Oxygen (mg/l)	pH (su)	Oxidation-Reduction Potential (mV)	Turbidity (ntu)
10:30	78.47	0.47	180	NR	NR	NR	NR	NR	NR
10:35	78.16	0.16	80	NR	NR	NR	NR	NR	NR
11:05	78.12	0.12	80	NR	NR	NR	NR	NR	NR
11:35	78.12	0.12	80	NR	NR	NR	NR	NR	79
11:55	78.12	0.12	80	17	585 +	4.7	7.4	84	75
12:00	78.12	0.12	80	15	581 +	0.8	7.4	-7	66
12:05	78.12	0.12	80	15	578 +	0.7	7.3	-29	59
12:10	78.12	0.12	80	15	578 +	0.6	7.3	-35	58
12:15	78.12	0.12	80	15	579 +	0.8	7.3	-37	55

Notes:

1) Abbreviations include: "deg c" indicates degrees Celsius; "ft" indicates feet; "ft bmp" indicates feet below reference measuring point; "gal" indicates gallons; "in" indicates inches; "mg/l" indicates milligrams per liter; "ml/min" indicates milliliters per minute; "mV" indicates millivolts; "NA" indicates not applicable; "NR" indicates not recorded; "ntu" indicates Nephelometric Turbidity units; "su" indicates standard units; "us/cm" indicates microsiemens per centimeter; and "+" indicates the parameter(s) may be used for stabilization calculations but cannot be used for other purposes.
2) Weather temperature units are in degrees Fahrenheit, unless otherwise noted.
3) Did indicator parameters reach stabilization? No
4) Was the two hour time limit reached? Yes
5) Calculations:
   - Head Above Pump Intake (ft) 147.50
   - Total Drawdown (ft) 0.12
   - Calculated Final Purge Volume (gal) NA
6) If Drawdown Did Not Stabilize or Stabilized Drawdown >0.3 ft, is Total Purge Volume > Calculated Final Purge Volume? NA

Well Sampling Worksheet
WWW RAP Field Data
AREA 6 2023-Q3 - HS-PMW-RI-109A
Kent County, MI

Well	HS-PMW-RI-109A / 2 in Diameter PVC
Sample Quarter	2023-Q3
Date	08/01/2023
Weather	77°F Cloudy
Sampler Initials	RCP
Purging Device	Bladder-Pump: NA, Peristaltic-Pump: PER-3, Centrifugal-Pump: NA
Meters Used	YSI: Agile Rental 4, Turbidimeter: Agile Rental 1, Water-Level-Meter: WLM-2
Reference Measuring Point	PVC
Well Screen (ft bmp)	13.6 - 18.6
Measured Bottom Depth (ft bmp)	18.6
Sample Comment	12:50 - Cannot get the flow rate below 80 ml/min. 13:00 - Low turbidity observed, connected YSI. 13:10 - Adjusted flow rate lower. 14:40 - Indicator parameters stable except for depth to water.
Initial Water Level Date/Time	08/01/2023 12:40
Initial Water Level Depth (ft bmp)	9.29
Pump/Tubing Intake Depth (ft bmp)	16.1
Tubing Length (ft)	20
Tubing Inner Diameter (in)	0.17
Purging Initiation Date/Time	08/01/2023 12:40
Total Purge Volume (gal)	2.5
Modified Sample	No
If Modified, Reasoning	
Sample Collection Information	Bottling-Start: 08/01/2023 14:45:00, Bottling-Stop: 08/01/2023 14:50:00, Parameters-Sampled: PFAS

Reading Time	Depth To Water (ft)	Cumulative Drawdown (ft)	Purge Rate (ml/min)	Temperature (deg c)	Specific Conductivity (us/cm)	Dissolved Oxygen (mg/l)	pH (su)	Oxidation-Reduction Potential (mV)	Turbidity (ntu)
12:50	9.48	0.19	80	NR	NR	NR	NR	NR	NR
13:00	9.67	0.38	80	NR	NR	NR	NR	NR	<5
13:05	9.80	0.51	80	16	547 +	8.1	7.4	301	<5
13:10	9.81	0.52	70	16	546 +	7.5	7.5	307	<5
13:15	9.85	0.56	70	16	545 +	7.5	7.5	309	<5
13:20	9.92	0.63	70	16	545 +	7.6	7.5	313	<5
13:30	10.02	0.73	70	16	545 +	8.2	7.5	314	<5
13:35	10.09	0.80	70	16	542 +	7.6	7.5	316	<5
13:40	10.15	0.86	70	16	540 +	7.6	7.5	316	<5
13:45	10.21	0.92	70	16	543 +	7.6	7.5	316	<5

Well Sampling Worksheet
WWW RAP Field Data
AREA 6 2023-Q3 - HS-PMW-RI-109A
Kent County, MI

Well	HS-PMW-RI-109A / 2 in Diameter PVC
Sample Quarter	2023-Q3
Date	08/01/2023
Weather	77°F Cloudy
Sampler Initials	RCP
Purging Device	Bladder-Pump: NA, Peristaltic-Pump: PER-3, Centrifugal-Pump: NA
Meters Used	YSI: Agile Rental 4, Turbidimeter: Agile Rental 1, Water-Level-Meter: WLM-2
Reference Measuring Point	PVC
Well Screen (ft bmp)	13.6 - 18.6
Measured Bottom Depth (ft bmp)	18.6
Sample Comment	12:50 - Cannot get the flow rate below 80 ml/min. 13:00 - Low turbidity observed, connected YSI. 13:10 - Adjusted flow rate lower. 14:40 - Indicator parameters stable except for depth to water.
Initial Water Level Date/Time	08/01/2023 12:40
Initial Water Level Depth (ft bmp)	9.29
Pump/Tubing Intake Depth (ft bmp)	16.1
Tubing Length (ft)	20
Tubing Inner Diameter (in)	0.17
Purging Initiation Date/Time	08/01/2023 12:40
Total Purge Volume (gal)	2.5
Modified Sample	No
If Modified, Reasoning	
Sample Collection Information	Bottling-Start: 08/01/2023 14:45:00, Bottling-Stop: 08/01/2023 14:50:00, Parameters-Sampled: PFAS

Reading Time	Depth To Water (ft)	Cumulative Drawdown (ft)	Purge Rate (ml/min)	Temperature (deg c)	Specific Conductivity (us/cm)	Dissolved Oxygen (mg/l)	pH (su)	Oxidation-Reduction Potential (mV)	Turbidity (ntu)
14:30	10.90	1.61	70	19	544 +	8.0	7.5	311	<5
14:35	10.93	1.64	70	20	546 +	8.0	7.5	312	<5
14:40	10.94	1.65	70	20	546 +	8.2	7.5	318	<5

Notes:

1) Abbreviations include: "deg c" indicates degrees Celsius; "ft" indicates feet; "ft bmp" indicates feet below reference measuring point; "gal" indicates gallons; "in" indicates inches; "mg/l" indicates milligrams per liter; "ml/min" indicates milliliters per minute; "mV" indicates millivolts; "NA" indicates not applicable; "NR" indicates not recorded; "ntu" indicates Nephelometric Turbidity units; "su" indicates standard units; "us/cm" indicates microsiemens per centimeter; and "+" indicates the parameter(s) may be used for stabilization calculations but cannot be used for other purposes.
2) Weather temperature units are in degrees Fahrenheit, unless otherwise noted.
3) Did indicator parameters reach stabilization? No
4) Was the two hour time limit reached? Yes
5) Calculations:
   - Head Above Pump Intake (ft) 6.81
   - Total Drawdown (ft) 1.65
   - Calculated Final Purge Volume (gal) 0.29
6) If Drawdown Did Not Stabilize or Stabilized Drawdown >0.3 ft, is Total Purge Volume > Calculated Final Purge Volume? Yes

Well Sampling Worksheet
WWW RAP Field Data
AREA 6 2023-Q3 - HS-PMW-RI-109B
Kent County, MI

Well	HS-PMW-RI-109B / 2 in Diameter PVC
Sample Quarter	2023-Q3
Date	08/01/2023
Weather	77F Cloudy
Sampler Initials	JET
Purging Device	Bladder-Pump: NA, Peristaltic-Pump: NA, Centrifugal-Pump: Mega Monsoon #2
Meters Used	YSI: Agile Rental 1, Turbidimeter: Agile Rental 1, Water-Level-Meter: WLM-4
Reference Measuring Point	PVC
Well Screen (ft bmp)	124.6 - 129.6
Measured Bottom Depth (ft bmp)	NR
Sample Comment	YSI Connected at 14:40.
Initial Water Level Date/Time	08/01/2023 13:30
Initial Water Level Depth (ft bmp)	64.23
Pump/Tubing Intake Depth (ft bmp)	127.1
Tubing Length (ft)	130
Tubing Inner Diameter (in)	0.17
Purging Initiation Date/Time	08/01/2023 13:30
Total Purge Volume (gal)	7
Modified Sample	No
If Modified, Reasoning	
Sample Collection Information	Bottling-Start: 08/01/2023 14:55:00, Bottling-Stop: 08/01/2023 15:00:00, Parameters-Sampled: PFAS

Reading Time	Depth To Water (ft)	Cumulative Drawdown (ft)	Purge Rate (ml/min)	Temperature (deg c)	Specific Conductivity (us/cm)	Dissolved Oxygen (mg/l)	pH (su)	Oxidation-Reduction Potential (mV)	Turbidity (ntu)
13:40	64.30	0.07	450	NR	NR	NR	NR	NR	NR
14:00	64.30	0.07	450	NR	NR	NR	NR	NR	17
14:30	64.30	0.07	450	NR	NR	NR	NR	NR	5
14:40	64.30	0.07	450	12 +	842 +	2.5	7.0	150	<5
14:45	64.30	0.07	450	12 +	842 +	2.5	7.0	150	<5
14:50	64.30	0.07	450	12 +	842 +	2.5	7.0	149	<5

Notes:

1) Abbreviations include: "deg c" indicates degrees Celsius; "ft" indicates feet; "ft bmp" indicates feet below reference measuring point; "gal" indicates gallons; "in" indicates inches; "mg/l" indicates milligrams per liter; "ml/min" indicates milliliters per minute; "mV" indicates millivolts; "NA" indicates not applicable; "NR" indicates not recorded; "ntu" indicates Nephelometric Turbidity units; "su" indicates standard units; "us/cm" indicates microsiemens per centimeter; and "+" indicates the parameter(s) may be used for stabilization calculations but cannot be used for other purposes.
2) Weather temperature units are in degrees Fahrenheit, unless otherwise noted.
3) Did indicator parameters reach stabilization? Yes
4) Was the two hour time limit reached? No
5) Calculations:
   - Head Above Pump Intake (ft): 62.87
   - Total Drawdown (ft): 0.07
   - Calculated Final Purge Volume (gal): NA
6) If Drawdown Did Not Stabilize or Stabilized Drawdown >0.3 ft, is Total Purge Volume > Calculated Final Purge Volume? NA

Well Sampling Worksheet
WWW RAP Field Data
AREA 6 2023-Q3 - HS-PMW-RI-109C
Kent County, MI

Well	HS-PMW-RI-109C / 2 in Diameter PVC
Sample Quarter	2023-Q3
Date	08/01/2023
Weather	77°F Cloudy
Sampler Initials	RCP
Purging Device	Bladder-Pump: BP-10, Peristaltic-Pump: NA, Centrifugal-Pump: NA
Meters Used	YSI: Agile Rental 4, Turbidimeter: Agile Rental 1, Water-Level-Meter: WLM-4
Reference Measuring Point	PVC
Well Screen (ft bmp)	143.7 - 148.7
Measured Bottom Depth (ft bmp)	148.7
Sample Comment	15:00 - Decreased refill and discharge time due to drawdown. 15:40 - Water level appears to have stabilized. YSI Connected at 16:15.
Initial Water Level Date/Time	08/01/2023 14:40
Initial Water Level Depth (ft bmp)	64.10
Pump/Tubing Intake Depth (ft bmp)	146.2
Tubing Length (ft)	150
Tubing Inner Diameter (in)	0.25
Purging Initiation Date/Time	08/01/2023 14:40
Total Purge Volume (gal)	4
Modified Sample	No
If Modified, Reasoning	
Sample Collection Information	Bottling-Start: 08/01/2023 16:45:00, Bottling-Stop: 08/01/2023 16:50:00, Parameters-Sampled: PFAS

Reading Time	Depth To Water (ft)	Cumulative Drawdown (ft)	Purge Rate (ml/min)	Temperature (deg c)	Specific Conductivity (us/cm)	Dissolved Oxygen (mg/l)	pH (su)	Oxidation-Reduction Potential (mV)	Turbidity (ntu)
15:00	65.50	1.40	180	NR	NR	NR	NR	NR	NR
15:20	64.90	0.80	160	NR	NR	NR	NR	NR	NR
15:40	64.90	0.80	130	NR	NR	NR	NR	NR	97
16:00	64.90	0.80	130	NR	NR	NR	NR	NR	30
16:15	64.90	0.80	130	13	425 +	<0.5	7.7	15	16
16:20	64.90	0.80	130	13	425 +	<0.5	7.7	-11	12
16:25	64.90	0.80	130	13	424 +	<0.5	7.7	-23	10
16:30	64.90	0.80	130	13	424 +	<0.5	7.7	-32	8
16:35	64.90	0.80	130	13	425 +	<0.5	7.7	-40	6
16:40	64.90	0.80	130	13	425 +	<0.5	7.7	-43	7

Notes:

1) Abbreviations include: "deg c" indicates degrees Celsius; "ft" indicates feet; "ft bmp" indicates feet below reference measuring point; "gal" indicates gallons; "in" indicates inches; "mg/l" indicates milligrams per liter; "ml/min" indicates milliliters per minute; "mV" indicates millivolts; "NA" indicates not applicable; "NR" indicates not recorded; "ntu" indicates Nephelometric Turbidity units; "su" indicates standard units; "us/cm" indicates microsiemens per centimeter; and "+" indicates the parameter(s) may be used for stabilization calculations but cannot be used for other purposes.
2) Weather temperature units are in degrees Fahrenheit, unless otherwise noted.
3) Did indicator parameters reach stabilization? No
4) Was the two hour time limit reached? Yes
5) Calculations:
   - Head Above Pump Intake (ft) 82.10
   - Total Drawdown (ft) 0.80
   - Calculated Final Purge Volume (gal) 0.52
6) If Drawdown Did Not Stabilize or Stabilized Drawdown >0.3 ft, is Total Purge Volume > Calculated Final Purge Volume? Yes

Well Sampling Worksheet
WWW RAP Field Data
PERIMETER 2023-Q3 - HS-PMW-RI-101A
Kent County, MI

Well	HS-PMW-RI-101A / 2 in Diameter PVC
Sample Quarter	2023-Q3
Date	08/29/2023
Weather	75 Cloudy
Sampler Initials	JMS
Purging Device	Bladder-Pump: NA, Peristaltic-Pump: PER-1, Centrifugal-Pump: NA
Meters Used	YSI: Agile Rental 2, Turbidimeter: Agile Rental 2, Water-Level-Meter: WLM-4
Reference Measuring Point	PVC
Well Screen (ft bmp)	10.1 - 15.1
Measured Bottom Depth (ft bmp)	NR
Sample Comment	YSI Connected at 17:00.
Initial Water Level Date/Time	08/29/2023 16:35
Initial Water Level Depth (ft bmp)	8.33
Pump/Tubing Intake Depth (ft bmp)	12.6
Tubing Length (ft)	17.6
Tubing Inner Diameter (in)	0.17
Purging Initiation Date/Time	08/29/2023 16:40
Total Purge Volume (gal)	2
Modified Sample	No
If Modified, Reasoning	
Sample Collection Information	Bottling-Start: 08/29/2023 17:35:00, Bottling-Stop: 08/29/2023 17:45:00, Parameters-Sampled: PFAS

Reading Time	Depth To Water (ft)	Cumulative Drawdown (ft)	Purge Rate (ml/min)	Temperature (deg c)	Specific Conductivity (us/cm)	Dissolved Oxygen (mg/l)	pH (su)	Oxidation-Reduction Potential (mV)	Turbidity (ntu)
16:50	8.37	0.04	200	NR	NR	NR	NR	NR	5
17:00	8.37	0.04	200	16	252 +	5.3	6.2	145	<5
17:05	8.37	0.04	200	16	254 +	5.0	6.2	144	<5
17:10	8.37	0.04	200	16	257 +	4.8	6.2	144	<5
17:15	8.37	0.04	200	15	258 +	4.7	6.1	147	<5

Notes:

1) Abbreviations include: "deg c" indicates degrees Celsius; "ft" indicates feet; "ft bmp" indicates feet below reference measuring point; "gal" indicates gallons; "in" indicates inches; "mg/l" indicates milligrams per liter; "ml/min" indicates milliliters per minute; "mV" indicates millivolts; "NA" indicates not applicable; "NR" indicates not recorded; "ntu" indicates Nephelometric Turbidity units; "su" indicates standard units; "us/cm" indicates microsiemens per centimeter; and "+" indicates the parameter(s) may be used for stabilization calculations but cannot be used for other purposes.
2) Weather temperature units are in degrees Fahrenheit, unless otherwise noted.
3) Did indicator parameters reach stabilization? Yes
4) Was the two hour time limit reached? No
5) Calculations:
   - Head Above Pump Intake (ft) 4.27
   - Total Drawdown (ft) 0.04
   - Calculated Final Purge Volume (gal) NA
6) If Drawdown Did Not Stabilize or Stabilized Drawdown >0.3 ft, is Total Purge Volume > Calculated Final Purge Volume? NA

Well Sampling Worksheet
WWW RAP Field Data
PERIMETER 2023-Q3 - HS-PMW-RI-101B
Kent County, MI

Well	HS-PMW-RI-101B / 2 in Diameter PVC
Sample Quarter	2023-Q3
Date	08/29/2023
Weather	75 Cloudy
Sampler Initials	BPT
Purging Device	Bladder-Pump: BP-12, Peristaltic-Pump: NA, Centrifugal-Pump: NA
Meters Used	YSI: Agile Rental 1, Turbidimeter: Agile Rental 1, Water-Level-Meter: WLM-1
Reference Measuring Point	PVC
Well Screen (ft bmp)	79.8 - 84.8
Measured Bottom Depth (ft bmp)	84.96
Sample Comment	17:30: YSI connected.
Initial Water Level Date/Time	08/29/2023 16:35
Initial Water Level Depth (ft bmp)	9.02
Pump/Tubing Intake Depth (ft bmp)	82.5
Tubing Length (ft)	85
Tubing Inner Diameter (in)	0.25
Purging Initiation Date/Time	08/29/2023 16:40
Total Purge Volume (gal)	1.5
Modified Sample	No
If Modified, Reasoning	
Sample Collection Information	Bottling-Start: 08/29/2023 18:30:00, Bottling-Stop: 08/29/2023 18:35:00, Parameters-Sampled: PFAS

Reading Time	Depth To Water (ft)	Cumulative Drawdown (ft)	Purge Rate (ml/min)	Temperature (deg c)	Specific Conductivity (us/cm)	Dissolved Oxygen (mg/l)	pH (su)	Oxidation-Reduction Potential (mV)	Turbidity (ntu)
17:00	11.82	2.80	50	NR	NR	NR	NR	NR	228
17:10	10.04	1.02	50	NR	NR	NR	NR	NR	282
17:20	9.83	0.81	50	NR	NR	NR	NR	NR	300
17:30	9.70	0.68	50	21	566 +	4.8	9.3	253	189
17:40	9.65	0.63	50	20	604 +	3.9	9.4	226	134
17:50	9.60	0.58	50	20	639 +	3.5	9.5	195	118
18:00	9.59	0.57	50	20	647 +	3.3	9.4	178	99
18:10	9.59	0.57	50	20	647 +	2.7	9.3	172	71
18:15	9.59	0.57	50	20	650 +	2.7	9.3	168	65
18:20	9.59	0.57	50	20	649 +	2.8	9.3	163	62

Notes:

1) Abbreviations include: "deg c" indicates degrees Celsius; "ft" indicates feet; "ft bmp" indicates feet below reference measuring point; "gal" indicates gallons; "in" indicates inches; "mg/l" indicates milligrams per liter; "ml/min" indicates milliliters per minute; "mV" indicates millivolts; "NA" indicates not applicable; "NR" indicates not recorded; "ntu" indicates Nephelometric Turbidity units; "su" indicates standard units; "us/cm" indicates microsiemens per centimeter; and "+" indicates the parameter(s) may be used for stabilization calculations but cannot be used for other purposes.
2) Weather temperature units are in degrees Fahrenheit, unless otherwise noted.
3) Did indicator parameters reach stabilization? Yes
4) Was the two hour time limit reached? No
5) Calculations:
   - Head Above Pump Intake (ft) 73.48
   - Total Drawdown (ft) 0.57
   - Calculated Final Purge Volume (gal) 0.31
6) If Drawdown Did Not Stabilize or Stabilized Drawdown >0.3 ft, is Total Purge Volume > Calculated Final Purge Volume? Yes

Well Sampling Worksheet
WWW RAP Field Data
PERIMETER 2023-Q3 - HS-PMW-RI-102A
Kent County, MI

Well	HS-PMW-RI-102A / 2 in Diameter PVC
Sample Quarter	2023-Q3
Date	08/22/2023
Weather	Cloudy 70
Sampler Initials	JET
Purging Device	Bladder-Pump: NA, Peristaltic-Pump: NA, Centrifugal-Pump: Mega Monsoon #2
Meters Used	YSI: Agile Rental 1, Turbidimeter: Agile Rental 1, Water-Level-Meter: WLM-2
Reference Measuring Point	PVC
Well Screen (ft bmp)	47.5 - 52.5
Measured Bottom Depth (ft bmp)	NR
Sample Comment	YSI Connected at 10:40.
Initial Water Level Date/Time	08/22/2023 10:05
Initial Water Level Depth (ft bmp)	43.30
Pump/Tubing Intake Depth (ft bmp)	50
Tubing Length (ft)	53
Tubing Inner Diameter (in)	0.17
Purging Initiation Date/Time	08/22/2023 10:05
Total Purge Volume (gal)	7
Modified Sample	No
If Modified, Reasoning	
Sample Collection Information	Bottling-Start: 08/22/2023 11:05:00, Bottling-Stop: 08/22/2023 11:10:00, Parameters-Sampled: PFAS

Reading Time	Depth To Water (ft)	Cumulative Drawdown (ft)	Purge Rate (ml/min)	Temperature (deg c)	Specific Conductivity (us/cm)	Dissolved Oxygen (mg/l)	pH (su)	Oxidation-Reduction Potential (mV)	Turbidity (ntu)
10:15	44.00	0.70	475	NR	NR	NR	NR	NR	62
10:30	44.00	0.70	475	NR	NR	NR	NR	NR	10
10:40	44.00	0.70	475	NR	NR	NR	NR	NR	9
10:50	44.00	0.70	475	12	437 +	9.8	7.1	301	<5
10:55	44.00	0.70	475	12	436 +	9.8	7.1	307	<5
11:00	44.00	0.70	475	12	436 +	9.8	7.1	308	<5

Notes:

1) Abbreviations include: "deg c" indicates degrees Celsius; "ft" indicates feet; "ft bmp" indicates feet below reference measuring point; "gal" indicates gallons; "in" indicates inches; "mg/l" indicates milligrams per liter; "ml/min" indicates milliliters per minute; "mV" indicates millivolts; "NA" indicates not applicable; "NR" indicates not recorded; "ntu" indicates Nephelometric Turbidity units; "su" indicates standard units; "us/cm" indicates microsiemens per centimeter; and "+" indicates the parameter(s) may be used for stabilization calculations but cannot be used for other purposes.
2) Weather temperature units are in degrees Fahrenheit, unless otherwise noted.
3) Did indicator parameters reach stabilization? Yes
4) Was the two hour time limit reached? No
5) Calculations:
   - Head Above Pump Intake (ft) 6.70
   - Total Drawdown (ft) 0.70
   - Calculated Final Purge Volume (gal) 0.18
6) If Drawdown Did Not Stabilize or Stabilized Drawdown >0.3 ft, is Total Purge Volume > Calculated Final Purge Volume? Yes

Well Sampling Worksheet
WWW RAP Field Data
PERIMETER 2023-Q3 - HS-PMW-RI-102B
Kent County, MI

Well	HS-PMW-RI-102B / 2 in Diameter PVC
Sample Quarter	2023-Q3
Date	08/22/2023
Weather	Cloudy 70
Sampler Initials	BPT
Purging Device	Bladder-Pump: NA, Peristaltic-Pump: NA, Centrifugal-Pump: Mega Monsoon #1
Meters Used	YSI: Agile Rental 1, Turbidimeter: Agile Rental 1, Water-Level-Meter: WLM-1
Reference Measuring Point	PVC
Well Screen (ft bmp)	101.5 - 106.5
Measured Bottom Depth (ft bmp)	NR
Sample Comment	11:00: YSI connected
Initial Water Level Date/Time	08/22/2023 10:10
Initial Water Level Depth (ft bmp)	43.05
Pump/Tubing Intake Depth (ft bmp)	104
Tubing Length (ft)	107
Tubing Inner Diameter (in)	0.17
Purging Initiation Date/Time	08/22/2023 10:15
Total Purge Volume (gal)	6.5
Modified Sample	No
If Modified, Reasoning	
Sample Collection Information	Bottling-Start: 08/22/2023 11:25:00, Bottling-Stop: 08/22/2023 11:30:00, Parameters-Sampled: PFAS

Reading Time	Depth To Water (ft)	Cumulative Drawdown (ft)	Purge Rate (ml/min)	Temperature (deg c)	Specific Conductivity (us/cm)	Dissolved Oxygen (mg/l)	pH (su)	Oxidation-Reduction Potential (mV)	Turbidity (ntu)
10:30	43.08	0.03	430	NR	NR	NR	NR	NR	51
10:40	43.09	0.04	430	NR	NR	NR	NR	NR	23
10:50	43.09	0.04	430	NR	NR	NR	NR	NR	14
11:00	43.09	0.04	430	12	397 +	8.1	7.5	171	10
11:10	43.09	0.04	430	12	397 +	8.1	7.6	163	<5
11:15	43.09	0.04	430	12	396 +	8.0	7.6	160	<5
11:20	43.09	0.04	430	12	396 +	8.1	7.6	158	<5

Notes:

1) Abbreviations include: "deg c" indicates degrees Celsius; "ft" indicates feet; "ft bmp" indicates feet below reference measuring point; "gal" indicates gallons; "in" indicates inches; "mg/l" indicates milligrams per liter; "ml/min" indicates milliliters per minute; "mV" indicates millivolts; "NA" indicates not applicable; "NR" indicates not recorded; "ntu" indicates Nephelometric Turbidity units; "su" indicates standard units; "us/cm" indicates microsiemens per centimeter; and "+" indicates the parameter(s) may be used for stabilization calculations but cannot be used for other purposes.
2) Weather temperature units are in degrees Fahrenheit, unless otherwise noted.
3) Did indicator parameters reach stabilization? Yes
4) Was the two hour time limit reached? No
5) Calculations:
   - Head Above Pump Intake (ft) 60.95
   - Total Drawdown (ft) 0.04
   - Calculated Final Purge Volume (gal) NA
6) If Drawdown Did Not Stabilize or Stabilized Drawdown >0.3 ft, is Total Purge Volume > Calculated Final Purge Volume? NA

Well Sampling Worksheet
WWW RAP Field Data
PERIMETER 2023-Q3 - HS-PMW-RI-102C
Kent County, MI

Well	HS-PMW-RI-102C / 2 in Diameter PVC
Sample Quarter	2023-Q3
Date	08/22/2023
Weather	Cloudy 70
Sampler Initials	NCK
Purging Device	Bladder-Pump: NA, Peristaltic-Pump: NA, Centrifugal-Pump: Mega Monsoon #2
Meters Used	YSI: Agile Rental 2, Turbidimeter: Agile Rental 2, Water-Level-Meter: WLM-2
Reference Measuring Point	PVC
Well Screen (ft bmp)	136.5 - 141.5
Measured Bottom Depth (ft bmp)	NR
Sample Comment	11:40 - Purge water observed to be turbid. 12:00 - YSI Connected.
Initial Water Level Date/Time	08/22/2023 11:25
Initial Water Level Depth (ft bmp)	43.10
Pump/Tubing Intake Depth (ft bmp)	139
Tubing Length (ft)	143
Tubing Inner Diameter (in)	0.17
Purging Initiation Date/Time	08/22/2023 11:30
Total Purge Volume (gal)	7.5
Modified Sample	No
If Modified, Reasoning	
Sample Collection Information	Bottling-Start: 08/22/2023 12:20:00, Bottling-Stop: 08/22/2023 12:25:00, Parameters-Sampled: PFAS

Reading Time	Depth To Water (ft)	Cumulative Drawdown (ft)	Purge Rate (ml/min)	Temperature (deg c)	Specific Conductivity (us/cm)	Dissolved Oxygen (mg/l)	pH (su)	Oxidation-Reduction Potential (mV)	Turbidity (ntu)
11:40	43.14	0.04	475	NR	NR	NR	NR	NR	NR
11:50	43.14	0.04	475	NR	NR	NR	NR	NR	NR
12:00	43.14	0.04	475	NR	NR	NR	NR	NR	NR
12:10	43.14	0.04	475	11	454 +	<0.5	7.5	-68	30
12:15	43.14	0.04	475	11	455 +	<0.5	7.6	-70	29
12:20	43.14	0.04	475	11	454 +	<0.5	7.6	-74	28

Notes:

1) Abbreviations include: "deg c" indicates degrees Celsius; "ft" indicates feet; "ft bmp" indicates feet below reference measuring point; "gal" indicates gallons; "in" indicates inches; "mg/l" indicates milligrams per liter; "ml/min" indicates milliliters per minute; "mV" indicates millivolts; "NA" indicates not applicable; "NR" indicates not recorded; "ntu" indicates Nephelometric Turbidity units; "su" indicates standard units; "us/cm" indicates microsiemens per centimeter; and "+" indicates the parameter(s) may be used for stabilization calculations but cannot be used for other purposes.
2) Weather temperature units are in degrees Fahrenheit, unless otherwise noted.
3) Did indicator parameters reach stabilization? Yes
4) Was the two hour time limit reached? No
5) Calculations:
   - Head Above Pump Intake (ft) 95.90
   - Total Drawdown (ft) 0.04
   - Calculated Final Purge Volume (gal) NA
6) If Drawdown Did Not Stabilize or Stabilized Drawdown >0.3 ft, is Total Purge Volume > Calculated Final Purge Volume? NA

Well Sampling Worksheet
WWW RAP Field Data
PERIMETER 2023-Q3 - HS-PMW-RI-102D
Kent County, MI

Well	HS-PMW-RI-102D / 2 in Diameter PVC
Sample Quarter	2023-Q3
Date	08/22/2023
Weather	Cloudy 70
Sampler Initials	RCP
Purging Device	Bladder-Pump: BP-12, Peristaltic-Pump: NA, Centrifugal-Pump: NA
Meters Used	YSI: Agile Rental 3, Turbidimeter: Agile Rental 3, Water-Level-Meter: WLM-4
Reference Measuring Point	PVC
Well Screen (ft bmp)	176.5 - 181.5
Measured Bottom Depth (ft bmp)	NR
Sample Comment	10:20 - Purge water initially observed to be clear and then became very turbid. 11:10 - Low turbidity observed. Connected YSI.
Initial Water Level Date/Time	08/22/2023 10:10
Initial Water Level Depth (ft bmp)	43.11
Pump/Tubing Intake Depth (ft bmp)	179
Tubing Length (ft)	183
Tubing Inner Diameter (in)	0.25
Purging Initiation Date/Time	08/22/2023 10:15
Total Purge Volume (gal)	7
Modified Sample	No
If Modified, Reasoning	
Sample Collection Information	Bottling-Start: 08/22/2023 11:55:00, Bottling-Stop: 08/22/2023 12:00:00, Parameters-Sampled: PFAS

Reading Time	Depth To Water (ft)	Cumulative Drawdown (ft)	Purge Rate (ml/min)	Temperature (deg c)	Specific Conductivity (us/cm)	Dissolved Oxygen (mg/l)	pH (su)	Oxidation-Reduction Potential (mV)	Turbidity (ntu)
10:20	43.15	0.04	180	NR	NR	NR	NR	NR	NR
10:40	43.18	0.07	180	NR	NR	NR	NR	NR	NR
10:50	43.18	0.07	180	NR	NR	NR	NR	NR	108
11:00	43.18	0.07	180	NR	NR	NR	NR	NR	44
11:10	43.18	0.07	180	NR	NR	NR	NR	NR	32
11:20	43.18	0.07	180	11	506 +	1.7	7.5	-59	27
11:30	43.18	0.07	180	11	503 +	0.7	7.6	-88	19
11:35	43.18	0.07	180	11	500 +	0.5	7.6	-93	19
11:40	43.18	0.07	180	11	500 +	<0.5	7.6	-96	18
11:45	43.18	0.07	180	11	501 +	<0.5	7.6	-98	17
11:50	43.18	0.07	180	11	501 +	<0.5	7.6	-99	17

Notes:

1) Abbreviations include: "deg c" indicates degrees Celsius; "ft" indicates feet; "ft bmp" indicates feet below reference measuring point; "gal" indicates gallons; "in" indicates inches; "mg/l" indicates milligrams per liter; "ml/min" indicates milliliters per minute; "mV" indicates millivolts; "NA" indicates not applicable; "NR" indicates not recorded; "ntu" indicates Nephelometric Turbidity units; "su" indicates standard units; "us/cm" indicates microsiemens per centimeter; and "+" indicates the parameter(s) may be used for stabilization calculations but cannot be used for other purposes.
2) Weather temperature units are in degrees Fahrenheit, unless otherwise noted.
3) Did indicator parameters reach stabilization? Yes
4) Was the two hour time limit reached? No
5) Calculations:
   - Head Above Pump Intake (ft) 135.89
   - Total Drawdown (ft) 0.07
   - Calculated Final Purge Volume (gal) NA
6) If Drawdown Did Not Stabilize or Stabilized Drawdown >0.3 ft, is Total Purge Volume > Calculated Final Purge Volume? NA

Well Sampling Worksheet
WWW RAP Field Data
AREA 5 2023-Q3 - HS-PMW-RI-103A
Kent County, MI

Well	HS-PMW-RI-103A / 2 in Diameter PVC
Sample Quarter	2023-Q3
Date	08/02/2023
Weather	Sunny 70
Sampler Initials	NCK
Purging Device	Bladder-Pump: NA, Peristaltic-Pump: NA, Centrifugal-Pump: Mega Monsoon #2
Meters Used	YSI: Agile Rental 3, Turbidimeter: Agile Rental 3, Water-Level-Meter: WLM-1
Reference Measuring Point	PVC
Well Screen (ft bmp)	89.6 - 94.6
Measured Bottom Depth (ft bmp)	NR
Sample Comment	YSI Connected at 10:40.
Initial Water Level Date/Time	08/02/2023 09:50
Initial Water Level Depth (ft bmp)	74.87
Pump/Tubing Intake Depth (ft bmp)	92.1
Tubing Length (ft)	95
Tubing Inner Diameter (in)	0.17
Purging Initiation Date/Time	08/02/2023 09:55
Total Purge Volume (gal)	5.5
Modified Sample	No
If Modified, Reasoning	
Sample Collection Information	Bottling-Start: 08/02/2023 11:00:00, Bottling-Stop: 08/02/2023 11:05:00, Parameters-Sampled: PFAS

Reading Time	Depth To Water (ft)	Cumulative Drawdown (ft)	Purge Rate (ml/min)	Temperature (deg c)	Specific Conductivity (us/cm)	Dissolved Oxygen (mg/l)	pH (su)	Oxidation-Reduction Potential (mV)	Turbidity (ntu)
10:10	74.89	0.02	320	NR	NR	NR	NR	NR	NR
10:20	74.89	0.02	320	NR	NR	NR	NR	NR	NR
10:30	74.89	0.02	320	NR	NR	NR	NR	NR	NR
10:40	74.89	0.02	320	NR	NR	NR	NR	NR	NR
10:50	74.89	0.02	320	13	646 +	1.6	7.4	185	<5
10:55	74.89	0.02	320	13	645 +	1.5	7.4	182	<5
11:00	74.89	0.02	320	13	645 +	1.5	7.4	181	<5

Notes:

1) Abbreviations include: "deg c" indicates degrees Celsius; "ft" indicates feet; "ft bmp" indicates feet below reference measuring point; "gal" indicates gallons; "in" indicates inches; "mg/l" indicates milligrams per liter; "ml/min" indicates milliliters per minute; "mV" indicates millivolts; "NA" indicates not applicable; "NR" indicates not recorded; "ntu" indicates Nephelometric Turbidity units; "su" indicates standard units; "us/cm" indicates microsiemens per centimeter; and "+" indicates the parameter(s) may be used for stabilization calculations but cannot be used for other purposes.
2) Weather temperature units are in degrees Fahrenheit, unless otherwise noted.
3) Did indicator parameters reach stabilization? Yes
4) Was the two hour time limit reached? No
5) Calculations:
   - Head Above Pump Intake (ft) 17.23
   - Total Drawdown (ft) 0.02
   - Calculated Final Purge Volume (gal) NA
6) If Drawdown Did Not Stabilize or Stabilized Drawdown >0.3 ft, is Total Purge Volume > Calculated Final Purge Volume? NA

Well Sampling Worksheet
WWW RAP Field Data
AREA 5 2023-Q3 - HS-PMW-RI-103B
Kent County, MI

Well	HS-PMW-RI-103B / 2 in Diameter PVC
Sample Quarter	2023-Q3
Date	08/02/2023
Weather	Sunny 70
Sampler Initials	WVK
Purging Device	Bladder-Pump: NA, Peristaltic-Pump: NA, Centrifugal-Pump: Mega Monsoon #1
Meters Used	YSI: Agile Rental 2, Turbidimeter: Agile Rental 2, Water-Level-Meter: WLM-4
Reference Measuring Point	PVC
Well Screen (ft bmp)	108.7 - 113.7
Measured Bottom Depth (ft bmp)	NR
Sample Comment	YSI Connected at 11:30.
Initial Water Level Date/Time	08/02/2023 10:00
Initial Water Level Depth (ft bmp)	76.29
Pump/Tubing Intake Depth (ft bmp)	111.2
Tubing Length (ft)	116
Tubing Inner Diameter (in)	0.17
Purging Initiation Date/Time	08/02/2023 10:00
Total Purge Volume (gal)	3
Modified Sample	No
If Modified, Reasoning	
Sample Collection Information	Bottling-Start: 08/02/2023 12:00:00, Bottling-Stop: 08/02/2023 12:05:00, Parameters-Sampled: PFAS

Reading Time	Depth To Water (ft)	Cumulative Drawdown (ft)	Purge Rate (ml/min)	Temperature (deg c)	Specific Conductivity (us/cm)	Dissolved Oxygen (mg/l)	pH (su)	Oxidation-Reduction Potential (mV)	Turbidity (ntu)
10:10	76.43	0.14	100	NR	NR	NR	NR	NR	>999
10:20	76.40	0.11	100	NR	NR	NR	NR	NR	>999
10:30	76.38	0.09	100	NR	NR	NR	NR	NR	815
10:40	76.41	0.12	100	NR	NR	NR	NR	NR	321
10:50	76.39	0.10	100	NR	NR	NR	NR	NR	122
11:00	76.40	0.11	100	NR	NR	NR	NR	NR	72
11:10	76.44	0.15	100	NR	NR	NR	NR	NR	53
11:20	76.40	0.11	100	NR	NR	NR	NR	NR	22
11:30	76.44	0.15	100	NR	NR	NR	NR	NR	16
11:40	76.44	0.15	100	13	712 +	<0.5	7.4	197	9
11:45	76.44	0.15	100	13	707 +	<0.5	7.4	194	10

Well Sampling Worksheet
WWW RAP Field Data
AREA 5 2023-Q3 - HS-PMW-RI-103B
Kent County, MI

Well	HS-PMW-RI-103B / 2 in Diameter PVC
Sample Quarter	2023-Q3
Date	08/02/2023
Weather	Sunny 70
Sampler Initials	WVK
Purging Device	Bladder-Pump: NA, Peristaltic-Pump: NA, Centrifugal-Pump: Mega Monsoon #1
Meters Used	YSI: Agile Rental 2, Turbidimeter: Agile Rental 2, Water-Level-Meter: WLM-4
Reference Measuring Point	PVC
Well Screen (ft bmp)	108.7 - 113.7
Measured Bottom Depth (ft bmp)	NR
Sample Comment	YSI Connected at 11:30.
Initial Water Level Date/Time	08/02/2023 10:00
Initial Water Level Depth (ft bmp)	76.29
Pump/Tubing Intake Depth (ft bmp)	111.2
Tubing Length (ft)	116
Tubing Inner Diameter (in)	0.17
Purging Initiation Date/Time	08/02/2023 10:00
Total Purge Volume (gal)	3
Modified Sample	No
If Modified, Reasoning	
Sample Collection Information	Bottling-Start: 08/02/2023 12:00:00, Bottling-Stop: 08/02/2023 12:05:00, Parameters-Sampled: PFAS

Reading Time	Depth To Water (ft)	Cumulative Drawdown (ft)	Purge Rate (ml/min)	Temperature (deg c)	Specific Conductivity (us/cm)	Dissolved Oxygen (mg/l)	pH (su)	Oxidation-Reduction Potential (mV)	Turbidity (ntu)
11:50	76.44	0.15	100	13	706 +	<0.5	7.4	185	8
11:55	76.44	0.15	100	13	707 +	<0.5	7.4	183	8
12:00	76.44	0.15	100	13	707 +	<0.5	7.4	182	7

Notes:

1) Abbreviations include: "deg c" indicates degrees Celsius; "ft" indicates feet; "ft bmp" indicates feet below reference measuring point; "gal" indicates gallons; "in" indicates inches; "mg/l" indicates milligrams per liter; "ml/min" indicates milliliters per minute; "mV" indicates millivolts; "NA" indicates not applicable; "NR" indicates not recorded; "ntu" indicates Nephelometric Turbidity units; "su" indicates standard units; "us/cm" indicates microsiemens per centimeter; and "+" indicates the parameter(s) may be used for stabilization calculations but cannot be used for other purposes.
2) Weather temperature units are in degrees Fahrenheit, unless otherwise noted.
3) Did indicator parameters reach stabilization? Yes
4) Was the two hour time limit reached? Yes
5) Calculations:
   - Head Above Pump Intake (ft): 34.91
   - Total Drawdown (ft): 0.15
   - Calculated Final Purge Volume (gal): NA
6) If Drawdown Did Not Stabilize or Stabilized Drawdown >0.3 ft, is Total Purge Volume > Calculated Final Purge Volume? NA

Well Sampling Worksheet
WWW RAP Field Data
AREA 5 2023-Q3 - HS-PMW-RI-104A
Kent County, MI

Well	HS-PMW-RI-104A / 2 in Diameter PVC
Sample Quarter	2023-Q3
Date	07/17/2023
Weather	Sunny 70°F
Sampler Initials	RCP
Purging Device	Bladder-Pump: NA, Peristaltic-Pump: PER-1, Centrifugal-Pump: NA
Meters Used	YSI: Agile Rental 2, Turbidimeter: Agile Rental 2, Water-Level-Meter: WLM-2
Reference Measuring Point	PVC
Well Screen (ft bmp)	14.6 - 19.6
Measured Bottom Depth (ft bmp)	19.6
Sample Comment	10:22 - Initial drawdown at start of purge slowed after a minute. 10:25 - Water level stabilized. Pump cannot purge at a lower rate without turning off. YSI Connected at 10:40. 11:00 - Stabilized but no sample bottles were available, continue purging while waiting for bottles. 11:55 - Restabilized.
Initial Water Level Date/Time	07/17/2023 10:15
Initial Water Level Depth (ft bmp)	12.97
Pump/Tubing Intake Depth (ft bmp)	17.1
Tubing Length (ft)	25
Tubing Inner Diameter (in)	0.17
Purging Initiation Date/Time	07/17/2023 10:20
Total Purge Volume (gal)	3
Modified Sample	No
If Modified, Reasoning	
Sample Collection Information	Bottling-Start: 07/17/2023 12:00:00, Bottling-Stop: 07/17/2023 12:10:00, Parameters-Sampled: PFAS

Reading Time	Depth To Water (ft)	Cumulative Drawdown (ft)	Purge Rate (ml/min)	Temperature (deg c)	Specific Conductivity (us/cm)	Dissolved Oxygen (mg/l)	pH (su)	Oxidation-Reduction Potential (mV)	Turbidity (ntu)
10:22	13.38	0.41	80	NR	NR	NR	NR	NR	NR
10:25	13.38	0.41	80	NR	NR	NR	NR	NR	<5
10:40	13.38	0.41	80	15 +	844 +	8.5	7.3	300 +	<5
10:45	13.38	0.41	80	15 +	833 +	8.1	7.3	300 +	<5
10:50	13.38	0.41	80	15 +	814 +	8.3	7.2	302 +	<5
10:55	13.38	0.41	80	15 +	800 +	8.3	7.3	299 +	<5
11:00	13.38	0.41	80	15 +	802 +	8.4	7.3	294 +	<5
11:45	13.38	0.41	80	15 +	783 +	8.0	7.4	253 +	<5
11:50	13.38	0.41	80	15 +	785 +	8.4	7.4	250 +	<5
11:55	13.38	0.41	80	15 +	787 +	8.3	7.4	251 +	<5

Notes:

1) Abbreviations include: "deg c" indicates degrees Celsius; "ft" indicates feet; "ft bmp" indicates feet below reference measuring point; "gal" indicates gallons; "in" indicates inches; "mg/l" indicates milligrams per liter; "ml/min" indicates milliliters per minute; "mV" indicates millivolts; "NA" indicates not applicable; "NR" indicates not recorded; "ntu" indicates Nephelometric Turbidity units; "su" indicates standard units; "us/cm" indicates microsiemens per centimeter; and "+" indicates the parameter(s) may be used for stabilization calculations but cannot be used for other purposes.
2) Weather temperature units are in degrees Fahrenheit, unless otherwise noted.
3) Did indicator parameters reach stabilization? Yes
4) Was the two hour time limit reached? No
5) Calculations:
   - Head Above Pump Intake (ft) 4.13
   - Total Drawdown (ft) 0.41
   - Calculated Final Purge Volume (gal) 0.1
6) If Drawdown Did Not Stabilize or Stabilized Drawdown >0.3 ft, is Total Purge Volume > Calculated Final Purge Volume? Yes

Well Sampling Worksheet
WWW RAP Field Data
AREA 5 2023-Q3 - HS-PMW-RI-104B
Kent County, MI

Well	HS-PMW-RI-104B / 2 in Diameter PVC
Sample Quarter	2023-Q3
Date	07/17/2023
Weather	Sunny 75
Sampler Initials	NCK
Purging Device	Bladder-Pump: NA, Peristaltic-Pump: PER-3, Centrifugal-Pump: NA
Meters Used	YSI: Agile Rental 1, Turbidimeter: Agile Rental 1, Water-Level-Meter: WLM-1
Reference Measuring Point	PVC
Well Screen (ft bmp)	45.4 - 50.4
Measured Bottom Depth (ft bmp)	50.4
Sample Comment	10:20 - 10:40 YSI not connected. Connected YSI at 10:45. 11:15 - Stabilized but no sample bottles were available, continue purging while waiting for bottles.
Initial Water Level Date/Time	07/17/2023 10:15
Initial Water Level Depth (ft bmp)	13.48
Pump/Tubing Intake Depth (ft bmp)	47.9
Tubing Length (ft)	52
Tubing Inner Diameter (in)	0.17
Purging Initiation Date/Time	07/17/2023 10:20
Total Purge Volume (gal)	7.4
Modified Sample	No
If Modified, Reasoning	
Sample Collection Information	Bottling-Start: 07/17/2023 11:45:00, Bottling-Stop: 07/17/2023 11:48:00, Parameters-Sampled: PFAS

Reading Time	Depth To Water (ft)	Cumulative Drawdown (ft)	Purge Rate (ml/min)	Temperature (deg c)	Specific Conductivity (us/cm)	Dissolved Oxygen (mg/l)	pH (su)	Oxidation-Reduction Potential (mV)	Turbidity (ntu)
10:30	13.50	0.02	350	NR	NR	NR	NR	NR	NR
10:40	13.50	0.02	350	NR	NR	NR	NR	NR	NR
10:45	13.50	0.02	350	11 +	642 +	3.3	7.4	212 +	<5
10:50	13.50	0.02	350	11 +	641 +	0.9	7.4	199 +	<5
10:55	13.50	0.02	350	11 +	641 +	<0.5	7.5	197 +	<5
11:00	13.50	0.02	350	11 +	641 +	<0.5	7.3	193 +	<5
11:05	13.50	0.02	350	11 +	642 +	<0.5	7.5	192 +	<5
11:10	13.50	0.02	350	11 +	641 +	<0.5	7.5	188 +	<5
11:15	13.50	0.02	350	11 +	640 +	<0.5	7.5	185 +	<5
11:20	13.50	0.02	350	11 +	642 +	<0.5	7.5	182 +	<5
11:25	13.50	0.02	350	11 +	642 +	<0.5	7.5	182 +	<5

Well Sampling Worksheet
WWW RAP Field Data
AREA 5 2023-Q3 - HS-PMW-RI-104B
Kent County, MI

Well	HS-PMW-RI-104B / 2 in Diameter PVC
Sample Quarter	2023-Q3
Date	07/17/2023
Weather	Sunny 75
Sampler Initials	NCK
Purging Device	Bladder-Pump: NA, Peristaltic-Pump: PER-3, Centrifugal-Pump: NA
Meters Used	YSI: Agile Rental 1, Turbidimeter: Agile Rental 1, Water-Level-Meter: WLM-1
Reference Measuring Point	PVC
Well Screen (ft bmp)	45.4 - 50.4
Measured Bottom Depth (ft bmp)	50.4
Sample Comment	10:20 - 10:40 YSI not connected. Connected YSI at 10:45. 11:15 - Stabilized but no sample bottles were available, continue purging while waiting for bottles.
Initial Water Level Date/Time	07/17/2023 10:15
Initial Water Level Depth (ft bmp)	13.48
Pump/Tubing Intake Depth (ft bmp)	47.9
Tubing Length (ft)	52
Tubing Inner Diameter (in)	0.17
Purging Initiation Date/Time	07/17/2023 10:20
Total Purge Volume (gal)	7.4
Modified Sample	No
If Modified, Reasoning	
Sample Collection Information	Bottling-Start: 07/17/2023 11:45:00, Bottling-Stop: 07/17/2023 11:48:00, Parameters-Sampled: PFAS

Reading Time	Depth To Water (ft)	Cumulative Drawdown (ft)	Purge Rate (ml/min)	Temperature (deg c)	Specific Conductivity (us/cm)	Dissolved Oxygen (mg/l)	pH (su)	Oxidation-Reduction Potential (mV)	Turbidity (ntu)
11:30	13.50	0.02	350	11 +	641 +	<0.5	7.4	181 +	<5
11:35	13.50	0.02	350	11 +	642 +	<0.5	7.5	178 +	<5
11:40	13.50	0.02	350	11 +	641 +	<0.5	7.5	174 +	<5

Notes:

1) Abbreviations include: "deg c" indicates degrees Celsius; "ft" indicates feet; "ft bmp" indicates feet below reference measuring point; "gal" indicates gallons; "in" indicates inches; "mg/l" indicates milligrams per liter; "ml/min" indicates milliliters per minute; "mV" indicates millivolts; "NA" indicates not applicable; "NR" indicates not recorded; "ntu" indicates Nephelometric Turbidity units; "su" indicates standard units; "us/cm" indicates microsiemens per centimeter; and "+" indicates the parameter(s) may be used for stabilization calculations but cannot be used for other purposes.
2) Weather temperature units are in degrees Fahrenheit, unless otherwise noted.
3) Did indicator parameters reach stabilization? Yes
4) Was the two hour time limit reached? No
5) Calculations:
   - Head Above Pump Intake (ft): 34.42
   - Total Drawdown (ft): 0.02
   - Calculated Final Purge Volume (gal): NA
6) If Drawdown Did Not Stabilize or Stabilized Drawdown >0.3 ft, is Total Purge Volume > Calculated Final Purge Volume? NA

Well Sampling Worksheet
WWW RAP Field Data
AREA 5 2023-Q3 - HS-PMW-RI-104C
Kent County, MI

Well	HS-PMW-RI-104C / 2 in Diameter PVC
Sample Quarter	2023-Q3
Date	07/17/2023
Weather	Sunny 75°F
Sampler Initials	RCP
Purging Device	Bladder-Pump: NA, Peristaltic-Pump: PER-3, Centrifugal-Pump: NA
Meters Used	YSI: Agile Rental 2, Turbidimeter: Agile Rental 2, Water-Level-Meter: WLM-2
Reference Measuring Point	PVC
Well Screen (ft bmp)	74.3 - 79.3
Measured Bottom Depth (ft bmp)	79.3
Sample Comment	No drawdown/stable water level. Low turbidity. Connected YSI at 13:25.
Initial Water Level Date/Time	07/17/2023 13:00
Initial Water Level Depth (ft bmp)	13.57
Pump/Tubing Intake Depth (ft bmp)	76.8
Tubing Length (ft)	79
Tubing Inner Diameter (in)	0.17
Purging Initiation Date/Time	07/17/2023 13:10
Total Purge Volume (gal)	4
Modified Sample	No
If Modified, Reasoning	
Sample Collection Information	Bottling-Start: 07/17/2023 14:10:00, Bottling-Stop: 07/17/2023 14:15:00, Parameters-Sampled: PFAS

Reading Time	Depth To Water (ft)	Cumulative Drawdown (ft)	Purge Rate (ml/min)	Temperature (deg c)	Specific Conductivity (us/cm)	Dissolved Oxygen (mg/l)	pH (su)	Oxidation-Reduction Potential (mV)	Turbidity (ntu)
13:20	13.55	-0.02	260	NR	NR	NR	NR	NR	NR
13:25	13.55	-0.02	260	NR	NR	NR	NR	NR	<5
13:30	13.55	-0.02	260	12 +	773 +	<0.5	7.5	62 +	<5
13:35	13.55	-0.02	260	12 +	772 +	<0.5	7.5	-3 +	<5
13:40	13.55	-0.02	260	12 +	771 +	<0.5	7.4	-38 +	<5
13:45	13.55	-0.02	260	12 +	771 +	<0.5	7.4	-51 +	<5
13:50	13.55	-0.02	260	12 +	770 +	<0.5	7.4	-69 +	<5
13:55	13.55	-0.02	260	12 +	774 +	<0.5	7.4	-77 +	<5
14:00	13.55	-0.02	260	12 +	775 +	<0.5	7.4	-82 +	<5
14:05	13.55	-0.02	260	12 +	779 +	<0.5	7.4	-85 +	<5

Notes:

1) Abbreviations include: "deg c" indicates degrees Celsius; "ft" indicates feet; "ft bmp" indicates feet below reference measuring point; "gal" indicates gallons; "in" indicates inches; "mg/l" indicates milligrams per liter; "ml/min" indicates milliliters per minute; "mV" indicates millivolts; "NA" indicates not applicable; "NR" indicates not recorded; "ntu" indicates Nephelometric Turbidity units; "su" indicates standard units; "us/cm" indicates microsiemens per centimeter; and "+" indicates the parameter(s) may be used for stabilization calculations but cannot be used for other purposes.
2) Weather temperature units are in degrees Fahrenheit, unless otherwise noted.
3) Did indicator parameters reach stabilization? Yes
4) Was the two hour time limit reached? No
5) Calculations:
   - Head Above Pump Intake (ft) 63.23
   - Total Drawdown (ft) -0.02
   - Calculated Final Purge Volume (gal) NA
6) If Drawdown Did Not Stabilize or Stabilized Drawdown >0.3 ft, is Total Purge Volume > Calculated Final Purge Volume? NA

Well Sampling Worksheet
WWW RAP Field Data
AREA 5 2023-Q3 - HS-PMW-RI-104D
Kent County, MI

Well	HS-PMW-RI-104D / 2 in Diameter PVC
Sample Quarter	2023-Q3
Date	07/17/2023
Weather	Sunny 80
Sampler Initials	NCK
Purging Device	Bladder-Pump: NA, Peristaltic-Pump: PER-1, Centrifugal-Pump: NA
Meters Used	YSI: Agile Rental 1, Turbidimeter: Agile Rental 1, Water-Level-Meter: WLM-1
Reference Measuring Point	PVC
Well Screen (ft bmp)	111.4 - 116.4
Measured Bottom Depth (ft bmp)	116.4
Sample Comment	13:05 - 13:25: Ensuring drawdown is under control before connecting meter. Connected YSI at 13:35.
Initial Water Level Date/Time	07/17/2023 13:00
Initial Water Level Depth (ft bmp)	7.48
Pump/Tubing Intake Depth (ft bmp)	113.9
Tubing Length (ft)	118
Tubing Inner Diameter (in)	0.17
Purging Initiation Date/Time	07/17/2023 13:05
Total Purge Volume (gal)	5
Modified Sample	No
If Modified, Reasoning	
Sample Collection Information	Bottling-Start: 07/17/2023 14:00:00, Bottling-Stop: 07/17/2023 14:03:00, Parameters-Sampled: PFAS

Reading Time	Depth To Water (ft)	Cumulative Drawdown (ft)	Purge Rate (ml/min)	Temperature (deg c)	Specific Conductivity (us/cm)	Dissolved Oxygen (mg/l)	pH (su)	Oxidation-Reduction Potential (mV)	Turbidity (ntu)
13:15	7.53	0.05	350	NR	NR	NR	NR	NR	NR
13:25	7.53	0.05	350	NR	NR	NR	NR	NR	NR
13:35	7.53	0.05	350	12.1 +	1,309 +	<0.5	7.5	-68 +	5
13:40	7.53	0.05	350	12 +	1,314 +	<0.5	7.4	-82 +	<5
13:45	7.53	0.05	350	12 +	1,313 +	<0.5	7.4	-88 +	<5
13:50	7.53	0.05	350	12 +	1,308 +	<0.5	7.4	-92 +	<5
13:55	7.53	0.05	350	12 +	1,311 +	<0.5	7.4	-96 +	<5

Notes:

1) Abbreviations include: "deg c" indicates degrees Celsius; "ft" indicates feet; "ft bmp" indicates feet below reference measuring point; "gal" indicates gallons; "in" indicates inches; "mg/l" indicates milligrams per liter; "ml/min" indicates milliliters per minute; "mV" indicates millivolts; "NA" indicates not applicable; "NR" indicates not recorded; "ntu" indicates Nephelometric Turbidity units; "su" indicates standard units; "us/cm" indicates microsiemens per centimeter; and "+" indicates the parameter(s) may be used for stabilization calculations but cannot be used for other purposes.
2) Weather temperature units are in degrees Fahrenheit, unless otherwise noted.
3) Did indicator parameters reach stabilization? Yes
4) Was the two hour time limit reached? No
5) Calculations:
   - Head Above Pump Intake (ft) 106.42
   - Total Drawdown (ft) 0.05
   - Calculated Final Purge Volume (gal) NA
6) If Drawdown Did Not Stabilize or Stabilized Drawdown >0.3 ft, is Total Purge Volume > Calculated Final Purge Volume? NA

Well Sampling Worksheet
WWW RAP Field Data
PERIMETER 2023-Q3 - HS-PMW-RI-105A
Kent County, MI

Well	HS-PMW-RI-105A / 2 in Diameter PVC
Sample Quarter	2023-Q3
Date	08/31/2023
Weather	72F Sunny
Sampler Initials	JET
Purging Device	Bladder-Pump: NA, Peristaltic-Pump: PER-3, Centrifugal-Pump: NA
Meters Used	YSI: Agile Rental 4, Turbidimeter: Agile Rental 1, Water-Level-Meter: WLM-2
Reference Measuring Point	PVC
Well Screen (ft bmp)	24.5 - 29.5
Measured Bottom Depth (ft bmp)	29.6
Sample Comment	YSI Connected at 16:15.
Initial Water Level Date/Time	08/31/2023 15:50
Initial Water Level Depth (ft bmp)	22.71
Pump/Tubing Intake Depth (ft bmp)	27.1
Tubing Length (ft)	34
Tubing Inner Diameter (in)	0.17
Purging Initiation Date/Time	08/31/2023 15:50
Total Purge Volume (gal)	5
Modified Sample	No
If Modified, Reasoning	
Sample Collection Information	Bottling-Start: 08/31/2023 16:50:00, Bottling-Stop: 08/31/2023 16:55:00, Parameters-Sampled: PFAS

Reading Time	Depth To Water (ft)	Cumulative Drawdown (ft)	Purge Rate (ml/min)	Temperature (deg c)	Specific Conductivity (us/cm)	Dissolved Oxygen (mg/l)	pH (su)	Oxidation-Reduction Potential (mV)	Turbidity (ntu)
16:00	22.71	0.00	400	NR	NR	NR	NR	NR	<5
16:15	22.71	0.00	400	11	602 +	9.0	7.4	232	<5
16:20	22.71	0.00	400	12	603 +	9.5	7.4	238	<5
16:30	22.71	0.00	400	12	605 +	10.1	7.5	245	<5
16:35	22.71	0.00	400	12	605 +	10.1	7.5	257	<5
16:40	22.71	0.00	400	12	607 +	10.1	7.5	258	<5
16:45	22.71	0.00	400	12	607 +	10.1	7.5	260	<5

Notes:

1) Abbreviations include: "deg c" indicates degrees Celsius; "ft" indicates feet; "ft bmp" indicates feet below reference measuring point; "gal" indicates gallons; "in" indicates inches; "mg/l" indicates milligrams per liter; "ml/min" indicates milliliters per minute; "mV" indicates millivolts; "NA" indicates not applicable; "NR" indicates not recorded; "ntu" indicates Nephelometric Turbidity units; "su" indicates standard units; "us/cm" indicates microsiemens per centimeter; and "+" indicates the parameter(s) may be used for stabilization calculations but cannot be used for other purposes.
2) Weather temperature units are in degrees Fahrenheit, unless otherwise noted.
3) Did indicator parameters reach stabilization? Yes
4) Was the two hour time limit reached? No
5) Calculations:
   - Head Above Pump Intake (ft) 4.39
   - Total Drawdown (ft) 0.00
   - Calculated Final Purge Volume (gal) NA
6) If Drawdown Did Not Stabilize or Stabilized Drawdown >0.3 ft, is Total Purge Volume > Calculated Final Purge Volume? NA

Well Sampling Worksheet
WWW RAP Field Data
PERIMETER 2023-Q3 - HS-PMW-RI-105B
Kent County, MI

Well	HS-PMW-RI-105B / 2 in Diameter PVC
Sample Quarter	2023-Q3
Date	08/31/2023
Weather	72F Sunny
Sampler Initials	MKM
Purging Device	Bladder-Pump: NA, Peristaltic-Pump: Rental, Centrifugal-Pump: NA
Meters Used	YSI: Agile Rental 1, Turbidimeter: Agile Rental 1, Water-Level-Meter: WLM-4
Reference Measuring Point	PVC
Well Screen (ft bmp)	152.8 - 157.8
Measured Bottom Depth (ft bmp)	NR
Sample Comment	YSI Connected at 16:50.
Initial Water Level Date/Time	08/31/2023 15:45
Initial Water Level Depth (ft bmp)	11.94
Pump/Tubing Intake Depth (ft bmp)	155.3
Tubing Length (ft)	157
Tubing Inner Diameter (in)	0.17
Purging Initiation Date/Time	08/31/2023 15:50
Total Purge Volume (gal)	8
Modified Sample	No
If Modified, Reasoning	
Sample Collection Information	Bottling-Start: 08/31/2023 17:40:00, Bottling-Stop: 08/31/2023 17:45:00, Parameters-Sampled: PFAS

Reading Time	Depth To Water (ft)	Cumulative Drawdown (ft)	Purge Rate (ml/min)	Temperature (deg c)	Specific Conductivity (us/cm)	Dissolved Oxygen (mg/l)	pH (su)	Oxidation-Reduction Potential (mV)	Turbidity (ntu)
16:00	11.94	0.00	300	NR	NR	NR	NR	NR	373
16:15	11.94	0.00	300	NR	NR	NR	NR	NR	122
16:30	11.94	0.00	300	NR	NR	NR	NR	NR	76
16:40	11.94	0.00	300	NR	NR	NR	NR	NR	73
16:50	11.94	0.00	300	13	1,179 +	<0.5	7.5	-45	106
16:55	11.94	0.00	300	13	1,175 +	<0.5	7.4	-75	177
17:05	11.94	0.00	300	12	1,177 +	<0.5	7.4	-91	170
17:10	11.94	0.00	300	12	1,177 +	<0.5	7.4	-95	169
17:15	11.94	0.00	300	12	1,172 +	<0.5	7.5	-100	200
17:20	11.94	0.00	300	12	1,172 +	<0.5	7.5	-101	131
17:25	11.94	0.00	300	12	1,176 +	<0.5	7.5	-103	111

Well Sampling Worksheet
WWW RAP Field Data
PERIMETER 2023-Q3 - HS-PMW-RI-105B
Kent County, MI

Well	HS-PMW-RI-105B / 2 in Diameter PVC
Sample Quarter	2023-Q3
Date	08/31/2023
Weather	72F Sunny
Sampler Initials	MKM
Purging Device	Bladder-Pump: NA, Peristaltic-Pump: Rental, Centrifugal-Pump: NA
Meters Used	YSI: Agile Rental 1, Turbidimeter: Agile Rental 1, Water-Level-Meter: WLM-4
Reference Measuring Point	PVC
Well Screen (ft bmp)	152.8 - 157.8
Measured Bottom Depth (ft bmp)	NR
Sample Comment	YSI Connected at 16:50.
Initial Water Level Date/Time	08/31/2023 15:45
Initial Water Level Depth (ft bmp)	11.94
Pump/Tubing Intake Depth (ft bmp)	155.3
Tubing Length (ft)	157
Tubing Inner Diameter (in)	0.17
Purging Initiation Date/Time	08/31/2023 15:50
Total Purge Volume (gal)	8
Modified Sample	No
If Modified, Reasoning	
Sample Collection Information	Bottling-Start: 08/31/2023 17:40:00, Bottling-Stop: 08/31/2023 17:45:00, Parameters-Sampled: PFAS

Reading Time	Depth To Water (ft)	Cumulative Drawdown (ft)	Purge Rate (ml/min)	Temperature (deg c)	Specific Conductivity (us/cm)	Dissolved Oxygen (mg/l)	pH (su)	Oxidation-Reduction Potential (mV)	Turbidity (ntu)
17:30	11.94	0.00	300	12	1,169 +	<0.5	7.5	-106	97
17:35	11.94	0.00	300	12	1,172 +	<0.5	7.5	-107	91
17:40	11.94	0.00	300	12	1,169 +	<0.5	7.5	-108	100

Notes:

1) Abbreviations include: "deg c" indicates degrees Celsius; "ft" indicates feet; "ft bmp" indicates feet below reference measuring point; "gal" indicates gallons; "in" indicates inches; "mg/l" indicates milligrams per liter; "ml/min" indicates milliliters per minute; "mV" indicates millivolts; "NA" indicates not applicable; "NR" indicates not recorded; "ntu" indicates Nephelometric Turbidity units; "su" indicates standard units; "us/cm" indicates microsiemens per centimeter; and "+" indicates the parameter(s) may be used for stabilization calculations but cannot be used for other purposes.
2) Weather temperature units are in degrees Fahrenheit, unless otherwise noted.
3) Did indicator parameters reach stabilization? Yes
4) Was the two hour time limit reached? No
5) Calculations:
   - Head Above Pump Intake (ft) 143.36
   - Total Drawdown (ft) 0.00
   - Calculated Final Purge Volume (gal) NA
6) If Drawdown Did Not Stabilize or Stabilized Drawdown >0.3 ft, is Total Purge Volume > Calculated Final Purge Volume? NA

Well Sampling Worksheet
WWW RAP Field Data
PERIMETER 2023-Q3 - HS-PMW-RI-106A
Kent County, MI

Well	HS-PMW-RI-106A / 2 in Diameter PVC
Sample Quarter	2023-Q3
Date	08/30/2023
Weather	60 Sunny
Sampler Initials	JMS
Purging Device	Bladder-Pump: NA, Peristaltic-Pump: NA, Centrifugal-Pump: Mega Monsoon #1
Meters Used	YSI: Agile Rental 1, Turbidimeter: Agile Rental 1, Water-Level-Meter: WLM-1
Reference Measuring Point	PVC
Well Screen (ft bmp)	44.7 - 49.7
Measured Bottom Depth (ft bmp)	50.4
Sample Comment	YSI Connected at 12:30.
Initial Water Level Date/Time	08/30/2023 11:55
Initial Water Level Depth (ft bmp)	37.50
Pump/Tubing Intake Depth (ft bmp)	47.5
Tubing Length (ft)	52.5
Tubing Inner Diameter (in)	0.17
Purging Initiation Date/Time	08/30/2023 12:00
Total Purge Volume (gal)	6
Modified Sample	No
If Modified, Reasoning	
Sample Collection Information	Bottling-Start: 08/30/2023 13:50:00, Bottling-Stop: 08/30/2023 13:55:00, Parameters-Sampled: PFAS

Reading Time	Depth To Water (ft)	Cumulative Drawdown (ft)	Purge Rate (ml/min)	Temperature (deg c)	Specific Conductivity (us/cm)	Dissolved Oxygen (mg/l)	pH (su)	Oxidation-Reduction Potential (mV)	Turbidity (ntu)
12:15	37.27	-0.23	360	NR	NR	NR	NR	NR	7
12:20	37.27	-0.23	360	NR	NR	NR	NR	NR	<5
12:30	37.27	-0.23	360	12	467 +	1.7	7.2	313	<5
12:40	37.27	-0.23	360	12	466 +	0.9	7.2	310	<5
12:45	37.27	-0.23	360	12	466 +	0.8	7.2	303	<5
12:50	37.27	-0.23	360	12	466 +	0.5	7.2	298	<5
12:55	37.27	-0.23	360	12	466 +	0.6	7.2	292	<5
13:00	37.27	-0.23	360	12	466 +	0.5	7.3	285	<5
13:05	37.27	-0.23	360	12	467 +	0.5	7.3	277	<5
13:10	37.27	-0.23	360	12	466 +	0.5	7.3	272	<5

Well Sampling Worksheet
WWW RAP Field Data
PERIMETER 2023-Q3 - HS-PMW-RI-106A
Kent County, MI

Well	HS-PMW-RI-106A / 2 in Diameter PVC
Sample Quarter	2023-Q3
Date	08/30/2023
Weather	60 Sunny
Sampler Initials	JMS
Purging Device	Bladder-Pump: NA, Peristaltic-Pump: NA, Centrifugal-Pump: Mega Monsoon #1
Meters Used	YSI: Agile Rental 1, Turbidimeter: Agile Rental 1, Water-Level-Meter: WLM-1
Reference Measuring Point	PVC
Well Screen (ft bmp)	44.7 - 49.7
Measured Bottom Depth (ft bmp)	50.4
Sample Comment	YSI Connected at 12:30.
Initial Water Level Date/Time	08/30/2023 11:55
Initial Water Level Depth (ft bmp)	37.50
Pump/Tubing Intake Depth (ft bmp)	47.5
Tubing Length (ft)	52.5
Tubing Inner Diameter (in)	0.17
Purging Initiation Date/Time	08/30/2023 12:00
Total Purge Volume (gal)	6
Modified Sample	No
If Modified, Reasoning	
Sample Collection Information	Bottling-Start: 08/30/2023 13:50:00, Bottling-Stop: 08/30/2023 13:55:00, Parameters-Sampled: PFAS

Reading Time	Depth To Water (ft)	Cumulative Drawdown (ft)	Purge Rate (ml/min)	Temperature (deg c)	Specific Conductivity (us/cm)	Dissolved Oxygen (mg/l)	pH (su)	Oxidation-Reduction Potential (mV)	Turbidity (ntu)
13:25	37.27	-0.23	360	12	466 +	<0.5	7.3	254	<5
13:30	37.27	-0.23	360	12	466 +	<0.5	7.3	252	<5
13:35	37.27	-0.23	360	12	466 +	<0.5	7.3	245	<5

Notes:

1) Abbreviations include: "deg c" indicates degrees Celsius; "ft" indicates feet; "ft bmp" indicates feet below reference measuring point; "gal" indicates gallons; "in" indicates inches; "mg/l" indicates milligrams per liter; "ml/min" indicates milliliters per minute; "mV" indicates millivolts; "NA" indicates not applicable; "NR" indicates not recorded; "ntu" indicates Nephelometric Turbidity units; "su" indicates standard units; "us/cm" indicates microsiemens per centimeter; and "+" indicates the parameter(s) may be used for stabilization calculations but cannot be used for other purposes.
2) Weather temperature units are in degrees Fahrenheit, unless otherwise noted.
3) Did indicator parameters reach stabilization? Yes
4) Was the two hour time limit reached? No
5) Calculations:
   - Head Above Pump Intake (ft) 10.00
   - Total Drawdown (ft) -0.23
   - Calculated Final Purge Volume (gal) NA
6) If Drawdown Did Not Stabilize or Stabilized Drawdown >0.3 ft, is Total Purge Volume > Calculated Final Purge Volume? NA

Well Sampling Worksheet
WWW RAP Field Data
PERIMETER 2023-Q3 - HS-PMW-RI-106B
Kent County, MI

Well	HS-PMW-RI-106B / 2 in Diameter PVC
Sample Quarter	2023-Q3
Date	08/30/2023
Weather	60 Sunny
Sampler Initials	BPT
Purging Device	Bladder-Pump: BP-12, Peristaltic-Pump: NA, Centrifugal-Pump: NA
Meters Used	YSI: Agile Rental 2, Turbidimeter: Agile Rental 2, Water-Level-Meter: WLM-4
Reference Measuring Point	PVC
Well Screen (ft bmp)	204.7 - 209.7
Measured Bottom Depth (ft bmp)	NR
Sample Comment	14:25: YSI connected.
Initial Water Level Date/Time	08/30/2023 13:15
Initial Water Level Depth (ft bmp)	37.53
Pump/Tubing Intake Depth (ft bmp)	207.2
Tubing Length (ft)	210
Tubing Inner Diameter (in)	0.25
Purging Initiation Date/Time	08/30/2023 13:20
Total Purge Volume (gal)	7.5
Modified Sample	No
If Modified, Reasoning	
Sample Collection Information	Bottling-Start: 08/30/2023 15:00:00, Bottling-Stop: 08/30/2023 15:05:00, Parameters-Sampled: PFAS

Reading Time	Depth To Water (ft)	Cumulative Drawdown (ft)	Purge Rate (ml/min)	Temperature (deg c)	Specific Conductivity (us/cm)	Dissolved Oxygen (mg/l)	pH (su)	Oxidation-Reduction Potential (mV)	Turbidity (ntu)
13:40	37.53	0.00	300	NR	NR	NR	NR	NR	115
13:55	37.53	0.00	300	NR	NR	NR	NR	NR	65
14:05	37.53	0.00	300	NR	NR	NR	NR	NR	29
14:15	37.53	0.00	300	NR	NR	NR	NR	NR	17
14:25	37.53	0.00	300	11	1,824 +	<0.5	7.4	75	14
14:35	37.53	0.00	300	11	1,841 +	<0.5	7.4	3	11
14:40	37.53	0.00	300	11	1,842 +	<0.5	7.4	-7	8
14:45	37.53	0.00	300	11	1,836 +	<0.5	7.4	-17	7
14:50	37.53	0.00	300	11	1,833 +	<0.5	7.4	-19	7
14:55	37.53	0.00	300	11	1,830 +	<0.5	7.4	-23	7

Notes:

1) Abbreviations include: "deg c" indicates degrees Celsius; "ft" indicates feet; "ft bmp" indicates feet below reference measuring point; "gal" indicates gallons; "in" indicates inches; "mg/l" indicates milligrams per liter; "ml/min" indicates milliliters per minute; "mV" indicates millivolts; "NA" indicates not applicable; "NR" indicates not recorded; "ntu" indicates Nephelometric Turbidity units; "su" indicates standard units; "us/cm" indicates microsiemens per centimeter; and "+" indicates the parameter(s) may be used for stabilization calculations but cannot be used for other purposes.
2) Weather temperature units are in degrees Fahrenheit, unless otherwise noted.
3) Did indicator parameters reach stabilization? Yes
4) Was the two hour time limit reached? No
5) Calculations:
   - Head Above Pump Intake (ft) 169.67
   - Total Drawdown (ft) 0.00
   - Calculated Final Purge Volume (gal) NA
6) If Drawdown Did Not Stabilize or Stabilized Drawdown >0.3 ft, is Total Purge Volume > Calculated Final Purge Volume? NA

Well Sampling Worksheet
WWW RAP Field Data
AREA 5 2023-Q3 - HS-PMW-RI-107A
Kent County, MI

Well	HS-PMW-RI-107A / 2 in Diameter PVC
Sample Quarter	2023-Q3
Date	08/01/2023
Weather	Sunny 80
Sampler Initials	WVK
Purging Device	Bladder-Pump: NA, Peristaltic-Pump: NA, Centrifugal-Pump: Mega Monsoon #1
Meters Used	YSI: Agile Rental 3, Turbidimeter: Agile Rental 3, Water-Level-Meter: WLM-4
Reference Measuring Point	PVC
Well Screen (ft bmp)	79.2 - 84.2
Measured Bottom Depth (ft bmp)	NR
Sample Comment	Connected YSI at 14:45.
Initial Water Level Date/Time	08/01/2023 14:25
Initial Water Level Depth (ft bmp)	48.03
Pump/Tubing Intake Depth (ft bmp)	81.7
Tubing Length (ft)	86
Tubing Inner Diameter (in)	0.17
Purging Initiation Date/Time	08/01/2023 14:25
Total Purge Volume (gal)	6
Modified Sample	No
If Modified, Reasoning	
Sample Collection Information	Bottling-Start: 08/01/2023 15:20:00, Bottling-Stop: 08/01/2023 15:25:00, Parameters-Sampled: PFAS

Reading Time	Depth To Water (ft)	Cumulative Drawdown (ft)	Purge Rate (ml/min)	Temperature (deg c)	Specific Conductivity (us/cm)	Dissolved Oxygen (mg/l)	pH (su)	Oxidation-Reduction Potential (mV)	Turbidity (ntu)
14:35	48.07	0.04	450	NR	NR	NR	NR	NR	23
14:45	48.07	0.04	450	NR	NR	NR	NR	NR	5
14:55	48.07	0.04	450	12	581 +	<0.5	7.5	190	<5
15:05	48.07	0.04	450	12	581 +	<0.5	7.5	179	<5
15:10	48.07	0.04	450	12	581 +	<0.5	7.5	174	<5
15:15	48.07	0.04	450	12	581 +	<0.5	7.5	171	<5

Notes:

1) Abbreviations include: "deg c" indicates degrees Celsius; "ft" indicates feet; "ft bmp" indicates feet below reference measuring point; "gal" indicates gallons; "in" indicates inches; "mg/l" indicates milligrams per liter; "ml/min" indicates milliliters per minute; "mV" indicates millivolts; "NA" indicates not applicable; "NR" indicates not recorded; "ntu" indicates Nephelometric Turbidity units; "su" indicates standard units; "us/cm" indicates microsiemens per centimeter; and "+" indicates the parameter(s) may be used for stabilization calculations but cannot be used for other purposes.
2) Weather temperature units are in degrees Fahrenheit, unless otherwise noted.
3) Did indicator parameters reach stabilization? Yes
4) Was the two hour time limit reached? No
5) Calculations:
   - Head Above Pump Intake (ft) 33.67
   - Total Drawdown (ft) 0.04
   - Calculated Final Purge Volume (gal) NA
6) If Drawdown Did Not Stabilize or Stabilized Drawdown >0.3 ft, is Total Purge Volume > Calculated Final Purge Volume? NA

Well Sampling Worksheet
WWW RAP Field Data
AREA 5 2023-Q3 - HS-PMW-RI-107B
Kent County, MI

Well	HS-PMW-RI-107B / 2 in Diameter PVC
Sample Quarter	2023-Q3
Date	08/01/2023
Weather	Sunny 75
Sampler Initials	CBM
Purging Device	Bladder-Pump: BP-12, Peristaltic-Pump: NA, Centrifugal-Pump: NA
Meters Used	YSI: Agile Rental 2, Turbidimeter: Agile Rental 2, Water-Level-Meter: WLM-1
Reference Measuring Point	PVC
Well Screen (ft bmp)	175.2 - 180.2
Measured Bottom Depth (ft bmp)	180.2
Sample Comment	Water level stabilized early, turbidity is high. All parameters stable except for turbidity when 2 hour time limit was reached.
Initial Water Level Date/Time	08/01/2023 13:00
Initial Water Level Depth (ft bmp)	62.38
Pump/Tubing Intake Depth (ft bmp)	177.7
Tubing Length (ft)	180
Tubing Inner Diameter (in)	0.25
Purging Initiation Date/Time	08/01/2023 14:05
Total Purge Volume (gal)	9.5
Modified Sample	No
If Modified, Reasoning	
Sample Collection Information	Bottling-Start: 08/01/2023 16:05:00, Bottling-Stop: 08/01/2023 16:10:00, Parameters-Sampled: PFAS

Reading Time	Depth To Water (ft)	Cumulative Drawdown (ft)	Purge Rate (ml/min)	Temperature (deg c)	Specific Conductivity (us/cm)	Dissolved Oxygen (mg/l)	pH (su)	Oxidation-Reduction Potential (mV)	Turbidity (ntu)
15:35	62.39	0.01	200	11	1,159 +	0.8	7.2	288	214
15:45	62.39	0.01	200	11	1,164 +	0.9	7.2	283	142
15:55	62.39	0.01	200	11	1,165 +	0.9	7.2	277	88
16:00	62.39	0.01	200	11	1,165 +	0.9	7.2	275	77
16:05	62.39	0.01	200	11	1,166 +	0.8	7.2	274	65

Notes:

1) Abbreviations include: "deg c" indicates degrees Celsius; "ft" indicates feet; "ft bmp" indicates feet below reference measuring point; "gal" indicates gallons; "in" indicates inches; "mg/l" indicates milligrams per liter; "ml/min" indicates milliliters per minute; "mV" indicates millivolts; "NA" indicates not applicable; "NR" indicates not recorded; "ntu" indicates Nephelometric Turbidity units; "su" indicates standard units; "us/cm" indicates microsiemens per centimeter; and "+" indicates the parameter(s) may be used for stabilization calculations but cannot be used for other purposes.
2) Weather temperature units are in degrees Fahrenheit, unless otherwise noted.
3) Did indicator parameters reach stabilization? No
4) Was the two hour time limit reached? Yes
5) Calculations:
   - Head Above Pump Intake (ft) 115.32
   - Total Drawdown (ft) 0.01
   - Calculated Final Purge Volume (gal) NA
6) If Drawdown Did Not Stabilize or Stabilized Drawdown >0.3 ft, is Total Purge Volume > Calculated Final Purge Volume? NA

Well Sampling Worksheet
WWW RAP Field Data
AREA 5 2023-Q3 - HS-PMW-RI-107C
Kent County, MI

Well	HS-PMW-RI-107C / 2 in Diameter PVC
Sample Quarter	2023-Q3
Date	08/01/2023
Weather	Sunny 75
Sampler Initials	NCK
Purging Device	Bladder-Pump: BP-10, Peristaltic-Pump: NA, Centrifugal-Pump: NA
Meters Used	YSI: Agile Rental 2, Turbidimeter: Agile Rental 2, Water-Level-Meter: WLM-1
Reference Measuring Point	PVC
Well Screen (ft bmp)	184.7 - 189.7
Measured Bottom Depth (ft bmp)	NR
Sample Comment	Connected YSI at 11:10.
Initial Water Level Date/Time	08/01/2023 10:15
Initial Water Level Depth (ft bmp)	62.50
Pump/Tubing Intake Depth (ft bmp)	187.2
Tubing Length (ft)	190
Tubing Inner Diameter (in)	0.25
Purging Initiation Date/Time	08/01/2023 10:30
Total Purge Volume (gal)	5
Modified Sample	No
If Modified, Reasoning	
Sample Collection Information	Bottling-Start: 08/01/2023 11:30:00, Bottling-Stop: 08/01/2023 11:35:00, Parameters-Sampled: PFAS

Reading Time	Depth To Water (ft)	Cumulative Drawdown (ft)	Purge Rate (ml/min)	Temperature (deg c)	Specific Conductivity (us/cm)	Dissolved Oxygen (mg/l)	pH (su)	Oxidation-Reduction Potential (mV)	Turbidity (ntu)
10:45	62.50	0.00	250	NR	NR	NR	NR	NR	NR
11:00	62.50	0.00	250	NR	NR	NR	NR	NR	NR
11:10	62.50	0.00	200	11	1,209 +	3.0	7.3	301	6
11:20	62.50	0.00	200	11	1,212 +	1.0	7.3	297	<5
11:25	62.50	0.00	200	11	1,215 +	1.0	7.3	294	<5
11:30	62.50	0.00	200	11	1,213 +	1.0	7.3	293	<5

Notes:

1) Abbreviations include: "deg c" indicates degrees Celsius; "ft" indicates feet; "ft bmp" indicates feet below reference measuring point; "gal" indicates gallons; "in" indicates inches; "mg/l" indicates milligrams per liter; "ml/min" indicates milliliters per minute; "mV" indicates millivolts; "NA" indicates not applicable; "NR" indicates not recorded; "ntu" indicates Nephelometric Turbidity units; "su" indicates standard units; "us/cm" indicates microsiemens per centimeter; and "+" indicates the parameter(s) may be used for stabilization calculations but cannot be used for other purposes.
2) Weather temperature units are in degrees Fahrenheit, unless otherwise noted.
3) Did indicator parameters reach stabilization? Yes
4) Was the two hour time limit reached? No
5) Calculations:
   - Head Above Pump Intake (ft) 124.70
   - Total Drawdown (ft) 0.00
   - Calculated Final Purge Volume (gal) NA
6) If Drawdown Did Not Stabilize or Stabilized Drawdown >0.3 ft, is Total Purge Volume > Calculated Final Purge Volume? NA

Well Sampling Worksheet
WWW RAP Field Data
AREA 5 2023-Q3 - HS-PMW-RI-107D
Kent County, MI

Well	HS-PMW-RI-107D / 2 in Diameter PVC
Sample Quarter	2023-Q3
Date	08/01/2023
Weather	Cloudy and 75
Sampler Initials	WVK
Purging Device	Bladder-Pump: BP-11, Peristaltic-Pump: NA, Centrifugal-Pump: NA
Meters Used	YSI: Agile Rental 3, Turbidimeter: Agile Rental 3, Water-Level-Meter: WLM-4
Reference Measuring Point	PVC
Well Screen (ft bmp)	198.7 - 203.7
Measured Bottom Depth (ft bmp)	203.7
Sample Comment	10:35 - Purge water observed to be very turbid (chocolate brown). 10:45 - Purge water is slowly clearing up. 10:55 - Purge water is still clearing up. Connected YSI at 11:35.
Initial Water Level Date/Time	08/01/2023 10:25
Initial Water Level Depth (ft bmp)	62.84
Pump/Tubing Intake Depth (ft bmp)	201.2
Tubing Length (ft)	205
Tubing Inner Diameter (in)	0.25
Purging Initiation Date/Time	08/01/2023 10:25
Total Purge Volume (gal)	7.5
Modified Sample	No
If Modified, Reasoning	
Sample Collection Information	Bottling-Start: 08/01/2023 12:25:00, Bottling-Stop: 08/01/2023 12:30:00, Parameters-Sampled: PFAS

Reading Time	Depth To Water (ft)	Cumulative Drawdown (ft)	Purge Rate (ml/min)	Temperature (deg c)	Specific Conductivity (us/cm)	Dissolved Oxygen (mg/l)	pH (su)	Oxidation-Reduction Potential (mV)	Turbidity (ntu)
10:35	62.84	0.00	250	NR	NR	NR	NR	NR	NR
10:45	62.84	0.00	250	NR	NR	NR	NR	NR	NR
10:55	62.84	0.00	250	NR	NR	NR	NR	NR	>999
11:05	62.84	0.00	250	NR	NR	NR	NR	NR	608
11:15	62.84	0.00	250	NR	NR	NR	NR	NR	694
11:25	62.84	0.00	250	NR	NR	NR	NR	NR	206
11:35	62.84	0.00	250	NR	NR	NR	NR	NR	140
11:45	62.84	0.00	250	11	1,377 +	0.9	7.0	111	186
11:55	62.84	0.00	250	11	1,377 +	0.9	7.0	100	142
12:00	62.84	0.00	250	11	1,380 +	0.9	7.0	94	111
12:10	62.84	0.00	250	11	1,380 +	0.9	7.0	86	90

Well Sampling Worksheet
WWW RAP Field Data
AREA 5 2023-Q3 - HS-PMW-RI-107D
Kent County, MI

Well	HS-PMW-RI-107D / 2 in Diameter PVC
Sample Quarter	2023-Q3
Date	08/01/2023
Weather	Cloudy and 75
Sampler Initials	WVK
Purging Device	Bladder-Pump: BP-11, Peristaltic-Pump: NA, Centrifugal-Pump: NA
Meters Used	YSI: Agile Rental 3, Turbidimeter: Agile Rental 3, Water-Level-Meter: WLM-4
Reference Measuring Point	PVC
Well Screen (ft bmp)	198.7 - 203.7
Measured Bottom Depth (ft bmp)	203.7
Sample Comment	10:35 - Purge water observed to be very turbid (chocolate brown). 10:45 - Purge water is slowly clearing up. 10:55 - Purge water is still clearing up. Connected YSI at 11:35.
Initial Water Level Date/Time	08/01/2023 10:25
Initial Water Level Depth (ft bmp)	62.84
Pump/Tubing Intake Depth (ft bmp)	201.2
Tubing Length (ft)	205
Tubing Inner Diameter (in)	0.25
Purging Initiation Date/Time	08/01/2023 10:25
Total Purge Volume (gal)	7.5
Modified Sample	No
If Modified, Reasoning	
Sample Collection Information	Bottling-Start: 08/01/2023 12:25:00, Bottling-Stop: 08/01/2023 12:30:00, Parameters-Sampled: PFAS

Reading Time	Depth To Water (ft)	Cumulative Drawdown (ft)	Purge Rate (ml/min)	Temperature (deg c)	Specific Conductivity (us/cm)	Dissolved Oxygen (mg/l)	pH (su)	Oxidation-Reduction Potential (mV)	Turbidity (ntu)
12:15	62.84	0.00	250	11	1,379 +	0.9	7.0	84	78
12:20	62.84	0.00	250	11	1,377 +	0.9	7.0	82	74
12:25	62.84	0.00	250	11	1,377 +	0.9	7.0	79	67

Notes:

1) Abbreviations include: "deg c" indicates degrees Celsius; "ft" indicates feet; "ft bmp" indicates feet below reference measuring point; "gal" indicates gallons; "in" indicates inches; "mg/l" indicates milligrams per liter; "ml/min" indicates milliliters per minute; "mV" indicates millivolts; "NA" indicates not applicable; "NR" indicates not recorded; "ntu" indicates Nephelometric Turbidity units; "su" indicates standard units; "us/cm" indicates microsiemens per centimeter; and "+" indicates the parameter(s) may be used for stabilization calculations but cannot be used for other purposes.
2) Weather temperature units are in degrees Fahrenheit, unless otherwise noted.
3) Did indicator parameters reach stabilization? Yes
4) Was the two hour time limit reached? Yes
5) Calculations:
   - Head Above Pump Intake (ft): 138.36
   - Total Drawdown (ft): 0.00
   - Calculated Final Purge Volume (gal): NA
6) If Drawdown Did Not Stabilize or Stabilized Drawdown >0.3 ft, is Total Purge Volume > Calculated Final Purge Volume? NA

Well Sampling Worksheet
WWW RAP Field Data
AREA 11/12 2023-Q3 - HS-PMW-RI-111A
Kent County, MI

Well	HS-PMW-RI-111A / 2 in Diameter PVC
Sample Quarter	2023-Q3
Date	07/13/2023
Weather	71°F Cloudy
Sampler Initials	WVK
Purging Device	Bladder-Pump: NA, Peristaltic-Pump: PER-1, Centrifugal-Pump: NA
Meters Used	YSI: Agile Rental 1, Turbidimeter: Agile Rental 1, Water-Level-Meter: WLM-2
Reference Measuring Point	PVC
Well Screen (ft bmp)	12.9 - 17.9
Measured Bottom Depth (ft bmp)	NR
Sample Comment	13:25 - Water level is stable and the water is clear. YSI Connected at 14:05.
Initial Water Level Date/Time	07/13/2023 13:15
Initial Water Level Depth (ft bmp)	8.08
Pump/Tubing Intake Depth (ft bmp)	15.4
Tubing Length (ft)	20
Tubing Inner Diameter (in)	0.17
Purging Initiation Date/Time	07/13/2023 13:15
Total Purge Volume (gal)	4.5
Modified Sample	No
If Modified, Reasoning	
Sample Collection Information	Bottling-Start: 07/13/2023 14:50:00, Bottling-Stop: 07/13/2023 14:55:00, Parameters-Sampled: PFAS

Reading Time	Depth To Water (ft)	Cumulative Drawdown (ft)	Purge Rate (ml/min)	Temperature (deg c)	Specific Conductivity (us/cm)	Dissolved Oxygen (mg/l)	pH (su)	Oxidation-Reduction Potential (mV)	Turbidity (ntu)
13:25	8.08	0.00	200	NR	NR	NR	NR	NR	10
13:35	8.08	0.00	200	NR	NR	NR	NR	NR	6
13:45	8.08	0.00	200	NR	NR	NR	NR	NR	<5
13:55	8.08	0.00	200	NR	NR	NR	NR	NR	<5
14:05	8.08	0.00	200	13 +	707 +	7.1	6.6	210	<5
14:15	8.08	0.00	200	13 +	707 +	3.1	7.0	217	<5
14:25	8.08	0.00	200	13 +	707 +	3.1	6.7	223	<5
14:30	8.08	0.00	200	13 +	708 +	3.1	6.8	231	<5
14:35	8.08	0.00	200	13 +	707 +	3.1	6.8	232	<5

Notes:

1) Abbreviations include: "deg c" indicates degrees Celsius; "ft" indicates feet; "ft bmp" indicates feet below reference measuring point; "gal" indicates gallons; "in" indicates inches; "mg/l" indicates milligrams per liter; "ml/min" indicates milliliters per minute; "mV" indicates millivolts; "NA" indicates not applicable; "NR" indicates not recorded; "ntu" indicates Nephelometric Turbidity units; "su" indicates standard units; "us/cm" indicates microsiemens per centimeter; and "+" indicates the parameter(s) may be used for stabilization calculations but cannot be used for other purposes.
2) Weather temperature units are in degrees Fahrenheit, unless otherwise noted.
3) Did indicator parameters reach stabilization? Yes
4) Was the two hour time limit reached? No
5) Calculations:
   - Head Above Pump Intake (ft) 7.32
   - Total Drawdown (ft) 0.00
   - Calculated Final Purge Volume (gal) NA
6) If Drawdown Did Not Stabilize or Stabilized Drawdown >0.3 ft, is Total Purge Volume > Calculated Final Purge Volume? NA

Well Sampling Worksheet
WWW RAP Field Data
AREA 11/12 2023-Q3 - HS-PMW-RI-111B
Kent County, MI

Well	HS-PMW-RI-111B / 2 in Diameter PVC
Sample Quarter	2023-Q3
Date	07/13/2023
Weather	71F Sunny
Sampler Initials	JET
Purging Device	Bladder-Pump: NA, Peristaltic-Pump: PER-3, Centrifugal-Pump: NA
Meters Used	YSI: Agile Rental 2, Turbidimeter: Agile Rental 1, Water-Level-Meter: WLM-4
Reference Measuring Point	PVC
Well Screen (ft bmp)	47.9 - 52.9
Measured Bottom Depth (ft bmp)	NR
Sample Comment	YSI Connected at 13:55.
Initial Water Level Date/Time	07/13/2023 13:25
Initial Water Level Depth (ft bmp)	8.40
Pump/Tubing Intake Depth (ft bmp)	50.4
Tubing Length (ft)	54
Tubing Inner Diameter (in)	0.17
Purging Initiation Date/Time	07/13/2023 13:25
Total Purge Volume (gal)	5
Modified Sample	No
If Modified, Reasoning	
Sample Collection Information	Bottling-Start: 07/13/2023 14:30:00, Bottling-Stop: 07/13/2023 14:35:00, Parameters-Sampled: PFAS

Reading Time	Depth To Water (ft)	Cumulative Drawdown (ft)	Purge Rate (ml/min)	Temperature (deg c)	Specific Conductivity (us/cm)	Dissolved Oxygen (mg/l)	pH (su)	Oxidation-Reduction Potential (mV)	Turbidity (ntu)
13:35	8.42	0.02	375	NR	NR	NR	NR	NR	8
13:45	8.42	0.02	375	NR	NR	NR	NR	NR	<5
13:55	8.42	0.02	375	12 +	768 +	8.7	7.3	326	<5
14:05	8.42	0.02	375	12 +	763 +	7.1	7.5	315	<5
14:15	8.42	0.02	375	12 +	761 +	7.1	7.5	312	<5
14:20	8.42	0.02	375	12 +	760 +	7.1	7.5	313	<5
14:25	8.42	0.02	375	12 +	761 +	7.1	7.5	315	<5

Notes:

1) Abbreviations include: "deg c" indicates degrees Celsius; "ft" indicates feet; "ft bmp" indicates feet below reference measuring point; "gal" indicates gallons; "in" indicates inches; "mg/l" indicates milligrams per liter; "ml/min" indicates milliliters per minute; "mV" indicates millivolts; "NA" indicates not applicable; "NR" indicates not recorded; "ntu" indicates Nephelometric Turbidity units; "su" indicates standard units; "us/cm" indicates microsiemens per centimeter; and "+" indicates the parameter(s) may be used for stabilization calculations but cannot be used for other purposes.
2) Weather temperature units are in degrees Fahrenheit, unless otherwise noted.
3) Did indicator parameters reach stabilization? Yes
4) Was the two hour time limit reached? No
5) Calculations:
   - Head Above Pump Intake (ft) 42.00
   - Total Drawdown (ft) 0.02
   - Calculated Final Purge Volume (gal) NA
6) If Drawdown Did Not Stabilize or Stabilized Drawdown >0.3 ft, is Total Purge Volume > Calculated Final Purge Volume? NA

Well Sampling Worksheet
WWW RAP Field Data
AREA 11/12 2023-Q3 - HS-PMW-RI-112A
Kent County, MI

Well	HS-PMW-RI-112A / 2 in Diameter PVC
Sample Quarter	2023-Q3
Date	07/11/2023
Weather	76 F Sunny
Sampler Initials	JET
Purging Device	Bladder-Pump: NA, Peristaltic-Pump: PER-1, Centrifugal-Pump: NA
Meters Used	YSI: Agile Rental 1, Turbidimeter: Agile Rental 1, Water-Level-Meter: WLM-2
Reference Measuring Point	PVC
Well Screen (ft bmp)	24.3 - 29.3
Measured Bottom Depth (ft bmp)	NR
Sample Comment	YSI Connected at 10:50.
Initial Water Level Date/Time	07/11/2023 10:20
Initial Water Level Depth (ft bmp)	9.37
Pump/Tubing Intake Depth (ft bmp)	26.8
Tubing Length (ft)	30
Tubing Inner Diameter (in)	0.17
Purging Initiation Date/Time	07/11/2023 10:20
Total Purge Volume (gal)	3
Modified Sample	No
If Modified, Reasoning	
Sample Collection Information	Bottling-Start: 07/11/2023 11:25:00, Bottling-Stop: 07/11/2023 11:30:00, Parameters-Sampled: PFAS

Reading Time	Depth To Water (ft)	Cumulative Drawdown (ft)	Purge Rate (ml/min)	Temperature (deg c)	Specific Conductivity (us/cm)	Dissolved Oxygen (mg/l)	pH (su)	Oxidation-Reduction Potential (mV)	Turbidity (ntu)
10:25	9.37	0.00	150	NR	NR	NR	NR	NR	NR
10:35	9.37	0.00	250	NR	NR	NR	NR	NR	NR
10:40	9.37	0.00	300	NR	NR	NR	NR	NR	<5
10:50	9.37	0.00	300	12 +	789 +	9.7	7.1	392 +	<5
11:00	9.37	0.00	300	12 +	787 +	9.6	7.1	413 +	<5
11:05	9.37	0.00	300	12 +	787 +	9.5	7.1	422 +	<5
11:10	9.37	0.00	300	12 +	787 +	9.6	7.1	429 +	<5
11:15	9.37	0.00	300	12 +	787 +	9.6	7.1	434 +	<5
11:20	9.37	0.00	300	12 +	787 +	9.5	7.1	438 +	<5

Notes:

1) Abbreviations include: "deg c" indicates degrees Celsius; "ft" indicates feet; "ft bmp" indicates feet below reference measuring point; "gal" indicates gallons; "in" indicates inches; "mg/l" indicates milligrams per liter; "ml/min" indicates milliliters per minute; "mV" indicates millivolts; "NA" indicates not applicable; "NR" indicates not recorded; "ntu" indicates Nephelometric Turbidity units; "su" indicates standard units; "us/cm" indicates microsiemens per centimeter; and "+" indicates the parameter(s) may be used for stabilization calculations but cannot be used for other purposes.
2) Weather temperature units are in degrees Fahrenheit, unless otherwise noted.
3) Did indicator parameters reach stabilization? Yes
4) Was the two hour time limit reached? No
5) Calculations:
   - Head Above Pump Intake (ft) 17.43
   - Total Drawdown (ft) 0.00
   - Calculated Final Purge Volume (gal) NA
6) If Drawdown Did Not Stabilize or Stabilized Drawdown >0.3 ft, is Total Purge Volume > Calculated Final Purge Volume? NA

Well Sampling Worksheet
WWW RAP Field Data
AREA 11/12 2023-Q3 - HS-PMW-RI-112B
Kent County, MI

Well	HS-PMW-RI-112B / 2 in Diameter PVC
Sample Quarter	2023-Q3
Date	07/11/2023
Weather	Sunny and 70
Sampler Initials	WVK
Purging Device	Bladder-Pump: NA, Peristaltic-Pump: PER-3, Centrifugal-Pump: NA
Meters Used	YSI: Agile Rental 2, Turbidimeter: Agile Rental 2, Water-Level-Meter: WLM-1
Reference Measuring Point	PVC
Well Screen (ft bmp)	69.4 - 74.4
Measured Bottom Depth (ft bmp)	74.4
Sample Comment	At beginning of purge, adjusted flow rate. Purge water was observed to be very clear. YSI Connected at 11:10.
Initial Water Level Date/Time	07/11/2023 10:10
Initial Water Level Depth (ft bmp)	9.20
Pump/Tubing Intake Depth (ft bmp)	71.9
Tubing Length (ft)	78
Tubing Inner Diameter (in)	0.17
Purging Initiation Date/Time	07/11/2023 10:10
Total Purge Volume (gal)	3
Modified Sample	No
If Modified, Reasoning	
Sample Collection Information	Bottling-Start: 07/11/2023 11:45:00, Bottling-Stop: 07/11/2023 11:50:00, Parameters-Sampled: PFAS

Reading Time	Depth To Water (ft)	Cumulative Drawdown (ft)	Purge Rate (ml/min)	Temperature (deg c)	Specific Conductivity (us/cm)	Dissolved Oxygen (mg/l)	pH (su)	Oxidation-Reduction Potential (mV)	Turbidity (ntu)
10:15	9.22	9.22	100	NR	NR	NR	NR	NR	22
10:25	9.22	9.22	100	NR	NR	NR	NR	NR	18
10:35	9.22	9.22	100	NR	NR	NR	NR	NR	16
10:45	9.22	9.22	100	NR	NR	NR	NR	NR	14
10:55	9.22	9.22	100	NR	NR	NR	NR	NR	9
11:05	9.22	9.22	100	NR	NR	NR	NR	NR	8
11:15	9.22	0.02	100	15 +	1,423 +	1.1	7.3	-10 +	8
11:25	9.22	0.02	100	14 +	1,409 +	<0.5	7.2	-27 +	<5
11:30	9.22	0.02	100	14 +	1,408 +	<0.5	7.2	-33 +	<5
11:35	9.22	0.02	100	14 +	1,409 +	<0.5	7.2	-37 +	<5
11:40	9.22	0.02	100	14 +	1,408 +	<0.5	7.2	-37 +	<5

Notes:

1) Abbreviations include: "deg c" indicates degrees Celsius; "ft" indicates feet; "ft bmp" indicates feet below reference measuring point; "gal" indicates gallons; "in" indicates inches; "mg/l" indicates milligrams per liter; "ml/min" indicates milliliters per minute; "mV" indicates millivolts; "NA" indicates not applicable; "NR" indicates not recorded; "ntu" indicates Nephelometric Turbidity units; "su" indicates standard units; "us/cm" indicates microsiemens per centimeter; and "+" indicates the parameter(s) may be used for stabilization calculations but cannot be used for other purposes.
2) Weather temperature units are in degrees Fahrenheit, unless otherwise noted.
3) Did indicator parameters reach stabilization? Yes
4) Was the two hour time limit reached? No
5) Calculations:
   - Head Above Pump Intake (ft): 62.70
   - Total Drawdown (ft): 0.02
   - Calculated Final Purge Volume (gal): NA
6) If Drawdown Did Not Stabilize or Stabilized Drawdown >0.3 ft, is Total Purge Volume > Calculated Final Purge Volume? NA

Well Sampling Worksheet
WWW RAP Field Data
PERIMETER 2023-Q4 - WV-PMW-RI-107
Kent County, MI

Well	WV-PMW-RI-107 / 2 in Diameter PVC
Sample Quarter	2023-Q4
Date	11/01/2023
Weather	Mostly Cloudy 40°F
Sampler Initials	BPT
Purging Device	Bladder-Pump: BP-11, Peristaltic-Pump: NA, Centrifugal-Pump: NA
Meters Used	YSI: Agile Rental 2, Turbidimeter: Agile Rental 2, Water-Level-Meter: WLM-2
Reference Measuring Point	PVC
Well Screen (ft bmp)	189.5 - 194.5
Measured Bottom Depth (ft bmp)	NR
Sample Comment	YSI Connected at 16:40.
Initial Water Level Date/Time	11/01/2023 15:20
Initial Water Level Depth (ft bmp)	99.60
Pump/Tubing Intake Depth (ft bmp)	192
Tubing Length (ft)	197
Tubing Inner Diameter (in)	0.25
Purging Initiation Date/Time	11/01/2023 15:30
Total Purge Volume (gal)	1.75
Modified Sample	No
If Modified, Reasoning	
Sample Collection Information	Bottling-Start: 11/01/2023 17:35:00, Bottling-Stop: 11/01/2023 17:40:00, Parameters-Sampled: PFAS

Reading Time	Depth To Water (ft)	Cumulative Drawdown (ft)	Purge Rate (ml/min)	Temperature (deg c)	Specific Conductivity (us/cm)	Dissolved Oxygen (mg/l)	pH (su)	Oxidation-Reduction Potential (mV)	Turbidity (ntu)
15:50	99.86	0.26	45	NR	NR	NR	NR	NR	>999
16:05	99.75	0.15	40	NR	NR	NR	NR	NR	>999
16:20	100.03	0.43	80	NR	NR	NR	NR	NR	>999
16:30	100.03	0.43	80	NR	NR	NR	NR	NR	>999
16:40	100.03	0.43	80	9 +	423 +	0.8	7.3	-64	716
16:50	100.04	0.44	80	9 +	423 +	0.6	7.3	-92	506
17:00	100.04	0.44	80	9 +	424 +	0.6	7.4	-99	339
17:10	100.04	0.44	80	9 +	423 +	0.6	7.4	-103	238
17:20	100.04	0.44	80	9 +	422 +	0.5	7.4	-107	183
17:25	100.04	0.44	80	9 +	422 +	0.6	7.4	-107	144
17:30	100.04	0.44	80	9 +	422 +	0.6	7.4	-108	124

Notes:

1) Abbreviations include: "deg c" indicates degrees Celsius; "ft" indicates feet; "ft bmp" indicates feet below reference measuring point; "gal" indicates gallons; "in" indicates inches; "mg/l" indicates milligrams per liter; "ml/min" indicates milliliters per minute; "mV" indicates millivolts; "NA" indicates not applicable; "NR" indicates not recorded; "ntu" indicates Nephelometric Turbidity units; "su" indicates standard units; "us/cm" indicates microsiemens per centimeter; and "+" indicates the parameter(s) may be used for stabilization calculations but cannot be used for other purposes.
2) Weather temperature units are in degrees Fahrenheit, unless otherwise noted.
3) Did indicator parameters reach stabilization? No
4) Was the two hour time limit reached? Yes
5) Calculations:
   - Head Above Pump Intake (ft) 92.40
   - Total Drawdown (ft) 0.44
   - Calculated Final Purge Volume (gal) 0.58
6) If Drawdown Did Not Stabilize or Stabilized Drawdown >0.3 ft, is Total Purge Volume > Calculated Final Purge Volume? Yes

Well Sampling Worksheet
WWW RAP Field Data
PERIMETER 2023-Q4 - WV-PMW-RI-108
Kent County, MI

Well	WV-PMW-RI-108 / 2 in Diameter PVC
Sample Quarter	2023-Q4
Date	11/02/2023
Weather	Cloudy 48°F
Sampler Initials	BPT
Purging Device	Bladder-Pump: NA, Peristaltic-Pump: PER-3, Centrifugal-Pump: NA
Meters Used	YSI: Agile Rental 2, Turbidimeter: Agile Rental 2, Water-Level-Meter: WLM-2
Reference Measuring Point	PVC
Well Screen (ft bmp)	12.9 - 17.9
Measured Bottom Depth (ft bmp)	NR
Sample Comment	
Initial Water Level Date/Time	11/02/2023 15:55
Initial Water Level Depth (ft bmp)	12.07
Pump/Tubing Intake Depth (ft bmp)	15.4
Tubing Length (ft)	22.9
Tubing Inner Diameter (in)	0.17
Purging Initiation Date/Time	11/02/2023 16:00
Total Purge Volume (gal)	3.1
Modified Sample	No
If Modified, Reasoning	
Sample Collection Information	Bottling-Start: 11/02/2023 16:50:00, Bottling-Stop: 11/02/2023 16:55:00, Parameters-Sampled: PFAS

Reading Time	Depth To Water (ft)	Cumulative Drawdown (ft)	Purge Rate (ml/min)	Temperature (deg c)	Specific Conductivity (us/cm)	Dissolved Oxygen (mg/l)	pH (su)	Oxidation-Reduction Potential (mV)	Turbidity (ntu)
16:15	12.16	0.09	260	11 +	238 +	9.3	7.7	158	10
16:25	12.16	0.09	260	11 +	443 +	4.7	7.2	130	6
16:35	12.16	0.09	260	11 +	452 +	4.7	7.2	110	<5
16:40	12.16	0.09	260	11 +	457 +	4.8	7.2	108	<5
16:45	12.16	0.09	260	11 +	463 +	5.0	7.2	109	<5

Notes:

1) Abbreviations include: "deg c" indicates degrees Celsius; "ft" indicates feet; "ft bmp" indicates feet below reference measuring point; "gal" indicates gallons; "in" indicates inches; "mg/l" indicates milligrams per liter; "ml/min" indicates milliliters per minute; "mV" indicates millivolts; "NA" indicates not applicable; "NR" indicates not recorded; "ntu" indicates Nephelometric Turbidity units; "su" indicates standard units; "us/cm" indicates microsiemens per centimeter; and "+" indicates the parameter(s) may be used for stabilization calculations but cannot be used for other purposes.
2) Weather temperature units are in degrees Fahrenheit, unless otherwise noted.
3) Did indicator parameters reach stabilization? Yes
4) Was the two hour time limit reached? No
5) Calculations:
   - Head Above Pump Intake (ft) 3.33
   - Total Drawdown (ft) 0.09
   - Calculated Final Purge Volume (gal) NA
6) If Drawdown Did Not Stabilize or Stabilized Drawdown >0.3 ft, is Total Purge Volume > Calculated Final Purge Volume? NA

Well Sampling Worksheet
WWW RAP Field Data
AREA 5 2023-Q4 - AREA5-RI-3A
Kent County, MI

Well	AREA5-RI-3A / 2 in Diameter PVC
Sample Quarter	2023-Q4
Date	10/10/2023
Weather	40s, Cloudy
Sampler Initials	AJG
Purging Device	Bladder-Pump: NA, Peristaltic-Pump: NA, Centrifugal-Pump: Mega Monsoon #1
Meters Used	YSI: Agile Rental 3, Turbidimeter: Agile Rental 3, Water-Level-Meter: WLM-3
Reference Measuring Point	PVC
Well Screen (ft bmp)	61.8 - 66.8
Measured Bottom Depth (ft bmp)	NR
Sample Comment	10:10 - Decreased flow rate from 175 mL/min to control drawdown. 11:00 - YSI Connected.
Initial Water Level Date/Time	10/10/2023 09:55
Initial Water Level Depth (ft bmp)	32.54
Pump/Tubing Intake Depth (ft bmp)	64.3
Tubing Length (ft)	68
Tubing Inner Diameter (in)	0.17
Purging Initiation Date/Time	10/10/2023 09:55
Total Purge Volume (gal)	3.5
Modified Sample	No
If Modified, Reasoning	
Sample Collection Information	Bottling-Start: 10/10/2023 11:30:00, Bottling-Stop: 10/10/2023 11:35:00, Parameters-Sampled: PFAS

Reading Time	Depth To Water (ft)	Cumulative Drawdown (ft)	Purge Rate (ml/min)	Temperature (deg c)	Specific Conductivity (us/cm)	Dissolved Oxygen (mg/l)	pH (su)	Oxidation-Reduction Potential (mV)	Turbidity (ntu)
10:10	32.74	0.20	150	NR	NR	NR	NR	NR	770
10:20	32.70	0.16	150	NR	NR	NR	NR	NR	484
10:30	32.67	0.13	150	NR	NR	NR	NR	NR	114
10:40	32.64	0.10	150	NR	NR	NR	NR	NR	68
11:00	32.64	0.10	150	12	658 +	4.8	7.3	258	10
11:10	32.64	0.10	150	12	657 +	4.9	7.3	258	5

Well Sampling Worksheet
WWW RAP Field Data
AREA 5 2023-Q4 - AREA5-RI-3A
Kent County, MI

Well	AREA5-RI-3A / 2 in Diameter PVC
Sample Quarter	2023-Q4
Date	10/10/2023
Weather	40s, Cloudy
Sampler Initials	AJG
Purging Device	Bladder-Pump: NA, Peristaltic-Pump: NA, Centrifugal-Pump: Mega Monsoon #1
Meters Used	YSI: Agile Rental 3, Turbidimeter: Agile Rental 3, Water-Level-Meter: WLM-3
Reference Measuring Point	PVC
Well Screen (ft bmp)	61.8 - 66.8
Measured Bottom Depth (ft bmp)	NR
Sample Comment	10:10 - Decreased flow rate from 175 mL/min to control drawdown. 11:00 - YSI Connected.
Initial Water Level Date/Time	10/10/2023 09:55
Initial Water Level Depth (ft bmp)	32.54
Pump/Tubing Intake Depth (ft bmp)	64.3
Tubing Length (ft)	68
Tubing Inner Diameter (in)	0.17
Purging Initiation Date/Time	10/10/2023 09:55
Total Purge Volume (gal)	3.5
Modified Sample	No
If Modified, Reasoning	
Sample Collection Information	Bottling-Start: 10/10/2023 11:30:00, Bottling-Stop: 10/10/2023 11:35:00, Parameters-Sampled: PFAS

Reading Time	Depth To Water (ft)	Cumulative Drawdown (ft)	Purge Rate (ml/min)	Temperature (deg c)	Specific Conductivity (us/cm)	Dissolved Oxygen (mg/l)	pH (su)	Oxidation-Reduction Potential (mV)	Turbidity (ntu)
11:15	32.64	0.10	150	12	658 +	4.9	7.3	259	<5
11:20	32.64	0.10	150	12	658 +	5.0	7.3	259	<5
11:25	32.64	0.10	150	12	659 +	5.0	7.3	260	<5

Notes:

1) Abbreviations include: "deg c" indicates degrees Celsius; "ft" indicates feet; "ft bmp" indicates feet below reference measuring point; "gal" indicates gallons; "in" indicates inches; "mg/l" indicates milligrams per liter; "ml/min" indicates milliliters per minute; "mV" indicates millivolts; "NA" indicates not applicable; "NR" indicates not recorded; "ntu" indicates Nephelometric Turbidity units; "su" indicates standard units; "us/cm" indicates microsiemens per centimeter; and "+" indicates the parameter(s) may be used for stabilization calculations but cannot be used for other purposes.
2) Weather temperature units are in degrees Fahrenheit, unless otherwise noted.
3) Did indicator parameters reach stabilization? Yes
4) Was the two hour time limit reached? No
5) Calculations:
   - Head Above Pump Intake (ft): 31.76
   - Total Drawdown (ft): 0.10
   - Calculated Final Purge Volume (gal): NA
6) If Drawdown Did Not Stabilize or Stabilized Drawdown >0.3 ft, is Total Purge Volume > Calculated Final Purge Volume? NA

Well Sampling Worksheet
WWW RAP Field Data
AREA 5 2023-Q4 - AREA5-RI-3B
Kent County, MI

Well	AREA5-RI-3B / 2 in Diameter PVC
Sample Quarter	2023-Q4
Date	10/10/2023
Weather	40s, Cloudy
Sampler Initials	AJG
Purging Device	Bladder-Pump: BP-12, Peristaltic-Pump: NA, Centrifugal-Pump: NA
Meters Used	YSI: Agile Rental 3, Turbidimeter: Agile Rental 3, Water-Level-Meter: WLM-3
Reference Measuring Point	PVC
Well Screen (ft bmp)	109.0 - 114.0
Measured Bottom Depth (ft bmp)	NR
Sample Comment	YSI Connected at 14:45.
Initial Water Level Date/Time	10/10/2023 13:05
Initial Water Level Depth (ft bmp)	34.03
Pump/Tubing Intake Depth (ft bmp)	111.5
Tubing Length (ft)	115
Tubing Inner Diameter (in)	0.25
Purging Initiation Date/Time	10/10/2023 13:10
Total Purge Volume (gal)	1.6
Modified Sample	No
If Modified, Reasoning	
Sample Collection Information	Bottling-Start: 10/10/2023 15:15:00, Bottling-Stop: 10/10/2023 15:20:00, Parameters-Sampled: PFAS

Reading Time	Depth To Water (ft)	Cumulative Drawdown (ft)	Purge Rate (ml/min)	Temperature (deg c)	Specific Conductivity (us/cm)	Dissolved Oxygen (mg/l)	pH (su)	Oxidation-Reduction Potential (mV)	Turbidity (ntu)
13:30	34.14	0.12	50	NR	NR	NR	NR	NR	>999
13:40	34.14	0.12	50	NR	NR	NR	NR	NR	>999
14:00	34.14	0.12	50	NR	NR	NR	NR	NR	>999
14:20	34.14	0.12	50	NR	NR	NR	NR	NR	348
14:40	34.14	0.12	50	NR	NR	NR	NR	NR	110
14:45	34.14	0.12	50	12	2,223 +	2.0	7.0	248	88
14:50	34.14	0.12	50	12	2,231 +	1.9	7.0	156	75
14:55	34.14	0.12	50	12	2,232 +	1.8	7.0	140	69

Well Sampling Worksheet
WWW RAP Field Data
AREA 5 2023-Q4 - AREA5-RI-3B
Kent County, MI

Well	AREA5-RI-3B / 2 in Diameter PVC
Sample Quarter	2023-Q4
Date	10/10/2023
Weather	40s, Cloudy
Sampler Initials	AJG
Purging Device	Bladder-Pump: BP-12, Peristaltic-Pump: NA, Centrifugal-Pump: NA
Meters Used	YSI: Agile Rental 3, Turbidimeter: Agile Rental 3, Water-Level-Meter: WLM-3
Reference Measuring Point	PVC
Well Screen (ft bmp)	109.0 - 114.0
Measured Bottom Depth (ft bmp)	NR
Sample Comment	YSI Connected at 14:45.
Initial Water Level Date/Time	10/10/2023 13:05
Initial Water Level Depth (ft bmp)	34.03
Pump/Tubing Intake Depth (ft bmp)	111.5
Tubing Length (ft)	115
Tubing Inner Diameter (in)	0.25
Purging Initiation Date/Time	10/10/2023 13:10
Total Purge Volume (gal)	1.6
Modified Sample	No
If Modified, Reasoning	
Sample Collection Information	Bottling-Start: 10/10/2023 15:15:00, Bottling-Stop: 10/10/2023 15:20:00, Parameters-Sampled: PFAS

Reading Time	Depth To Water (ft)	Cumulative Drawdown (ft)	Purge Rate (ml/min)	Temperature (deg c)	Specific Conductivity (us/cm)	Dissolved Oxygen (mg/l)	pH (su)	Oxidation-Reduction Potential (mV)	Turbidity (ntu)
15:00	34.14	0.12	50	12	2,232 +	1.8	7.0	119	59
15:05	34.14	0.12	50	12	2,231 +	1.8	7.0	98	56
15:10	34.14	0.12	50	12	2,231 +	1.8	7.0	85	48

Notes:

1) Abbreviations include: "deg c" indicates degrees Celsius; "ft" indicates feet; "ft bmp" indicates feet below reference measuring point; "gal" indicates gallons; "in" indicates inches; "mg/l" indicates milligrams per liter; "ml/min" indicates milliliters per minute; "mV" indicates millivolts; "NA" indicates not applicable; "NR" indicates not recorded; "ntu" indicates Nephelometric Turbidity units; "su" indicates standard units; "us/cm" indicates microsiemens per centimeter; and "+" indicates the parameter(s) may be used for stabilization calculations but cannot be used for other purposes.
2) Weather temperature units are in degrees Fahrenheit, unless otherwise noted.
3) Did indicator parameters reach stabilization? No
4) Was the two hour time limit reached? Yes
5) Calculations:
   - Head Above Pump Intake (ft) 77.47
   - Total Drawdown (ft) 0.11
   - Calculated Final Purge Volume (gal) NA
6) If Drawdown Did Not Stabilize or Stabilized Drawdown >0.3 ft, is Total Purge Volume > Calculated Final Purge Volume? NA

Well Sampling Worksheet
WWW RAP Field Data
AREA 5 2023-Q4 - AREA5-RI-8A
Kent County, MI

Well	AREA5-RI-8A / 2 in Diameter PVC
Sample Quarter	2023-Q4
Date	10/09/2023
Weather	52 and Sunny
Sampler Initials	JMS
Purging Device	Bladder-Pump: NA, Peristaltic-Pump: NA, Centrifugal-Pump: Mega Monsoon #1
Meters Used	YSI: Agile Rental 3, Turbidimeter: Agile Rental 3, Water-Level-Meter: WLM-2
Reference Measuring Point	PVC
Well Screen (ft bmp)	85.1 - 90.1
Measured Bottom Depth (ft bmp)	NR
Sample Comment	YSI Connected at 15:00.
Initial Water Level Date/Time	10/09/2023 13:40
Initial Water Level Depth (ft bmp)	80.70
Pump/Tubing Intake Depth (ft bmp)	87.6
Tubing Length (ft)	91
Tubing Inner Diameter (in)	0.17
Purging Initiation Date/Time	10/09/2023 13:45
Total Purge Volume (gal)	9.5
Modified Sample	No
If Modified, Reasoning	
Sample Collection Information	Bottling-Start: 10/09/2023 15:50:00, Bottling-Stop: 10/09/2023 15:55:00, Parameters-Sampled: PFAS

Reading Time	Depth To Water (ft)	Cumulative Drawdown (ft)	Purge Rate (ml/min)	Temperature (deg c)	Specific Conductivity (us/cm)	Dissolved Oxygen (mg/l)	pH (su)	Oxidation-Reduction Potential (mV)	Turbidity (ntu)
13:50	80.73	0.03	300	NR	NR	NR	NR	NR	>999
14:10	80.73	0.03	300	NR	NR	NR	NR	NR	>999
14:20	80.73	0.03	300	NR	NR	NR	NR	NR	769
14:30	80.73	0.03	300	NR	NR	NR	NR	NR	254
14:40	80.73	0.03	300	NR	NR	NR	NR	NR	143
14:50	80.73	0.03	300	NR	NR	NR	NR	NR	107
15:00	80.73	0.03	300	15	733 +	8.9	7.1	56	72
15:10	80.73	0.03	300	14	733 +	9.1	7.1	52	35
15:20	80.73	0.03	300	15	738 +	8.7	7.2	67	34
15:25	80.73	0.03	300	15	738 +	8.9	7.2	64	36
15:30	80.73	0.03	300	15	741 +	8.6	7.2	47	35

Well Sampling Worksheet
WWW RAP Field Data
AREA 5 2023-Q4 - AREA5-RI-8A
Kent County, MI

Well	AREA5-RI-8A / 2 in Diameter PVC
Sample Quarter	2023-Q4
Date	10/09/2023
Weather	52 and Sunny
Sampler Initials	JMS
Purging Device	Bladder-Pump: NA, Peristaltic-Pump: NA, Centrifugal-Pump: Mega Monsoon #1
Meters Used	YSI: Agile Rental 3, Turbidimeter: Agile Rental 3, Water-Level-Meter: WLM-2
Reference Measuring Point	PVC
Well Screen (ft bmp)	85.1 - 90.1
Measured Bottom Depth (ft bmp)	NR
Sample Comment	YSI Connected at 15:00.
Initial Water Level Date/Time	10/09/2023 13:40
Initial Water Level Depth (ft bmp)	80.70
Pump/Tubing Intake Depth (ft bmp)	87.6
Tubing Length (ft)	91
Tubing Inner Diameter (in)	0.17
Purging Initiation Date/Time	10/09/2023 13:45
Total Purge Volume (gal)	9.5
Modified Sample	No
If Modified, Reasoning	
Sample Collection Information	Bottling-Start: 10/09/2023 15:50:00, Bottling-Stop: 10/09/2023 15:55:00, Parameters-Sampled: PFAS

Reading Time	Depth To Water (ft)	Cumulative Drawdown (ft)	Purge Rate (ml/min)	Temperature (deg c)	Specific Conductivity (us/cm)	Dissolved Oxygen (mg/l)	pH (su)	Oxidation-Reduction Potential (mV)	Turbidity (ntu)
15:35	80.73	0.03	400	17	748 +	8.3	7.2	-56	34
15:40	80.73	0.03	400	16	734 +	9.2	7.1	-27	26
15:45	80.73	0.03	400	15	733 +	9.2	7.1	37	18

Notes:

1) Abbreviations include: "deg c" indicates degrees Celsius; "ft" indicates feet; "ft bmp" indicates feet below reference measuring point; "gal" indicates gallons; "in" indicates inches; "mg/l" indicates milligrams per liter; "ml/min" indicates milliliters per minute; "mV" indicates millivolts; "NA" indicates not applicable; "NR" indicates not recorded; "ntu" indicates Nephelometric Turbidity units; "su" indicates standard units; "us/cm" indicates microsiemens per centimeter; and "+" indicates the parameter(s) may be used for stabilization calculations but cannot be used for other purposes.
2) Weather temperature units are in degrees Fahrenheit, unless otherwise noted.
3) Did indicator parameters reach stabilization? No
4) Was the two hour time limit reached? Yes
5) Calculations:
   - Head Above Pump Intake (ft) 6.90
   - Total Drawdown (ft) 0.03
   - Calculated Final Purge Volume (gal) NA
6) If Drawdown Did Not Stabilize or Stabilized Drawdown >0.3 ft, is Total Purge Volume > Calculated Final Purge Volume? NA

Well Sampling Worksheet
WWW RAP Field Data
AREA 5 2023-Q4 - AREA5-RI-8B
Kent County, MI

Well	AREA5-RI-8B / 2 in Diameter PVC
Sample Quarter	2023-Q4
Date	10/09/2023
Weather	Cloudy, 50
Sampler Initials	NCK
Purging Device	Bladder-Pump: NA, Peristaltic-Pump: NA, Centrifugal-Pump: Mega Monsoon #2
Meters Used	YSI: Agile Rental 1, Turbidimeter: Agile Rental 1, Water-Level-Meter: WLM-4
Reference Measuring Point	PVC
Well Screen (ft bmp)	156.5 - 161.5
Measured Bottom Depth (ft bmp)	NR
Sample Comment	13:50-14:20: Troubleshooting a different well. 14:20: YSI connected
Initial Water Level Date/Time	10/09/2023 13:40
Initial Water Level Depth (ft bmp)	80.41
Pump/Tubing Intake Depth (ft bmp)	159
Tubing Length (ft)	162
Tubing Inner Diameter (in)	0.17
Purging Initiation Date/Time	10/09/2023 13:45
Total Purge Volume (gal)	9.5
Modified Sample	No
If Modified, Reasoning	
Sample Collection Information	Bottling-Start: 10/09/2023 15:05:00, Bottling-Stop: 10/09/2023 15:10:00, Parameters-Sampled: PFAS

Reading Time	Depth To Water (ft)	Cumulative Drawdown (ft)	Purge Rate (ml/min)	Temperature (deg c)	Specific Conductivity (us/cm)	Dissolved Oxygen (mg/l)	pH (su)	Oxidation-Reduction Potential (mV)	Turbidity (ntu)
13:50	80.49	0.08	450	NR	NR	NR	NR	NR	NR
13:55	80.49	0.08	450	NR	NR	NR	NR	NR	NR
14:00	80.49	0.08	450	NR	NR	NR	NR	NR	NR
14:15	80.49	0.08	450	NR	NR	NR	NR	NR	NR
14:20	80.49	0.08	450	12	1,032	<0.5	7.1	-6	34
14:35	80.49	0.08	450	12	1,038	<0.5	7.1	-46	16
14:50	80.49	0.08	450	12	1,033	<0.5	7.1	-56	16

Well Sampling Worksheet
WWW RAP Field Data
AREA 5 2023-Q4 - AREA5-RI-8B
Kent County, MI

Well	AREA5-RI-8B / 2 in Diameter PVC
Sample Quarter	2023-Q4
Date	10/09/2023
Weather	Cloudy, 50
Sampler Initials	NCK
Purging Device	Bladder-Pump: NA, Peristaltic-Pump: NA, Centrifugal-Pump: Mega Monsoon #2
Meters Used	YSI: Agile Rental 1, Turbidimeter: Agile Rental 1, Water-Level-Meter: WLM-4
Reference Measuring Point	PVC
Well Screen (ft bmp)	156.5 - 161.5
Measured Bottom Depth (ft bmp)	NR
Sample Comment	13:50-14:20: Troubleshooting a different well. 14:20: YSI connected
Initial Water Level Date/Time	10/09/2023 13:40
Initial Water Level Depth (ft bmp)	80.41
Pump/Tubing Intake Depth (ft bmp)	159
Tubing Length (ft)	162
Tubing Inner Diameter (in)	0.17
Purging Initiation Date/Time	10/09/2023 13:45
Total Purge Volume (gal)	9.5
Modified Sample	No
If Modified, Reasoning	
Sample Collection Information	Bottling-Start: 10/09/2023 15:05:00, Bottling-Stop: 10/09/2023 15:10:00, Parameters-Sampled: PFAS

Reading Time	Depth To Water (ft)	Cumulative Drawdown (ft)	Purge Rate (ml/min)	Temperature (deg c)	Specific Conductivity (us/cm)	Dissolved Oxygen (mg/l)	pH (su)	Oxidation-Reduction Potential (mV)	Turbidity (ntu)
14:55	80.49	0.08	450	12	1,034	<0.5	7.1	-59	11
15:00	80.49	0.08	450	12	1,035	<0.5	7.1	-59	12
15:05	80.49	0.08	450	12	1,036	<0.5	7.1	-61	11

Notes:

1) Abbreviations include: "deg c" indicates degrees Celsius; "ft" indicates feet; "ft bmp" indicates feet below reference measuring point; "gal" indicates gallons; "in" indicates inches; "mg/l" indicates milligrams per liter; "ml/min" indicates milliliters per minute; "mV" indicates millivolts; "NA" indicates not applicable; "NR" indicates not recorded; "ntu" indicates Nephelometric Turbidity units; "su" indicates standard units; "us/cm" indicates microsiemens per centimeter; and "+" indicates the parameter(s) may be used for stabilization calculations but cannot be used for other purposes.
2) Weather temperature units are in degrees Fahrenheit, unless otherwise noted.
3) Did indicator parameters reach stabilization? Yes
4) Was the two hour time limit reached? No
5) Calculations:
   - Head Above Pump Intake (ft) 78.59
   - Total Drawdown (ft) 0.08
   - Calculated Final Purge Volume (gal) NA
6) If Drawdown Did Not Stabilize or Stabilized Drawdown >0.3 ft, is Total Purge Volume > Calculated Final Purge Volume? NA

Well Sampling Worksheet
WWW RAP Field Data
AREA 5 2023-Q4 - AREA5-RI-8C
Kent County, MI

Well	AREA5-RI-8C / 2 in Diameter PVC
Sample Quarter	2023-Q4
Date	10/09/2023
Weather	Sunny, 50F
Sampler Initials	RCP
Purging Device	Bladder-Pump: BP-10, Peristaltic-Pump: NA, Centrifugal-Pump: NA
Meters Used	YSI: Agile Rental 2, Turbidimeter: Agile Rental 2, Water-Level-Meter: WLM-3
Reference Measuring Point	PVC
Well Screen (ft bmp)	174.4 - 179.4
Measured Bottom Depth (ft bmp)	NR
Sample Comment	14:30 - Too much drawdown observed after the reading. Reduced the refill time. 15:35 - YSI connected.
Initial Water Level Date/Time	10/09/2023 14:15
Initial Water Level Depth (ft bmp)	84.53
Pump/Tubing Intake Depth (ft bmp)	176.9
Tubing Length (ft)	180
Tubing Inner Diameter (in)	0.25
Purging Initiation Date/Time	10/09/2023 14:20
Total Purge Volume (gal)	1.5
Modified Sample	No
If Modified, Reasoning	
Sample Collection Information	Bottling-Start: 10/09/2023 16:05:00, Bottling-Stop: 10/09/2023 16:15:00, Parameters-Sampled: PFAS

Reading Time	Depth To Water (ft)	Cumulative Drawdown (ft)	Purge Rate (ml/min)	Temperature (deg c)	Specific Conductivity (us/cm)	Dissolved Oxygen (mg/l)	pH (su)	Oxidation-Reduction Potential (mV)	Turbidity (ntu)
14:30	84.53	0.00	80	NR	NR	NR	NR	NR	NR
14:40	84.53	0.00	50	NR	NR	NR	NR	NR	NR
15:25	84.53	0.00	50	NR	NR	NR	NR	NR	160
15:35	84.53	0.00	50	12 +	953 +	4.9	7.3	210	120
15:45	84.53	0.00	50	12 +	947 +	4.9	6.8	234	92
15:50	84.53	0.00	50	12 +	946 +	4.8	6.5	237	96
15:55	84.53	0.00	50	12 +	946 +	4.8	6.4	232	94
16:00	84.53	0.00	50	12 +	944 +	4.7	6.4	230	93

Notes:

1) Abbreviations include: "deg c" indicates degrees Celsius; "ft" indicates feet; "ft bmp" indicates feet below reference measuring point; "gal" indicates gallons; "in" indicates inches; "mg/l" indicates milligrams per liter; "ml/min" indicates milliliters per minute; "mV" indicates millivolts; "NA" indicates not applicable; "NR" indicates not recorded; "ntu" indicates Nephelometric Turbidity units; "su" indicates standard units; "us/cm" indicates microsiemens per centimeter; and "+" indicates the parameter(s) may be used for stabilization calculations but cannot be used for other purposes.
2) Weather temperature units are in degrees Fahrenheit, unless otherwise noted.
3) Did indicator parameters reach stabilization? Yes
4) Was the two hour time limit reached? No
5) Calculations:
   - Head Above Pump Intake (ft) 92.37
   - Total Drawdown (ft) 0.00
   - Calculated Final Purge Volume (gal) NA
6) If Drawdown Did Not Stabilize or Stabilized Drawdown >0.3 ft, is Total Purge Volume > Calculated Final Purge Volume? NA

Well Sampling Worksheet
WWW RAP Field Data
AREA 5 2023-Q4 - AREA5-RI-9A
Kent County, MI

Well	AREA5-RI-9A / 2 in Diameter PVC
Sample Quarter	2023-Q4
Date	10/11/2023
Weather	40s, Cloudy
Sampler Initials	AJG
Purging Device	Bladder-Pump: NA, Peristaltic-Pump: NA, Centrifugal-Pump: Mega Monsoon #1
Meters Used	YSI: Agile Rental 3, Turbidimeter: Agile Rental 3, Water-Level-Meter: WLM-3
Reference Measuring Point	PVC
Well Screen (ft bmp)	98.5 - 103.5
Measured Bottom Depth (ft bmp)	NR
Sample Comment	YSI Connected at 11:30.
Initial Water Level Date/Time	10/11/2023 09:45
Initial Water Level Depth (ft bmp)	95.19
Pump/Tubing Intake Depth (ft bmp)	101
Tubing Length (ft)	104
Tubing Inner Diameter (in)	0.17
Purging Initiation Date/Time	10/11/2023 09:50
Total Purge Volume (gal)	1.6
Modified Sample	No
If Modified, Reasoning	
Sample Collection Information	Bottling-Start: 10/11/2023 11:55:00, Bottling-Stop: 10/11/2023 12:05:00, Parameters-Sampled: PFAS

Reading Time	Depth To Water (ft)	Cumulative Drawdown (ft)	Purge Rate (ml/min)	Temperature (deg c)	Specific Conductivity (us/cm)	Dissolved Oxygen (mg/l)	pH (su)	Oxidation-Reduction Potential (mV)	Turbidity (ntu)
10:05	95.38	0.19	50	NR	NR	NR	NR	NR	>999
10:20	95.38	0.19	50	NR	NR	NR	NR	NR	538
10:35	95.38	0.19	50	NR	NR	NR	NR	NR	233
10:50	95.38	0.19	50	NR	NR	NR	NR	NR	107
11:05	95.38	0.19	50	NR	NR	NR	NR	NR	73
11:20	95.38	0.19	50	NR	NR	NR	NR	NR	81
11:30	95.38	0.19	50	15	770 +	2.0	7.2	72	78
11:35	95.38	0.19	50	14	768 +	1.9	7.2	40	79

Well Sampling Worksheet
WWW RAP Field Data
AREA 5 2023-Q4 - AREA5-RI-9A
Kent County, MI

Well	AREA5-RI-9A / 2 in Diameter PVC
Sample Quarter	2023-Q4
Date	10/11/2023
Weather	40s, Cloudy
Sampler Initials	AJG
Purging Device	Bladder-Pump: NA, Peristaltic-Pump: NA, Centrifugal-Pump: Mega Monsoon #1
Meters Used	YSI: Agile Rental 3, Turbidimeter: Agile Rental 3, Water-Level-Meter: WLM-3
Reference Measuring Point	PVC
Well Screen (ft bmp)	98.5 - 103.5
Measured Bottom Depth (ft bmp)	NR
Sample Comment	YSI Connected at 11:30.
Initial Water Level Date/Time	10/11/2023 09:45
Initial Water Level Depth (ft bmp)	95.19
Pump/Tubing Intake Depth (ft bmp)	101
Tubing Length (ft)	104
Tubing Inner Diameter (in)	0.17
Purging Initiation Date/Time	10/11/2023 09:50
Total Purge Volume (gal)	1.6
Modified Sample	No
If Modified, Reasoning	
Sample Collection Information	Bottling-Start: 10/11/2023 11:55:00, Bottling-Stop: 10/11/2023 12:05:00, Parameters-Sampled: PFAS

Reading Time	Depth To Water (ft)	Cumulative Drawdown (ft)	Purge Rate (ml/min)	Temperature (deg c)	Specific Conductivity (us/cm)	Dissolved Oxygen (mg/l)	pH (su)	Oxidation-Reduction Potential (mV)	Turbidity (ntu)
11:40	95.38	0.19	50	14	767 +	1.9	7.2	26	65
11:45	95.38	0.19	50	13	762 +	1.7	7.2	22	53
11:50	95.38	0.19	50	14	761 +	1.6	7.3	24	39

Notes:

1) Abbreviations include: "deg c" indicates degrees Celsius; "ft" indicates feet; "ft bmp" indicates feet below reference measuring point; "gal" indicates gallons; "in" indicates inches; "mg/l" indicates milligrams per liter; "ml/min" indicates milliliters per minute; "mV" indicates millivolts; "NA" indicates not applicable; "NR" indicates not recorded; "ntu" indicates Nephelometric Turbidity units; "su" indicates standard units; "us/cm" indicates microsiemens per centimeter; and "+" indicates the parameter(s) may be used for stabilization calculations but cannot be used for other purposes.
2) Weather temperature units are in degrees Fahrenheit, unless otherwise noted.
3) Did indicator parameters reach stabilization? No
4) Was the two hour time limit reached? Yes
5) Calculations:
   - Head Above Pump Intake (ft) 5.81
   - Total Drawdown (ft) 0.19
   - Calculated Final Purge Volume (gal) NA
6) If Drawdown Did Not Stabilize or Stabilized Drawdown >0.3 ft, is Total Purge Volume > Calculated Final Purge Volume? NA

Well Sampling Worksheet
WWW RAP Field Data
AREA 5 2023-Q4 - AREA5-RI-9B
Kent County, MI

Well	AREA5-RI-9B / 2 in Diameter PVC
Sample Quarter	2023-Q4
Date	10/11/2023
Weather	54 Cloudy
Sampler Initials	JMS
Purging Device	Bladder-Pump: NA, Peristaltic-Pump: NA, Centrifugal-Pump: Mega Monsoon #2
Meters Used	YSI: Agile Rental 2, Turbidimeter: Agile Rental 2, Water-Level-Meter: WLM-2
Reference Measuring Point	PVC
Well Screen (ft bmp)	151.6 - 156.6
Measured Bottom Depth (ft bmp)	NR
Sample Comment	YSI Connected at 11:35.
Initial Water Level Date/Time	10/11/2023 10:00
Initial Water Level Depth (ft bmp)	109.71
Pump/Tubing Intake Depth (ft bmp)	154.1
Tubing Length (ft)	157
Tubing Inner Diameter (in)	0.25
Purging Initiation Date/Time	10/11/2023 10:05
Total Purge Volume (gal)	9.5
Modified Sample	No
If Modified, Reasoning	
Sample Collection Information	Bottling-Start: 10/11/2023 12:10:00, Bottling-Stop: 10/11/2023 12:15:00, Parameters-Sampled: PFAS

Reading Time	Depth To Water (ft)	Cumulative Drawdown (ft)	Purge Rate (ml/min)	Temperature (deg c)	Specific Conductivity (us/cm)	Dissolved Oxygen (mg/l)	pH (su)	Oxidation-Reduction Potential (mV)	Turbidity (ntu)
10:15	109.76	0.05	300	NR	NR	NR	NR	NR	>999
10:35	109.76	0.05	300	NR	NR	NR	NR	NR	446
10:45	109.76	0.05	300	NR	NR	NR	NR	NR	70
10:55	109.76	0.05	300	NR	NR	NR	NR	NR	32
11:05	109.76	0.05	300	NR	NR	NR	NR	NR	19
11:15	109.73	0.02	300	NR	NR	NR	NR	NR	214
11:25	109.73	0.02	300	NR	NR	NR	NR	NR	112
11:35	109.73	0.02	300	12 +	937 +	<0.5	7.1	-106	67
11:45	109.73	0.02	300	12 +	936 +	<0.5	7.2	-108	26
11:50	109.73	0.02	300	12 +	936 +	<0.5	7.2	-109	18

Well Sampling Worksheet
WWW RAP Field Data
AREA 5 2023-Q4 - AREA5-RI-9B
Kent County, MI

Well	AREA5-RI-9B / 2 in Diameter PVC
Sample Quarter	2023-Q4
Date	10/11/2023
Weather	54 Cloudy
Sampler Initials	JMS
Purging Device	Bladder-Pump: NA, Peristaltic-Pump: NA, Centrifugal-Pump: Mega Monsoon #2
Meters Used	YSI: Agile Rental 2, Turbidimeter: Agile Rental 2, Water-Level-Meter: WLM-2
Reference Measuring Point	PVC
Well Screen (ft bmp)	151.6 - 156.6
Measured Bottom Depth (ft bmp)	NR
Sample Comment	YSI Connected at 11:35.
Initial Water Level Date/Time	10/11/2023 10:00
Initial Water Level Depth (ft bmp)	109.71
Pump/Tubing Intake Depth (ft bmp)	154.1
Tubing Length (ft)	157
Tubing Inner Diameter (in)	0.25
Purging Initiation Date/Time	10/11/2023 10:05
Total Purge Volume (gal)	9.5
Modified Sample	No
If Modified, Reasoning	
Sample Collection Information	Bottling-Start: 10/11/2023 12:10:00, Bottling-Stop: 10/11/2023 12:15:00, Parameters-Sampled: PFAS

Reading Time	Depth To Water (ft)	Cumulative Drawdown (ft)	Purge Rate (ml/min)	Temperature (deg c)	Specific Conductivity (us/cm)	Dissolved Oxygen (mg/l)	pH (su)	Oxidation-Reduction Potential (mV)	Turbidity (ntu)
11:55	109.73	0.02	300	12 +	936 +	<0.5	7.2	-109	15
12:00	109.73	0.02	300	12 +	936 +	<0.5	7.2	-110	12
12:05	109.73	0.02	300	12 +	936 +	<0.5	7.2	-110	9

Notes:

1) Abbreviations include: "deg c" indicates degrees Celsius; "ft" indicates feet; "ft bmp" indicates feet below reference measuring point; "gal" indicates gallons; "in" indicates inches; "mg/l" indicates milligrams per liter; "ml/min" indicates milliliters per minute; "mV" indicates millivolts; "NA" indicates not applicable; "NR" indicates not recorded; "ntu" indicates Nephelometric Turbidity units; "su" indicates standard units; "us/cm" indicates microsiemens per centimeter; and "+" indicates the parameter(s) may be used for stabilization calculations but cannot be used for other purposes.
2) Weather temperature units are in degrees Fahrenheit, unless otherwise noted.
3) Did indicator parameters reach stabilization? No
4) Was the two hour time limit reached? Yes
5) Calculations:
   - Head Above Pump Intake (ft) 44.39
   - Total Drawdown (ft) 0.02
   - Calculated Final Purge Volume (gal) NA
6) If Drawdown Did Not Stabilize or Stabilized Drawdown >0.3 ft, is Total Purge Volume > Calculated Final Purge Volume? NA

Well Sampling Worksheet
WWW RAP Field Data
AREA 5 2023-Q4 - AREA5-RI-9C
Kent County, MI

Well	AREA5-RI-9C / 2 in Diameter PVC
Sample Quarter	2023-Q4
Date	10/11/2023
Weather	Partly Cloudy 50F
Sampler Initials	RCP
Purging Device	Bladder-Pump: BP-11, Peristaltic-Pump: NA, Centrifugal-Pump: NA
Meters Used	YSI: Agile Rental 1, Turbidimeter: Agile Rental 1, Water-Level-Meter: WLM-4
Reference Measuring Point	PVC
Well Screen (ft bmp)	221.9 - 226.9
Measured Bottom Depth (ft bmp)	NR
Sample Comment	10:15 - Purge water was oberved to be turbid. 11:25 - YSI Connected.
Initial Water Level Date/Time	10/11/2023 10:00
Initial Water Level Depth (ft bmp)	110.16
Pump/Tubing Intake Depth (ft bmp)	224.4
Tubing Length (ft)	228
Tubing Inner Diameter (in)	0.25
Purging Initiation Date/Time	10/11/2023 10:05
Total Purge Volume (gal)	6
Modified Sample	No
If Modified, Reasoning	
Sample Collection Information	Bottling-Start: 10/11/2023 12:05:00, Bottling-Stop: 10/11/2023 12:10:00, Parameters-Sampled: PFAS

Reading Time	Depth To Water (ft)	Cumulative Drawdown (ft)	Purge Rate (ml/min)	Temperature (deg c)	Specific Conductivity (us/cm)	Dissolved Oxygen (mg/l)	pH (su)	Oxidation-Reduction Potential (mV)	Turbidity (ntu)
10:15	110.20	0.04	180	NR	NR	NR	NR	NR	NR
10:35	110.20	0.04	180	NR	NR	NR	NR	NR	>999
10:55	110.20	0.04	180	NR	NR	NR	NR	NR	>999
11:15	110.20	0.04	180	NR	NR	NR	NR	NR	627
11:25	110.20	0.04	180	11	1,434 +	0.6	7.2	-4	323
11:35	110.20	0.04	180	11	1,435 +	0.5	7.2	-35	217
11:40	110.20	0.04	180	11	1,436 +	<0.5	7.2	-43	184
11:45	110.20	0.04	180	11	1,437 +	<0.5	7.2	-49	144
11:50	110.20	0.04	180	11	1,439 +	<0.5	7.2	-54	107

Well Sampling Worksheet
WWW RAP Field Data
AREA 5 2023-Q4 - AREA5-RI-9C
Kent County, MI

Well	AREA5-RI-9C / 2 in Diameter PVC
Sample Quarter	2023-Q4
Date	10/11/2023
Weather	Partly Cloudy 50F
Sampler Initials	RCP
Purging Device	Bladder-Pump: BP-11, Peristaltic-Pump: NA, Centrifugal-Pump: NA
Meters Used	YSI: Agile Rental 1, Turbidimeter: Agile Rental 1, Water-Level-Meter: WLM-4
Reference Measuring Point	PVC
Well Screen (ft bmp)	221.9 - 226.9
Measured Bottom Depth (ft bmp)	NR
Sample Comment	10:15 - Purge water was oberved to be turbid. 11:25 - YSI Connected.
Initial Water Level Date/Time	10/11/2023 10:00
Initial Water Level Depth (ft bmp)	110.16
Pump/Tubing Intake Depth (ft bmp)	224.4
Tubing Length (ft)	228
Tubing Inner Diameter (in)	0.25
Purging Initiation Date/Time	10/11/2023 10:05
Total Purge Volume (gal)	6
Modified Sample	No
If Modified, Reasoning	
Sample Collection Information	Bottling-Start: 10/11/2023 12:05:00, Bottling-Stop: 10/11/2023 12:10:00, Parameters-Sampled: PFAS

Reading Time	Depth To Water (ft)	Cumulative Drawdown (ft)	Purge Rate (ml/min)	Temperature (deg c)	Specific Conductivity (us/cm)	Dissolved Oxygen (mg/l)	pH (su)	Oxidation-Reduction Potential (mV)	Turbidity (ntu)
11:55	110.20	0.04	180	11	1,440 +	<0.5	7.2	-58	77
12:00	110.20	0.04	180	11	1,440 +	<0.5	7.2	-60	67
12:05	110.20	0.04	180	11	1,441 +	<0.5	7.2	-63	47

Notes:

1) Abbreviations include: "deg c" indicates degrees Celsius; "ft" indicates feet; "ft bmp" indicates feet below reference measuring point; "gal" indicates gallons; "in" indicates inches; "mg/l" indicates milligrams per liter; "ml/min" indicates milliliters per minute; "mV" indicates millivolts; "NA" indicates not applicable; "NR" indicates not recorded; "ntu" indicates Nephelometric Turbidity units; "su" indicates standard units; "us/cm" indicates microsiemens per centimeter; and "+" indicates the parameter(s) may be used for stabilization calculations but cannot be used for other purposes.
2) Weather temperature units are in degrees Fahrenheit, unless otherwise noted.
3) Did indicator parameters reach stabilization? No
4) Was the two hour time limit reached? Yes
5) Calculations:
   - Head Above Pump Intake (ft) 114.24
   - Total Drawdown (ft) 0.04
   - Calculated Final Purge Volume (gal) NA
6) If Drawdown Did Not Stabilize or Stabilized Drawdown >0.3 ft, is Total Purge Volume > Calculated Final Purge Volume? NA

Well Sampling Worksheet
WWW RAP Field Data
AREA 5 2023-Q4 - AREA5-RI-11A
Kent County, MI

Well	AREA5-RI-11A / 2 in Diameter PVC
Sample Quarter	2023-Q4
Date	10/12/2023
Weather	Sunny, 50
Sampler Initials	NCK
Purging Device	Bladder-Pump: NA, Peristaltic-Pump: NA, Centrifugal-Pump: Mega Monsoon #1
Meters Used	YSI: Agile Rental 3, Turbidimeter: Agile Rental 3, Water-Level-Meter: WLM-2
Reference Measuring Point	PVC
Well Screen (ft bmp)	110.0 - 115.0
Measured Bottom Depth (ft bmp)	NR
Sample Comment	10:50 - YSI Connected. Greater than 10 minute readings due to YSI stabilization.
Initial Water Level Date/Time	10/12/2023 10:10
Initial Water Level Depth (ft bmp)	96.17
Pump/Tubing Intake Depth (ft bmp)	112.5
Tubing Length (ft)	116
Tubing Inner Diameter (in)	0.17
Purging Initiation Date/Time	10/12/2023 10:15
Total Purge Volume (gal)	12
Modified Sample	No
If Modified, Reasoning	
Sample Collection Information	Bottling-Start: 10/12/2023 11:45:00, Bottling-Stop: 10/12/2023 11:50:00, Parameters-Sampled: PFAS

Reading Time	Depth To Water (ft)	Cumulative Drawdown (ft)	Purge Rate (ml/min)	Temperature (deg c)	Specific Conductivity (us/cm)	Dissolved Oxygen (mg/l)	pH (su)	Oxidation-Reduction Potential (mV)	Turbidity (ntu)
10:20	96.20	0.03	500	NR	NR	NR	NR	NR	NR
10:25	96.20	0.03	500	NR	NR	NR	NR	NR	NR
10:50	96.20	0.03	500	NR	NR	NR	NR	NR	NR
11:15	96.20	0.03	500	13	689 +	<0.5	7.3	7	32
11:35	96.20	0.03	500	13	689 +	<0.5	7.3	-18	<5
11:40	96.20	0.03	500	13	689 +	<0.5	7.3	-22	<5
11:45	96.20	0.03	500	13	690 +	<0.5	7.3	-26	<5

Notes:

1) Abbreviations include: "deg c" indicates degrees Celsius; "ft" indicates feet; "ft bmp" indicates feet below reference measuring point; "gal" indicates gallons; "in" indicates inches; "mg/l" indicates milligrams per liter; "ml/min" indicates milliliters per minute; "mV" indicates millivolts; "NA" indicates not applicable; "NR" indicates not recorded; "ntu" indicates Nephelometric Turbidity units; "su" indicates standard units; "us/cm" indicates microsiemens per centimeter; and "+" indicates the parameter(s) may be used for stabilization calculations but cannot be used for other purposes.
2) Weather temperature units are in degrees Fahrenheit, unless otherwise noted.
3) Did indicator parameters reach stabilization? Yes
4) Was the two hour time limit reached? No
5) Calculations:
   - Head Above Pump Intake (ft): 16.33
   - Total Drawdown (ft): 0.03
   - Calculated Final Purge Volume (gal): NA
6) If Drawdown Did Not Stabilize or Stabilized Drawdown >0.3 ft, is Total Purge Volume > Calculated Final Purge Volume? NA

Well Sampling Worksheet
WWW RAP Field Data
AREA 5 2023-Q4 - AREA5-RI-11B
Kent County, MI

Well	AREA5-RI-11B / 2 in Diameter PVC
Sample Quarter	2023-Q4
Date	10/12/2023
Weather	48 Sunny
Sampler Initials	JMS
Purging Device	Bladder-Pump: NA, Peristaltic-Pump: NA, Centrifugal-Pump: Mega Monsoon #2
Meters Used	YSI: Agile Rental 2, Turbidimeter: Agile Rental 2, Water-Level-Meter: WLM-3
Reference Measuring Point	PVC
Well Screen (ft bmp)	140.0 - 145.0
Measured Bottom Depth (ft bmp)	NR
Sample Comment	YSI Connected at 11:05.
Initial Water Level Date/Time	10/12/2023 10:00
Initial Water Level Depth (ft bmp)	95.84
Pump/Tubing Intake Depth (ft bmp)	142.5
Tubing Length (ft)	146
Tubing Inner Diameter (in)	0.17
Purging Initiation Date/Time	10/12/2023 10:05
Total Purge Volume (gal)	10
Modified Sample	No
If Modified, Reasoning	
Sample Collection Information	Bottling-Start: 10/12/2023 11:20:00, Bottling-Stop: 10/12/2023 11:25:00, Parameters-Sampled: PFAS

Reading Time	Depth To Water (ft)	Cumulative Drawdown (ft)	Purge Rate (ml/min)	Temperature (deg c)	Specific Conductivity (us/cm)	Dissolved Oxygen (mg/l)	pH (su)	Oxidation-Reduction Potential (mV)	Turbidity (ntu)
10:15	95.83	-0.01	300	NR	NR	NR	NR	NR	436
10:25	95.83	-0.01	500	NR	NR	NR	NR	NR	112
10:35	95.83	-0.01	500	NR	NR	NR	NR	NR	28
10:45	95.83	-0.01	500	NR	NR	NR	NR	NR	11
10:55	95.83	-0.01	500	NR	NR	NR	NR	NR	7
11:05	95.83	-0.01	500	11 +	691 +	<0.5	7.1	-81	6
11:10	95.83	-0.01	500	11 +	690 +	<0.5	7.1	-83	6
11:15	95.83	-0.01	500	11 +	690 +	<0.5	7.1	-83	5

Notes:

1) Abbreviations include: "deg c" indicates degrees Celsius; "ft" indicates feet; "ft bmp" indicates feet below reference measuring point; "gal" indicates gallons; "in" indicates inches; "mg/l" indicates milligrams per liter; "ml/min" indicates milliliters per minute; "mV" indicates millivolts; "NA" indicates not applicable; "NR" indicates not recorded; "ntu" indicates Nephelometric Turbidity units; "su" indicates standard units; "us/cm" indicates microsiemens per centimeter; and "+" indicates the parameter(s) may be used for stabilization calculations but cannot be used for other purposes.
2) Weather temperature units are in degrees Fahrenheit, unless otherwise noted.
3) Did indicator parameters reach stabilization? Yes
4) Was the two hour time limit reached? No
5) Calculations:
   - Head Above Pump Intake (ft) 46.66
   - Total Drawdown (ft) -0.01
   - Calculated Final Purge Volume (gal) NA
6) If Drawdown Did Not Stabilize or Stabilized Drawdown >0.3 ft, is Total Purge Volume > Calculated Final Purge Volume? NA

Well Sampling Worksheet
WWW RAP Field Data
AREA 5 2023-Q4 - AREA5-RI-11C
Kent County, MI

Well	AREA5-RI-11C / 2 in Diameter PVC
Sample Quarter	2023-Q4
Date	10/12/2023
Weather	40s, Clear
Sampler Initials	AJG
Purging Device	Bladder-Pump: BP-10, Peristaltic-Pump: NA, Centrifugal-Pump: NA
Meters Used	YSI: Agile Rental 1, Turbidimeter: Agile Rental 1, Water-Level-Meter: WLM-4
Reference Measuring Point	PVC
Well Screen (ft bmp)	232.5 - 237.5
Measured Bottom Depth (ft bmp)	237.5
Sample Comment	10:45 - Readings > 10 minutes due to observed turbidity. 11:15 - YSI Connected. 11:20 - Turbidity dropping fast.
Initial Water Level Date/Time	10/12/2023 10:20
Initial Water Level Depth (ft bmp)	106.05
Pump/Tubing Intake Depth (ft bmp)	235
Tubing Length (ft)	237
Tubing Inner Diameter (in)	0.25
Purging Initiation Date/Time	10/12/2023 10:25
Total Purge Volume (gal)	9.5
Modified Sample	No
If Modified, Reasoning	
Sample Collection Information	Bottling-Start: 10/12/2023 12:30:00, Bottling-Stop: 10/12/2023 12:35:00, Parameters-Sampled: PFAS

Reading Time	Depth To Water (ft)	Cumulative Drawdown (ft)	Purge Rate (ml/min)	Temperature (deg c)	Specific Conductivity (us/cm)	Dissolved Oxygen (mg/l)	pH (su)	Oxidation-Reduction Potential (mV)	Turbidity (ntu)
10:35	106.00	-0.05	300	NR	NR	NR	NR	NR	657
10:45	106.04	-0.01	300	NR	NR	NR	NR	NR	NR
11:15	106.04	-0.01	300	NR	NR	NR	NR	NR	NR
11:20	106.04	-0.01	300	10	1,428 +	0.9	7.2	107	53
11:35	106.04	-0.01	300	10	1,429 +	1.4	7.2	103	22
11:45	106.04	-0.01	300	10	1,429 +	1.2	7.2	101	15
11:55	106.04	-0.01	300	10	1,429 +	0.8	7.1	99	9
12:05	106.04	-0.01	300	10	1,429 +	0.5	7.1	97	8
12:10	106.04	-0.01	300	10	1,428 +	0.6	7.1	96	6

Well Sampling Worksheet
WWW RAP Field Data
AREA 5 2023-Q4 - AREA5-RI-11C
Kent County, MI

Well	AREA5-RI-11C / 2 in Diameter PVC
Sample Quarter	2023-Q4
Date	10/12/2023
Weather	40s, Clear
Sampler Initials	AJG
Purging Device	Bladder-Pump: BP-10, Peristaltic-Pump: NA, Centrifugal-Pump: NA
Meters Used	YSI: Agile Rental 1, Turbidimeter: Agile Rental 1, Water-Level-Meter: WLM-4
Reference Measuring Point	PVC
Well Screen (ft bmp)	232.5 - 237.5
Measured Bottom Depth (ft bmp)	237.5
Sample Comment	10:45 - Readings > 10 minutes due to observed turbidity. 11:15 - YSI Connected. 11:20 - Turbidity dropping fast.
Initial Water Level Date/Time	10/12/2023 10:20
Initial Water Level Depth (ft bmp)	106.05
Pump/Tubing Intake Depth (ft bmp)	235
Tubing Length (ft)	237
Tubing Inner Diameter (in)	0.25
Purging Initiation Date/Time	10/12/2023 10:25
Total Purge Volume (gal)	9.5
Modified Sample	No
If Modified, Reasoning	
Sample Collection Information	Bottling-Start: 10/12/2023 12:30:00, Bottling-Stop: 10/12/2023 12:35:00, Parameters-Sampled: PFAS

Reading Time	Depth To Water (ft)	Cumulative Drawdown (ft)	Purge Rate (ml/min)	Temperature (deg c)	Specific Conductivity (us/cm)	Dissolved Oxygen (mg/l)	pH (su)	Oxidation-Reduction Potential (mV)	Turbidity (ntu)
12:15	106.04	-0.01	300	10	1,429 +	0.6	7.1	95	5
12:20	106.04	-0.01	300	10	1,428 +	0.7	7.1	95	5
12:25	106.04	-0.01	300	10	1,428 +	0.7	7.1	94	7

Notes:

1) Abbreviations include: "deg c" indicates degrees Celsius; "ft" indicates feet; "ft bmp" indicates feet below reference measuring point; "gal" indicates gallons; "in" indicates inches; "mg/l" indicates milligrams per liter; "ml/min" indicates milliliters per minute; "mV" indicates millivolts; "NA" indicates not applicable; "NR" indicates not recorded; "ntu" indicates Nephelometric Turbidity units; "su" indicates standard units; "us/cm" indicates microsiemens per centimeter; and "+" indicates the parameter(s) may be used for stabilization calculations but cannot be used for other purposes.
2) Weather temperature units are in degrees Fahrenheit, unless otherwise noted.
3) Did indicator parameters reach stabilization? No
4) Was the two hour time limit reached? Yes
5) Calculations:
   - Head Above Pump Intake (ft) 128.95
   - Total Drawdown (ft) -0.01
   - Calculated Final Purge Volume (gal) NA
6) If Drawdown Did Not Stabilize or Stabilized Drawdown >0.3 ft, is Total Purge Volume > Calculated Final Purge Volume? NA

Well Sampling Worksheet
WWW RAP Field Data
AREA 5 2023-Q4 - AREA5-RI-11D
Kent County, MI

Well	AREA5-RI-11D / 2 in Diameter PVC
Sample Quarter	2023-Q4
Date	10/12/2023
Weather	50 Cloudy
Sampler Initials	JMS
Purging Device	Bladder-Pump: BP-11, Peristaltic-Pump: NA, Centrifugal-Pump: NA
Meters Used	YSI: Agile Rental 2, Turbidimeter: Agile Rental 2, Water-Level-Meter: WLM-3
Reference Measuring Point	PVC
Well Screen (ft bmp)	262.0 - 267.0
Measured Bottom Depth (ft bmp)	NR
Sample Comment	YSI Connected at 14:45.
Initial Water Level Date/Time	10/12/2023 13:50
Initial Water Level Depth (ft bmp)	107.51
Pump/Tubing Intake Depth (ft bmp)	264.5
Tubing Length (ft)	268
Tubing Inner Diameter (in)	0.25
Purging Initiation Date/Time	10/12/2023 13:55
Total Purge Volume (gal)	8.5
Modified Sample	No
If Modified, Reasoning	
Sample Collection Information	Bottling-Start: 10/12/2023 15:15:00, Bottling-Stop: 10/12/2023 15:20:00, Parameters-Sampled: PFAS

Reading Time	Depth To Water (ft)	Cumulative Drawdown (ft)	Purge Rate (ml/min)	Temperature (deg c)	Specific Conductivity (us/cm)	Dissolved Oxygen (mg/l)	pH (su)	Oxidation-Reduction Potential (mV)	Turbidity (ntu)
14:05	107.74	0.23	400	NR	NR	NR	NR	NR	64
14:15	107.74	0.23	400	NR	NR	NR	NR	NR	20
14:25	107.74	0.23	400	NR	NR	NR	NR	NR	14
14:35	107.74	0.23	400	NR	NR	NR	NR	NR	8
14:45	107.74	0.23	400	10 +	1,677 +	<0.5	6.8	-46	8
14:50	107.74	0.23	400	10 +	1,678 +	<0.5	6.8	-46	9
14:55	107.74	0.23	400	10 +	1,676 +	<0.5	6.8	-46	9

Notes:

1) Abbreviations include: "deg c" indicates degrees Celsius; "ft" indicates feet; "ft bmp" indicates feet below reference measuring point; "gal" indicates gallons; "in" indicates inches; "mg/l" indicates milligrams per liter; "ml/min" indicates milliliters per minute; "mV" indicates millivolts; "NA" indicates not applicable; "NR" indicates not recorded; "ntu" indicates Nephelometric Turbidity units; "su" indicates standard units; "us/cm" indicates microsiemens per centimeter; and "+" indicates the parameter(s) may be used for stabilization calculations but cannot be used for other purposes.
2) Weather temperature units are in degrees Fahrenheit, unless otherwise noted.
3) Did indicator parameters reach stabilization? Yes
4) Was the two hour time limit reached? No
5) Calculations:
   - Head Above Pump Intake (ft) 156.99
   - Total Drawdown (ft) 0.23
   - Calculated Final Purge Volume (gal) NA
6) If Drawdown Did Not Stabilize or Stabilized Drawdown >0.3 ft, is Total Purge Volume > Calculated Final Purge Volume? NA

Well Sampling Worksheet
WWW RAP Field Data
AREA 19 2023-Q4 - AREA19-MW-8A
Kent County, MI

Well	AREA19-MW-8A / 2 in Diameter PVC
Sample Quarter	2023-Q4
Date	12/11/2023
Weather	Cloudy, 30's
Sampler Initials	CBM
Purging Device	Bladder-Pump: NA, Peristaltic-Pump: NA, Centrifugal-Pump: Mega Monsoon #1
Meters Used	YSI: Agile Rental 1, Turbidimeter: Agile Rental 1, Water-Level-Meter: WLM-4
Reference Measuring Point	PVC
Well Screen (ft bmp)	29.5 - 34.5
Measured Bottom Depth (ft bmp)	34.5
Sample Comment	Initial water level is within the well screen. Pump intake was placed at halfway point in the water column.
Initial Water Level Date/Time	12/11/2023 13:15
Initial Water Level Depth (ft bmp)	32.62
Pump/Tubing Intake Depth (ft bmp)	33.5
Tubing Length (ft)	35
Tubing Inner Diameter (in)	0.25
Purging Initiation Date/Time	12/11/2023 13:20
Total Purge Volume (gal)	1.8
Modified Sample	Yes
If Modified, Reasoning	Water Below Top of Screen
Sample Collection Information	Bottling-Start: 12/11/2023 15:20:00, Bottling-Stop: 12/11/2023 15:30:00, Parameters-Sampled: PFAS

Reading Time	Depth To Water (ft)	Cumulative Drawdown (ft)	Purge Rate (ml/min)	Temperature (deg c)	Specific Conductivity (us/cm)	Dissolved Oxygen (mg/l)	pH (su)	Oxidation-Reduction Potential (mV)	Turbidity (ntu)
14:20	32.60	-0.02	50	11	505 +	9.0	7.3	258	12
14:35	32.60	-0.02	50	12	505 +	8.8	7.5	262	12
14:45	32.60	-0.02	50	11	508 +	8.5	7.3	280	13
14:50	32.60	-0.02	50	12	505 +	8.7	7.4	274	7
14:55	32.62	0.00	50	12	505 +	9.0	7.4	277	5
15:00	32.62	0.00	50	12	505 +	9.1	7.3	286	<5
15:05	32.62	0.00	50	11	503 +	9.0	7.3	291	<5
15:10	32.62	0.00	50	11	507 +	9.0	7.3	290	<5
15:15	32.62	0.00	50	12	506 +	9.2	7.4	288	<5
15:20	32.62	0.00	50	11	506 +	9.2	7.3	293	<5

Notes:

1) Abbreviations include: "deg c" indicates degrees Celsius; "ft" indicates feet; "ft bmp" indicates feet below reference measuring point; "gal" indicates gallons; "in" indicates inches; "mg/l" indicates milligrams per liter; "ml/min" indicates milliliters per minute; "mV" indicates millivolts; "NA" indicates not applicable; "NR" indicates not recorded; "ntu" indicates Nephelometric Turbidity units; "su" indicates standard units; "us/cm" indicates microsiemens per centimeter; and "+" indicates the parameter(s) may be used for stabilization calculations but cannot be used for other purposes.
2) Weather temperature units are in degrees Fahrenheit, unless otherwise noted.
3) Did indicator parameters reach stabilization? Yes
4) Was the two hour time limit reached? Yes
5) Calculations:
   - Head Above Pump Intake (ft) 0.88
   - Total Drawdown (ft) 0.00
   - Calculated Final Purge Volume (gal) NA
6) If Drawdown Did Not Stabilize or Stabilized Drawdown >0.3 ft, is Total Purge Volume > Calculated Final Purge Volume? NA

Well Sampling Worksheet
WWW RAP Field Data
AREA 19 2023-Q4 - AREA19-MW-8B
Kent County, MI

Well	AREA19-MW-8B / 2 in Diameter PVC
Sample Quarter	2023-Q4
Date	12/11/2023
Weather	Cloudy 30
Sampler Initials	NCK
Purging Device	Bladder-Pump: BP-11, Peristaltic-Pump: NA, Centrifugal-Pump: NA
Meters Used	YSI: Agile Rental 2, Turbidimeter: Agile Rental 2, Water-Level-Meter: WLM-3
Reference Measuring Point	PVC
Well Screen (ft bmp)	180.8 - 185.8
Measured Bottom Depth (ft bmp)	NR
Sample Comment	13:00 - Purge water observed to be very turbid. 14: 20 - YSI Connected.
Initial Water Level Date/Time	12/11/2023 10:20
Initial Water Level Depth (ft bmp)	90.09
Pump/Tubing Intake Depth (ft bmp)	183.3
Tubing Length (ft)	186
Tubing Inner Diameter (in)	0.25
Purging Initiation Date/Time	12/11/2023 12:50
Total Purge Volume (gal)	5
Modified Sample	No
If Modified, Reasoning	
Sample Collection Information	Bottling-Start: 12/11/2023 14:50:00, Bottling-Stop: 12/11/2023 14:55:00, Parameters-Sampled: PFAS

Reading Time	Depth To Water (ft)	Cumulative Drawdown (ft)	Purge Rate (ml/min)	Temperature (deg c)	Specific Conductivity (us/cm)	Dissolved Oxygen (mg/l)	pH (su)	Oxidation-Reduction Potential (mV)	Turbidity (ntu)
13:00	90.31	0.22	150	NR	NR	NR	NR	NR	NR
13:20	90.31	0.22	150	NR	NR	NR	NR	NR	NR
13:40	90.31	0.22	150	NR	NR	NR	NR	NR	620
14:20	90.31	0.22	150	NR	NR	NR	NR	NR	230
14:35	90.31	0.22	150	9	456 +	<0.5	7.8	83	190
14:40	90.31	0.22	150	9	455 +	<0.5	7.8	72	180
14:45	90.31	0.22	150	9	465 +	<0.5	7.8	65	205
14:50	90.31	0.22	150	9	459 +	<0.5	7.8	66	215

Notes:

1) Abbreviations include: "deg c" indicates degrees Celsius; "ft" indicates feet; "ft bmp" indicates feet below reference measuring point; "gal" indicates gallons; "in" indicates inches; "mg/l" indicates milligrams per liter; "ml/min" indicates milliliters per minute; "mV" indicates millivolts; "NA" indicates not applicable; "NR" indicates not recorded; "ntu" indicates Nephelometric Turbidity units; "su" indicates standard units; "us/cm" indicates microsiemens per centimeter; and "+" indicates the parameter(s) may be used for stabilization calculations but cannot be used for other purposes.
2) Weather temperature units are in degrees Fahrenheit, unless otherwise noted.
3) Did indicator parameters reach stabilization? No
4) Was the two hour time limit reached? Yes
5) Calculations:
   - Head Above Pump Intake (ft) 93.21
   - Total Drawdown (ft) 0.22
   - Calculated Final Purge Volume (gal) NA
6) If Drawdown Did Not Stabilize or Stabilized Drawdown >0.3 ft, is Total Purge Volume > Calculated Final Purge Volume? NA

Well Sampling Worksheet
WWW RAP Field Data
AREA 19 2023-Q4 - AREA19-MW-8C
Kent County, MI

Well	AREA19-MW-8C / 2 in Diameter PVC
Sample Quarter	2023-Q4
Date	12/11/2023
Weather	Cloudy, 30s
Sampler Initials	CBM
Purging Device	Bladder-Pump: BP-12, Peristaltic-Pump: NA, Centrifugal-Pump: NA
Meters Used	YSI: Agile Rental 1, Turbidimeter: Agile Rental 1, Water-Level-Meter: WLM-4
Reference Measuring Point	PVC
Well Screen (ft bmp)	247.0 - 252.0
Measured Bottom Depth (ft bmp)	252
Sample Comment	10:30 - Beginning to see water effluent in tubing. Turbidity was visually high for the first hour plus of purging.
Initial Water Level Date/Time	12/11/2023 10:20
Initial Water Level Depth (ft bmp)	109.46
Pump/Tubing Intake Depth (ft bmp)	249.5
Tubing Length (ft)	251
Tubing Inner Diameter (in)	0.25
Purging Initiation Date/Time	12/11/2023 10:30
Total Purge Volume (gal)	1.8
Modified Sample	No
If Modified, Reasoning	
Sample Collection Information	Bottling-Start: 12/11/2023 12:30:00, Bottling-Stop: 12/11/2023 12:40:00, Parameters-Sampled: PFAS

Reading Time	Depth To Water (ft)	Cumulative Drawdown (ft)	Purge Rate (ml/min)	Temperature (deg c)	Specific Conductivity (us/cm)	Dissolved Oxygen (mg/l)	pH (su)	Oxidation-Reduction Potential (mV)	Turbidity (ntu)
10:30	NR	NR	NR	NR	NR	NR	NR	NR	NR
11:35	109.48	0.02	50	NR	NR	NR	NR	NR	>999
12:00	109.48	0.02	50	6	724 +	4.0	7.6	194	829
12:10	109.48	0.02	50	7	724 +	3.1	7.6	111	NR
12:20	109.48	0.02	50	7	722 +	1.6	7.6	31	300
12:30	109.46	0.00	50	7	721 +	1.5	7.6	-1	204

Notes:

1) Abbreviations include: "deg c" indicates degrees Celsius; "ft" indicates feet; "ft bmp" indicates feet below reference measuring point; "gal" indicates gallons; "in" indicates inches; "mg/l" indicates milligrams per liter; "ml/min" indicates milliliters per minute; "mV" indicates millivolts; "NA" indicates not applicable; "NR" indicates not recorded; "ntu" indicates Nephelometric Turbidity units; "su" indicates standard units; "us/cm" indicates microsiemens per centimeter; and "+" indicates the parameter(s) may be used for stabilization calculations but cannot be used for other purposes.
2) Weather temperature units are in degrees Fahrenheit, unless otherwise noted.
3) Did indicator parameters reach stabilization? No
4) Was the two hour time limit reached? Yes
5) Calculations:
   - Head Above Pump Intake (ft) 140.04
   - Total Drawdown (ft) 0.00
   - Calculated Final Purge Volume (gal) 0.65
6) If Drawdown Did Not Stabilize or Stabilized Drawdown >0.3 ft, is Total Purge Volume > Calculated Final Purge Volume? Yes

Well Sampling Worksheet
WWW RAP Field Data
AREA 19 2023-Q4 - AREA19-MW-9A
Kent County, MI

Well	AREA19-MW-9A / 2 in Diameter PVC
Sample Quarter	2023-Q4
Date	12/12/2023
Weather	Partly sunny, 30's.
Sampler Initials	CBM
Purging Device	Bladder-Pump: NA, Peristaltic-Pump: PER-3, Centrifugal-Pump: NA
Meters Used	YSI: Agile Rental 1, Turbidimeter: Agile Rental 1, Water-Level-Meter: WLM-3
Reference Measuring Point	PVC
Well Screen (ft bmp)	18.8 - 23.8
Measured Bottom Depth (ft bmp)	23.8
Sample Comment	Pumped at slowest speed possible.
Initial Water Level Date/Time	12/12/2023 12:40
Initial Water Level Depth (ft bmp)	4.68
Pump/Tubing Intake Depth (ft bmp)	21.3
Tubing Length (ft)	22.5
Tubing Inner Diameter (in)	0.17
Purging Initiation Date/Time	12/12/2023 12:50
Total Purge Volume (gal)	1
Modified Sample	No
If Modified, Reasoning	
Sample Collection Information	Bottling-Start: 12/12/2023 14:00:00, Bottling-Stop: 12/12/2023 14:10:00, Parameters-Sampled: PFAS

Reading Time	Depth To Water (ft)	Cumulative Drawdown (ft)	Purge Rate (ml/min)	Temperature (deg c)	Specific Conductivity (us/cm)	Dissolved Oxygen (mg/l)	pH (su)	Oxidation-Reduction Potential (mV)	Turbidity (ntu)
13:35	4.90	0.22	50	10	589 +	1.0	7.5	214	<5
13:50	4.86	0.18	50	10	604 +	1.0	7.5	211	<5
13:55	4.86	0.18	50	10	602 +	1.0	7.6	209	<5
14:00	4.86	0.18	50	10	606 +	1.0	7.5	210	<5

Notes:

1) Abbreviations include: "deg c" indicates degrees Celsius; "ft" indicates feet; "ft bmp" indicates feet below reference measuring point; "gal" indicates gallons; "in" indicates inches; "mg/l" indicates milligrams per liter; "ml/min" indicates milliliters per minute; "mV" indicates millivolts; "NA" indicates not applicable; "NR" indicates not recorded; "ntu" indicates Nephelometric Turbidity units; "su" indicates standard units; "us/cm" indicates microsiemens per centimeter; and "+" indicates the parameter(s) may be used for stabilization calculations but cannot be used for other purposes.
2) Weather temperature units are in degrees Fahrenheit, unless otherwise noted.
3) Did indicator parameters reach stabilization? Yes
4) Was the two hour time limit reached? No
5) Calculations:
   - Head Above Pump Intake (ft) 16.62
   - Total Drawdown (ft) 0.18
   - Calculated Final Purge Volume (gal) NA
6) If Drawdown Did Not Stabilize or Stabilized Drawdown >0.3 ft, is Total Purge Volume > Calculated Final Purge Volume? NA

Well Sampling Worksheet
WWW RAP Field Data
AREA 19 2023-Q4 - AREA19-MW-9B
Kent County, MI

Well	AREA19-MW-9B / 2 in Diameter PVC
Sample Quarter	2023-Q4
Date	12/12/2023
Weather	Partly cloudy, 20's-30's.
Sampler Initials	CBM
Purging Device	Bladder-Pump: NA, Peristaltic-Pump: NA, Centrifugal-Pump: Mega Monsoon #1
Meters Used	YSI: Agile Rental 1, Turbidimeter: Agile Rental 1, Water-Level-Meter: WLM-3
Reference Measuring Point	PVC
Well Screen (ft bmp)	93.0 - 98.0
Measured Bottom Depth (ft bmp)	99.4
Sample Comment	
Initial Water Level Date/Time	12/12/2023 09:00
Initial Water Level Depth (ft bmp)	50.64
Pump/Tubing Intake Depth (ft bmp)	96.9
Tubing Length (ft)	100
Tubing Inner Diameter (in)	0.17
Purging Initiation Date/Time	12/12/2023 09:30
Total Purge Volume (gal)	9.5
Modified Sample	No
If Modified, Reasoning	
Sample Collection Information	Bottling-Start: 12/12/2023 11:30:00, Bottling-Stop: 12/12/2023 11:32:00, Parameters-Sampled: PFAS

Reading Time	Depth To Water (ft)	Cumulative Drawdown (ft)	Purge Rate (ml/min)	Temperature (deg c)	Specific Conductivity (us/cm)	Dissolved Oxygen (mg/l)	pH (su)	Oxidation-Reduction Potential (mV)	Turbidity (ntu)
11:00	50.64	0.00	300	11	578 +	0.7	7.4	216	10
11:05	50.64	0.00	300	11	577 +	<0.5	7.5	84	10
11:10	50.64	0.00	300	11	576 +	<0.5	7.5	12	8
11:15	50.64	0.00	300	11	575 +	<0.5	7.5	-32	6
11:20	50.64	0.00	300	11	575 +	<0.5	7.5	-61	6
11:25	50.64	0.00	300	11	574 +	<0.5	7.5	-90	<5
11:30	50.64	0.00	300	11	574 +	<0.5	7.6	-109	<5

Notes:

1) Abbreviations include: "deg c" indicates degrees Celsius; "ft" indicates feet; "ft bmp" indicates feet below reference measuring point; "gal" indicates gallons; "in" indicates inches; "mg/l" indicates milligrams per liter; "ml/min" indicates milliliters per minute; "mV" indicates millivolts; "NA" indicates not applicable; "NR" indicates not recorded; "ntu" indicates Nephelometric Turbidity units; "su" indicates standard units; "us/cm" indicates microsiemens per centimeter; and "+" indicates the parameter(s) may be used for stabilization calculations but cannot be used for other purposes.
2) Weather temperature units are in degrees Fahrenheit, unless otherwise noted.
3) Did indicator parameters reach stabilization? No
4) Was the two hour time limit reached? Yes
5) Calculations:
   - Head Above Pump Intake (ft) 46.26
   - Total Drawdown (ft) 0.00
   - Calculated Final Purge Volume (gal) NA
6) If Drawdown Did Not Stabilize or Stabilized Drawdown >0.3 ft, is Total Purge Volume > Calculated Final Purge Volume? NA

Well Sampling Worksheet
WWW RAP Field Data
AREA 19 2023-Q4 - AREA19-MW-9C
Kent County, MI

Well	AREA19-MW-9C / 2 in Diameter PVC
Sample Quarter	2023-Q4
Date	12/12/2023
Weather	Clear 30
Sampler Initials	NCK
Purging Device	Bladder-Pump: BP-11, Peristaltic-Pump: NA, Centrifugal-Pump: NA
Meters Used	YSI: Agile Rental 2, Turbidimeter: Agile Rental 2, Water-Level-Meter: WLM-4
Reference Measuring Point	PVC
Well Screen (ft bmp)	157.0 - 162.0
Measured Bottom Depth (ft bmp)	NR
Sample Comment	9:50-11:10: Off-site; 11:10: YSI connected
Initial Water Level Date/Time	12/12/2023 09:15
Initial Water Level Depth (ft bmp)	50.54
Pump/Tubing Intake Depth (ft bmp)	159.5
Tubing Length (ft)	165
Tubing Inner Diameter (in)	0.25
Purging Initiation Date/Time	12/12/2023 09:30
Total Purge Volume (gal)	3
Modified Sample	No
If Modified, Reasoning	
Sample Collection Information	Bottling-Start: 12/12/2023 11:30:00, Bottling-Stop: 12/12/2023 11:40:00, Parameters-Sampled: PFAS

Reading Time	Depth To Water (ft)	Cumulative Drawdown (ft)	Purge Rate (ml/min)	Temperature (deg c)	Specific Conductivity (us/cm)	Dissolved Oxygen (mg/l)	pH (su)	Oxidation-Reduction Potential (mV)	Turbidity (ntu)
09:40	50.80	0.26	75	NR	NR	NR	NR	NR	NR
09:50	50.80	0.26	75	NR	NR	NR	NR	NR	NR
11:10	50.48	-0.06	75	NR	NR	NR	NR	NR	NR
11:15	50.42	-0.12	75	10	381 +	3.3	7.8	65	126
11:20	50.42	-0.12	75	9	381 +	3.3	7.8	53	110
11:25	50.42	-0.12	75	9	375 +	3.3	7.8	87	80
11:30	50.42	-0.12	75	9	375 +	3.3	7.8	93	90

Notes:

1) Abbreviations include: "deg c" indicates degrees Celsius; "ft" indicates feet; "ft bmp" indicates feet below reference measuring point; "gal" indicates gallons; "in" indicates inches; "mg/l" indicates milligrams per liter; "ml/min" indicates milliliters per minute; "mV" indicates millivolts; "NA" indicates not applicable; "NR" indicates not recorded; "ntu" indicates Nephelometric Turbidity units; "su" indicates standard units; "us/cm" indicates microsiemens per centimeter; and "+" indicates the parameter(s) may be used for stabilization calculations but cannot be used for other purposes.
2) Weather temperature units are in degrees Fahrenheit, unless otherwise noted.
3) Did indicator parameters reach stabilization? No
4) Was the two hour time limit reached? Yes
5) Calculations:
   - Head Above Pump Intake (ft) 108.96
   - Total Drawdown (ft) -0.12
   - Calculated Final Purge Volume (gal) NA
6) If Drawdown Did Not Stabilize or Stabilized Drawdown >0.3 ft, is Total Purge Volume > Calculated Final Purge Volume? NA

Well Sampling Worksheet
WWW RAP Field Data
AREA 19 2023-Q4 - AREA19-MW-14A
Kent County, MI

Well	AREA19-MW-14A / 2 in Diameter PVC
Sample Quarter	2023-Q4
Date	12/13/2023
Weather	Cloudy, 30s
Sampler Initials	CBM
Purging Device	Bladder-Pump: BP-11, Peristaltic-Pump: NA, Centrifugal-Pump: NA
Meters Used	YSI: Agile Rental 1, Turbidimeter: Agile Rental 1, Water-Level-Meter: WLM-1
Reference Measuring Point	PVC
Well Screen (ft bmp)	152.2 - 157.2
Measured Bottom Depth (ft bmp)	157.2
Sample Comment	15:45: Pump fell approximately 1 foot, resecured pump to 154.7 ft.
Initial Water Level Date/Time	12/13/2023 13:30
Initial Water Level Depth (ft bmp)	134.14
Pump/Tubing Intake Depth (ft bmp)	154.7
Tubing Length (ft)	160
Tubing Inner Diameter (in)	0.25
Purging Initiation Date/Time	12/13/2023 13:55
Total Purge Volume (gal)	1.6
Modified Sample	No
If Modified, Reasoning	
Sample Collection Information	Bottling-Start: 12/13/2023 15:55:00, Bottling-Stop: 12/13/2023 16:00:00, Parameters-Sampled: PFAS

Reading Time	Depth To Water (ft)	Cumulative Drawdown (ft)	Purge Rate (ml/min)	Temperature (deg c)	Specific Conductivity (us/cm)	Dissolved Oxygen (mg/l)	pH (su)	Oxidation-Reduction Potential (mV)	Turbidity (ntu)
15:35	134.39	0.25	50	7	432 +	2.9	8.0	240	16
15:40	134.35	0.21	50	8	480 +	2.8	8.2	218	15
15:45	134.39	0.25	50	8	429 +	2.2	8.2	202	12
15:50	134.40	0.26	50	8	428 +	1.9	8.2	182	13
15:55	134.41	0.27	50	8	427 +	1.8	8.1	168	169

Notes:

1) Abbreviations include: "deg c" indicates degrees Celsius; "ft" indicates feet; "ft bmp" indicates feet below reference measuring point; "gal" indicates gallons; "in" indicates inches; "mg/l" indicates milligrams per liter; "ml/min" indicates milliliters per minute; "mV" indicates millivolts; "NA" indicates not applicable; "NR" indicates not recorded; "ntu" indicates Nephelometric Turbidity units; "su" indicates standard units; "us/cm" indicates microsiemens per centimeter; and "+" indicates the parameter(s) may be used for stabilization calculations but cannot be used for other purposes.
2) Weather temperature units are in degrees Fahrenheit, unless otherwise noted.
3) Did indicator parameters reach stabilization? No
4) Was the two hour time limit reached? Yes
5) Calculations:
   - Head Above Pump Intake (ft) 20.56
   - Total Drawdown (ft) 0.27
   - Calculated Final Purge Volume (gal) 0.46
6) If Drawdown Did Not Stabilize or Stabilized Drawdown >0.3 ft, is Total Purge Volume > Calculated Final Purge Volume? Yes

Well Sampling Worksheet
WWW RAP Field Data
AREA 19 2023-Q4 - AREA19-MW-14B
Kent County, MI

Well	AREA19-MW-14B / 2 in Diameter PVC
Sample Quarter	2023-Q4
Date	12/14/2023
Weather	Cloudy, 30's.
Sampler Initials	CBM
Purging Device	Bladder-Pump: BP-12, Peristaltic-Pump: NA, Centrifugal-Pump: NA
Meters Used	YSI: Agile Rental 1, Turbidimeter: Agile Rental 1, Water-Level-Meter: WLM-4
Reference Measuring Point	PVC
Well Screen (ft bmp)	166.6 - 171.6
Measured Bottom Depth (ft bmp)	171.6
Sample Comment	11:35 - Pump was set to lowest purge setting and water level is still dropping. 11:45 - Air was observed in the discharge line.
Initial Water Level Date/Time	12/14/2023 09:50
Initial Water Level Depth (ft bmp)	132.36
Pump/Tubing Intake Depth (ft bmp)	169.1
Tubing Length (ft)	171
Tubing Inner Diameter (in)	0.25
Purging Initiation Date/Time	12/14/2023 10:00
Total Purge Volume (gal)	1.9
Modified Sample	Yes
If Modified, Reasoning	> 0.3 ft drawdown at 50 ml/min
Sample Collection Information	Bottling-Start: 12/14/2023 12:00:00, Bottling-Stop: 12/14/2023 12:10:00, Parameters-Sampled: PFAS

Reading Time	Depth To Water (ft)	Cumulative Drawdown (ft)	Purge Rate (ml/min)	Temperature (deg c)	Specific Conductivity (us/cm)	Dissolved Oxygen (mg/l)	pH (su)	Oxidation-Reduction Potential (mV)	Turbidity (ntu)
11:35	139.92	7.56	50	10	1,055 +	12.2	8.2	281	>999
11:40	141.08	8.72	50	10	1,053 +	11.5	8.2	275	>999
11:45	141.32	8.96	50	10	1,057 +	12.2	8.1	275	>999
11:50	141.43	9.07	50	10	1,049 +	12.3	8.1	272	>999
11:55	141.91	9.55	50	9	756 +	15.0	8.1	271	>999
12:00	142.14	9.78	50	9	813 +	14.6	8.1	264	>999

Notes:

1) Abbreviations include: "deg c" indicates degrees Celsius; "ft" indicates feet; "ft bmp" indicates feet below reference measuring point; "gal" indicates gallons; "in" indicates inches; "mg/l" indicates milligrams per liter; "ml/min" indicates milliliters per minute; "mV" indicates millivolts; "NA" indicates not applicable; "NR" indicates not recorded; "ntu" indicates Nephelometric Turbidity units; "su" indicates standard units; "us/cm" indicates microsiemens per centimeter; and "+" indicates the parameter(s) may be used for stabilization calculations but cannot be used for other purposes.
2) Weather temperature units are in degrees Fahrenheit, unless otherwise noted.
3) Did indicator parameters reach stabilization? No * Turbidity Out of Range
4) Was the two hour time limit reached? Yes
5) Calculations:
   - Head Above Pump Intake (ft) 36.74
   - Total Drawdown (ft) 9.78
   - Calculated Final Purge Volume (gal) 2.01
6) If Drawdown Did Not Stabilize or Stabilized Drawdown >0.3 ft, is Total Purge Volume > Calculated Final Purge Volume? No

Well Sampling Worksheet
WWW RAP Field Data
AREA 19 2023-Q4 - AREA19-MW-15A
Kent County, MI

Well	AREA19-MW-15A / 2 in Diameter PVC
Sample Quarter	2023-Q4
Date	12/14/2023
Weather	Clear 30s
Sampler Initials	NCK
Purging Device	Bladder-Pump: BP-10, Peristaltic-Pump: NA, Centrifugal-Pump: NA
Meters Used	YSI: Agile Rental 2, Turbidimeter: Agile Rental 2, Water-Level-Meter: WLM-2
Reference Measuring Point	PVC
Well Screen (ft bmp)	44.5 - 49.5
Measured Bottom Depth (ft bmp)	NR
Sample Comment	YSI Connected at 11:10.
Initial Water Level Date/Time	12/14/2023 09:20
Initial Water Level Depth (ft bmp)	43.01
Pump/Tubing Intake Depth (ft bmp)	47
Tubing Length (ft)	50
Tubing Inner Diameter (in)	0.25
Purging Initiation Date/Time	12/14/2023 09:40
Total Purge Volume (gal)	1.5
Modified Sample	Yes
If Modified, Reasoning	> 0.3 ft drawdown at 50 ml/min. During purging, water level dropped to within the well screen interval.
Sample Collection Information	Bottling-Start: 12/14/2023 11:25:00, Bottling-Stop: 12/14/2023 11:35:00, Parameters-Sampled: PFAS

Reading Time	Depth To Water (ft)	Cumulative Drawdown (ft)	Purge Rate (ml/min)	Temperature (deg c)	Specific Conductivity (us/cm)	Dissolved Oxygen (mg/l)	pH (su)	Oxidation-Reduction Potential (mV)	Turbidity (ntu)
09:45	43.30	0.29	50	NR	NR	NR	NR	NR	NR
09:50	43.55	0.54	50	NR	NR	NR	NR	NR	NR
09:55	43.80	0.79	50	NR	NR	NR	NR	NR	NR
10:00	44.05	1.04	50	NR	NR	NR	NR	NR	NR
10:30	44.75	1.74	50	NR	NR	NR	NR	NR	NR
11:10	44.75	1.74	50	10	759 +	4.7	7.3	177	24
11:15	44.70	1.69	50	10	754 +	4.7	7.3	186	22
11:20	44.70	1.69	50	10	754 +	4.6	7.3	187	23
11:25	44.70	1.69	50	10	757 +	4.6	7.3	188	21

Notes:

1) Abbreviations include: "deg c" indicates degrees Celsius; "ft" indicates feet; "ft bmp" indicates feet below reference measuring point; "gal" indicates gallons; "in" indicates inches; "mg/l" indicates milligrams per liter; "ml/min" indicates milliliters per minute; "mV" indicates millivolts; "NA" indicates not applicable; "NR" indicates not recorded; "ntu" indicates Nephelometric Turbidity units; "su" indicates standard units; "us/cm" indicates microsiemens per centimeter; and "+" indicates the parameter(s) may be used for stabilization calculations but cannot be used for other purposes.
2) Weather temperature units are in degrees Fahrenheit, unless otherwise noted.
3) Did indicator parameters reach stabilization? Yes
4) Was the two hour time limit reached? No
5) Calculations:
   - Head Above Pump Intake (ft) 3.99
   - Total Drawdown (ft) 1.69
   - Calculated Final Purge Volume (gal) 0.4
6) If Drawdown Did Not Stabilize or Stabilized Drawdown >0.3 ft, is Total Purge Volume > Calculated Final Purge Volume? Yes

Well Sampling Worksheet
WWW RAP Field Data
AREA 19 2023-Q4 - AREA19-MW-15B
Kent County, MI

Well	AREA19-MW-15B / 2 in Diameter PVC
Sample Quarter	2023-Q4
Date	12/12/2023
Weather	Sunny 30s
Sampler Initials	NCK
Purging Device	Bladder-Pump: BP-10, Peristaltic-Pump: NA, Centrifugal-Pump: NA
Meters Used	YSI: Agile Rental 2, Turbidimeter: Agile Rental 2, Water-Level-Meter: WLM-4
Reference Measuring Point	PVC
Well Screen (ft bmp)	128.6 - 133.6
Measured Bottom Depth (ft bmp)	NR
Sample Comment	YSI Connected at 15:05.
Initial Water Level Date/Time	12/12/2023 13:30
Initial Water Level Depth (ft bmp)	91.06
Pump/Tubing Intake Depth (ft bmp)	131.1
Tubing Length (ft)	135
Tubing Inner Diameter (in)	0.25
Purging Initiation Date/Time	12/12/2023 13:50
Total Purge Volume (gal)	2.5
Modified Sample	No
If Modified, Reasoning	
Sample Collection Information	Bottling-Start: 12/12/2023 15:50:00, Bottling-Stop: 12/12/2023 15:55:00, Parameters-Sampled: PFAS

Reading Time	Depth To Water (ft)	Cumulative Drawdown (ft)	Purge Rate (ml/min)	Temperature (deg c)	Specific Conductivity (us/cm)	Dissolved Oxygen (mg/l)	pH (su)	Oxidation-Reduction Potential (mV)	Turbidity (ntu)
14:00	91.10	0.04	150	NR	NR	NR	NR	NR	NR
14:30	91.10	0.04	150	NR	NR	NR	NR	NR	NR
15:00	91.10	0.04	150	NR	NR	NR	NR	NR	NR
15:05	91.10	0.04	150	9	620 +	<0.5	7.9	48	88
15:30	91.10	0.04	150	10	596 +	<0.5	7.9	4	38
15:40	91.10	0.04	150	10	588 +	<0.5	7.9	-7	30
15:45	91.10	0.04	150	10	586 +	<0.5	7.9	-15	25
15:50	91.10	0.04	150	10	584 +	<0.5	7.9	-18	19

Notes:

1) Abbreviations include: "deg c" indicates degrees Celsius; "ft" indicates feet; "ft bmp" indicates feet below reference measuring point; "gal" indicates gallons; "in" indicates inches; "mg/l" indicates milligrams per liter; "ml/min" indicates milliliters per minute; "mV" indicates millivolts; "NA" indicates not applicable; "NR" indicates not recorded; "ntu" indicates Nephelometric Turbidity units; "su" indicates standard units; "us/cm" indicates microsiemens per centimeter; and "+" indicates the parameter(s) may be used for stabilization calculations but cannot be used for other purposes.
2) Weather temperature units are in degrees Fahrenheit, unless otherwise noted.
3) Did indicator parameters reach stabilization? No
4) Was the two hour time limit reached? Yes
5) Calculations:
   - Head Above Pump Intake (ft) 40.04
   - Total Drawdown (ft) 0.04
   - Calculated Final Purge Volume (gal) NA
6) If Drawdown Did Not Stabilize or Stabilized Drawdown >0.3 ft, is Total Purge Volume > Calculated Final Purge Volume? NA

Well Sampling Worksheet
WWW RAP Field Data
AREA 19 2023-Q4 - AREA19-MW-15C
Kent County, MI

Well	AREA19-MW-15C / 2 in Diameter PVC
Sample Quarter	2023-Q4
Date	12/12/2023
Weather	Partly sunny, 30's.
Sampler Initials	CBM
Purging Device	Bladder-Pump: NA, Peristaltic-Pump: NA, Centrifugal-Pump: Mega Monsoon #2
Meters Used	YSI: Agile Rental 1, Turbidimeter: Agile Rental 1, Water-Level-Meter: WLM-3
Reference Measuring Point	PVC
Well Screen (ft bmp)	164.2 - 169.2
Measured Bottom Depth (ft bmp)	169.2
Sample Comment	
Initial Water Level Date/Time	12/12/2023 14:15
Initial Water Level Depth (ft bmp)	91.23
Pump/Tubing Intake Depth (ft bmp)	166.7
Tubing Length (ft)	168
Tubing Inner Diameter (in)	0.17
Purging Initiation Date/Time	12/12/2023 14:25
Total Purge Volume (gal)	1.6
Modified Sample	No
If Modified, Reasoning	
Sample Collection Information	Bottling-Start: 12/12/2023 16:25:00, Bottling-Stop: 12/12/2023 16:35:00, Parameters-Sampled: PFAS

Reading Time	Depth To Water (ft)	Cumulative Drawdown (ft)	Purge Rate (ml/min)	Temperature (deg c)	Specific Conductivity (us/cm)	Dissolved Oxygen (mg/l)	pH (su)	Oxidation-Reduction Potential (mV)	Turbidity (ntu)
15:45	91.25	0.02	50	10	451 +	0.5	7.9	-181	75
15:50	91.25	0.02	50	10	451 +	<0.5	7.9	-193	89
16:10	91.25	0.02	50	9	451 +	<0.5	7.9	-210	75
16:15	91.25	0.02	50	10	448 +	<0.5	7.9	-211	74
16:20	91.25	0.02	50	10	450 +	<0.5	7.9	-215	62
16:25	91.25	0.02	50	10	450 +	<0.5	7.9	-216	54

Notes:

1) Abbreviations include: "deg c" indicates degrees Celsius; "ft" indicates feet; "ft bmp" indicates feet below reference measuring point; "gal" indicates gallons; "in" indicates inches; "mg/l" indicates milligrams per liter; "ml/min" indicates milliliters per minute; "mV" indicates millivolts; "NA" indicates not applicable; "NR" indicates not recorded; "ntu" indicates Nephelometric Turbidity units; "su" indicates standard units; "us/cm" indicates microsiemens per centimeter; and "+" indicates the parameter(s) may be used for stabilization calculations but cannot be used for other purposes.
2) Weather temperature units are in degrees Fahrenheit, unless otherwise noted.
3) Did indicator parameters reach stabilization? No
4) Was the two hour time limit reached? Yes
5) Calculations:
   - Head Above Pump Intake (ft) 75.47
   - Total Drawdown (ft) 0.02
   - Calculated Final Purge Volume (gal) NA
6) If Drawdown Did Not Stabilize or Stabilized Drawdown >0.3 ft, is Total Purge Volume > Calculated Final Purge Volume? NA

Well Sampling Worksheet
WWW RAP Field Data
AREA 6 2023-Q4 - HS-MW-13A
Kent County, MI

Well	HS-MW-13A / 2 in Diameter PVC
Sample Quarter	2023-Q4
Date	12/15/2023
Weather	Clear 30s F
Sampler Initials	NCK
Purging Device	Bladder-Pump: NA, Peristaltic-Pump: NA, Centrifugal-Pump: Mega Monsoon #2
Meters Used	YSI: Agile Rental 2, Turbidimeter: Agile Rental 2, Water-Level-Meter: WLM-2
Reference Measuring Point	PVC
Well Screen (ft bmp)	81.7 - 86.5
Measured Bottom Depth (ft bmp)	NR
Sample Comment	YSI Connected at 13:15.
Initial Water Level Date/Time	12/15/2023 11:20
Initial Water Level Depth (ft bmp)	58.64
Pump/Tubing Intake Depth (ft bmp)	84.1
Tubing Length (ft)	87
Tubing Inner Diameter (in)	0.17
Purging Initiation Date/Time	12/15/2023 11:30
Total Purge Volume (gal)	14
Modified Sample	No
If Modified, Reasoning	
Sample Collection Information	Bottling-Start: 12/15/2023 13:30:00, Bottling-Stop: 12/15/2023 13:35:00, Parameters-Sampled: PFAS

Reading Time	Depth To Water (ft)	Cumulative Drawdown (ft)	Purge Rate (ml/min)	Temperature (deg c)	Specific Conductivity (us/cm)	Dissolved Oxygen (mg/l)	pH (su)	Oxidation-Reduction Potential (mV)	Turbidity (ntu)
11:40	58.64	0.00	450	NR	NR	NR	NR	NR	NR
11:50	58.64	0.00	450	NR	NR	NR	NR	NR	NR
13:15	58.64	0.00	450	11	530 +	5.6	7.5	160	<5
13:20	58.64	0.00	450	11	531 +	5.6	7.5	166	<5
13:25	58.64	0.00	450	11	530 +	5.6	7.5	171	<5
13:30	58.64	0.00	450	11	531 +	5.6	7.5	178	<5

Notes:

1) Abbreviations include: "deg c" indicates degrees Celsius; "ft" indicates feet; "ft bmp" indicates feet below reference measuring point; "gal" indicates gallons; "in" indicates inches; "mg/l" indicates milligrams per liter; "ml/min" indicates milliliters per minute; "mV" indicates millivolts; "NA" indicates not applicable; "NR" indicates not recorded; "ntu" indicates Nephelometric Turbidity units; "su" indicates standard units; "us/cm" indicates microsiemens per centimeter; and "+" indicates the parameter(s) may be used for stabilization calculations but cannot be used for other purposes.
2) Weather temperature units are in degrees Fahrenheit, unless otherwise noted.
3) Did indicator parameters reach stabilization? Yes
4) Was the two hour time limit reached? Yes
5) Calculations:
   - Head Above Pump Intake (ft) 25.46
   - Total Drawdown (ft) 0.00
   - Calculated Final Purge Volume (gal) NA
6) If Drawdown Did Not Stabilize or Stabilized Drawdown >0.3 ft, is Total Purge Volume > Calculated Final Purge Volume? NA

Well Sampling Worksheet
WWW RAP Field Data
AREA 6 2023-Q4 - HS-MW-13B
Kent County, MI

Well	HS-MW-13B / 2 in Diameter PVC
Sample Quarter	2023-Q4
Date	12/15/2023
Weather	Clear 30s F
Sampler Initials	NCK
Purging Device	Bladder-Pump: NA, Peristaltic-Pump: NA, Centrifugal-Pump: Mega Monsoon #2
Meters Used	YSI: Agile Rental 2, Turbidimeter: Agile Rental 2, Water-Level-Meter: WLM-2
Reference Measuring Point	PVC
Well Screen (ft bmp)	151.2 - 156.0
Measured Bottom Depth (ft bmp)	NR
Sample Comment	Purge initially began at 11:40 but the pump died shortly thereafter. The pump was swapped for another and the sampling procedure was restarted at 13:50. 15:00 - YSI connected.
Initial Water Level Date/Time	12/15/2023 11:40
Initial Water Level Depth (ft bmp)	58.65
Pump/Tubing Intake Depth (ft bmp)	153.6
Tubing Length (ft)	156
Tubing Inner Diameter (in)	0.17
Purging Initiation Date/Time	12/15/2023 13:50
Total Purge Volume (gal)	13
Modified Sample	No
If Modified, Reasoning	
Sample Collection Information	Bottling-Start: 12/15/2023 15:30:00, Bottling-Stop: 12/15/2023 15:435:00, Parameters-Sampled: PFAS

Reading Time	Depth To Water (ft)	Cumulative Drawdown (ft)	Purge Rate (ml/min)	Temperature (deg c)	Specific Conductivity (us/cm)	Dissolved Oxygen (mg/l)	pH (su)	Oxidation-Reduction Potential (mV)	Turbidity (ntu)
14:00	58.65	0.00	500	NR	NR	NR	NR	NR	NR
14:10	58.65	0.00	500	NR	NR	NR	NR	NR	NR
15:00	58.65	0.00	500	NR	NR	NR	NR	NR	NR
15:20	58.65	0.00	500	11	893 +	5.5	7.3	233	<5
15:25	58.65	0.00	500	11	893 +	5.5	7.3	232	<5
15:30	58.65	0.00	500	11	893 +	5.5	7.3	232	<5

Notes:

1) Abbreviations include: "deg c" indicates degrees Celsius; "ft" indicates feet; "ft bmp" indicates feet below reference measuring point; "gal" indicates gallons; "in" indicates inches; "mg/l" indicates milligrams per liter; "ml/min" indicates milliliters per minute; "mV" indicates millivolts; "NA" indicates not applicable; "NR" indicates not recorded; "ntu" indicates Nephelometric Turbidity units; "su" indicates standard units; "us/cm" indicates microsiemens per centimeter; and "+" indicates the parameter(s) may be used for stabilization calculations but cannot be used for other purposes.
2) Weather temperature units are in degrees Fahrenheit, unless otherwise noted.
3) Did indicator parameters reach stabilization? Yes
4) Was the two hour time limit reached? No
5) Calculations:
   - Head Above Pump Intake (ft) 94.95
   - Total Drawdown (ft) 0.00
   - Calculated Final Purge Volume (gal) NA
6) If Drawdown Did Not Stabilize or Stabilized Drawdown >0.3 ft, is Total Purge Volume > Calculated Final Purge Volume? NA

Well Sampling Worksheet
WWW RAP Field Data
AREA 6 2023-Q4 - HS-MW-13C
Kent County, MI

Well	HS-MW-13C / 2 in Diameter PVC
Sample Quarter	2023-Q4
Date	12/18/2023
Weather	Snow, 30's F
Sampler Initials	CBM
Purging Device	Bladder-Pump: BP-12, Peristaltic-Pump: NA, Centrifugal-Pump: NA
Meters Used	YSI: Agile Rental 1, Turbidimeter: Agile Rental 1, Water-Level-Meter: WLM-4
Reference Measuring Point	PVC
Well Screen (ft bmp)	201.7 - 206.5
Measured Bottom Depth (ft bmp)	206.5
Sample Comment	12:10 - Collected field blank (FB-CBM).
Initial Water Level Date/Time	12/18/2023 10:00
Initial Water Level Depth (ft bmp)	57.84
Pump/Tubing Intake Depth (ft bmp)	204.1
Tubing Length (ft)	206
Tubing Inner Diameter (in)	0.25
Purging Initiation Date/Time	12/18/2023 10:15
Total Purge Volume (gal)	2.5
Modified Sample	No
If Modified, Reasoning	
Sample Collection Information	Bottling-Start: 12/18/2023 12:15:00, Bottling-Stop: 12/18/2023 12:25:00, Parameters-Sampled: PFAS

Reading Time	Depth To Water (ft)	Cumulative Drawdown (ft)	Purge Rate (ml/min)	Temperature (deg c)	Specific Conductivity (us/cm)	Dissolved Oxygen (mg/l)	pH (su)	Oxidation-Reduction Potential (mV)	Turbidity (ntu)
11:50	57.96	0.12	100	7	1,736 +	0.6	7.2	99	138
11:55	57.99	0.15	100	7	1,728 +	0.6	7.3	76	152
12:00	57.97	0.13	100	6	1,738 +	0.7	7.3	64	145
12:05	57.96	0.12	100	7	1,737 +	0.6	7.3	50	122
12:10	57.96	0.12	100	7	1,738 +	0.6	7.3	38	162
12:15	57.96	0.12	100	7	1,737 +	0.6	7.3	29	125

Notes:

1) Abbreviations include: "deg c" indicates degrees Celsius; "ft" indicates feet; "ft bmp" indicates feet below reference measuring point; "gal" indicates gallons; "in" indicates inches; "mg/l" indicates milligrams per liter; "ml/min" indicates milliliters per minute; "mV" indicates millivolts; "NA" indicates not applicable; "NR" indicates not recorded; "ntu" indicates Nephelometric Turbidity units; "su" indicates standard units; "us/cm" indicates microsiemens per centimeter; and "+" indicates the parameter(s) may be used for stabilization calculations but cannot be used for other purposes.
2) Weather temperature units are in degrees Fahrenheit, unless otherwise noted.
3) Did indicator parameters reach stabilization? No
4) Was the two hour time limit reached? Yes
5) Calculations:
   - Head Above Pump Intake (ft) 146.26
   - Total Drawdown (ft) 0.12
   - Calculated Final Purge Volume (gal) NA
6) If Drawdown Did Not Stabilize or Stabilized Drawdown >0.3 ft, is Total Purge Volume > Calculated Final Purge Volume? NA

Well Sampling Worksheet
WWW RAP Field Data
PERIMETER 2023-Q4 - HS-MW-32A
Kent County, MI

Well	HS-MW-32A / 2 in Diameter PVC
Sample Quarter	2023-Q4
Date	10/24/2023
Weather	Sunny 60
Sampler Initials	NCK
Purging Device	Bladder-Pump: NA, Peristaltic-Pump: NA, Centrifugal-Pump: Mega Monsoon #1
Meters Used	YSI: Agile Rental 1, Turbidimeter: Agile Rental 1, Water-Level-Meter: WLM-2
Reference Measuring Point	PVC
Well Screen (ft bmp)	63.5 - 68.1
Measured Bottom Depth (ft bmp)	NR
Sample Comment	14:20 - Purge water observed to be turbid. Connected YSI prior to 14:40 readings.
Initial Water Level Date/Time	10/24/2023 13:45
Initial Water Level Depth (ft bmp)	7.84
Pump/Tubing Intake Depth (ft bmp)	65.8
Tubing Length (ft)	68
Tubing Inner Diameter (in)	0.17
Purging Initiation Date/Time	10/24/2023 13:50
Total Purge Volume (gal)	5.5
Modified Sample	No
If Modified, Reasoning	
Sample Collection Information	Bottling-Start: 10/24/2023 15:15:00, Bottling-Stop: 10/24/2023 15:20:00, Parameters-Sampled: PFAS

Reading Time	Depth To Water (ft)	Cumulative Drawdown (ft)	Purge Rate (ml/min)	Temperature (deg c)	Specific Conductivity (us/cm)	Dissolved Oxygen (mg/l)	pH (su)	Oxidation-Reduction Potential (mV)	Turbidity (ntu)
14:00	7.87	0.03	250	NR	NR	NR	NR	NR	NR
14:20	7.87	0.03	250	NR	NR	NR	NR	NR	NR
14:40	7.87	0.03	250	12 +	1,070 +	<0.5	7.4	137	18 +
14:55	7.87	0.03	250	12 +	1,068 +	<0.5	7.4	-1	8 +
15:05	7.87	0.03	250	12 +	1,066 +	<0.5	7.4	-25	<5 +
15:10	7.87	0.03	250	12 +	1,064 +	<0.5	7.4	-27	<5 +
15:15	7.87	0.03	250	12 +	1,065 +	<0.5	7.4	-33	<5 +

Notes:

1) Abbreviations include: "deg c" indicates degrees Celsius; "ft" indicates feet; "ft bmp" indicates feet below reference measuring point; "gal" indicates gallons; "in" indicates inches; "mg/l" indicates milligrams per liter; "ml/min" indicates milliliters per minute; "mV" indicates millivolts; "NA" indicates not applicable; "NR" indicates not recorded; "ntu" indicates Nephelometric Turbidity units; "su" indicates standard units; "us/cm" indicates microsiemens per centimeter; and "+" indicates the parameter(s) may be used for stabilization calculations but cannot be used for other purposes.
2) Weather temperature units are in degrees Fahrenheit, unless otherwise noted.
3) Did indicator parameters reach stabilization? Yes
4) Was the two hour time limit reached? No
5) Calculations:
   - Head Above Pump Intake (ft) 57.96
   - Total Drawdown (ft) 0.03
   - Calculated Final Purge Volume (gal) NA
6) If Drawdown Did Not Stabilize or Stabilized Drawdown >0.3 ft, is Total Purge Volume > Calculated Final Purge Volume? NA

Well Sampling Worksheet
WWW RAP Field Data
PERIMETER 2023-Q4 - HS-MW-32B
Kent County, MI

Well	HS-MW-32B / 2 in Diameter PVC
Sample Quarter	2023-Q4
Date	10/24/2023
Weather	Sunny 60
Sampler Initials	RCP
Purging Device	Bladder-Pump: NA, Peristaltic-Pump: PER-1, Centrifugal-Pump: NA
Meters Used	YSI: Agile Rental 2, Turbidimeter: Agile Rental 2, Water-Level-Meter: WLM-3
Reference Measuring Point	PVC
Well Screen (ft bmp)	81.8 - 86.4
Measured Bottom Depth (ft bmp)	86.4
Sample Comment	14:20 - Pump will not go lower than 70 mL/min without turning off. 14:35 - Low turbidity observed. Water level stabilized. Connected YSI.
Initial Water Level Date/Time	10/24/2023 14:00
Initial Water Level Depth (ft bmp)	8.36
Pump/Tubing Intake Depth (ft bmp)	84.1
Tubing Length (ft)	86.1
Tubing Inner Diameter (in)	0.17
Purging Initiation Date/Time	10/24/2023 14:10
Total Purge Volume (gal)	1
Modified Sample	No
If Modified, Reasoning	
Sample Collection Information	Bottling-Start: 10/24/2023 15:15:00, Bottling-Stop: 10/24/2023 15:25:00, Parameters-Sampled: PFAS

Reading Time	Depth To Water (ft)	Cumulative Drawdown (ft)	Purge Rate (ml/min)	Temperature (deg c)	Specific Conductivity (us/cm)	Dissolved Oxygen (mg/l)	pH (su)	Oxidation-Reduction Potential (mV)	Turbidity (ntu)
14:20	8.52	0.16	70	NR	NR	NR	NR	NR	NR
14:25	8.56	0.20	70	NR	NR	NR	NR	NR	NR
14:35	8.56	0.20	70	NR	NR	NR	NR	NR	27
14:45	8.56	0.20	70	14 +	1,055 +	0.6	7.5	-92	27
14:50	8.56	0.20	70	14 +	1,054 +	<0.5	7.3	-100	18
14:55	8.56	0.20	70	14 +	1,054 +	<0.5	7.3	-101	12
15:00	8.56	0.20	70	14 +	1,054 +	<0.5	7.3	-102	10
15:05	8.56	0.20	70	14 +	1,056 +	<0.5	7.3	-103	10
15:10	8.56	0.20	70	14 +	1,054 +	<0.5	7.3	-104	9

Notes:

1) Abbreviations include: "deg c" indicates degrees Celsius; "ft" indicates feet; "ft bmp" indicates feet below reference measuring point; "gal" indicates gallons; "in" indicates inches; "mg/l" indicates milligrams per liter; "ml/min" indicates milliliters per minute; "mV" indicates millivolts; "NA" indicates not applicable; "NR" indicates not recorded; "ntu" indicates Nephelometric Turbidity units; "su" indicates standard units; "us/cm" indicates microsiemens per centimeter; and "+" indicates the parameter(s) may be used for stabilization calculations but cannot be used for other purposes.
2) Weather temperature units are in degrees Fahrenheit, unless otherwise noted.
3) Did indicator parameters reach stabilization? Yes
4) Was the two hour time limit reached? No
5) Calculations:
   - Head Above Pump Intake (ft) 75.74
   - Total Drawdown (ft) 0.20
   - Calculated Final Purge Volume (gal) NA
6) If Drawdown Did Not Stabilize or Stabilized Drawdown >0.3 ft, is Total Purge Volume > Calculated Final Purge Volume? NA

Well Sampling Worksheet
WWW RAP Field Data
PERIMETER 2023-Q4 - HS-MW-32A
Kent County, MI

Well	HS-MW-32A / 2 in Diameter PVC
Sample Quarter	2023-Q4
Date	10/24/2023
Weather	Sunny 60
Sampler Initials	NCK
Purging Device	Bladder-Pump: NA, Peristaltic-Pump: NA, Centrifugal-Pump: Mega Monsoon #1
Meters Used	YSI: Agile Rental 1, Turbidimeter: Agile Rental 1, Water-Level-Meter: WLM-2
Reference Measuring Point	PVC
Well Screen (ft bmp)	63.5 - 68.1
Measured Bottom Depth (ft bmp)	NR
Sample Comment	14:20 - Purge water observed to be turbid. Connected YSI prior to 14:40 readings.
Initial Water Level Date/Time	10/24/2023 13:45
Initial Water Level Depth (ft bmp)	7.84
Pump/Tubing Intake Depth (ft bmp)	65.8
Tubing Length (ft)	68
Tubing Inner Diameter (in)	0.17
Purging Initiation Date/Time	10/24/2023 13:50
Total Purge Volume (gal)	5.5
Modified Sample	No
If Modified, Reasoning	
Sample Collection Information	Bottling-Start: 10/24/2023 15:15:00, Bottling-Stop: 10/24/2023 15:20:00, Parameters-Sampled: PFAS

Reading Time	Depth To Water (ft)	Cumulative Drawdown (ft)	Purge Rate (ml/min)	Temperature (deg c)	Specific Conductivity (us/cm)	Dissolved Oxygen (mg/l)	pH (su)	Oxidation-Reduction Potential (mV)	Turbidity (ntu)
14:00	7.87	0.03	250	NR	NR	NR	NR	NR	NR
14:20	7.87	0.03	250	NR	NR	NR	NR	NR	NR
14:40	7.87	0.03	250	12 +	1,070 +	<0.5	7.4	137	18 +
14:55	7.87	0.03	250	12 +	1,068 +	<0.5	7.4	-1	8 +
15:05	7.87	0.03	250	12 +	1,066 +	<0.5	7.4	-25	<5 +
15:10	7.87	0.03	250	12 +	1,064 +	<0.5	7.4	-27	<5 +
15:15	7.87	0.03	250	12 +	1,065 +	<0.5	7.4	-33	<5 +

Notes:

1) Abbreviations include: "deg c" indicates degrees Celsius; "ft" indicates feet; "ft bmp" indicates feet below reference measuring point; "gal" indicates gallons; "in" indicates inches; "mg/l" indicates milligrams per liter; "ml/min" indicates milliliters per minute; "mV" indicates millivolts; "NA" indicates not applicable; "NR" indicates not recorded; "ntu" indicates Nephelometric Turbidity units; "su" indicates standard units; "us/cm" indicates microsiemens per centimeter; and "+" indicates the parameter(s) may be used for stabilization calculations but cannot be used for other purposes.
2) Weather temperature units are in degrees Fahrenheit, unless otherwise noted.
3) Did indicator parameters reach stabilization? Yes
4) Was the two hour time limit reached? No
5) Calculations:
   - Head Above Pump Intake (ft) 57.96
   - Total Drawdown (ft) 0.03
   - Calculated Final Purge Volume (gal) NA
6) If Drawdown Did Not Stabilize or Stabilized Drawdown >0.3 ft, is Total Purge Volume > Calculated Final Purge Volume? NA

Well Sampling Worksheet
WWW RAP Field Data
PERIMETER 2023-Q4 - HS-MW-32D
Kent County, MI

Well	HS-MW-32D / 2 in Diameter PVC
Sample Quarter	2023-Q4
Date	10/25/2023
Weather	Cloudy 64
Sampler Initials	CRB
Purging Device	Bladder-Pump: NA, Peristaltic-Pump: PER-1, Centrifugal-Pump: NA
Meters Used	YSI: Agile Rental 2, Turbidimeter: Agile Rental 2, Water-Level-Meter: WLM-1
Reference Measuring Point	PVC
Well Screen (ft bmp)	144.8 - 149.4
Measured Bottom Depth (ft bmp)	NR
Sample Comment	YSI Connected at 11:35.
Initial Water Level Date/Time	10/25/2023 11:00
Initial Water Level Depth (ft bmp)	8.12
Pump/Tubing Intake Depth (ft bmp)	147.1
Tubing Length (ft)	149.4
Tubing Inner Diameter (in)	0.17
Purging Initiation Date/Time	10/25/2023 11:00
Total Purge Volume (gal)	1.3
Modified Sample	No
If Modified, Reasoning	
Sample Collection Information	Bottling-Start: 10/25/2023 12:35:00, Bottling-Stop: 10/25/2023 12:40:00, Parameters-Sampled: PFAS

Reading Time	Depth To Water (ft)	Cumulative Drawdown (ft)	Purge Rate (ml/min)	Temperature (deg c)	Specific Conductivity (us/cm)	Dissolved Oxygen (mg/l)	pH (su)	Oxidation-Reduction Potential (mV)	Turbidity (ntu)
11:05	8.75	0.63	100	NR	NR	NR	NR	NR	>999
11:10	8.97	0.85	50	NR	NR	NR	NR	NR	421
11:25	9.20	1.08	50	NR	NR	NR	NR	NR	83
11:35	9.31	1.19	50	14 +	2,638 +	<0.5	7.3	-134	35
11:45	9.37	1.25	50	13 +	2,639 +	<0.5	7.3	-133	30
12:00	9.44	1.32	50	13 +	2,640 +	<0.5	7.3	-134	21
12:05	9.44	1.32	50	13 +	2,639 +	<0.5	7.3	-134	20
12:10	9.47	1.35	50	13 +	2,640 +	<0.5	7.3	-145	15
12:20	9.23	1.11	50	13 +	2,641 +	<0.5	7.3	-135	15
12:25	9.23	1.11	50	13 +	2,641 +	<0.5	7.3	-134	14
12:30	9.23	1.11	50	13 +	2,638 +	<0.5	7.3	-134	14

Notes:

1) Abbreviations include: "deg c" indicates degrees Celsius; "ft" indicates feet; "ft bmp" indicates feet below reference measuring point; "gal" indicates gallons; "in" indicates inches; "mg/l" indicates milligrams per liter; "ml/min" indicates milliliters per minute; "mV" indicates millivolts; "NA" indicates not applicable; "NR" indicates not recorded; "ntu" indicates Nephelometric Turbidity units; "su" indicates standard units; "us/cm" indicates microsiemens per centimeter; and "+" indicates the parameter(s) may be used for stabilization calculations but cannot be used for other purposes.
2) Weather temperature units are in degrees Fahrenheit, unless otherwise noted.
3) Did indicator parameters reach stabilization? Yes
4) Was the two hour time limit reached? No
5) Calculations:
   - Head Above Pump Intake (ft) 138.98
   - Total Drawdown (ft) 1.11
   - Calculated Final Purge Volume (gal) 0.36
6) If Drawdown Did Not Stabilize or Stabilized Drawdown >0.3 ft, is Total Purge Volume > Calculated Final Purge Volume? Yes

Well Sampling Worksheet
WWW RAP Field Data
AREA 6 2023-Q4 - HS-PMW-16A
Kent County, MI

Well	HS-PMW-16A / 2 in Diameter PVC
Sample Quarter	2023-Q4
Date	12/18/2023
Weather	Snow 30s F
Sampler Initials	NCK
Purging Device	Bladder-Pump: NA, Peristaltic-Pump: NA, Centrifugal-Pump: Mega Monsoon #1
Meters Used	YSI: Agile Rental 2, Turbidimeter: Agile Rental 2, Water-Level-Meter: WLM-1
Reference Measuring Point	PVC
Well Screen (ft bmp)	89.0 - 94.0
Measured Bottom Depth (ft bmp)	NR
Sample Comment	YSI Connected at 11:00.
Initial Water Level Date/Time	12/18/2023 10:20
Initial Water Level Depth (ft bmp)	73.98
Pump/Tubing Intake Depth (ft bmp)	91.5
Tubing Length (ft)	94
Tubing Inner Diameter (in)	0.17
Purging Initiation Date/Time	12/18/2023 10:30
Total Purge Volume (gal)	8
Modified Sample	No
If Modified, Reasoning	
Sample Collection Information	Bottling-Start: 12/18/2023 11:30:00, Bottling-Stop: 12/18/2023 11:35:00, Parameters-Sampled: PFAS

Reading Time	Depth To Water (ft)	Cumulative Drawdown (ft)	Purge Rate (ml/min)	Temperature (deg c)	Specific Conductivity (us/cm)	Dissolved Oxygen (mg/l)	pH (su)	Oxidation-Reduction Potential (mV)	Turbidity (ntu)
10:40	74.09	0.11	500	NR	NR	NR	NR	NR	NR
10:50	74.09	0.11	500	NR	NR	NR	NR	NR	NR
11:00	74.09	0.11	500	NR	NR	NR	NR	NR	NR
11:20	74.09	0.11	500	12	787 +	8.8	7.0	195	<5
11:25	74.09	0.11	500	12	787 +	8.8	7.0	197	<5
11:30	74.09	0.11	500	12	786 +	8.8	7.0	201	<5

Notes:

1) Abbreviations include: "deg c" indicates degrees Celsius; "ft" indicates feet; "ft bmp" indicates feet below reference measuring point; "gal" indicates gallons; "in" indicates inches; "mg/l" indicates milligrams per liter; "ml/min" indicates milliliters per minute; "mV" indicates millivolts; "NA" indicates not applicable; "NR" indicates not recorded; "ntu" indicates Nephelometric Turbidity units; "su" indicates standard units; "us/cm" indicates microsiemens per centimeter; and "+" indicates the parameter(s) may be used for stabilization calculations but cannot be used for other purposes.
2) Weather temperature units are in degrees Fahrenheit, unless otherwise noted.
3) Did indicator parameters reach stabilization? Yes
4) Was the two hour time limit reached? No
5) Calculations:
   - Head Above Pump Intake (ft) 17.52
   - Total Drawdown (ft) 0.11
   - Calculated Final Purge Volume (gal) NA
6) If Drawdown Did Not Stabilize or Stabilized Drawdown >0.3 ft, is Total Purge Volume > Calculated Final Purge Volume? NA

Well Sampling Worksheet
WWW RAP Field Data
AREA 6 2023-Q4 - HS-PMW-16B
Kent County, MI

Well	HS-PMW-16B / 2 in Diameter PVC
Sample Quarter	2023-Q4
Date	12/18/2023
Weather	Snow 30s F
Sampler Initials	NCK
Purging Device	Bladder-Pump: NA, Peristaltic-Pump: NA, Centrifugal-Pump: Mega Monsoon #2
Meters Used	YSI: Agile Rental 2, Turbidimeter: Agile Rental 2, Water-Level-Meter: WLM-2
Reference Measuring Point	PVC
Well Screen (ft bmp)	118.1 - 123.1
Measured Bottom Depth (ft bmp)	NR
Sample Comment	YSI Connected at 11:40. Field blank (FB-NCK) collected at 12:20.
Initial Water Level Date/Time	12/18/2023 10:20
Initial Water Level Depth (ft bmp)	73.82
Pump/Tubing Intake Depth (ft bmp)	120.6
Tubing Length (ft)	124
Tubing Inner Diameter (in)	0.25
Purging Initiation Date/Time	12/18/2023 10:30
Total Purge Volume (gal)	13
Modified Sample	No
If Modified, Reasoning	
Sample Collection Information	Bottling-Start: 12/18/2023 12:10:00, Bottling-Stop: 12/18/2023 12:10:00, Parameters-Sampled: PFAS

Reading Time	Depth To Water (ft)	Cumulative Drawdown (ft)	Purge Rate (ml/min)	Temperature (deg c)	Specific Conductivity (us/cm)	Dissolved Oxygen (mg/l)	pH (su)	Oxidation-Reduction Potential (mV)	Turbidity (ntu)
10:40	73.93	0.11	500	NR	NR	NR	NR	NR	NR
10:50	73.93	0.11	500	NR	NR	NR	NR	NR	NR
11:00	73.93	0.11	500	NR	NR	NR	NR	NR	NR
11:40	73.93	0.11	500	NR	NR	NR	NR	NR	NR
12:00	73.93	0.11	500	12	879 +	6.3	7.2	123	12
12:05	73.93	0.11	500	12	879 +	6.4	7.2	125	11
12:10	73.93	0.11	500	12	879 +	6.4	7.2	131	12

Notes:

1) Abbreviations include: "deg c" indicates degrees Celsius; "ft" indicates feet; "ft bmp" indicates feet below reference measuring point; "gal" indicates gallons; "in" indicates inches; "mg/l" indicates milligrams per liter; "ml/min" indicates milliliters per minute; "mV" indicates millivolts; "NA" indicates not applicable; "NR" indicates not recorded; "ntu" indicates Nephelometric Turbidity units; "su" indicates standard units; "us/cm" indicates microsiemens per centimeter; and "+" indicates the parameter(s) may be used for stabilization calculations but cannot be used for other purposes.
2) Weather temperature units are in degrees Fahrenheit, unless otherwise noted.
3) Did indicator parameters reach stabilization? Yes
4) Was the two hour time limit reached? No
5) Calculations:
   - Head Above Pump Intake (ft): 46.78
   - Total Drawdown (ft): 0.11
   - Calculated Final Purge Volume (gal): NA
6) If Drawdown Did Not Stabilize or Stabilized Drawdown >0.3 ft, is Total Purge Volume > Calculated Final Purge Volume? NA

Well Sampling Worksheet
WWW RAP Field Data
AREA 6 2023-Q4 - HS-PMW-16C
Kent County, MI

Well	HS-PMW-16C / 2 in Diameter PVC
Sample Quarter	2023-Q4
Date	12/18/2023
Weather	Cloudy, 20's to 30's F
Sampler Initials	CBM
Purging Device	Bladder-Pump: BP-11, Peristaltic-Pump: NA, Centrifugal-Pump: NA
Meters Used	YSI: Agile Rental 2, Turbidimeter: Agile Rental 2, Water-Level-Meter: WLM-2
Reference Measuring Point	PVC
Well Screen (ft bmp)	161.3 - 166.3
Measured Bottom Depth (ft bmp)	166.3
Sample Comment	16:50 - Collected Duplicate (HS-PMW-16C DUP).
Initial Water Level Date/Time	12/18/2023 14:30
Initial Water Level Depth (ft bmp)	77.36
Pump/Tubing Intake Depth (ft bmp)	163.8
Tubing Length (ft)	165
Tubing Inner Diameter (in)	0.25
Purging Initiation Date/Time	12/18/2023 14:50
Total Purge Volume (gal)	14
Modified Sample	No
If Modified, Reasoning	
Sample Collection Information	Bottling-Start: 12/18/2023 16:50:00, Bottling-Stop: 12/18/2023 17:05:00, Parameters-Sampled: PFAS

Reading Time	Depth To Water (ft)	Cumulative Drawdown (ft)	Purge Rate (ml/min)	Temperature (deg c)	Specific Conductivity (us/cm)	Dissolved Oxygen (mg/l)	pH (su)	Oxidation-Reduction Potential (mV)	Turbidity (ntu)
16:00	77.48	0.12	450	8	676 +	<0.5	7.4	92	492
16:35	77.42	0.06	450	7	670 +	0.7	7.4	62	54
16:40	77.42	0.06	450	8	680 +	0.6	7.4	57	50
16:45	77.42	0.06	450	8	684 +	0.6	7.4	54	47
16:50	77.42	0.06	450	8	689 +	0.6	7.4	52	41

Notes:

1) Abbreviations include: "deg c" indicates degrees Celsius; "ft" indicates feet; "ft bmp" indicates feet below reference measuring point; "gal" indicates gallons; "in" indicates inches; "mg/l" indicates milligrams per liter; "ml/min" indicates milliliters per minute; "mV" indicates millivolts; "NA" indicates not applicable; "NR" indicates not recorded; "ntu" indicates Nephelometric Turbidity units; "su" indicates standard units; "us/cm" indicates microsiemens per centimeter; and "+" indicates the parameter(s) may be used for stabilization calculations but cannot be used for other purposes.
2) Weather temperature units are in degrees Fahrenheit, unless otherwise noted.
3) Did indicator parameters reach stabilization? No
4) Was the two hour time limit reached? Yes
5) Calculations:
   - Head Above Pump Intake (ft) 86.44
   - Total Drawdown (ft) 0.06
   - Calculated Final Purge Volume (gal) NA
6) If Drawdown Did Not Stabilize or Stabilized Drawdown >0.3 ft, is Total Purge Volume > Calculated Final Purge Volume? NA

Well Sampling Worksheet
WWW RAP Field Data
PERIMETER 2023-Q4 - HS-PMW-22
Kent County, MI

Well	HS-PMW-22 / 2 in Diameter PVC
Sample Quarter	2023-Q4
Date	11/02/2023
Weather	Cloudy 36
Sampler Initials	JMS
Purging Device	Bladder-Pump: BP-10, Peristaltic-Pump: NA, Centrifugal-Pump: NA
Meters Used	YSI: Agile Rental 2, Turbidimeter: Agile Rental 2, Water-Level-Meter: WLM-2
Reference Measuring Point	PVC
Well Screen (ft bmp)	171.6 - 176.6
Measured Bottom Depth (ft bmp)	NR
Sample Comment	11:05: YSI connected
Initial Water Level Date/Time	11/02/2023 10:25
Initial Water Level Depth (ft bmp)	97.52
Pump/Tubing Intake Depth (ft bmp)	174.1
Tubing Length (ft)	178
Tubing Inner Diameter (in)	0.25
Purging Initiation Date/Time	11/02/2023 10:30
Total Purge Volume (gal)	2.2
Modified Sample	No
If Modified, Reasoning	
Sample Collection Information	Bottling-Start: 11/02/2023 11:30:00, Bottling-Stop: 11/02/2023 11:35:00, Parameters-Sampled: PFAS

Reading Time	Depth To Water (ft)	Cumulative Drawdown (ft)	Purge Rate (ml/min)	Temperature (deg c)	Specific Conductivity (us/cm)	Dissolved Oxygen (mg/l)	pH (su)	Oxidation-Reduction Potential (mV)	Turbidity (ntu)
10:45	97.48	-0.04	150	NR	NR	NR	NR	NR	42
10:55	97.48	-0.04	150	NR	NR	NR	NR	NR	17
11:05	97.48	-0.04	150	9 +	1,472 +	2.5	7.1	-30	9
11:15	97.48	-0.04	150	9 +	1,472 +	2.4	7.1	-27	6
11:20	97.48	-0.04	150	9 +	1,472 +	2.5	7.1	-25	5
11:25	97.48	-0.04	150	9 +	1,472 +	2.5	7.1	-23	5

Notes:

1) Abbreviations include: "deg c" indicates degrees Celsius; "ft" indicates feet; "ft bmp" indicates feet below reference measuring point; "gal" indicates gallons; "in" indicates inches; "mg/l" indicates milligrams per liter; "ml/min" indicates milliliters per minute; "mV" indicates millivolts; "NA" indicates not applicable; "NR" indicates not recorded; "ntu" indicates Nephelometric Turbidity units; "su" indicates standard units; "us/cm" indicates microsiemens per centimeter; and "+" indicates the parameter(s) may be used for stabilization calculations but cannot be used for other purposes.
2) Weather temperature units are in degrees Fahrenheit, unless otherwise noted.
3) Did indicator parameters reach stabilization? Yes
4) Was the two hour time limit reached? No
5) Calculations:
   - Head Above Pump Intake (ft) 76.58
   - Total Drawdown (ft) -0.04
   - Calculated Final Purge Volume (gal) NA
6) If Drawdown Did Not Stabilize or Stabilized Drawdown >0.3 ft, is Total Purge Volume > Calculated Final Purge Volume? NA

Well Sampling Worksheet
WWW RAP Field Data
PERIMETER 2023-Q4 - HS-MW-32A
Kent County, MI

Well	HS-MW-32A / 2 in Diameter PVC
Sample Quarter	2023-Q4
Date	10/24/2023
Weather	Sunny 60
Sampler Initials	NCK
Purging Device	Bladder-Pump: NA, Peristaltic-Pump: NA, Centrifugal-Pump: Mega Monsoon #1
Meters Used	YSI: Agile Rental 1, Turbidimeter: Agile Rental 1, Water-Level-Meter: WLM-2
Reference Measuring Point	PVC
Well Screen (ft bmp)	63.5 - 68.1
Measured Bottom Depth (ft bmp)	NR
Sample Comment	14:20 - Purge water observed to be turbid. Connected YSI prior to 14:40 readings.
Initial Water Level Date/Time	10/24/2023 13:45
Initial Water Level Depth (ft bmp)	7.84
Pump/Tubing Intake Depth (ft bmp)	65.8
Tubing Length (ft)	68
Tubing Inner Diameter (in)	0.17
Purging Initiation Date/Time	10/24/2023 13:50
Total Purge Volume (gal)	5.5
Modified Sample	No
If Modified, Reasoning	
Sample Collection Information	Bottling-Start: 10/24/2023 15:15:00, Bottling-Stop: 10/24/2023 15:20:00, Parameters-Sampled: PFAS

Reading Time	Depth To Water (ft)	Cumulative Drawdown (ft)	Purge Rate (ml/min)	Temperature (deg c)	Specific Conductivity (us/cm)	Dissolved Oxygen (mg/l)	pH (su)	Oxidation-Reduction Potential (mV)	Turbidity (ntu)
14:00	7.87	0.03	250	NR	NR	NR	NR	NR	NR
14:20	7.87	0.03	250	NR	NR	NR	NR	NR	NR
14:40	7.87	0.03	250	12 +	1,070 +	<0.5	7.4	137	18 +
14:55	7.87	0.03	250	12 +	1,068 +	<0.5	7.4	-1	8 +
15:05	7.87	0.03	250	12 +	1,066 +	<0.5	7.4	-25	<5 +
15:10	7.87	0.03	250	12 +	1,064 +	<0.5	7.4	-27	<5 +
15:15	7.87	0.03	250	12 +	1,065 +	<0.5	7.4	-33	<5 +

Notes:

1) Abbreviations include: "deg c" indicates degrees Celsius; "ft" indicates feet; "ft bmp" indicates feet below reference measuring point; "gal" indicates gallons; "in" indicates inches; "mg/l" indicates milligrams per liter; "ml/min" indicates milliliters per minute; "mV" indicates millivolts; "NA" indicates not applicable; "NR" indicates not recorded; "ntu" indicates Nephelometric Turbidity units; "su" indicates standard units; "us/cm" indicates microsiemens per centimeter; and "+" indicates the parameter(s) may be used for stabilization calculations but cannot be used for other purposes.
2) Weather temperature units are in degrees Fahrenheit, unless otherwise noted.
3) Did indicator parameters reach stabilization? Yes
4) Was the two hour time limit reached? No
5) Calculations:
   - Head Above Pump Intake (ft) 57.96
   - Total Drawdown (ft) 0.03
   - Calculated Final Purge Volume (gal) NA
6) If Drawdown Did Not Stabilize or Stabilized Drawdown >0.3 ft, is Total Purge Volume > Calculated Final Purge Volume? NA

Well Sampling Worksheet
WWW RAP Field Data
PERIMETER 2023-Q4 - HS-PMW-RI-101B
Kent County, MI

Well	HS-PMW-RI-101B / 2 in Diameter PVC
Sample Quarter	2023-Q4
Date	10/24/2023
Weather	Cloudy 55
Sampler Initials	NCK
Purging Device	Bladder-Pump: BP-10, Peristaltic-Pump: NA, Centrifugal-Pump: NA
Meters Used	YSI: Agile Rental 3, Turbidimeter: Agile Rental 3, Water-Level-Meter: WLM-2
Reference Measuring Point	PVC
Well Screen (ft bmp)	79.8 - 84.8
Measured Bottom Depth (ft bmp)	NR
Sample Comment	10:40-12:10: Sheltered in car due to lightning.
Initial Water Level Date/Time	10/24/2023 10:30
Initial Water Level Depth (ft bmp)	8.97
Pump/Tubing Intake Depth (ft bmp)	82.3
Tubing Length (ft)	85
Tubing Inner Diameter (in)	0.25
Purging Initiation Date/Time	10/24/2023 10:35
Total Purge Volume (gal)	1.5
Modified Sample	No
If Modified, Reasoning	
Sample Collection Information	Bottling-Start: 10/24/2023 12:35:00, Bottling-Stop: 10/24/2023 12:45:00, Parameters-Sampled: PFAS

Reading Time	Depth To Water (ft)	Cumulative Drawdown (ft)	Purge Rate (ml/min)	Temperature (deg c)	Specific Conductivity (us/cm)	Dissolved Oxygen (mg/l)	pH (su)	Oxidation-Reduction Potential (mV)	Turbidity (ntu)
10:40	9.05	0.08	50	NR	NR	NR	NR	NR	NR
12:15	9.05	0.08	50	NR	NR	NR	NR	NR	NR
12:20	9.05	0.08	50	14	828 +	1.2	8.4	146	>999
12:25	9.05	0.08	50	13	823 +	<0.5	8.4	146	>999
12:30	9.05	0.08	50	13	820 +	<0.5	8.4	148	726
12:35	9.05	0.08	50	13	819 +	<0.5	8.4	147	541

Notes:

1) Abbreviations include: "deg c" indicates degrees Celsius; "ft" indicates feet; "ft bmp" indicates feet below reference measuring point; "gal" indicates gallons; "in" indicates inches; "mg/l" indicates milligrams per liter; "ml/min" indicates milliliters per minute; "mV" indicates millivolts; "NA" indicates not applicable; "NR" indicates not recorded; "ntu" indicates Nephelometric Turbidity units; "su" indicates standard units; "us/cm" indicates microsiemens per centimeter; and "+" indicates the parameter(s) may be used for stabilization calculations but cannot be used for other purposes.
2) Weather temperature units are in degrees Fahrenheit, unless otherwise noted.
3) Did indicator parameters reach stabilization? No
4) Was the two hour time limit reached? Yes
5) Calculations:
   - Head Above Pump Intake (ft) 73.33
   - Total Drawdown (ft) 0.08
   - Calculated Final Purge Volume (gal) NA
6) If Drawdown Did Not Stabilize or Stabilized Drawdown >0.3 ft, is Total Purge Volume > Calculated Final Purge Volume? NA

Well Sampling Worksheet
WWW RAP Field Data
PERIMETER 2023-Q4 - HS-PMW-RI-102A
Kent County, MI

Well	HS-PMW-RI-102A / 2 in Diameter PVC
Sample Quarter	2023-Q4
Date	10/26/2023
Weather	Cloudy 65F
Sampler Initials	RCP
Purging Device	Bladder-Pump: NA, Peristaltic-Pump: NA, Centrifugal-Pump: Mega Monsoon #1
Meters Used	YSI: Agile Rental 2, Turbidimeter: Agile Rental 2, Water-Level-Meter: WLM-3
Reference Measuring Point	PVC
Well Screen (ft bmp)	47.5 - 52.5
Measured Bottom Depth (ft bmp)	NR
Sample Comment	14:00 - Water level stable. 14:25 - Low turbidity observed. Attached YSI. 15:05 - AECOM split sample.
Initial Water Level Date/Time	10/26/2023 13:50
Initial Water Level Depth (ft bmp)	43.62
Pump/Tubing Intake Depth (ft bmp)	50
Tubing Length (ft)	55
Tubing Inner Diameter (in)	0.17
Purging Initiation Date/Time	10/26/2023 13:55
Total Purge Volume (gal)	5
Modified Sample	No
If Modified, Reasoning	
Sample Collection Information	Bottling-Start: 10/26/2023 15:05:00, Bottling-Stop: 10/26/2023 15:10:00, Parameters-Sampled: PFAS

Reading Time	Depth To Water (ft)	Cumulative Drawdown (ft)	Purge Rate (ml/min)	Temperature (deg c)	Specific Conductivity (us/cm)	Dissolved Oxygen (mg/l)	pH (su)	Oxidation-Reduction Potential (mV)	Turbidity (ntu)
14:00	43.68	0.06	280	NR	NR	NR	NR	NR	399
14:25	43.68	0.06	280	NR	NR	NR	NR	NR	32
14:30	43.68	0.06	280	13 +	481 +	10.4	7.2	149	22
14:35	43.68	0.06	280	13 +	478 +	9.5	7.1	157	15
14:40	43.68	0.06	280	13 +	478 +	9.2	7.1	166	12
14:45	43.68	0.06	280	13 +	476 +	9.6	7.1	170	8
14:50	43.68	0.06	280	13 +	473 +	9.6	7.1	176	<5
14:55	43.68	0.06	280	13 +	474 +	9.5	7.1	177	<5
15:00	43.68	0.06	280	13 +	474 +	9.6	7.1	180	<5

Notes:

1) Abbreviations include: "deg c" indicates degrees Celsius; "ft" indicates feet; "ft bmp" indicates feet below reference measuring point; "gal" indicates gallons; "in" indicates inches; "mg/l" indicates milligrams per liter; "ml/min" indicates milliliters per minute; "mV" indicates millivolts; "NA" indicates not applicable; "NR" indicates not recorded; "ntu" indicates Nephelometric Turbidity units; "su" indicates standard units; "us/cm" indicates microsiemens per centimeter; and "+" indicates the parameter(s) may be used for stabilization calculations but cannot be used for other purposes.
2) Weather temperature units are in degrees Fahrenheit, unless otherwise noted.
3) Did indicator parameters reach stabilization? Yes
4) Was the two hour time limit reached? No
5) Calculations:
   - Head Above Pump Intake (ft) 6.38
   - Total Drawdown (ft) 0.06
   - Calculated Final Purge Volume (gal) NA
6) If Drawdown Did Not Stabilize or Stabilized Drawdown >0.3 ft, is Total Purge Volume > Calculated Final Purge Volume? NA

Well Sampling Worksheet
WWW RAP Field Data
PERIMETER 2023-Q4 - HS-PMW-RI-102B
Kent County, MI

Well	HS-PMW-RI-102B / 2 in Diameter PVC
Sample Quarter	2023-Q4
Date	10/26/2023
Weather	Cloudy 60
Sampler Initials	NCK
Purging Device	Bladder-Pump: NA, Peristaltic-Pump: NA, Centrifugal-Pump: Mega Monsoon #2
Meters Used	YSI: Agile Rental 3, Turbidimeter: Agile Rental 3, Water-Level-Meter: WLM-2
Reference Measuring Point	PVC
Well Screen (ft bmp)	101.5 - 106.5
Measured Bottom Depth (ft bmp)	NR
Sample Comment	YSI Connected at 14:55. Collected MS/MSD, DUP, and AECOM split.
Initial Water Level Date/Time	10/26/2023 13:55
Initial Water Level Depth (ft bmp)	43.38
Pump/Tubing Intake Depth (ft bmp)	104
Tubing Length (ft)	107
Tubing Inner Diameter (in)	0.17
Purging Initiation Date/Time	10/26/2023 13:55
Total Purge Volume (gal)	12
Modified Sample	No
If Modified, Reasoning	
Sample Collection Information	Bottling-Start: 10/26/2023 15:25:00, Bottling-Stop: 10/26/2023 15:30:00, Parameters-Sampled: PFAS

Reading Time	Depth To Water (ft)	Cumulative Drawdown (ft)	Purge Rate (ml/min)	Temperature (deg c)	Specific Conductivity (us/cm)	Dissolved Oxygen (mg/l)	pH (su)	Oxidation-Reduction Potential (mV)	Turbidity (ntu)
14:05	43.41	0.03	500	NR	NR	NR	NR	NR	NR
14:15	43.41	0.03	500	NR	NR	NR	NR	NR	NR
14:30	43.41	0.03	500	NR	NR	NR	NR	NR	NR
14:55	43.41	0.03	500	11	553 +	5.8 +	7.4	184	<5
15:15	43.41	0.03	500	11	554 +	5.7 +	7.4	212	<5
15:20	43.41	0.03	500	11	554 +	5.7 +	7.4	207	<5
15:25	43.41	0.03	500	11	553 +	5.7 +	7.4	205	<5

Notes:

1) Abbreviations include: "deg c" indicates degrees Celsius; "ft" indicates feet; "ft bmp" indicates feet below reference measuring point; "gal" indicates gallons; "in" indicates inches; "mg/l" indicates milligrams per liter; "ml/min" indicates milliliters per minute; "mV" indicates millivolts; "NA" indicates not applicable; "NR" indicates not recorded; "ntu" indicates Nephelometric Turbidity units; "su" indicates standard units; "us/cm" indicates microsiemens per centimeter; and "+" indicates the parameter(s) may be used for stabilization calculations but cannot be used for other purposes.
2) Weather temperature units are in degrees Fahrenheit, unless otherwise noted.
3) Did indicator parameters reach stabilization? Yes
4) Was the two hour time limit reached? No
5) Calculations:
   - Head Above Pump Intake (ft) 60.62
   - Total Drawdown (ft) 0.03
   - Calculated Final Purge Volume (gal) NA
6) If Drawdown Did Not Stabilize or Stabilized Drawdown >0.3 ft, is Total Purge Volume > Calculated Final Purge Volume? NA

Well Sampling Worksheet
WWW RAP Field Data
PERIMETER 2023-Q4 - HS-PMW-RI-102C
Kent County, MI

Well	HS-PMW-RI-102C / 2 in Diameter PVC
Sample Quarter	2023-Q4
Date	10/27/2023
Weather	Rainy 65F
Sampler Initials	RCP
Purging Device	Bladder-Pump: NA, Peristaltic-Pump: NA, Centrifugal-Pump: Mega Monsoon #2
Meters Used	YSI: Agile Rental 1, Turbidimeter: Agile Rental 1, Water-Level-Meter: WLM-3
Reference Measuring Point	PVC
Well Screen (ft bmp)	136.5 - 141.5
Measured Bottom Depth (ft bmp)	NR
Sample Comment	09:55 - Purge water was observed to be very turbid. 10:30 - Low turbidity observed. Attached YSI.
Initial Water Level Date/Time	10/27/2023 09:45
Initial Water Level Depth (ft bmp)	43.44
Pump/Tubing Intake Depth (ft bmp)	139
Tubing Length (ft)	144
Tubing Inner Diameter (in)	0.25
Purging Initiation Date/Time	10/27/2023 09:50
Total Purge Volume (gal)	8.5
Modified Sample	No
If Modified, Reasoning	
Sample Collection Information	Bottling-Start: 10/27/2023 11:20:00, Bottling-Stop: 10/27/2023 11:25:00, Parameters-Sampled: PFAS

Reading Time	Depth To Water (ft)	Cumulative Drawdown (ft)	Purge Rate (ml/min)	Temperature (deg c)	Specific Conductivity (us/cm)	Dissolved Oxygen (mg/l)	pH (su)	Oxidation-Reduction Potential (mV)	Turbidity (ntu)
09:55	43.47	0.03	350	NR	NR	NR	NR	NR	NR
10:10	43.47	0.03	350	NR	NR	NR	NR	NR	98 +
10:30	43.47	0.03	350	NR	NR	NR	NR	NR	32 +
10:45	43.47	0.03	350	11 +	543 +	<0.5	7.5	-10	24 +
10:55	43.47	0.03	350	11 +	540 +	<0.5	7.5	-65	26 +
11:00	43.47	0.03	350	11 +	539 +	<0.5	7.5	-71	27 +
11:05	43.47	0.03	350	11 +	539 +	<0.5	7.5	-82	27 +
11:10	43.47	0.03	350	11 +	538 +	<0.5	7.5	-86	28 +
11:15	43.47	0.03	350	11 +	538 +	<0.5	7.5	-91	29 +

Notes:

1) Abbreviations include: "deg c" indicates degrees Celsius; "ft" indicates feet; "ft bmp" indicates feet below reference measuring point; "gal" indicates gallons; "in" indicates inches; "mg/l" indicates milligrams per liter; "ml/min" indicates milliliters per minute; "mV" indicates millivolts; "NA" indicates not applicable; "NR" indicates not recorded; "ntu" indicates Nephelometric Turbidity units; "su" indicates standard units; "us/cm" indicates microsiemens per centimeter; and "+" indicates the parameter(s) may be used for stabilization calculations but cannot be used for other purposes.
2) Weather temperature units are in degrees Fahrenheit, unless otherwise noted.
3) Did indicator parameters reach stabilization? Yes
4) Was the two hour time limit reached? No
5) Calculations:
   - Head Above Pump Intake (ft) 95.56
   - Total Drawdown (ft) 0.03
   - Calculated Final Purge Volume (gal) NA
6) If Drawdown Did Not Stabilize or Stabilized Drawdown >0.3 ft, is Total Purge Volume > Calculated Final Purge Volume? NA

Well Sampling Worksheet
WWW RAP Field Data
PERIMETER 2023-Q4 - HS-PMW-RI-102D
Kent County, MI

Well	HS-PMW-RI-102D / 2 in Diameter PVC
Sample Quarter	2023-Q4
Date	10/27/2023
Weather	Rain 60
Sampler Initials	NCK
Purging Device	Bladder-Pump: BP-10, Peristaltic-Pump: NA, Centrifugal-Pump: NA
Meters Used	YSI: Agile Rental 2, Turbidimeter: Agile Rental 2, Water-Level-Meter: WLM-2
Reference Measuring Point	PVC
Well Screen (ft bmp)	176.5 - 181.5
Measured Bottom Depth (ft bmp)	NR
Sample Comment	09:55 - Purge water was observed to be very turbid.10:30 - YSI connected. 11:00 - Collected Field Blank.
Initial Water Level Date/Time	10/27/2023 09:30
Initial Water Level Depth (ft bmp)	43.46
Pump/Tubing Intake Depth (ft bmp)	179
Tubing Length (ft)	183
Tubing Inner Diameter (in)	0.25
Purging Initiation Date/Time	10/27/2023 09:45
Total Purge Volume (gal)	7
Modified Sample	No
If Modified, Reasoning	
Sample Collection Information	Bottling-Start: 10/27/2023 10:50:00, Bottling-Stop: 10/27/2023 10:55:00, Parameters-Sampled: PFAS

Reading Time	Depth To Water (ft)	Cumulative Drawdown (ft)	Purge Rate (ml/min)	Temperature (deg c)	Specific Conductivity (us/cm)	Dissolved Oxygen (mg/l)	pH (su)	Oxidation-Reduction Potential (mV)	Turbidity (ntu)
09:55	43.69	0.23	400	NR	NR	NR	NR	NR	NR
10:10	43.63	0.17	400	NR	NR	NR	NR	NR	NR
10:20	43.63	0.17	400	NR	NR	NR	NR	NR	NR
10:30	43.63	0.17	400	NR	NR	NR	NR	NR	NR
10:40	43.63	0.17	400	10 +	624 +	<0.5	7.3	-102	11
10:45	43.63	0.17	400	10 +	622 +	<0.5	7.3	-103	10
10:50	43.63	0.17	400	10 +	622 +	<0.5	7.3	-104	10

Notes:

1) Abbreviations include: "deg c" indicates degrees Celsius; "ft" indicates feet; "ft bmp" indicates feet below reference measuring point; "gal" indicates gallons; "in" indicates inches; "mg/l" indicates milligrams per liter; "ml/min" indicates milliliters per minute; "mV" indicates millivolts; "NA" indicates not applicable; "NR" indicates not recorded; "ntu" indicates Nephelometric Turbidity units; "su" indicates standard units; "us/cm" indicates microsiemens per centimeter; and "+" indicates the parameter(s) may be used for stabilization calculations but cannot be used for other purposes.
2) Weather temperature units are in degrees Fahrenheit, unless otherwise noted.
3) Did indicator parameters reach stabilization? Yes
4) Was the two hour time limit reached? No
5) Calculations:
   - Head Above Pump Intake (ft) 135.54
   - Total Drawdown (ft) 0.17
   - Calculated Final Purge Volume (gal) NA
6) If Drawdown Did Not Stabilize or Stabilized Drawdown >0.3 ft, is Total Purge Volume > Calculated Final Purge Volume? NA

Well Sampling Worksheet
WWW RAP Field Data
AREA 5 2023-Q4 - HS-PMW-RI-103A
Kent County, MI

Well	HS-PMW-RI-103A / 2 in Diameter PVC
Sample Quarter	2023-Q4
Date	10/05/2023
Weather	Cloudy 70
Sampler Initials	NCK
Purging Device	Bladder-Pump: NA, Peristaltic-Pump: NA, Centrifugal-Pump: Mega Monsoon #2
Meters Used	YSI: Agile Rental 1, Turbidimeter: Agile Rental 1, Water-Level-Meter: WLM-2
Reference Measuring Point	PVC
Well Screen (ft bmp)	89.6 - 94.6
Measured Bottom Depth (ft bmp)	NR
Sample Comment	14:30 - Purge water observed to be turbid. 14:40 - Connected YSI. 14:55 - Turbidity is dropping.
Initial Water Level Date/Time	10/05/2023 13:50
Initial Water Level Depth (ft bmp)	75.06
Pump/Tubing Intake Depth (ft bmp)	92.1
Tubing Length (ft)	95
Tubing Inner Diameter (in)	0.17
Purging Initiation Date/Time	10/05/2023 13:55
Total Purge Volume (gal)	12
Modified Sample	No
If Modified, Reasoning	
Sample Collection Information	Bottling-Start: 10/05/2023 15:15:00, Bottling-Stop: 10/05/2023 15:20:00, Parameters-Sampled: PFAS

Reading Time	Depth To Water (ft)	Cumulative Drawdown (ft)	Purge Rate (ml/min)	Temperature (deg c)	Specific Conductivity (us/cm)	Dissolved Oxygen (mg/l)	pH (su)	Oxidation-Reduction Potential (mV)	Turbidity (ntu)
14:00	75.09	0.03	500	NR	NR	NR	NR	NR	NR
14:10	75.10	0.04	500	NR	NR	NR	NR	NR	NR
14:30	75.10	0.04	500	NR	NR	NR	NR	NR	NR
14:40	75.10	0.04	500	NR	NR	NR	NR	NR	NR
14:50	75.10	0.04	500	12	766 +	1.2	7.5	149	25
14:55	75.10	0.04	500	12	765 +	1.2	7.5	147	16

Well Sampling Worksheet
WWW RAP Field Data
AREA 5 2023-Q4 - HS-PMW-RI-103A
Kent County, MI

Well	HS-PMW-RI-103A / 2 in Diameter PVC
Sample Quarter	2023-Q4
Date	10/05/2023
Weather	Cloudy 70
Sampler Initials	NCK
Purging Device	Bladder-Pump: NA, Peristaltic-Pump: NA, Centrifugal-Pump: Mega Monsoon #2
Meters Used	YSI: Agile Rental 1, Turbidimeter: Agile Rental 1, Water-Level-Meter: WLM-2
Reference Measuring Point	PVC
Well Screen (ft bmp)	89.6 - 94.6
Measured Bottom Depth (ft bmp)	NR
Sample Comment	14:30 - Purge water observed to be turbid. 14:40 - Connected YSI. 14:55 - Turbidity is dropping.
Initial Water Level Date/Time	10/05/2023 13:50
Initial Water Level Depth (ft bmp)	75.06
Pump/Tubing Intake Depth (ft bmp)	92.1
Tubing Length (ft)	95
Tubing Inner Diameter (in)	0.17
Purging Initiation Date/Time	10/05/2023 13:55
Total Purge Volume (gal)	12
Modified Sample	No
If Modified, Reasoning	
Sample Collection Information	Bottling-Start: 10/05/2023 15:15:00, Bottling-Stop: 10/05/2023 15:20:00, Parameters-Sampled: PFAS

Reading Time	Depth To Water (ft)	Cumulative Drawdown (ft)	Purge Rate (ml/min)	Temperature (deg c)	Specific Conductivity (us/cm)	Dissolved Oxygen (mg/l)	pH (su)	Oxidation-Reduction Potential (mV)	Turbidity (ntu)
15:05	75.10	0.04	500	12	766 +	1.2	7.5	144	8
15:10	75.10	0.04	500	12	766 +	1.2	7.5	142	7
15:15	75.10	0.04	500	12	767 +	1.2	7.5	141	7

Notes:

1) Abbreviations include: "deg c" indicates degrees Celsius; "ft" indicates feet; "ft bmp" indicates feet below reference measuring point; "gal" indicates gallons; "in" indicates inches; "mg/l" indicates milligrams per liter; "ml/min" indicates milliliters per minute; "mV" indicates millivolts; "NA" indicates not applicable; "NR" indicates not recorded; "ntu" indicates Nephelometric Turbidity units; "su" indicates standard units; "us/cm" indicates microsiemens per centimeter; and "+" indicates the parameter(s) may be used for stabilization calculations but cannot be used for other purposes.
2) Weather temperature units are in degrees Fahrenheit, unless otherwise noted.
3) Did indicator parameters reach stabilization? Yes
4) Was the two hour time limit reached? No
5) Calculations:
   - Head Above Pump Intake (ft): 17.04
   - Total Drawdown (ft): 0.04
   - Calculated Final Purge Volume (gal): NA
6) If Drawdown Did Not Stabilize or Stabilized Drawdown >0.3 ft, is Total Purge Volume > Calculated Final Purge Volume? NA

Well Sampling Worksheet
WWW RAP Field Data
AREA 5 2023-Q4 - HS-PMW-RI-103B
Kent County, MI

Well	HS-PMW-RI-103B / 2 in Diameter PVC
Sample Quarter	2023-Q4
Date	10/05/2023
Weather	Rain 65F
Sampler Initials	BPT
Purging Device	Bladder-Pump: NA, Peristaltic-Pump: NA, Centrifugal-Pump: Mega Monsoon #1
Meters Used	YSI: Agile Rental 2, Turbidimeter: Agile Rental 2, Water-Level-Meter: WLM-3
Reference Measuring Point	PVC
Well Screen (ft bmp)	108.7 - 113.7
Measured Bottom Depth (ft bmp)	NR
Sample Comment	14:20 - YSI not connected. Voltage lowered. 14:40 - YSI not connected. 14:50 - YSI not connected. Voltage lowered. 15:00 - YSI connected. 15:10 - Voltage raised due to lack of flow.
Initial Water Level Date/Time	10/05/2023 13:55
Initial Water Level Depth (ft bmp)	76.56
Pump/Tubing Intake Depth (ft bmp)	110.2
Tubing Length (ft)	115
Tubing Inner Diameter (in)	0.17
Purging Initiation Date/Time	10/05/2023 14:00
Total Purge Volume (gal)	6.5
Modified Sample	No
If Modified, Reasoning	
Sample Collection Information	Bottling-Start: 10/05/2023 15:40:00, Bottling-Stop: 10/05/2023 15:45:00, Parameters-Sampled: PFAS

Reading Time	Depth To Water (ft)	Cumulative Drawdown (ft)	Purge Rate (ml/min)	Temperature (deg c)	Specific Conductivity (us/cm)	Dissolved Oxygen (mg/l)	pH (su)	Oxidation-Reduction Potential (mV)	Turbidity (ntu)
14:20	77.05	0.49	300	NR	NR	NR	NR	NR	464
14:40	76.82	0.26	250	NR	NR	NR	NR	NR	69
14:50	76.87	0.31	250	NR	NR	NR	NR	NR	25
15:00	76.77	0.21	180	12 +	785 +	<0.5	7.2	68	24
15:10	76.75	0.19	180	12 +	780 +	<0.5	7.2	-66	50
15:15	76.79	0.23	180	12 +	785 +	<0.5	7.2	-72	30
15:20	76.75	0.19	180	12 +	776 +	<0.5	7.2	-68	29

Well Sampling Worksheet
WWW RAP Field Data
AREA 5 2023-Q4 - HS-PMW-RI-103B
Kent County, MI

Well	HS-PMW-RI-103B / 2 in Diameter PVC
Sample Quarter	2023-Q4
Date	10/05/2023
Weather	Rain 65F
Sampler Initials	BPT
Purging Device	Bladder-Pump: NA, Peristaltic-Pump: NA, Centrifugal-Pump: Mega Monsoon #1
Meters Used	YSI: Agile Rental 2, Turbidimeter: Agile Rental 2, Water-Level-Meter: WLM-3
Reference Measuring Point	PVC
Well Screen (ft bmp)	108.7 - 113.7
Measured Bottom Depth (ft bmp)	NR
Sample Comment	14:20 - YSI not connected. Voltage lowered. 14:40 - YSI not connected. 14:50 - YSI not connected. Voltage lowered. 15:00 - YSI connected. 15:10 - Voltage raised due to lack of flow.
Initial Water Level Date/Time	10/05/2023 13:55
Initial Water Level Depth (ft bmp)	76.56
Pump/Tubing Intake Depth (ft bmp)	110.2
Tubing Length (ft)	115
Tubing Inner Diameter (in)	0.17
Purging Initiation Date/Time	10/05/2023 14:00
Total Purge Volume (gal)	6.5
Modified Sample	No
If Modified, Reasoning	
Sample Collection Information	Bottling-Start: 10/05/2023 15:40:00, Bottling-Stop: 10/05/2023 15:45:00, Parameters-Sampled: PFAS

Reading Time	Depth To Water (ft)	Cumulative Drawdown (ft)	Purge Rate (ml/min)	Temperature (deg c)	Specific Conductivity (us/cm)	Dissolved Oxygen (mg/l)	pH (su)	Oxidation-Reduction Potential (mV)	Turbidity (ntu)
15:25	76.85	0.29	180	12 +	780 +	<0.5	7.2	-59	28
15:30	76.85	0.29	180	12 +	782 +	<0.5	7.2	-56	27
15:35	76.85	0.29	180	12 +	781 +	<0.5	7.2	-53	26

Notes:

1) Abbreviations include: "deg c" indicates degrees Celsius; "ft" indicates feet; "ft bmp" indicates feet below reference measuring point; "gal" indicates gallons; "in" indicates inches; "mg/l" indicates milligrams per liter; "ml/min" indicates milliliters per minute; "mV" indicates millivolts; "NA" indicates not applicable; "NR" indicates not recorded; "ntu" indicates Nephelometric Turbidity units; "su" indicates standard units; "us/cm" indicates microsiemens per centimeter; and "+" indicates the parameter(s) may be used for stabilization calculations but cannot be used for other purposes.
2) Weather temperature units are in degrees Fahrenheit, unless otherwise noted.
3) Did indicator parameters reach stabilization? Yes
4) Was the two hour time limit reached? No
5) Calculations:
   - Head Above Pump Intake (ft) 33.64
   - Total Drawdown (ft) 0.29
   - Calculated Final Purge Volume (gal) NA
6) If Drawdown Did Not Stabilize or Stabilized Drawdown >0.3 ft, is Total Purge Volume > Calculated Final Purge Volume? NA

Well Sampling Worksheet
WWW RAP Field Data
AREA 5 2023-Q4 - HS-PMW-RI-104A
Kent County, MI

Well	HS-PMW-RI-104A / 2 in Diameter PVC
Sample Quarter	2023-Q4
Date	10/04/2023
Weather	Partly Cloudy 74F
Sampler Initials	BPT
Purging Device	Bladder-Pump: NA, Peristaltic-Pump: PER-1, Centrifugal-Pump: NA
Meters Used	YSI: Agile Rental 1, Turbidimeter: Agile Rental 1, Water-Level-Meter: WLM-3
Reference Measuring Point	PVC
Well Screen (ft bmp)	14.6 - 19.6
Measured Bottom Depth (ft bmp)	20.6
Sample Comment	14:55 - YSI not connected. 15:00 - YSI connected. 15:50 - Collected field blank (FB-BPT).
Initial Water Level Date/Time	10/04/2023 14:35
Initial Water Level Depth (ft bmp)	13.81
Pump/Tubing Intake Depth (ft bmp)	18.1
Tubing Length (ft)	22
Tubing Inner Diameter (in)	0.17
Purging Initiation Date/Time	10/04/2023 14:40
Total Purge Volume (gal)	2.5
Modified Sample	No
If Modified, Reasoning	
Sample Collection Information	Bottling-Start: 10/04/2023 15:15:00, Bottling-Stop: 10/04/2023 15:20:00, Parameters-Sampled: PFAS

Reading Time	Depth To Water (ft)	Cumulative Drawdown (ft)	Purge Rate (ml/min)	Temperature (deg c)	Specific Conductivity (us/cm)	Dissolved Oxygen (mg/l)	pH (su)	Oxidation-Reduction Potential (mV)	Turbidity (ntu)
14:55	13.83	0.02	300	NR	NR	NR	NR	NR	2
15:00	13.83	0.02	300	15	950 +	5.6	7.3	112	<5
15:05	13.83	0.02	200	15	942 +	5.3	7.3	108	<5
15:10	13.83	0.02	300	15	934 +	5.7	7.3	107	<5

Notes:

1) Abbreviations include: "deg c" indicates degrees Celsius; "ft" indicates feet; "ft bmp" indicates feet below reference measuring point; "gal" indicates gallons; "in" indicates inches; "mg/l" indicates milligrams per liter; "ml/min" indicates milliliters per minute; "mV" indicates millivolts; "NA" indicates not applicable; "NR" indicates not recorded; "ntu" indicates Nephelometric Turbidity units; "su" indicates standard units; "us/cm" indicates microsiemens per centimeter; and "+" indicates the parameter(s) may be used for stabilization calculations but cannot be used for other purposes.
2) Weather temperature units are in degrees Fahrenheit, unless otherwise noted.
3) Did indicator parameters reach stabilization? Yes
4) Was the two hour time limit reached? No
5) Calculations:
   - Head Above Pump Intake (ft) 4.29
   - Total Drawdown (ft) 0.02
   - Calculated Final Purge Volume (gal) NA
6) If Drawdown Did Not Stabilize or Stabilized Drawdown >0.3 ft, is Total Purge Volume > Calculated Final Purge Volume? NA

Well Sampling Worksheet
WWW RAP Field Data
AREA 5 2023-Q4 - HS-PMW-RI-104B
Kent County, MI

Well	HS-PMW-RI-104B / 2 in Diameter PVC
Sample Quarter	2023-Q4
Date	10/04/2023
Weather	Sunny 75
Sampler Initials	NCK
Purging Device	Bladder-Pump: NA, Peristaltic-Pump: PER-3, Centrifugal-Pump: NA
Meters Used	YSI: Agile Rental 2, Turbidimeter: Agile Rental 2, Water-Level-Meter: WLM-2
Reference Measuring Point	PVC
Well Screen (ft bmp)	45.4 - 50.4
Measured Bottom Depth (ft bmp)	NR
Sample Comment	14:50 - Confirming water level is stable. 15:00 - Connected YSI. 15:10 - YSI equilibrating. 15:25 - DO is dropping. 15:55 - Duplicate and MS/MSD collected. 16:00 - Field blank (FB-NCK) collected.
Initial Water Level Date/Time	10/04/2023 14:40
Initial Water Level Depth (ft bmp)	13.91
Pump/Tubing Intake Depth (ft bmp)	47.9
Tubing Length (ft)	51
Tubing Inner Diameter (in)	0.17
Purging Initiation Date/Time	10/04/2023 14:45
Total Purge Volume (gal)	6
Modified Sample	No
If Modified, Reasoning	
Sample Collection Information	Bottling-Start: 10/04/2023 15:50:00, Bottling-Stop: 10/04/2023 15:55:00, Parameters-Sampled: PFAS

Reading Time	Depth To Water (ft)	Cumulative Drawdown (ft)	Purge Rate (ml/min)	Temperature (deg c)	Specific Conductivity (us/cm)	Dissolved Oxygen (mg/l)	pH (su)	Oxidation-Reduction Potential (mV)	Turbidity (ntu)
14:50	13.93	0.02	350	NR	NR	NR	NR	NR	NR
14:55	13.93	0.02	350	NR	NR	NR	NR	NR	NR
15:00	13.93	0.02	350	NR	NR	NR	NR	NR	NR
15:10	13.93	0.02	350	NR	NR	NR	NR	NR	NR
15:20	13.93	0.02	350	12 +	550 +	6.1	7.2	238	<5
15:25	13.93	0.02	350	12 +	603 +	3.1	7.1	229	<5

Well Sampling Worksheet
WWW RAP Field Data
AREA 5 2023-Q4 - HS-PMW-RI-104B
Kent County, MI

Well	HS-PMW-RI-104B / 2 in Diameter PVC
Sample Quarter	2023-Q4
Date	10/04/2023
Weather	Sunny 75
Sampler Initials	NCK
Purging Device	Bladder-Pump: NA, Peristaltic-Pump: PER-3, Centrifugal-Pump: NA
Meters Used	YSI: Agile Rental 2, Turbidimeter: Agile Rental 2, Water-Level-Meter: WLM-2
Reference Measuring Point	PVC
Well Screen (ft bmp)	45.4 - 50.4
Measured Bottom Depth (ft bmp)	NR
Sample Comment	14:50 - Confirming water level is stable. 15:00 - Connected YSI. 15:10 - YSI equilibrating. 15:25 - DO is dropping. 15:55 - Duplicate and MS/MSD collected. 16:00 - Field blank (FB-NCK) collected.
Initial Water Level Date/Time	10/04/2023 14:40
Initial Water Level Depth (ft bmp)	13.91
Pump/Tubing Intake Depth (ft bmp)	47.9
Tubing Length (ft)	51
Tubing Inner Diameter (in)	0.17
Purging Initiation Date/Time	10/04/2023 14:45
Total Purge Volume (gal)	6
Modified Sample	No
If Modified, Reasoning	
Sample Collection Information	Bottling-Start: 10/04/2023 15:50:00, Bottling-Stop: 10/04/2023 15:55:00, Parameters-Sampled: PFAS

Reading Time	Depth To Water (ft)	Cumulative Drawdown (ft)	Purge Rate (ml/min)	Temperature (deg c)	Specific Conductivity (us/cm)	Dissolved Oxygen (mg/l)	pH (su)	Oxidation-Reduction Potential (mV)	Turbidity (ntu)
15:40	13.93	0.02	350	12 +	615 +	2.0	7.1	205	<5
15:45	13.93	0.02	350	12 +	620 +	2.1	7.1	200	<5
15:50	13.93	0.02	350	12 +	624 +	2.1	7.1	197	<5

Notes:

1) Abbreviations include: "deg c" indicates degrees Celsius; "ft" indicates feet; "ft bmp" indicates feet below reference measuring point; "gal" indicates gallons; "in" indicates inches; "mg/l" indicates milligrams per liter; "ml/min" indicates milliliters per minute; "mV" indicates millivolts; "NA" indicates not applicable; "NR" indicates not recorded; "ntu" indicates Nephelometric Turbidity units; "su" indicates standard units; "us/cm" indicates microsiemens per centimeter; and "+" indicates the parameter(s) may be used for stabilization calculations but cannot be used for other purposes.
2) Weather temperature units are in degrees Fahrenheit, unless otherwise noted.
3) Did indicator parameters reach stabilization? Yes
4) Was the two hour time limit reached? No
5) Calculations:
   - Head Above Pump Intake (ft) 33.99
   - Total Drawdown (ft) 0.02
   - Calculated Final Purge Volume (gal) NA
6) If Drawdown Did Not Stabilize or Stabilized Drawdown >0.3 ft, is Total Purge Volume > Calculated Final Purge Volume? NA

Well Sampling Worksheet
WWW RAP Field Data
AREA 5 2023-Q4 - HS-PMW-RI-104C
Kent County, MI

Well	HS-PMW-RI-104C / 2 in Diameter PVC
Sample Quarter	2023-Q4
Date	10/04/2023
Weather	Cloudy 75
Sampler Initials	NCK
Purging Device	Bladder-Pump: NA, Peristaltic-Pump: PER-3, Centrifugal-Pump: NA
Meters Used	YSI: Agile Rental 2, Turbidimeter: Agile Rental 2, Water-Level-Meter: WLM-2
Reference Measuring Point	PVC
Well Screen (ft bmp)	74.3 - 79.3
Measured Bottom Depth (ft bmp)	NR
Sample Comment	13:15 - Confirming water level is stable. 13:30 - Connected YSI. 14:00 - Allowed YSI to equilibrate. 14:10 - Values between readings are changing greatly.
Initial Water Level Date/Time	10/04/2023 13:00
Initial Water Level Depth (ft bmp)	13.96
Pump/Tubing Intake Depth (ft bmp)	76.8
Tubing Length (ft)	80
Tubing Inner Diameter (in)	0.17
Purging Initiation Date/Time	10/04/2023 13:10
Total Purge Volume (gal)	6
Modified Sample	No
If Modified, Reasoning	
Sample Collection Information	Bottling-Start: 10/04/2023 14:30:00, Bottling-Stop: 10/04/2023 14:35:00, Parameters-Sampled: PFAS

Reading Time	Depth To Water (ft)	Cumulative Drawdown (ft)	Purge Rate (ml/min)	Temperature (deg c)	Specific Conductivity (us/cm)	Dissolved Oxygen (mg/l)	pH (su)	Oxidation-Reduction Potential (mV)	Turbidity (ntu)
13:15	13.98	0.02	300	NR	NR	NR	NR	NR	NR
13:20	13.98	0.02	300	NR	NR	NR	NR	NR	NR
13:25	13.98	0.02	300	NR	NR	NR	NR	NR	NR
13:30	13.98	0.02	300	NR	NR	NR	NR	NR	NR
14:00	13.98	0.02	300	12 +	797 +	0.8	7.0	-101	<5
14:10	13.98	0.02	300	12 +	993 +	0.8	7.1	-88	<5

Well Sampling Worksheet
WWW RAP Field Data
AREA 5 2023-Q4 - HS-PMW-RI-104C
Kent County, MI

Well	HS-PMW-RI-104C / 2 in Diameter PVC
Sample Quarter	2023-Q4
Date	10/04/2023
Weather	Cloudy 75
Sampler Initials	NCK
Purging Device	Bladder-Pump: NA, Peristaltic-Pump: PER-3, Centrifugal-Pump: NA
Meters Used	YSI: Agile Rental 2, Turbidimeter: Agile Rental 2, Water-Level-Meter: WLM-2
Reference Measuring Point	PVC
Well Screen (ft bmp)	74.3 - 79.3
Measured Bottom Depth (ft bmp)	NR
Sample Comment	13:15 - Confirming water level is stable. 13:30 - Connected YSI. 14:00 - Allowed YSI to equilibrate. 14:10 - Values between readings are changing greatly.
Initial Water Level Date/Time	10/04/2023 13:00
Initial Water Level Depth (ft bmp)	13.96
Pump/Tubing Intake Depth (ft bmp)	76.8
Tubing Length (ft)	80
Tubing Inner Diameter (in)	0.17
Purging Initiation Date/Time	10/04/2023 13:10
Total Purge Volume (gal)	6
Modified Sample	No
If Modified, Reasoning	
Sample Collection Information	Bottling-Start: 10/04/2023 14:30:00, Bottling-Stop: 10/04/2023 14:35:00, Parameters-Sampled: PFAS

Reading Time	Depth To Water (ft)	Cumulative Drawdown (ft)	Purge Rate (ml/min)	Temperature (deg c)	Specific Conductivity (us/cm)	Dissolved Oxygen (mg/l)	pH (su)	Oxidation-Reduction Potential (mV)	Turbidity (ntu)
14:20	13.98	0.02	300	12 +	1,056 +	0.6	7.1	-75	<5
14:25	13.98	0.02	300	12 +	1,057 +	0.7	7.1	-74	<5
14:30	13.98	0.02	300	12 +	1,060 +	0.7	7.1	-70	<5

Notes:

1) Abbreviations include: "deg c" indicates degrees Celsius; "ft" indicates feet; "ft bmp" indicates feet below reference measuring point; "gal" indicates gallons; "in" indicates inches; "mg/l" indicates milligrams per liter; "ml/min" indicates milliliters per minute; "mV" indicates millivolts; "NA" indicates not applicable; "NR" indicates not recorded; "ntu" indicates Nephelometric Turbidity units; "su" indicates standard units; "us/cm" indicates microsiemens per centimeter; and "+" indicates the parameter(s) may be used for stabilization calculations but cannot be used for other purposes.
2) Weather temperature units are in degrees Fahrenheit, unless otherwise noted.
3) Did indicator parameters reach stabilization? Yes
4) Was the two hour time limit reached? No
5) Calculations:
   - Head Above Pump Intake (ft) 62.84
   - Total Drawdown (ft) 0.02
   - Calculated Final Purge Volume (gal) NA
6) If Drawdown Did Not Stabilize or Stabilized Drawdown >0.3 ft, is Total Purge Volume > Calculated Final Purge Volume? NA

Well Sampling Worksheet
WWW RAP Field Data
AREA 5 2023-Q4 - HS-PMW-RI-104D
Kent County, MI

Well	HS-PMW-RI-104D / 2 in Diameter PVC
Sample Quarter	2023-Q4
Date	10/04/2023
Weather	Cloudy 72°F
Sampler Initials	BPT
Purging Device	Bladder-Pump: NA, Peristaltic-Pump: PER-1, Centrifugal-Pump: NA
Meters Used	YSI: Agile Rental 1, Turbidimeter: Agile Rental 1, Water-Level-Meter: WLM-3
Reference Measuring Point	PVC
Well Screen (ft bmp)	111.4 - 116.4
Measured Bottom Depth (ft bmp)	117.8
Sample Comment	13:25 - YSI not connected.
Initial Water Level Date/Time	10/04/2023 13:00
Initial Water Level Depth (ft bmp)	7.86
Pump/Tubing Intake Depth (ft bmp)	115.3
Tubing Length (ft)	120
Tubing Inner Diameter (in)	0.17
Purging Initiation Date/Time	10/04/2023 13:10
Total Purge Volume (gal)	3
Modified Sample	No
If Modified, Reasoning	
Sample Collection Information	Bottling-Start: 10/04/2023 14:10:00, Bottling-Stop: 10/04/2023 14:15:00, Parameters-Sampled: PFAS

Reading Time	Depth To Water (ft)	Cumulative Drawdown (ft)	Purge Rate (ml/min)	Temperature (deg c)	Specific Conductivity (us/cm)	Dissolved Oxygen (mg/l)	pH (su)	Oxidation-Reduction Potential (mV)	Turbidity (ntu)
13:25	7.91	0.05	200	NR	NR	NR	NR	NR	19
13:40	7.91	0.05	200	14	1,294 +	<0.5	7.3	-28	8
13:55	7.91	0.05	200	14	1,292 +	<0.5	7.3	-75	<5
14:00	7.91	0.05	200	14	1,290 +	<0.5	7.3	-79	<5
14:05	7.91	0.05	200	14	1,288 +	<0.5	7.3	-82	<5

Notes:

1) Abbreviations include: "deg c" indicates degrees Celsius; "ft" indicates feet; "ft bmp" indicates feet below reference measuring point; "gal" indicates gallons; "in" indicates inches; "mg/l" indicates milligrams per liter; "ml/min" indicates milliliters per minute; "mV" indicates millivolts; "NA" indicates not applicable; "NR" indicates not recorded; "ntu" indicates Nephelometric Turbidity units; "su" indicates standard units; "us/cm" indicates microsiemens per centimeter; and "+" indicates the parameter(s) may be used for stabilization calculations but cannot be used for other purposes.
2) Weather temperature units are in degrees Fahrenheit, unless otherwise noted.
3) Did indicator parameters reach stabilization? Yes
4) Was the two hour time limit reached? No
5) Calculations:
   - Head Above Pump Intake (ft) 107.44
   - Total Drawdown (ft) 0.05
   - Calculated Final Purge Volume (gal) NA
6) If Drawdown Did Not Stabilize or Stabilized Drawdown >0.3 ft, is Total Purge Volume > Calculated Final Purge Volume? NA

Well Sampling Worksheet
WWW RAP Field Data
PERIMETER 2023-Q4 - HS-PMW-RI-105A
Kent County, MI

Well	HS-PMW-RI-105A / 2 in Diameter PVC
Sample Quarter	2023-Q4
Date	10/25/2023
Weather	Cloudy 60 Degrees
Sampler Initials	RCP
Purging Device	Bladder-Pump: NA, Peristaltic-Pump: PER-3, Centrifugal-Pump: NA
Meters Used	YSI: Agile Rental 1, Turbidimeter: Agile Rental 1, Water-Level-Meter: WLM-3
Reference Measuring Point	PVC
Well Screen (ft bmp)	24.5 - 29.5
Measured Bottom Depth (ft bmp)	29.5
Sample Comment	10:45 - Low turbidity observed. Attached YSI after collecting readings.
Initial Water Level Date/Time	10/25/2023 10:40
Initial Water Level Depth (ft bmp)	22.50
Pump/Tubing Intake Depth (ft bmp)	27
Tubing Length (ft)	28.5
Tubing Inner Diameter (in)	0.17
Purging Initiation Date/Time	10/25/2023 10:40
Total Purge Volume (gal)	2
Modified Sample	No
If Modified, Reasoning	
Sample Collection Information	Bottling-Start: 10/25/2023 11:15:00, Bottling-Stop: 10/25/2023 11:20:00, Parameters-Sampled: PFAS

Reading Time	Depth To Water (ft)	Cumulative Drawdown (ft)	Purge Rate (ml/min)	Temperature (deg c)	Specific Conductivity (us/cm)	Dissolved Oxygen (mg/l)	pH (su)	Oxidation-Reduction Potential (mV)	Turbidity (ntu)
10:45	22.50	0.00	260	NR	NR	NR	NR	NR	7
11:00	22.50	0.00	260	13	1,637 +	7.1	7.3	140	<5
11:05	22.50	0.00	260	13	1,642 +	6.9	7.3	140	<5
11:10	22.50	0.00	260	13	1,633 +	6.8	7.3	139	<5

Notes:

1) Abbreviations include: "deg c" indicates degrees Celsius; "ft" indicates feet; "ft bmp" indicates feet below reference measuring point; "gal" indicates gallons; "in" indicates inches; "mg/l" indicates milligrams per liter; "ml/min" indicates milliliters per minute; "mV" indicates millivolts; "NA" indicates not applicable; "NR" indicates not recorded; "ntu" indicates Nephelometric Turbidity units; "su" indicates standard units; "us/cm" indicates microsiemens per centimeter; and "+" indicates the parameter(s) may be used for stabilization calculations but cannot be used for other purposes.
2) Weather temperature units are in degrees Fahrenheit, unless otherwise noted.
3) Did indicator parameters reach stabilization? Yes
4) Was the two hour time limit reached? No
5) Calculations:
   - Head Above Pump Intake (ft) 4.50
   - Total Drawdown (ft) 0.00
   - Calculated Final Purge Volume (gal) NA
6) If Drawdown Did Not Stabilize or Stabilized Drawdown >0.3 ft, is Total Purge Volume > Calculated Final Purge Volume? NA

Well Sampling Worksheet
WWW RAP Field Data
PERIMETER 2023-Q4 - HS-PMW-RI-105B
Kent County, MI

Well	HS-PMW-RI-105B / 2 in Diameter PVC
Sample Quarter	2023-Q4
Date	10/25/2023
Weather	Cloudy 60
Sampler Initials	NCK
Purging Device	Bladder-Pump: NA, Peristaltic-Pump: NA, Centrifugal-Pump: Mega Monsoon #2
Meters Used	YSI: Agile Rental 3, Turbidimeter: Agile Rental 3, Water-Level-Meter: WLM-2
Reference Measuring Point	PVC
Well Screen (ft bmp)	152.8 - 157.8
Measured Bottom Depth (ft bmp)	NR
Sample Comment	11:00 to 11:20 - Purge water observed to be very turbid. 11:30 - YSI Connected.
Initial Water Level Date/Time	10/25/2023 10:40
Initial Water Level Depth (ft bmp)	11.55
Pump/Tubing Intake Depth (ft bmp)	155.3
Tubing Length (ft)	157.3
Tubing Inner Diameter (in)	0.17
Purging Initiation Date/Time	10/25/2023 10:50
Total Purge Volume (gal)	13.5
Modified Sample	No
If Modified, Reasoning	
Sample Collection Information	Bottling-Start: 10/25/2023 12:35:00, Bottling-Stop: 10/25/2023 12:40:00, Parameters-Sampled: PFAS

Reading Time	Depth To Water (ft)	Cumulative Drawdown (ft)	Purge Rate (ml/min)	Temperature (deg c)	Specific Conductivity (us/cm)	Dissolved Oxygen (mg/l)	pH (su)	Oxidation-Reduction Potential (mV)	Turbidity (ntu)
11:00	11.62	0.07	500	NR	NR	NR	NR	NR	NR
11:10	11.62	0.07	500	NR	NR	NR	NR	NR	NR
11:20	11.60	0.05	500	NR	NR	NR	NR	NR	NR
11:30	11.60	0.05	500	12	1,464 +	<0.5	7.4	-32 +	170
11:40	11.60	0.05	500	12	1,452 +	<0.5	7.4	-81 +	94
11:50	11.60	0.05	500	12	1,453 +	<0.5	7.4	-90 +	65
12:20	11.60	0.05	500	11	1,449 +	<0.5	7.4	-103 +	33
12:25	11.60	0.05	500	11	1,447 +	<0.5	7.4	-104 +	22
12:30	11.60	0.05	500	11	1,446 +	<0.5	7.4	-105 +	21
12:35	11.60	0.05	500	11	1,447 +	<0.5	7.4	-106 +	20

Notes:

1) Abbreviations include: "deg c" indicates degrees Celsius; "ft" indicates feet; "ft bmp" indicates feet below reference measuring point; "gal" indicates gallons; "in" indicates inches; "mg/l" indicates milligrams per liter; "ml/min" indicates milliliters per minute; "mV" indicates millivolts; "NA" indicates not applicable; "NR" indicates not recorded; "ntu" indicates Nephelometric Turbidity units; "su" indicates standard units; "us/cm" indicates microsiemens per centimeter; and "+" indicates the parameter(s) may be used for stabilization calculations but cannot be used for other purposes.
2) Weather temperature units are in degrees Fahrenheit, unless otherwise noted.
3) Did indicator parameters reach stabilization? Yes
4) Was the two hour time limit reached? No
5) Calculations:
   - Head Above Pump Intake (ft) 143.75
   - Total Drawdown (ft) 0.05
   - Calculated Final Purge Volume (gal) NA
6) If Drawdown Did Not Stabilize or Stabilized Drawdown >0.3 ft, is Total Purge Volume > Calculated Final Purge Volume? NA

Well Sampling Worksheet
WWW RAP Field Data
PERIMETER 2023-Q4 - HS-PMW-RI-106A
Kent County, MI

Well	HS-PMW-RI-106A / 2 in Diameter PVC
Sample Quarter	2023-Q4
Date	10/30/2023
Weather	Cloudy 40s
Sampler Initials	JMS
Purging Device	Bladder-Pump: NA, Peristaltic-Pump: NA, Centrifugal-Pump: Mega Monsoon #2
Meters Used	YSI: Agile Rental 2, Turbidimeter: Agile Rental 2, Water-Level-Meter: WLM-2
Reference Measuring Point	PVC
Well Screen (ft bmp)	44.7 - 49.7
Measured Bottom Depth (ft bmp)	NR
Sample Comment	YSI connected at 12:10.
Initial Water Level Date/Time	10/30/2023 11:30
Initial Water Level Depth (ft bmp)	37.21
Pump/Tubing Intake Depth (ft bmp)	47.2
Tubing Length (ft)	52.2
Tubing Inner Diameter (in)	0.17
Purging Initiation Date/Time	10/30/2023 11:40
Total Purge Volume (gal)	5.5
Modified Sample	No
If Modified, Reasoning	
Sample Collection Information	Bottling-Start: 10/30/2023 12:40:00, Bottling-Stop: 10/30/2023 12:45:00, Parameters-Sampled: PFAS

Reading Time	Depth To Water (ft)	Cumulative Drawdown (ft)	Purge Rate (ml/min)	Temperature (deg c)	Specific Conductivity (us/cm)	Dissolved Oxygen (mg/l)	pH (su)	Oxidation-Reduction Potential (mV)	Turbidity (ntu)
11:50	37.24	0.03	350	NR	NR	NR	NR	NR	115
12:00	37.24	0.03	350	NR	NR	NR	NR	NR	28
12:10	37.24	0.03	350	11 +	574 +	<0.5	6.9	66	11
12:15	37.24	0.03	350	11 +	572 +	<0.5	6.9	53	8
12:20	37.24	0.03	350	11 +	570 +	<0.5	6.9	46	5
12:25	37.24	0.03	350	11 +	569 +	<0.5	6.9	39	5
12:30	37.24	0.03	350	11 +	567 +	<0.5	6.9	36	5

Notes:

1) Abbreviations include: "deg c" indicates degrees Celsius; "ft" indicates feet; "ft bmp" indicates feet below reference measuring point; "gal" indicates gallons; "in" indicates inches; "mg/l" indicates milligrams per liter; "ml/min" indicates milliliters per minute; "mV" indicates millivolts; "NA" indicates not applicable; "NR" indicates not recorded; "ntu" indicates Nephelometric Turbidity units; "su" indicates standard units; "us/cm" indicates microsiemens per centimeter; and "+" indicates the parameter(s) may be used for stabilization calculations but cannot be used for other purposes.
2) Weather temperature units are in degrees Fahrenheit, unless otherwise noted.
3) Did indicator parameters reach stabilization? Yes
4) Was the two hour time limit reached? No
5) Calculations:
   - Head Above Pump Intake (ft) 9.99
   - Total Drawdown (ft) 0.03
   - Calculated Final Purge Volume (gal) NA
6) If Drawdown Did Not Stabilize or Stabilized Drawdown >0.3 ft, is Total Purge Volume > Calculated Final Purge Volume? NA

Well Sampling Worksheet
WWW RAP Field Data
PERIMETER 2023-Q4 - HS-PMW-RI-106B
Kent County, MI

Well	HS-PMW-RI-106B / 2 in Diameter PVC
Sample Quarter	2023-Q4
Date	10/30/2023
Weather	Cloudy 40s
Sampler Initials	BPT
Purging Device	Bladder-Pump: BP-12, Peristaltic-Pump: NA, Centrifugal-Pump: NA
Meters Used	YSI: Agile Rental 3, Turbidimeter: Agile Rental 3, Water-Level-Meter: LAV
Reference Measuring Point	PVC
Well Screen (ft bmp)	204.7 - 209.7
Measured Bottom Depth (ft bmp)	NR
Sample Comment	
Initial Water Level Date/Time	10/30/2023 11:25
Initial Water Level Depth (ft bmp)	37.48
Pump/Tubing Intake Depth (ft bmp)	207.2
Tubing Length (ft)	212.2
Tubing Inner Diameter (in)	0.25
Purging Initiation Date/Time	10/30/2023 11:35
Total Purge Volume (gal)	6.5
Modified Sample	No
If Modified, Reasoning	
Sample Collection Information	Bottling-Start: 10/30/2023 13:40:00, Bottling-Stop: 10/30/2023 13:45:00, Parameters-Sampled: PFAS

Reading Time	Depth To Water (ft)	Cumulative Drawdown (ft)	Purge Rate (ml/min)	Temperature (deg c)	Specific Conductivity (us/cm)	Dissolved Oxygen (mg/l)	pH (su)	Oxidation-Reduction Potential (mV)	Turbidity (ntu)
11:45	37.50	0.02	200	10	2,308 +	1.4	7.3	154	>999
11:55	37.49	0.01	200	10	2,355 +	<0.5	7.2	82	>999
12:05	37.49	0.01	200	10	2,365 +	<0.5	7.2	35	906
12:15	37.49	0.01	200	10	2,369 +	<0.5	7.2	-3	627
12:25	37.49	0.01	200	10	2,366 +	<0.5	7.2	-17	438
12:35	37.49	0.01	200	10	2,372 +	<0.5	7.2	-31	248
12:45	37.49	0.01	200	10	2,371 +	<0.5	7.2	-35	164
12:55	37.49	0.01	200	10	2,371 +	<0.5	7.2	-41	84
13:05	37.49	0.01	200	10	2,367 +	<0.5	7.2	-44	29
13:15	37.49	0.01	200	10	2,369 +	<0.5	7.2	-46	21
13:20	37.49	0.01	200	10	2,366 +	<0.5	7.2	-47	16

Well Sampling Worksheet
WWW RAP Field Data
PERIMETER 2023-Q4 - HS-PMW-RI-106B
Kent County, MI

Well	HS-PMW-RI-106B / 2 in Diameter PVC
Sample Quarter	2023-Q4
Date	10/30/2023
Weather	Cloudy 40s
Sampler Initials	BPT
Purging Device	Bladder-Pump: BP-12, Peristaltic-Pump: NA, Centrifugal-Pump: NA
Meters Used	YSI: Agile Rental 3, Turbidimeter: Agile Rental 3, Water-Level-Meter: LAV
Reference Measuring Point	PVC
Well Screen (ft bmp)	204.7 - 209.7
Measured Bottom Depth (ft bmp)	NR
Sample Comment	
Initial Water Level Date/Time	10/30/2023 11:25
Initial Water Level Depth (ft bmp)	37.48
Pump/Tubing Intake Depth (ft bmp)	207.2
Tubing Length (ft)	212.2
Tubing Inner Diameter (in)	0.25
Purging Initiation Date/Time	10/30/2023 11:35
Total Purge Volume (gal)	6.5
Modified Sample	No
If Modified, Reasoning	
Sample Collection Information	Bottling-Start: 10/30/2023 13:40:00, Bottling-Stop: 10/30/2023 13:45:00, Parameters-Sampled: PFAS

Reading Time	Depth To Water (ft)	Cumulative Drawdown (ft)	Purge Rate (ml/min)	Temperature (deg c)	Specific Conductivity (us/cm)	Dissolved Oxygen (mg/l)	pH (su)	Oxidation-Reduction Potential (mV)	Turbidity (ntu)
13:25	37.49	0.01	200	10	2,360 +	<0.5	7.2	-48	13
13:30	37.49	0.01	200	10	2,365 +	<0.5	7.2	-49	10
13:35	37.49	0.01	200	10	2,363 +	<0.5	7.2	-50	9

Notes:

1) Abbreviations include: "deg c" indicates degrees Celsius; "ft" indicates feet; "ft bmp" indicates feet below reference measuring point; "gal" indicates gallons; "in" indicates inches; "mg/l" indicates milligrams per liter; "ml/min" indicates milliliters per minute; "mV" indicates millivolts; "NA" indicates not applicable; "NR" indicates not recorded; "ntu" indicates Nephelometric Turbidity units; "su" indicates standard units; "us/cm" indicates microsiemens per centimeter; and "+" indicates the parameter(s) may be used for stabilization calculations but cannot be used for other purposes.
2) Weather temperature units are in degrees Fahrenheit, unless otherwise noted.
3) Did indicator parameters reach stabilization? No
4) Was the two hour time limit reached? Yes
5) Calculations:
   - Head Above Pump Intake (ft) 169.72
   - Total Drawdown (ft) 0.01
   - Calculated Final Purge Volume (gal) NA
6) If Drawdown Did Not Stabilize or Stabilized Drawdown >0.3 ft, is Total Purge Volume > Calculated Final Purge Volume? NA

Well Sampling Worksheet
WWW RAP Field Data
AREA 5 2023-Q4 - HS-PMW-RI-107A
Kent County, MI

Well	HS-PMW-RI-107A / 2 in Diameter PVC
Sample Quarter	2023-Q4
Date	10/13/2023
Weather	48 Rainy
Sampler Initials	JMS
Purging Device	Bladder-Pump: NA, Peristaltic-Pump: NA, Centrifugal-Pump: Mega Monsoon #2
Meters Used	YSI: Agile Rental 1, Turbidimeter: Agile Rental 1, Water-Level-Meter: WLM-2
Reference Measuring Point	PVC
Well Screen (ft bmp)	79.2 - 84.2
Measured Bottom Depth (ft bmp)	NR
Sample Comment	YSI Connected 10:25.
Initial Water Level Date/Time	10/13/2023 09:55
Initial Water Level Depth (ft bmp)	48.33
Pump/Tubing Intake Depth (ft bmp)	81.7
Tubing Length (ft)	84
Tubing Inner Diameter (in)	0.17
Purging Initiation Date/Time	10/13/2023 10:00
Total Purge Volume (gal)	6.5
Modified Sample	No
If Modified, Reasoning	
Sample Collection Information	Bottling-Start: 10/13/2023 10:50:00, Bottling-Stop: 10/13/2023 10:55:00, Parameters-Sampled: PFAS

Reading Time	Depth To Water (ft)	Cumulative Drawdown (ft)	Purge Rate (ml/min)	Temperature (deg c)	Specific Conductivity (us/cm)	Dissolved Oxygen (mg/l)	pH (su)	Oxidation-Reduction Potential (mV)	Turbidity (ntu)
10:15	48.37	0.04	500	NR	NR	NR	NR	NR	24
10:25	48.37	0.04	500	11	628 +	<0.5	7.5	125	6
10:30	48.37	0.04	500	11	627 +	<0.5	7.5	119	<5
10:35	48.37	0.04	500	11	627 +	<0.5	7.5	111	<5
10:40	48.37	0.04	500	11	627 +	<0.5	7.5	106	<5
10:45	48.37	0.04	500	11	626 +	<0.5	7.5	101	<5

Notes:

1) Abbreviations include: "deg c" indicates degrees Celsius; "ft" indicates feet; "ft bmp" indicates feet below reference measuring point; "gal" indicates gallons; "in" indicates inches; "mg/l" indicates milligrams per liter; "ml/min" indicates milliliters per minute; "mV" indicates millivolts; "NA" indicates not applicable; "NR" indicates not recorded; "ntu" indicates Nephelometric Turbidity units; "su" indicates standard units; "us/cm" indicates microsiemens per centimeter; and "+" indicates the parameter(s) may be used for stabilization calculations but cannot be used for other purposes.
2) Weather temperature units are in degrees Fahrenheit, unless otherwise noted.
3) Did indicator parameters reach stabilization? Yes
4) Was the two hour time limit reached? No
5) Calculations:
   - Head Above Pump Intake (ft) 33.37
   - Total Drawdown (ft) 0.04
   - Calculated Final Purge Volume (gal) NA
6) If Drawdown Did Not Stabilize or Stabilized Drawdown >0.3 ft, is Total Purge Volume > Calculated Final Purge Volume? NA

Well Sampling Worksheet
WWW RAP Field Data
AREA 5 2023-Q4 - HS-PMW-RI-107B
Kent County, MI

Well	HS-PMW-RI-107B / 2 in Diameter PVC
Sample Quarter	2023-Q4
Date	10/13/2023
Weather	Rain 50
Sampler Initials	NCK
Purging Device	Bladder-Pump: BP-10, Peristaltic-Pump: NA, Centrifugal-Pump: NA
Meters Used	YSI: Agile Rental 1, Turbidimeter: Agile Rental 1, Water-Level-Meter: WLM-4
Reference Measuring Point	PVC
Well Screen (ft bmp)	175.2 - 180.2
Measured Bottom Depth (ft bmp)	NR
Sample Comment	13:30 - Air sputtering out of the water line. Connected YSI.
Initial Water Level Date/Time	10/13/2023 12:25
Initial Water Level Depth (ft bmp)	63.11
Pump/Tubing Intake Depth (ft bmp)	177.7
Tubing Length (ft)	181
Tubing Inner Diameter (in)	0.25
Purging Initiation Date/Time	10/13/2023 12:30
Total Purge Volume (gal)	12.5
Modified Sample	No
If Modified, Reasoning	
Sample Collection Information	Bottling-Start: 10/13/2023 14:30:00, Bottling-Stop: 10/13/2023 14:35:00, Parameters-Sampled: PFAS

Reading Time	Depth To Water (ft)	Cumulative Drawdown (ft)	Purge Rate (ml/min)	Temperature (deg c)	Specific Conductivity (us/cm)	Dissolved Oxygen (mg/l)	pH (su)	Oxidation-Reduction Potential (mV)	Turbidity (ntu)
12:35	63.17	0.06	400	NR	NR	NR	NR	NR	NR
12:40	63.17	0.06	400	NR	NR	NR	NR	NR	NR
13:00	63.17	0.06	400	NR	NR	NR	NR	NR	NR
13:30	63.17	0.06	400	NR	NR	NR	NR	NR	90
14:00	63.17	0.06	400	10	1,188 +	1.3	7.2	84	9
14:05	63.17	0.06	400	10	1,188 +	0.9	7.2	82	8

Well Sampling Worksheet
WWW RAP Field Data
AREA 5 2023-Q4 - HS-PMW-RI-107B
Kent County, MI

Well	HS-PMW-RI-107B / 2 in Diameter PVC
Sample Quarter	2023-Q4
Date	10/13/2023
Weather	Rain 50
Sampler Initials	NCK
Purging Device	Bladder-Pump: BP-10, Peristaltic-Pump: NA, Centrifugal-Pump: NA
Meters Used	YSI: Agile Rental 1, Turbidimeter: Agile Rental 1, Water-Level-Meter: WLM-4
Reference Measuring Point	PVC
Well Screen (ft bmp)	175.2 - 180.2
Measured Bottom Depth (ft bmp)	NR
Sample Comment	13:30 - Air sputtering out of the water line. Connected YSI.
Initial Water Level Date/Time	10/13/2023 12:25
Initial Water Level Depth (ft bmp)	63.11
Pump/Tubing Intake Depth (ft bmp)	177.7
Tubing Length (ft)	181
Tubing Inner Diameter (in)	0.25
Purging Initiation Date/Time	10/13/2023 12:30
Total Purge Volume (gal)	12.5
Modified Sample	No
If Modified, Reasoning	
Sample Collection Information	Bottling-Start: 10/13/2023 14:30:00, Bottling-Stop: 10/13/2023 14:35:00, Parameters-Sampled: PFAS

Reading Time	Depth To Water (ft)	Cumulative Drawdown (ft)	Purge Rate (ml/min)	Temperature (deg c)	Specific Conductivity (us/cm)	Dissolved Oxygen (mg/l)	pH (su)	Oxidation-Reduction Potential (mV)	Turbidity (ntu)
14:20	63.17	0.06	400	10	1,188 +	0.6	7.2	78	<5
14:25	63.17	0.06	400	10	1,189 +	0.6	7.2	77	<5
14:30	63.17	0.06	400	10	1,189 +	0.6	7.2	77	<5

Notes:

1) Abbreviations include: "deg c" indicates degrees Celsius; "ft" indicates feet; "ft bmp" indicates feet below reference measuring point; "gal" indicates gallons; "in" indicates inches; "mg/l" indicates milligrams per liter; "ml/min" indicates milliliters per minute; "mV" indicates millivolts; "NA" indicates not applicable; "NR" indicates not recorded; "ntu" indicates Nephelometric Turbidity units; "su" indicates standard units; "us/cm" indicates microsiemens per centimeter; and "+" indicates the parameter(s) may be used for stabilization calculations but cannot be used for other purposes.
2) Weather temperature units are in degrees Fahrenheit, unless otherwise noted.
3) Did indicator parameters reach stabilization? Yes
4) Was the two hour time limit reached? Yes
5) Calculations:
   - Head Above Pump Intake (ft) 114.59
   - Total Drawdown (ft) 0.06
   - Calculated Final Purge Volume (gal) NA
6) If Drawdown Did Not Stabilize or Stabilized Drawdown >0.3 ft, is Total Purge Volume > Calculated Final Purge Volume? NA

Well Sampling Worksheet
WWW RAP Field Data
AREA 5 2023-Q4 - HS-PMW-RI-107C
Kent County, MI

Well	HS-PMW-RI-107C / 2 in Diameter PVC
Sample Quarter	2023-Q4
Date	10/13/2023
Weather	40s, Rain
Sampler Initials	AJG
Purging Device	Bladder-Pump: BP-11, Peristaltic-Pump: NA, Centrifugal-Pump: NA
Meters Used	YSI: Agile Rental 3, Turbidimeter: Agile Rental 3, Water-Level-Meter: WLM-1
Reference Measuring Point	PVC
Well Screen (ft bmp)	184.7 - 189.7
Measured Bottom Depth (ft bmp)	189.7
Sample Comment	YSI Connected at 10:35.
Initial Water Level Date/Time	10/13/2023 10:05
Initial Water Level Depth (ft bmp)	62.76
Pump/Tubing Intake Depth (ft bmp)	187.2
Tubing Length (ft)	189
Tubing Inner Diameter (in)	0.25
Purging Initiation Date/Time	10/13/2023 10:10
Total Purge Volume (gal)	4.2
Modified Sample	No
If Modified, Reasoning	
Sample Collection Information	Bottling-Start: 10/13/2023 10:50:00, Bottling-Stop: 10/13/2023 10:55:00, Parameters-Sampled: PFAS

Reading Time	Depth To Water (ft)	Cumulative Drawdown (ft)	Purge Rate (ml/min)	Temperature (deg c)	Specific Conductivity (us/cm)	Dissolved Oxygen (mg/l)	pH (su)	Oxidation-Reduction Potential (mV)	Turbidity (ntu)
10:20	62.77	0.01	450	NR	NR	NR	NR	NR	293
10:30	62.77	0.01	450	NR	NR	NR	NR	NR	10
10:35	62.77	0.01	450	11	1,248 +	0.8	7.1	260	5
10:40	62.77	0.01	450	11	1,250 +	0.8	7.1	259	4
10:45	62.77	0.01	450	11	1,250 +	0.8	7.1	259	4

Notes:

1) Abbreviations include: "deg c" indicates degrees Celsius; "ft" indicates feet; "ft bmp" indicates feet below reference measuring point; "gal" indicates gallons; "in" indicates inches; "mg/l" indicates milligrams per liter; "ml/min" indicates milliliters per minute; "mV" indicates millivolts; "NA" indicates not applicable; "NR" indicates not recorded; "ntu" indicates Nephelometric Turbidity units; "su" indicates standard units; "us/cm" indicates microsiemens per centimeter; and "+" indicates the parameter(s) may be used for stabilization calculations but cannot be used for other purposes.
2) Weather temperature units are in degrees Fahrenheit, unless otherwise noted.
3) Did indicator parameters reach stabilization? Yes
4) Was the two hour time limit reached? No
5) Calculations:
   - Head Above Pump Intake (ft) 124.44
   - Total Drawdown (ft) 0.01
   - Calculated Final Purge Volume (gal) NA
6) If Drawdown Did Not Stabilize or Stabilized Drawdown >0.3 ft, is Total Purge Volume > Calculated Final Purge Volume? NA

Well Sampling Worksheet
WWW RAP Field Data
AREA 5 2023-Q4 - HS-PMW-RI-107D
Kent County, MI

Well	HS-PMW-RI-107D / 2 in Diameter PVC
Sample Quarter	2023-Q4
Date	10/13/2023
Weather	Rain 50
Sampler Initials	NCK
Purging Device	Bladder-Pump: BP-12, Peristaltic-Pump: NA, Centrifugal-Pump: NA
Meters Used	YSI: Agile Rental 1, Turbidimeter: Agile Rental 1, Water-Level-Meter: WLM-4
Reference Measuring Point	PVC
Well Screen (ft bmp)	198.7 - 203.7
Measured Bottom Depth (ft bmp)	NR
Sample Comment	10:40 to 11:00 - Purge water was observed to be very turbid. 11:30 - YSI connected.
Initial Water Level Date/Time	10/13/2023 10:15
Initial Water Level Depth (ft bmp)	63.11
Pump/Tubing Intake Depth (ft bmp)	201.2
Tubing Length (ft)	204
Tubing Inner Diameter (in)	0.25
Purging Initiation Date/Time	10/13/2023 10:20
Total Purge Volume (gal)	12.5
Modified Sample	No
If Modified, Reasoning	
Sample Collection Information	Bottling-Start: 10/13/2023 12:20:00, Bottling-Stop: 10/13/2023 12:25:00, Parameters-Sampled: PFAS

Reading Time	Depth To Water (ft)	Cumulative Drawdown (ft)	Purge Rate (ml/min)	Temperature (deg c)	Specific Conductivity (us/cm)	Dissolved Oxygen (mg/l)	pH (su)	Oxidation-Reduction Potential (mV)	Turbidity (ntu)
10:30	63.15	0.04	400	NR	NR	NR	NR	NR	NR
10:40	63.15	0.04	400	NR	NR	NR	NR	NR	NR
11:00	63.15	0.04	400	NR	NR	NR	NR	NR	NR
11:30	63.15	0.04	400	10	1,425 +	<0.5	7.0	100	75
11:45	63.15	0.04	400	10	1,445 +	<0.5	7.0	80	50
12:00	63.15	0.04	400	10	1,440 +	<0.5	7.0	30	20
12:05	63.15	0.04	400	10	1,449 +	<0.5	7.0	29	16

Well Sampling Worksheet
WWW RAP Field Data
AREA 5 2023-Q4 - HS-PMW-RI-107D
Kent County, MI

Well	HS-PMW-RI-107D / 2 in Diameter PVC
Sample Quarter	2023-Q4
Date	10/13/2023
Weather	Rain 50
Sampler Initials	NCK
Purging Device	Bladder-Pump: BP-12, Peristaltic-Pump: NA, Centrifugal-Pump: NA
Meters Used	YSI: Agile Rental 1, Turbidimeter: Agile Rental 1, Water-Level-Meter: WLM-4
Reference Measuring Point	PVC
Well Screen (ft bmp)	198.7 - 203.7
Measured Bottom Depth (ft bmp)	NR
Sample Comment	10:40 to 11:00 - Purge water was observed to be very turbid. 11:30 - YSI connected.
Initial Water Level Date/Time	10/13/2023 10:15
Initial Water Level Depth (ft bmp)	63.11
Pump/Tubing Intake Depth (ft bmp)	201.2
Tubing Length (ft)	204
Tubing Inner Diameter (in)	0.25
Purging Initiation Date/Time	10/13/2023 10:20
Total Purge Volume (gal)	12.5
Modified Sample	No
If Modified, Reasoning	
Sample Collection Information	Bottling-Start: 10/13/2023 12:20:00, Bottling-Stop: 10/13/2023 12:25:00, Parameters-Sampled: PFAS

Reading Time	Depth To Water (ft)	Cumulative Drawdown (ft)	Purge Rate (ml/min)	Temperature (deg c)	Specific Conductivity (us/cm)	Dissolved Oxygen (mg/l)	pH (su)	Oxidation-Reduction Potential (mV)	Turbidity (ntu)
12:10	63.15	0.04	400	10	1,451 +	<0.5	7.0	29	18
12:15	63.15	0.04	400	10	1,445 +	<0.5	7.0	20	15
12:20	63.15	0.04	400	10	1,444 +	<0.5	7.0	20	9

Notes:

1) Abbreviations include: "deg c" indicates degrees Celsius; "ft" indicates feet; "ft bmp" indicates feet below reference measuring point; "gal" indicates gallons; "in" indicates inches; "mg/l" indicates milligrams per liter; "ml/min" indicates milliliters per minute; "mV" indicates millivolts; "NA" indicates not applicable; "NR" indicates not recorded; "ntu" indicates Nephelometric Turbidity units; "su" indicates standard units; "us/cm" indicates microsiemens per centimeter; and "+" indicates the parameter(s) may be used for stabilization calculations but cannot be used for other purposes.
2) Weather temperature units are in degrees Fahrenheit, unless otherwise noted.
3) Did indicator parameters reach stabilization? No
4) Was the two hour time limit reached? Yes
5) Calculations:
   - Head Above Pump Intake (ft) 138.09
   - Total Drawdown (ft) 0.04
   - Calculated Final Purge Volume (gal) NA
6) If Drawdown Did Not Stabilize or Stabilized Drawdown >0.3 ft, is Total Purge Volume > Calculated Final Purge Volume? NA

Well Sampling Worksheet
WWW RAP Field Data
AREA 6 2023-Q4 - HS-PMW-RI-108A
Kent County, MI

Well	HS-PMW-RI-108A / 2 in Diameter PVC
Sample Quarter	2023-Q4
Date	12/19/2023
Weather	Cloudy 30s F
Sampler Initials	NCK
Purging Device	Bladder-Pump: NA, Peristaltic-Pump: PER-3, Centrifugal-Pump: NA
Meters Used	YSI: Agile Rental 1, Turbidimeter: Agile Rental 1, Water-Level-Meter: WLM-1
Reference Measuring Point	PVC
Well Screen (ft bmp)	65.2 - 70.2
Measured Bottom Depth (ft bmp)	NR
Sample Comment	YSI Connected at 12:10. Collected duplicate sample and MS/MSD.
Initial Water Level Date/Time	12/19/2023 10:15
Initial Water Level Depth (ft bmp)	17.02
Pump/Tubing Intake Depth (ft bmp)	67.7
Tubing Length (ft)	70
Tubing Inner Diameter (in)	0.17
Purging Initiation Date/Time	12/19/2023 10:30
Total Purge Volume (gal)	9.5
Modified Sample	No
If Modified, Reasoning	
Sample Collection Information	Bottling-Start: 12/19/2023 12:30:00, Bottling-Stop: 12/19/2023 12:30:00, Parameters-Sampled: PFAS

Reading Time	Depth To Water (ft)	Cumulative Drawdown (ft)	Purge Rate (ml/min)	Temperature (deg c)	Specific Conductivity (us/cm)	Dissolved Oxygen (mg/l)	pH (su)	Oxidation-Reduction Potential (mV)	Turbidity (ntu)
10:40	17.08	0.06	50	NR	NR	NR	NR	NR	NR
10:50	17.20	0.18	100	NR	NR	NR	NR	NR	NR
11:00	17.26	0.24	300	NR	NR	NR	NR	NR	NR
12:10	17.26	0.24	300	11	645 +	<0.5	7.4	-142	<5
12:15	17.26	0.24	300	11	645 +	<0.5	7.4	-146	<5
12:20	17.26	0.24	300	11	645 +	<0.5	7.4	-150	<5
12:25	17.26	0.24	300	11	645 +	<0.5	7.4	-153	<5
12:30	17.26	0.24	300	11	645 +	<0.5	7.4	-153	<5

Notes:

1) Abbreviations include: "deg c" indicates degrees Celsius; "ft" indicates feet; "ft bmp" indicates feet below reference measuring point; "gal" indicates gallons; "in" indicates inches; "mg/l" indicates milligrams per liter; "ml/min" indicates milliliters per minute; "mV" indicates millivolts; "NA" indicates not applicable; "NR" indicates not recorded; "ntu" indicates Nephelometric Turbidity units; "su" indicates standard units; "us/cm" indicates microsiemens per centimeter; and "+" indicates the parameter(s) may be used for stabilization calculations but cannot be used for other purposes.
2) Weather temperature units are in degrees Fahrenheit, unless otherwise noted.
3) Did indicator parameters reach stabilization? Yes
4) Was the two hour time limit reached? Yes
5) Calculations:
   - Head Above Pump Intake (ft) 50.68
   - Total Drawdown (ft) 0.24
   - Calculated Final Purge Volume (gal) NA
6) If Drawdown Did Not Stabilize or Stabilized Drawdown >0.3 ft, is Total Purge Volume > Calculated Final Purge Volume? NA

Well Sampling Worksheet
WWW RAP Field Data
AREA 6 2023-Q4 - HS-PMW-RI-108B
Kent County, MI

Well	HS-PMW-RI-108B / 2 in Diameter PVC
Sample Quarter	2023-Q4
Date	12/19/2023
Weather	Cloudy, 20's to 30's F
Sampler Initials	CBM
Purging Device	Bladder-Pump: NA, Peristaltic-Pump: NA, Centrifugal-Pump: Mega Monsoon #2
Meters Used	YSI: Agile Rental 2, Turbidimeter: Agile Rental 2, Water-Level-Meter: WLM-2
Reference Measuring Point	PVC
Well Screen (ft bmp)	131.6 - 136.6
Measured Bottom Depth (ft bmp)	136.6
Sample Comment	12:10 - Adjusted flow rate to 50 mL/min from 75 mL/min. 12:30 - Collected MS/MSD (HS-PMW-RI-108B MS/MSD).
Initial Water Level Date/Time	12/19/2023 10:20
Initial Water Level Depth (ft bmp)	74.54
Pump/Tubing Intake Depth (ft bmp)	134.1
Tubing Length (ft)	136
Tubing Inner Diameter (in)	0.17
Purging Initiation Date/Time	12/19/2023 10:30
Total Purge Volume (gal)	2
Modified Sample	Yes
If Modified, Reasoning	> 0.3 ft drawdown at 50 ml/min
Sample Collection Information	Bottling-Start: 12/19/2023 12:30:00, Bottling-Stop: 12/19/2023 12:50:00, Parameters-Sampled: PFAS

Reading Time	Depth To Water (ft)	Cumulative Drawdown (ft)	Purge Rate (ml/min)	Temperature (deg c)	Specific Conductivity (us/cm)	Dissolved Oxygen (mg/l)	pH (su)	Oxidation-Reduction Potential (mV)	Turbidity (ntu)
12:10	75.71	1.17	50	10	731 +	0.9	7.9	106	>999
12:15	75.59	1.05	50	9	725 +	<0.5	7.8	13	>999
12:20	75.52	0.98	50	8	724 +	<0.5	7.8	-50	>999
12:25	75.47	0.93	50	8	721 +	<0.5	7.8	-81	>999
12:30	75.42	0.88	50	8	720 +	<0.5	7.8	-99	>999

Notes:

1) Abbreviations include: "deg c" indicates degrees Celsius; "ft" indicates feet; "ft bmp" indicates feet below reference measuring point; "gal" indicates gallons; "in" indicates inches; "mg/l" indicates milligrams per liter; "ml/min" indicates milliliters per minute; "mV" indicates millivolts; "NA" indicates not applicable; "NR" indicates not recorded; "ntu" indicates Nephelometric Turbidity units; "su" indicates standard units; "us/cm" indicates microsiemens per centimeter; and "+" indicates the parameter(s) may be used for stabilization calculations but cannot be used for other purposes.
2) Weather temperature units are in degrees Fahrenheit, unless otherwise noted.
3) Did indicator parameters reach stabilization? No * Turbidity Out of Range
4) Was the two hour time limit reached? Yes
5) Calculations:
   - Head Above Pump Intake (ft) 59.56
   - Total Drawdown (ft) 0.88
   - Calculated Final Purge Volume (gal) 0.3
6) If Drawdown Did Not Stabilize or Stabilized Drawdown >0.3 ft, is Total Purge Volume > Calculated Final Purge Volume? Yes

Well Sampling Worksheet
WWW RAP Field Data
AREA 6 2023-Q4 - HS-PMW-RI-108D
Kent County, MI

Well	HS-PMW-RI-108D / 2 in Diameter PVC
Sample Quarter	2023-Q4
Date	12/19/2023
Weather	Cloudy, 20's to 30's F
Sampler Initials	CBM
Purging Device	Bladder-Pump: BP-10, Peristaltic-Pump: NA, Centrifugal-Pump: NA
Meters Used	YSI: Agile Rental 1, Turbidimeter: Agile Rental 1, Water-Level-Meter: WLM-4
Reference Measuring Point	PVC
Well Screen (ft bmp)	223.0 - 228.0
Measured Bottom Depth (ft bmp)	228
Sample Comment	
Initial Water Level Date/Time	12/19/2023 12:15
Initial Water Level Depth (ft bmp)	74.92
Pump/Tubing Intake Depth (ft bmp)	225.5
Tubing Length (ft)	227
Tubing Inner Diameter (in)	0.25
Purging Initiation Date/Time	12/19/2023 12:25
Total Purge Volume (gal)	2
Modified Sample	No
If Modified, Reasoning	
Sample Collection Information	Bottling-Start: 12/19/2023 14:25:00, Bottling-Stop: 12/19/2023 14:35:00, Parameters-Sampled: PFAS

Reading Time	Depth To Water (ft)	Cumulative Drawdown (ft)	Purge Rate (ml/min)	Temperature (deg c)	Specific Conductivity (us/cm)	Dissolved Oxygen (mg/l)	pH (su)	Oxidation-Reduction Potential (mV)	Turbidity (ntu)
14:15	75.10	0.18	50	8	582 +	1.3	7.5	105	43
14:20	75.11	0.19	50	8	582 +	0.6	7.5	81	34
14:25	75.08	0.16	50	8	579 +	0.5	7.4	43	23

Notes:

1) Abbreviations include: "deg c" indicates degrees Celsius; "ft" indicates feet; "ft bmp" indicates feet below reference measuring point; "gal" indicates gallons; "in" indicates inches; "mg/l" indicates milligrams per liter; "ml/min" indicates milliliters per minute; "mV" indicates millivolts; "NA" indicates not applicable; "NR" indicates not recorded; "ntu" indicates Nephelometric Turbidity units; "su" indicates standard units; "us/cm" indicates microsiemens per centimeter; and "+" indicates the parameter(s) may be used for stabilization calculations but cannot be used for other purposes.
2) Weather temperature units are in degrees Fahrenheit, unless otherwise noted.
3) Did indicator parameters reach stabilization? No
4) Was the two hour time limit reached? Yes
5) Calculations:
   - Head Above Pump Intake (ft) 150.58
   - Total Drawdown (ft) 0.16
   - Calculated Final Purge Volume (gal) 0.62
6) If Drawdown Did Not Stabilize or Stabilized Drawdown >0.3 ft, is Total Purge Volume > Calculated Final Purge Volume? Yes

Well Sampling Worksheet
WWW RAP Field Data
AREA 6 2023-Q4 - HS-PMW-RI-109A
Kent County, MI

Well	HS-PMW-RI-109A / 2 in Diameter PVC
Sample Quarter	2023-Q4
Date	12/14/2023
Weather	Clear 30s
Sampler Initials	NCK
Purging Device	Bladder-Pump: NA, Peristaltic-Pump: PER-1, Centrifugal-Pump: NA
Meters Used	YSI: Agile Rental 2, Turbidimeter: Agile Rental 2, Water-Level-Meter: WLM-2
Reference Measuring Point	PVC
Well Screen (ft bmp)	13.6 - 18.6
Measured Bottom Depth (ft bmp)	NR
Sample Comment	YSI Connected at 14:35.
Initial Water Level Date/Time	12/14/2023 13:30
Initial Water Level Depth (ft bmp)	8.97
Pump/Tubing Intake Depth (ft bmp)	16.1
Tubing Length (ft)	19
Tubing Inner Diameter (in)	0.17
Purging Initiation Date/Time	12/14/2023 13:40
Total Purge Volume (gal)	1
Modified Sample	No
If Modified, Reasoning	
Sample Collection Information	Bottling-Start: 12/14/2023 14:55:00, Bottling-Stop: 12/14/2023 15:05:00, Parameters-Sampled: PFAS

Reading Time	Depth To Water (ft)	Cumulative Drawdown (ft)	Purge Rate (ml/min)	Temperature (deg c)	Specific Conductivity (us/cm)	Dissolved Oxygen (mg/l)	pH (su)	Oxidation-Reduction Potential (mV)	Turbidity (ntu)
13:50	9.21	0.24	50	NR	NR	NR	NR	NR	NR
14:00	9.51	0.54	50	NR	NR	NR	NR	NR	NR
14:35	10.43	1.46	50	11	570 +	8.2	7.3	262	<5
14:40	10.50	1.53	50	11	567 +	8.5	7.3	264	<5
14:45	10.62	1.65	50	12	567 +	7.6	7.3	268	<5
14:50	10.62	1.65	50	11	568 +	8.0	7.3	272	<5
14:55	10.62	1.65	50	11	570 +	8.0	7.3	273	<5

Notes:

1) Abbreviations include: "deg c" indicates degrees Celsius; "ft" indicates feet; "ft bmp" indicates feet below reference measuring point; "gal" indicates gallons; "in" indicates inches; "mg/l" indicates milligrams per liter; "ml/min" indicates milliliters per minute; "mV" indicates millivolts; "NA" indicates not applicable; "NR" indicates not recorded; "ntu" indicates Nephelometric Turbidity units; "su" indicates standard units; "us/cm" indicates microsiemens per centimeter; and "+" indicates the parameter(s) may be used for stabilization calculations but cannot be used for other purposes.
2) Weather temperature units are in degrees Fahrenheit, unless otherwise noted.
3) Did indicator parameters reach stabilization? Yes
4) Was the two hour time limit reached? No
5) Calculations:
   - Head Above Pump Intake (ft) 7.13
   - Total Drawdown (ft) 1.65
   - Calculated Final Purge Volume (gal) 0.29
6) If Drawdown Did Not Stabilize or Stabilized Drawdown >0.3 ft, is Total Purge Volume > Calculated Final Purge Volume? Yes

Well Sampling Worksheet
WWW RAP Field Data
AREA 6 2023-Q4 - HS-PMW-RI-109B
Kent County, MI

Well	HS-PMW-RI-109B / 2 in Diameter PVC
Sample Quarter	2023-Q4
Date	12/14/2023
Weather	Clear 30s
Sampler Initials	NCK
Purging Device	Bladder-Pump: NA, Peristaltic-Pump: NA, Centrifugal-Pump: Mega Monsoon #1
Meters Used	YSI: Agile Rental 2, Turbidimeter: Agile Rental 2, Water-Level-Meter: WLM-1
Reference Measuring Point	PVC
Well Screen (ft bmp)	124.6 - 129.6
Measured Bottom Depth (ft bmp)	NR
Sample Comment	YSI Connected at 15:10.
Initial Water Level Date/Time	12/14/2023 13:50
Initial Water Level Depth (ft bmp)	64.85
Pump/Tubing Intake Depth (ft bmp)	127.1
Tubing Length (ft)	130
Tubing Inner Diameter (in)	0.17
Purging Initiation Date/Time	12/14/2023 14:00
Total Purge Volume (gal)	14
Modified Sample	No
If Modified, Reasoning	
Sample Collection Information	Bottling-Start: 12/14/2023 16:00:00, Bottling-Stop: 12/14/2023 16:05:00, Parameters-Sampled: PFAS

Reading Time	Depth To Water (ft)	Cumulative Drawdown (ft)	Purge Rate (ml/min)	Temperature (deg c)	Specific Conductivity (us/cm)	Dissolved Oxygen (mg/l)	pH (su)	Oxidation-Reduction Potential (mV)	Turbidity (ntu)
14:10	64.90	0.05	450	NR	NR	NR	NR	NR	NR
14:20	64.90	0.05	450	NR	NR	NR	NR	NR	NR
15:10	64.90	0.05	450	12	870 +	2.4	7.1	224	7
15:15	64.90	0.05	450	12	870 +	2.4	7.1	212	5
15:20	64.90	0.05	450	12	870 +	2.4	7.1	200	<5
15:50	64.90	0.05	450	12	870 +	2.3	7.1	169	<5
15:55	64.90	0.05	450	12	870 +	2.3	7.1	169	<5
16:00	64.90	0.05	450	12	870 +	2.3	7.1	170	<5

Notes:

1) Abbreviations include: "deg c" indicates degrees Celsius; "ft" indicates feet; "ft bmp" indicates feet below reference measuring point; "gal" indicates gallons; "in" indicates inches; "mg/l" indicates milligrams per liter; "ml/min" indicates milliliters per minute; "mV" indicates millivolts; "NA" indicates not applicable; "NR" indicates not recorded; "ntu" indicates Nephelometric Turbidity units; "su" indicates standard units; "us/cm" indicates microsiemens per centimeter; and "+" indicates the parameter(s) may be used for stabilization calculations but cannot be used for other purposes.
2) Weather temperature units are in degrees Fahrenheit, unless otherwise noted.
3) Did indicator parameters reach stabilization? Yes
4) Was the two hour time limit reached? Yes
5) Calculations:
   - Head Above Pump Intake (ft) 62.25
   - Total Drawdown (ft) 0.05
   - Calculated Final Purge Volume (gal) NA
6) If Drawdown Did Not Stabilize or Stabilized Drawdown >0.3 ft, is Total Purge Volume > Calculated Final Purge Volume? NA

Well Sampling Worksheet
WWW RAP Field Data
AREA 6 2023-Q4 - HS-PMW-RI-109C
Kent County, MI

Well	HS-PMW-RI-109C / 2 in Diameter PVC
Sample Quarter	2023-Q4
Date	12/14/2023
Weather	P. Sunny, 30's-40's.
Sampler Initials	CBM
Purging Device	Bladder-Pump: BP-11, Peristaltic-Pump: NA, Centrifugal-Pump: NA
Meters Used	YSI: Agile Rental 1, Turbidimeter: Agile Rental 1, Water-Level-Meter: WLM-4
Reference Measuring Point	PVC
Well Screen (ft bmp)	143.7 - 148.7
Measured Bottom Depth (ft bmp)	148.7
Sample Comment	
Initial Water Level Date/Time	12/14/2023 13:45
Initial Water Level Depth (ft bmp)	64.71
Pump/Tubing Intake Depth (ft bmp)	146.2
Tubing Length (ft)	148
Tubing Inner Diameter (in)	0.25
Purging Initiation Date/Time	12/14/2023 14:05
Total Purge Volume (gal)	1.6
Modified Sample	No
If Modified, Reasoning	
Sample Collection Information	Bottling-Start: 12/14/2023 16:05:00, Bottling-Stop: 12/14/2023 16:15:00, Parameters-Sampled: PFAS

Reading Time	Depth To Water (ft)	Cumulative Drawdown (ft)	Purge Rate (ml/min)	Temperature (deg c)	Specific Conductivity (us/cm)	Dissolved Oxygen (mg/l)	pH (su)	Oxidation-Reduction Potential (mV)	Turbidity (ntu)
15:10	65.20	0.49	60	10	423 +	<0.5	7.5	-3	305
15:45	65.16	0.45	60	10	423 +	<0.5	7.6	-100	74
15:50	65.14	0.43	60	10	422 +	<0.5	7.6	-106	42
15:55	65.06	0.35	60	10	422 +	<0.5	7.6	-109	33
16:00	64.99	0.28	60	10	422 +	<0.5	7.6	-111	27
16:05	64.99	0.28	60	10	422 +	<0.5	7.6	-113	24

Notes:

1) Abbreviations include: "deg c" indicates degrees Celsius; "ft" indicates feet; "ft bmp" indicates feet below reference measuring point; "gal" indicates gallons; "in" indicates inches; "mg/l" indicates milligrams per liter; "ml/min" indicates milliliters per minute; "mV" indicates millivolts; "NA" indicates not applicable; "NR" indicates not recorded; "ntu" indicates Nephelometric Turbidity units; "su" indicates standard units; "us/cm" indicates microsiemens per centimeter; and "+" indicates the parameter(s) may be used for stabilization calculations but cannot be used for other purposes.
2) Weather temperature units are in degrees Fahrenheit, unless otherwise noted.
3) Did indicator parameters reach stabilization? No
4) Was the two hour time limit reached? Yes
5) Calculations:
   - Head Above Pump Intake (ft) 81.49
   - Total Drawdown (ft) 0.28
   - Calculated Final Purge Volume (gal) 0.43
6) If Drawdown Did Not Stabilize or Stabilized Drawdown >0.3 ft, is Total Purge Volume > Calculated Final Purge Volume? Yes

Well Sampling Worksheet
WWW RAP Field Data
AREA 11/12 2023-Q4 - HS-PMW-RI-111A
Kent County, MI

Well	HS-PMW-RI-111A / 2 in Diameter PVC
Sample Quarter	2023-Q4
Date	12/13/2023
Weather	Cloudy, 30's.
Sampler Initials	CBM
Purging Device	Bladder-Pump: NA, Peristaltic-Pump: PER-3, Centrifugal-Pump: NA
Meters Used	YSI: Agile Rental 2, Turbidimeter: Agile Rental 2, Water-Level-Meter: WLM-1
Reference Measuring Point	PVC
Well Screen (ft bmp)	12.9 - 17.9
Measured Bottom Depth (ft bmp)	17.9
Sample Comment	
Initial Water Level Date/Time	12/13/2023 11:20
Initial Water Level Depth (ft bmp)	8.35
Pump/Tubing Intake Depth (ft bmp)	15.4
Tubing Length (ft)	18
Tubing Inner Diameter (in)	0.17
Purging Initiation Date/Time	12/13/2023 11:30
Total Purge Volume (gal)	7.05
Modified Sample	No
If Modified, Reasoning	
Sample Collection Information	Bottling-Start: 12/13/2023 12:55:00, Bottling-Stop: 12/13/2023 13:00:00, Parameters-Sampled: PFAS

Reading Time	Depth To Water (ft)	Cumulative Drawdown (ft)	Purge Rate (ml/min)	Temperature (deg c)	Specific Conductivity (us/cm)	Dissolved Oxygen (mg/l)	pH (su)	Oxidation-Reduction Potential (mV)	Turbidity (ntu)
12:45	8.35	0.00	300	12	618 +	6.0	7.1	266	<5
12:50	8.35	0.00	300	12	619 +	6.2	7.1	268	<5
12:55	8.35	0.00	300	12	618 +	6.1	7.1	271	<5

Notes:

1) Abbreviations include: "deg c" indicates degrees Celsius; "ft" indicates feet; "ft bmp" indicates feet below reference measuring point; "gal" indicates gallons; "in" indicates inches; "mg/l" indicates milligrams per liter; "ml/min" indicates milliliters per minute; "mV" indicates millivolts; "NA" indicates not applicable; "NR" indicates not recorded; "ntu" indicates Nephelometric Turbidity units; "su" indicates standard units; "us/cm" indicates microsiemens per centimeter; and "+" indicates the parameter(s) may be used for stabilization calculations but cannot be used for other purposes.
2) Weather temperature units are in degrees Fahrenheit, unless otherwise noted.
3) Did indicator parameters reach stabilization? Yes
4) Was the two hour time limit reached? No
5) Calculations:
   - Head Above Pump Intake (ft) 7.05
   - Total Drawdown (ft) 0.00
   - Calculated Final Purge Volume (gal) NA
6) If Drawdown Did Not Stabilize or Stabilized Drawdown >0.3 ft, is Total Purge Volume > Calculated Final Purge Volume? NA

Well Sampling Worksheet
WWW RAP Field Data
AREA 11/12 2023-Q4 - HS-PMW-RI-111B
Kent County, MI

Well	HS-PMW-RI-111B / 2 in Diameter PVC
Sample Quarter	2023-Q4
Date	12/13/2023
Weather	Clear 35
Sampler Initials	NCK
Purging Device	Bladder-Pump: NA, Peristaltic-Pump: PER-1, Centrifugal-Pump: NA
Meters Used	YSI: Agile Rental 1, Turbidimeter: Agile Rental 1, Water-Level-Meter: WLM-4
Reference Measuring Point	PVC
Well Screen (ft bmp)	47.9 - 52.9
Measured Bottom Depth (ft bmp)	NR
Sample Comment	11:35 to 12:45 - YSI was not connected.
Initial Water Level Date/Time	12/13/2023 11:25
Initial Water Level Depth (ft bmp)	8.66
Pump/Tubing Intake Depth (ft bmp)	50.4
Tubing Length (ft)	53
Tubing Inner Diameter (in)	0.17
Purging Initiation Date/Time	12/13/2023 11:30
Total Purge Volume (gal)	4
Modified Sample	No
If Modified, Reasoning	
Sample Collection Information	Bottling-Start: 12/13/2023 13:00:00, Bottling-Stop: 12/13/2023 13:05:00, Parameters-Sampled: PFAS

Reading Time	Depth To Water (ft)	Cumulative Drawdown (ft)	Purge Rate (ml/min)	Temperature (deg c)	Specific Conductivity (us/cm)	Dissolved Oxygen (mg/l)	pH (su)	Oxidation-Reduction Potential (mV)	Turbidity (ntu)
11:35	8.69	0.03	250	NR	NR	NR	NR	NR	NR
12:45	8.69	0.03	250	NR	NR	NR	NR	NR	NR
12:50	8.69	0.03	250	11	797 +	6.1	7.4	307	<5
12:55	8.69	0.03	250	11	802 +	6.0	7.4	307	<5
13:00	8.69	0.03	250	11	802 +	6.0	7.4	307	<5

Notes:

1) Abbreviations include: "deg c" indicates degrees Celsius; "ft" indicates feet; "ft bmp" indicates feet below reference measuring point; "gal" indicates gallons; "in" indicates inches; "mg/l" indicates milligrams per liter; "ml/min" indicates milliliters per minute; "mV" indicates millivolts; "NA" indicates not applicable; "NR" indicates not recorded; "ntu" indicates Nephelometric Turbidity units; "su" indicates standard units; "us/cm" indicates microsiemens per centimeter; and "+" indicates the parameter(s) may be used for stabilization calculations but cannot be used for other purposes.
2) Weather temperature units are in degrees Fahrenheit, unless otherwise noted.
3) Did indicator parameters reach stabilization? Yes
4) Was the two hour time limit reached? No
5) Calculations:
   - Head Above Pump Intake (ft) 41.74
   - Total Drawdown (ft) 0.03
   - Calculated Final Purge Volume (gal) NA
6) If Drawdown Did Not Stabilize or Stabilized Drawdown >0.3 ft, is Total Purge Volume > Calculated Final Purge Volume? NA

Well Sampling Worksheet
WWW RAP Field Data
AREA 11/12 2023-Q4 - HS-PMW-RI-112A
Kent County, MI

Well	HS-PMW-RI-112A / 2 in Diameter PVC
Sample Quarter	2023-Q4
Date	12/15/2023
Weather	Sunny, 30's - 40's.
Sampler Initials	CBM
Purging Device	Bladder-Pump: NA, Peristaltic-Pump: PER-3, Centrifugal-Pump: NA
Meters Used	YSI: Agile Rental 1, Turbidimeter: Agile Rental 1, Water-Level-Meter: WLM-2
Reference Measuring Point	PVC
Well Screen (ft bmp)	24.3 - 29.3
Measured Bottom Depth (ft bmp)	29.3
Sample Comment	16:00 to 16:15 - Batteries in the YSI are low. Keeps turning off. Replaced batteries.
Initial Water Level Date/Time	12/15/2023 13:50
Initial Water Level Depth (ft bmp)	8.98
Pump/Tubing Intake Depth (ft bmp)	26.8
Tubing Length (ft)	28
Tubing Inner Diameter (in)	0.17
Purging Initiation Date/Time	12/15/2023 14:25
Total Purge Volume (gal)	4.75
Modified Sample	No
If Modified, Reasoning	
Sample Collection Information	Bottling-Start: 12/15/2023 16:25:00, Bottling-Stop: 12/15/2023 16:30:00, Parameters-Sampled: PFAS

Reading Time	Depth To Water (ft)	Cumulative Drawdown (ft)	Purge Rate (ml/min)	Temperature (deg c)	Specific Conductivity (us/cm)	Dissolved Oxygen (mg/l)	pH (su)	Oxidation-Reduction Potential (mV)	Turbidity (ntu)
16:00	8.98	0.00	150	11	651 +	8.0	7.4	190	<5
16:15	8.98	0.00	150	11	650 +	8.2	7.4	200	<5
16:20	8.98	0.00	150	11	651 +	8.3	7.4	205	<5
16:25	8.98	0.00	150	11	649 +	8.3	7.4	209	<5

Notes:

1) Abbreviations include: "deg c" indicates degrees Celsius; "ft" indicates feet; "ft bmp" indicates feet below reference measuring point; "gal" indicates gallons; "in" indicates inches; "mg/l" indicates milligrams per liter; "ml/min" indicates milliliters per minute; "mV" indicates millivolts; "NA" indicates not applicable; "NR" indicates not recorded; "ntu" indicates Nephelometric Turbidity units; "su" indicates standard units; "us/cm" indicates microsiemens per centimeter; and "+" indicates the parameter(s) may be used for stabilization calculations but cannot be used for other purposes.
2) Weather temperature units are in degrees Fahrenheit, unless otherwise noted.
3) Did indicator parameters reach stabilization? Yes
4) Was the two hour time limit reached? Yes
5) Calculations:
   - Head Above Pump Intake (ft) 17.82
   - Total Drawdown (ft) 0.00
   - Calculated Final Purge Volume (gal) NA
6) If Drawdown Did Not Stabilize or Stabilized Drawdown >0.3 ft, is Total Purge Volume > Calculated Final Purge Volume? NA

Well Sampling Worksheet
WWW RAP Field Data
AREA 11/12 2023-Q4 - HS-PMW-RI-112B
Kent County, MI

Well	HS-PMW-RI-112B / 2 in Diameter PVC
Sample Quarter	2023-Q4
Date	12/15/2023
Weather	Sunny, 30's - 40's.
Sampler Initials	CBM
Purging Device	Bladder-Pump: NA, Peristaltic-Pump: PER-1, Centrifugal-Pump: NA
Meters Used	YSI: Agile Rental 1, Turbidimeter: Agile Rental 1, Water-Level-Meter: WLM-4
Reference Measuring Point	PVC
Well Screen (ft bmp)	69.4 - 74.4
Measured Bottom Depth (ft bmp)	74.4
Sample Comment	
Initial Water Level Date/Time	12/15/2023 14:00
Initial Water Level Depth (ft bmp)	8.79
Pump/Tubing Intake Depth (ft bmp)	71.9
Tubing Length (ft)	72.5
Tubing Inner Diameter (in)	0.17
Purging Initiation Date/Time	12/15/2023 14:05
Total Purge Volume (gal)	3.75
Modified Sample	No
If Modified, Reasoning	
Sample Collection Information	Bottling-Start: 12/15/2023 15:40:00, Bottling-Stop: 12/15/2023 15:45:00, Parameters-Sampled: PFAS

Reading Time	Depth To Water (ft)	Cumulative Drawdown (ft)	Purge Rate (ml/min)	Temperature (deg c)	Specific Conductivity (us/cm)	Dissolved Oxygen (mg/l)	pH (su)	Oxidation-Reduction Potential (mV)	Turbidity (ntu)
14:25	8.79	0.00	150	11	1,372 +	<0.5	7.2	113	9
14:30	8.79	0.00	150	11	1,369 +	<0.5	7.2	92	7
14:40	8.79	0.00	150	11	1,366 +	<0.5	7.2	58	<5
14:55	8.79	0.00	150	11	1,362 +	<0.5	7.3	10	<5
15:00	8.79	0.00	150	11	1,360 +	<0.5	7.3	-1	<5
15:15	8.79	0.00	150	11	1,360 +	<0.5	7.3	-28	<5
15:20	8.79	0.00	150	11	1,360 +	<0.5	7.3	-35	<5
15:25	8.79	0.00	150	11	1,359 +	<0.5	7.3	-49	<5

Well Sampling Worksheet
WWW RAP Field Data
AREA 11/12 2023-Q4 - HS-PMW-RI-112B
Kent County, MI

Well	HS-PMW-RI-112B / 2 in Diameter PVC
Sample Quarter	2023-Q4
Date	12/15/2023
Weather	Sunny, 30's - 40's.
Sampler Initials	CBM
Purging Device	Bladder-Pump: NA, Peristaltic-Pump: PER-1, Centrifugal-Pump: NA
Meters Used	YSI: Agile Rental 1, Turbidimeter: Agile Rental 1, Water-Level-Meter: WLM-4
Reference Measuring Point	PVC
Well Screen (ft bmp)	69.4 - 74.4
Measured Bottom Depth (ft bmp)	74.4
Sample Comment	
Initial Water Level Date/Time	12/15/2023 14:00
Initial Water Level Depth (ft bmp)	8.79
Pump/Tubing Intake Depth (ft bmp)	71.9
Tubing Length (ft)	72.5
Tubing Inner Diameter (in)	0.17
Purging Initiation Date/Time	12/15/2023 14:05
Total Purge Volume (gal)	3.75
Modified Sample	No
If Modified, Reasoning	
Sample Collection Information	Bottling-Start: 12/15/2023 15:40:00, Bottling-Stop: 12/15/2023 15:45:00, Parameters-Sampled: PFAS

Reading Time	Depth To Water (ft)	Cumulative Drawdown (ft)	Purge Rate (ml/min)	Temperature (deg c)	Specific Conductivity (us/cm)	Dissolved Oxygen (mg/l)	pH (su)	Oxidation-Reduction Potential (mV)	Turbidity (ntu)
15:30	8.79	0.00	150	11	1,358 +	<0.5	7.3	-57	<5
15:35	8.79	0.00	150	11	1,358 +	<0.5	7.3	-63	<5
15:40	8.79	0.00	150	11	1,358 +	<0.5	7.3	-66	<5

Notes:

1) Abbreviations include: "deg c" indicates degrees Celsius; "ft" indicates feet; "ft bmp" indicates feet below reference measuring point; "gal" indicates gallons; "in" indicates inches; "mg/l" indicates milligrams per liter; "ml/min" indicates milliliters per minute; "mV" indicates millivolts; "NA" indicates not applicable; "NR" indicates not recorded; "ntu" indicates Nephelometric Turbidity units; "su" indicates standard units; "us/cm" indicates microsiemens per centimeter; and "+" indicates the parameter(s) may be used for stabilization calculations but cannot be used for other purposes.
2) Weather temperature units are in degrees Fahrenheit, unless otherwise noted.
3) Did indicator parameters reach stabilization? Yes
4) Was the two hour time limit reached? No
5) Calculations:
   - Head Above Pump Intake (ft): 63.11
   - Total Drawdown (ft): 0.00
   - Calculated Final Purge Volume (gal): NA
6) If Drawdown Did Not Stabilize or Stabilized Drawdown >0.3 ft, is Total Purge Volume > Calculated Final Purge Volume? NA

Well Sampling Worksheet
WWW RAP Field Data
PERIMETER 2023-Q4 - WV-MW-4
Kent County, MI

Well	WV-MW-4 / 2 in Diameter PVC
Sample Quarter	2023-Q4
Date	11/01/2023
Weather	35 Sunny
Sampler Initials	BPT
Purging Device	Bladder-Pump: BP-12, Peristaltic-Pump: NA, Centrifugal-Pump: NA
Meters Used	YSI: Agile Rental 2, Turbidimeter: Agile Rental 2, Water-Level-Meter: WLM-2
Reference Measuring Point	PVC
Well Screen (ft bmp)	132.7 - 137.7
Measured Bottom Depth (ft bmp)	NR
Sample Comment	
Initial Water Level Date/Time	11/01/2023 11:35
Initial Water Level Depth (ft bmp)	103.41
Pump/Tubing Intake Depth (ft bmp)	135.2
Tubing Length (ft)	138
Tubing Inner Diameter (in)	0.25
Purging Initiation Date/Time	11/01/2023 11:40
Total Purge Volume (gal)	3.25
Modified Sample	No
If Modified, Reasoning	
Sample Collection Information	Bottling-Start: 11/01/2023 13:45:00, Bottling-Stop: 11/01/2023 13:55:00, Parameters-Sampled: PFAS

Reading Time	Depth To Water (ft)	Cumulative Drawdown (ft)	Purge Rate (ml/min)	Temperature (deg c)	Specific Conductivity (us/cm)	Dissolved Oxygen (mg/l)	pH (su)	Oxidation-Reduction Potential (mV)	Turbidity (ntu)
12:00	103.75	0.34	100	9 +	334 +	1.8	7.5	-93	61
12:10	103.75	0.34	100	9 +	335 +	0.7	7.5	-120	536
12:20	103.70	0.29	100	8 +	334 +	0.7	7.6	-118	318
12:30	103.64	0.23	100	8 +	335 +	0.9	7.5	-115	248
12:40	103.64	0.23	100	8 +	336 +	0.8	7.3	-114	171
12:50	103.64	0.23	100	8 +	334 +	0.9	7.4	-112	129
13:00	103.64	0.23	100	8 +	334 +	1.0	7.4	-109	99
13:10	103.64	0.23	100	8 +	334 +	1.0	7.4	-105	77
13:20	103.64	0.23	100	8 +	334 +	1.0	7.4	-108	58

Well Sampling Worksheet
WWW RAP Field Data
PERIMETER 2023-Q4 - WV-MW-4
Kent County, MI

Well	WV-MW-4 / 2 in Diameter PVC
Sample Quarter	2023-Q4
Date	11/01/2023
Weather	35 Sunny
Sampler Initials	BPT
Purging Device	Bladder-Pump: BP-12, Peristaltic-Pump: NA, Centrifugal-Pump: NA
Meters Used	YSI: Agile Rental 2, Turbidimeter: Agile Rental 2, Water-Level-Meter: WLM-2
Reference Measuring Point	PVC
Well Screen (ft bmp)	132.7 - 137.7
Measured Bottom Depth (ft bmp)	NR
Sample Comment	
Initial Water Level Date/Time	11/01/2023 11:35
Initial Water Level Depth (ft bmp)	103.41
Pump/Tubing Intake Depth (ft bmp)	135.2
Tubing Length (ft)	138
Tubing Inner Diameter (in)	0.25
Purging Initiation Date/Time	11/01/2023 11:40
Total Purge Volume (gal)	3.25
Modified Sample	No
If Modified, Reasoning	
Sample Collection Information	Bottling-Start: 11/01/2023 13:45:00, Bottling-Stop: 11/01/2023 13:55:00, Parameters-Sampled: PFAS

Reading Time	Depth To Water (ft)	Cumulative Drawdown (ft)	Purge Rate (ml/min)	Temperature (deg c)	Specific Conductivity (us/cm)	Dissolved Oxygen (mg/l)	pH (su)	Oxidation-Reduction Potential (mV)	Turbidity (ntu)
13:30	103.64	0.23	100	8 +	334 +	1.1	7.4	-106	51
13:35	103.64	0.23	100	8 +	334 +	1.1	7.4	-106	43
13:40	103.64	0.23	100	8 +	334 +	1.0	7.4	-107	40

Notes:

1) Abbreviations include: "deg c" indicates degrees Celsius; "ft" indicates feet; "ft bmp" indicates feet below reference measuring point; "gal" indicates gallons; "in" indicates inches; "mg/l" indicates milligrams per liter; "ml/min" indicates milliliters per minute; "mV" indicates millivolts; "NA" indicates not applicable; "NR" indicates not recorded; "ntu" indicates Nephelometric Turbidity units; "su" indicates standard units; "us/cm" indicates microsiemens per centimeter; and "+" indicates the parameter(s) may be used for stabilization calculations but cannot be used for other purposes.
2) Weather temperature units are in degrees Fahrenheit, unless otherwise noted.
3) Did indicator parameters reach stabilization? No
4) Was the two hour time limit reached? Yes
5) Calculations:
   - Head Above Pump Intake (ft) 31.79
   - Total Drawdown (ft) 0.23
   - Calculated Final Purge Volume (gal) NA
6) If Drawdown Did Not Stabilize or Stabilized Drawdown >0.3 ft, is Total Purge Volume > Calculated Final Purge Volume? NA

Well Sampling Worksheet
WWW RAP Field Data
PERIMETER 2023-Q4 - WV-MW-5D
Kent County, MI

Well	WV-MW-5D / 2 in Diameter PVC
Sample Quarter	2023-Q4
Date	10/31/2023
Weather	Cloudy 41
Sampler Initials	BPT
Purging Device	Bladder-Pump: NA, Peristaltic-Pump: NA, Centrifugal-Pump: Mega Monsoon #1
Meters Used	YSI: Agile Rental 3, Turbidimeter: Agile Rental 3, Water-Level-Meter: LAV
Reference Measuring Point	PVC
Well Screen (ft bmp)	71.8 - 76.8
Measured Bottom Depth (ft bmp)	NR
Sample Comment	15:45: YSI connected.
Initial Water Level Date/Time	10/31/2023 15:10
Initial Water Level Depth (ft bmp)	65.50
Pump/Tubing Intake Depth (ft bmp)	74.3
Tubing Length (ft)	78
Tubing Inner Diameter (in)	0.17
Purging Initiation Date/Time	10/31/2023 15:15
Total Purge Volume (gal)	8
Modified Sample	No
If Modified, Reasoning	
Sample Collection Information	Bottling-Start: 10/31/2023 16:15:00, Bottling-Stop: 10/31/2023 16:20:00, Parameters-Sampled: PFAS

Reading Time	Depth To Water (ft)	Cumulative Drawdown (ft)	Purge Rate (ml/min)	Temperature (deg c)	Specific Conductivity (us/cm)	Dissolved Oxygen (mg/l)	pH (su)	Oxidation-Reduction Potential (mV)	Turbidity (ntu)
15:30	65.52	0.02	500	NR	NR	NR	NR	NR	35
15:45	65.52	0.02	500	12	675 +	7.4	7.3	200	10
15:50	65.52	0.02	500	12	675 +	7.4	7.3	196	8
15:55	65.52	0.02	500	13	675 +	7.4	7.3	194	7
16:00	65.52	0.02	500	13	675 +	7.4	7.3	193	<5
16:05	65.52	0.02	500	13	675 +	7.4	7.3	192	<5
16:10	65.52	0.02	500	13	676 +	7.4	7.3	191	<5

Notes:

1) Abbreviations include: "deg c" indicates degrees Celsius; "ft" indicates feet; "ft bmp" indicates feet below reference measuring point; "gal" indicates gallons; "in" indicates inches; "mg/l" indicates milligrams per liter; "ml/min" indicates milliliters per minute; "mV" indicates millivolts; "NA" indicates not applicable; "NR" indicates not recorded; "ntu" indicates Nephelometric Turbidity units; "su" indicates standard units; "us/cm" indicates microsiemens per centimeter; and "+" indicates the parameter(s) may be used for stabilization calculations but cannot be used for other purposes.
2) Weather temperature units are in degrees Fahrenheit, unless otherwise noted.
3) Did indicator parameters reach stabilization? Yes
4) Was the two hour time limit reached? No
5) Calculations:
   - Head Above Pump Intake (ft) 8.80
   - Total Drawdown (ft) 0.02
   - Calculated Final Purge Volume (gal) NA
6) If Drawdown Did Not Stabilize or Stabilized Drawdown >0.3 ft, is Total Purge Volume > Calculated Final Purge Volume? NA

Well Sampling Worksheet
WWW RAP Field Data
PERIMETER 2023-Q4 - WV-MW-5S
Kent County, MI

Well	WV-MW-5S / 2 in Diameter PVC
Sample Quarter	2023-Q4
Date	10/31/2023
Weather	41 Cloudy
Sampler Initials	JMS
Purging Device	Bladder-Pump: NA, Peristaltic-Pump: NA, Centrifugal-Pump: Mega Monsoon #2
Meters Used	YSI: Agile Rental 2, Turbidimeter: Agile Rental 2, Water-Level-Meter: WLM-2
Reference Measuring Point	PVC
Well Screen (ft bmp)	64.4 - 69.4
Measured Bottom Depth (ft bmp)	NR
Sample Comment	YSI Connected after the 16:00 turbidity reading.
Initial Water Level Date/Time	10/31/2023 15:05
Initial Water Level Depth (ft bmp)	65.27
Pump/Tubing Intake Depth (ft bmp)	67.3
Tubing Length (ft)	72.3
Tubing Inner Diameter (in)	0.17
Purging Initiation Date/Time	10/31/2023 15:10
Total Purge Volume (gal)	8.75
Modified Sample	No
If Modified, Reasoning	
Sample Collection Information	Bottling-Start: 10/31/2023 16:25:00, Bottling-Stop: 10/31/2023 16:30:00, Parameters-Sampled: PFAS

Reading Time	Depth To Water (ft)	Cumulative Drawdown (ft)	Purge Rate (ml/min)	Temperature (deg c)	Specific Conductivity (us/cm)	Dissolved Oxygen (mg/l)	pH (su)	Oxidation-Reduction Potential (mV)	Turbidity (ntu)
15:20	65.29	0.02	450	NR	NR	NR	NR	NR	128
15:35	65.29	0.02	450	NR	NR	NR	NR	NR	22
16:00	65.29	0.02	450	NR	NR	NR	NR	NR	8
16:10	65.29	0.02	450	12 +	744 +	9.0	7.0	101	<5
16:15	65.29	0.02	450	12 +	745 +	8.9	7.0	103	<5
16:20	65.29	0.02	450	12 +	744 +	8.9	7.0	105	<5

Notes:

1) Abbreviations include: "deg c" indicates degrees Celsius; "ft" indicates feet; "ft bmp" indicates feet below reference measuring point; "gal" indicates gallons; "in" indicates inches; "mg/l" indicates milligrams per liter; "ml/min" indicates milliliters per minute; "mV" indicates millivolts; "NA" indicates not applicable; "NR" indicates not recorded; "ntu" indicates Nephelometric Turbidity units; "su" indicates standard units; "us/cm" indicates microsiemens per centimeter; and "+" indicates the parameter(s) may be used for stabilization calculations but cannot be used for other purposes.
2) Weather temperature units are in degrees Fahrenheit, unless otherwise noted.
3) Did indicator parameters reach stabilization? Yes
4) Was the two hour time limit reached? No
5) Calculations:
   - Head Above Pump Intake (ft) 2.03
   - Total Drawdown (ft) 0.02
   - Calculated Final Purge Volume (gal) NA
6) If Drawdown Did Not Stabilize or Stabilized Drawdown >0.3 ft, is Total Purge Volume > Calculated Final Purge Volume? NA

Well Sampling Worksheet
WWW RAP Field Data
PERIMETER 2023-Q4 - WV-MW-11D
Kent County, MI

Well	WV-MW-11D / 2 in Diameter PVC
Sample Quarter	2023-Q4
Date	10/24/2023
Weather	Cloudy, 55F
Sampler Initials	RCP
Purging Device	Bladder-Pump: NA, Peristaltic-Pump: PER-3, Centrifugal-Pump: NA
Meters Used	YSI: Agile Rental 2, Turbidimeter: Agile Rental 2, Water-Level-Meter: NA
Reference Measuring Point	PVC
Well Screen (ft bmp)	161.9 - 166.9
Measured Bottom Depth (ft bmp)	166.9
Sample Comment	Artesian. Flow of artesian well could not overcome the head in the tubing, a peristaltic pump with a pumping rate of 450 mL/min was used to maintain the static depth of water at the top of the PVC. 10:10 - Water level stable. Turbidity was observed to be low, so connected YSI.
Initial Water Level Date/Time	10/24/2023 10:00
Initial Water Level Depth (ft bmp)	Artesian
Pump/Tubing Intake Depth (ft bmp)	164.4
Tubing Length (ft)	165.4
Tubing Inner Diameter (in)	0.17
Purging Initiation Date/Time	10/24/2023 10:00
Total Purge Volume (gal)	4
Modified Sample	No
If Modified, Reasoning	
Sample Collection Information	Bottling-Start: 10/24/2023 10:35:00, Bottling-Stop: 10/24/2023 10:40:00, Parameters-Sampled: PFAS

Reading Time	Depth To Water (ft)	Cumulative Drawdown (ft)	Purge Rate (ml/min)	Temperature (deg c)	Specific Conductivity (us/cm)	Dissolved Oxygen (mg/l)	pH (su)	Oxidation-Reduction Potential (mV)	Turbidity (ntu)
10:10	0.00	0.00	450	NR	NR	NR	NR	NR	<5
10:15	0.00	0.00	450	10 +	622 +	0.7	7.3	-88	<5
10:20	0.00	0.00	450	10 +	619 +	<0.5	7.4	-101	<5
10:25	0.00	0.00	450	10 +	618 +	<0.5	7.4	-107	<5
10:30	0.00	0.00	450	10 +	617 +	<0.5	7.4	-109	<5

Notes:

1) Abbreviations include: "deg c" indicates degrees Celsius; "ft" indicates feet; "ft bmp" indicates feet below reference measuring point; "gal" indicates gallons; "in" indicates inches; "mg/l" indicates milligrams per liter; "ml/min" indicates milliliters per minute; "mV" indicates millivolts; "NA" indicates not applicable; "NR" indicates not recorded; "ntu" indicates Nephelometric Turbidity units; "su" indicates standard units; "us/cm" indicates microsiemens per centimeter; and "+" indicates the parameter(s) may be used for stabilization calculations but cannot be used for other purposes.
2) Weather temperature units are in degrees Fahrenheit, unless otherwise noted.
3) Did indicator parameters reach stabilization? Yes
4) Was the two hour time limit reached? No
5) Calculations:
   - Head Above Pump Intake (ft) 164.40
   - Total Drawdown (ft) 0.00
   - Calculated Final Purge Volume (gal) NA
6) If Drawdown Did Not Stabilize or Stabilized Drawdown >0.3 ft, is Total Purge Volume > Calculated Final Purge Volume? NA

Well Sampling Worksheet
WWW RAP Field Data
PERIMETER 2023-Q4 - WV-MW-11S
Kent County, MI

Well	WV-MW-11S / 2 in Diameter PVC
Sample Quarter	2023-Q4
Date	10/23/2023
Weather	55°F and Sunny
Sampler Initials	RCP
Purging Device	Bladder-Pump: NA, Peristaltic-Pump: NA, Centrifugal-Pump: Mega Monsoon #2
Meters Used	YSI: Agile Rental 2, Turbidimeter: Agile Rental 2, Water-Level-Meter: WLM-2
Reference Measuring Point	PVC
Well Screen (ft bmp)	32.5 - 37.5
Measured Bottom Depth (ft bmp)	37.5
Sample Comment	15:55 - Water level stable. Turbidity observed to be low so YSI was connected.
Initial Water Level Date/Time	10/23/2023 15:30
Initial Water Level Depth (ft bmp)	12.92
Pump/Tubing Intake Depth (ft bmp)	35
Tubing Length (ft)	37
Tubing Inner Diameter (in)	0.17
Purging Initiation Date/Time	10/23/2023 15:35
Total Purge Volume (gal)	7
Modified Sample	No
If Modified, Reasoning	
Sample Collection Information	Bottling-Start: 10/23/2023 16:30:00, Bottling-Stop: 10/23/2023 16:35:00, Parameters-Sampled: PFAS

Reading Time	Depth To Water (ft)	Cumulative Drawdown (ft)	Purge Rate (ml/min)	Temperature (deg c)	Specific Conductivity (us/cm)	Dissolved Oxygen (mg/l)	pH (su)	Oxidation-Reduction Potential (mV)	Turbidity (ntu)
15:45	12.92	0.00	500	NR	NR	NR	NR	NR	133
15:55	12.92	0.00	500	NR	NR	NR	NR	NR	28
16:00	12.92	0.00	500	11 +	585 +	1.1	7.1	208	12
16:05	12.92	0.00	500	11 +	584 +	1.0	7.2	204	8
16:10	12.92	0.00	500	11 +	584 +	1.0	7.2	203	7
16:15	12.92	0.00	500	11 +	584 +	1.0	7.2	202	<5
16:20	12.92	0.00	500	11 +	584 +	1.0	7.2	201	<5
16:25	12.92	0.00	500	11 +	583 +	1.0	7.2	200	<5

Notes:

1) Abbreviations include: "deg c" indicates degrees Celsius; "ft" indicates feet; "ft bmp" indicates feet below reference measuring point; "gal" indicates gallons; "in" indicates inches; "mg/l" indicates milligrams per liter; "ml/min" indicates milliliters per minute; "mV" indicates millivolts; "NA" indicates not applicable; "NR" indicates not recorded; "ntu" indicates Nephelometric Turbidity units; "su" indicates standard units; "us/cm" indicates microsiemens per centimeter; and "+" indicates the parameter(s) may be used for stabilization calculations but cannot be used for other purposes.
2) Weather temperature units are in degrees Fahrenheit, unless otherwise noted.
3) Did indicator parameters reach stabilization? Yes
4) Was the two hour time limit reached? No
5) Calculations:
   - Head Above Pump Intake (ft) 22.08
   - Total Drawdown (ft) 0.00
   - Calculated Final Purge Volume (gal) NA
6) If Drawdown Did Not Stabilize or Stabilized Drawdown >0.3 ft, is Total Purge Volume > Calculated Final Purge Volume? NA

Well Sampling Worksheet
WWW RAP Field Data
PERIMETER 2023-Q4 - WV-MW-15A
Kent County, MI

Well	WV-MW-15A / 2 in Diameter PVC
Sample Quarter	2023-Q4
Date	10/23/2023
Weather	Clear- 50F
Sampler Initials	CRB
Purging Device	Bladder-Pump: NA, Peristaltic-Pump: PER-1, Centrifugal-Pump: NA
Meters Used	YSI: Agile Rental 1, Turbidimeter: Agile Rental 1, Water-Level-Meter: WLM-1
Reference Measuring Point	PVC
Well Screen (ft bmp)	8.8 - 13.8
Measured Bottom Depth (ft bmp)	13.8
Sample Comment	YSI Connected 12:15.
Initial Water Level Date/Time	10/23/2023 11:15
Initial Water Level Depth (ft bmp)	5.09
Pump/Tubing Intake Depth (ft bmp)	11.3
Tubing Length (ft)	13.8
Tubing Inner Diameter (in)	0.17
Purging Initiation Date/Time	10/23/2023 11:15
Total Purge Volume (gal)	6.5
Modified Sample	No
If Modified, Reasoning	
Sample Collection Information	Bottling-Start: 10/23/2023 13:05:00, Bottling-Stop: 10/23/2023 13:10:00, Parameters-Sampled: PFAS

Reading Time	Depth To Water (ft)	Cumulative Drawdown (ft)	Purge Rate (ml/min)	Temperature (deg c)	Specific Conductivity (us/cm)	Dissolved Oxygen (mg/l)	pH (su)	Oxidation-Reduction Potential (mV)	Turbidity (ntu)
11:20	5.10	0.01	225	NR	NR	NR	NR	NR	NR
11:25	5.10	0.01	225	NR	NR	NR	NR	NR	101 +
11:35	5.10	0.01	225	NR	NR	NR	NR	NR	53 +
11:50	5.10	0.01	225	NR	NR	NR	NR	NR	27 +
11:55	5.10	0.01	225	NR	NR	NR	NR	NR	14 +
12:15	5.10	0.01	225	12	334 +	1.0	7.8	-87 +	9 +
12:20	5.10	0.01	225	12	334 +	1.0	7.8	-96 +	10 +
12:25	5.10	0.01	225	12	334 +	1.2	7.8	-100 +	9 +
12:30	5.10	0.01	225	12	334 +	1.1	7.8	-104 +	7 +
12:45	5.10	0.01	225	12	335 +	0.9	7.8	-116 +	<5 +

Well Sampling Worksheet
WWW RAP Field Data
PERIMETER 2023-Q4 - WV-MW-15A
Kent County, MI

Well	WV-MW-15A / 2 in Diameter PVC
Sample Quarter	2023-Q4
Date	10/23/2023
Weather	Clear- 50F
Sampler Initials	CRB
Purging Device	Bladder-Pump: NA, Peristaltic-Pump: PER-1, Centrifugal-Pump: NA
Meters Used	YSI: Agile Rental 1, Turbidimeter: Agile Rental 1, Water-Level-Meter: WLM-1
Reference Measuring Point	PVC
Well Screen (ft bmp)	8.8 - 13.8
Measured Bottom Depth (ft bmp)	13.8
Sample Comment	YSI Connected 12:15.
Initial Water Level Date/Time	10/23/2023 11:15
Initial Water Level Depth (ft bmp)	5.09
Pump/Tubing Intake Depth (ft bmp)	11.3
Tubing Length (ft)	13.8
Tubing Inner Diameter (in)	0.17
Purging Initiation Date/Time	10/23/2023 11:15
Total Purge Volume (gal)	6.5
Modified Sample	No
If Modified, Reasoning	
Sample Collection Information	Bottling-Start: 10/23/2023 13:05:00, Bottling-Stop: 10/23/2023 13:10:00, Parameters-Sampled: PFAS

Reading Time	Depth To Water (ft)	Cumulative Drawdown (ft)	Purge Rate (ml/min)	Temperature (deg c)	Specific Conductivity (us/cm)	Dissolved Oxygen (mg/l)	pH (su)	Oxidation-Reduction Potential (mV)	Turbidity (ntu)
12:55	5.10	0.01	225	12	334 +	0.9	7.8	-118 +	<5 +
13:00	5.10	0.01	225	12	335 +	0.8	7.8	-120 +	<5 +
13:05	5.10	0.01	225	12	336 +	0.7	7.8	-122 +	<5 +

Notes:

1) Abbreviations include: "deg c" indicates degrees Celsius; "ft" indicates feet; "ft bmp" indicates feet below reference measuring point; "gal" indicates gallons; "in" indicates inches; "mg/l" indicates milligrams per liter; "ml/min" indicates milliliters per minute; "mV" indicates millivolts; "NA" indicates not applicable; "NR" indicates not recorded; "ntu" indicates Nephelometric Turbidity units; "su" indicates standard units; "us/cm" indicates microsiemens per centimeter; and "+" indicates the parameter(s) may be used for stabilization calculations but cannot be used for other purposes.
2) Weather temperature units are in degrees Fahrenheit, unless otherwise noted.
3) Did indicator parameters reach stabilization? Yes
4) Was the two hour time limit reached? No
5) Calculations:
   - Head Above Pump Intake (ft) 6.21
   - Total Drawdown (ft) 0.01
   - Calculated Final Purge Volume (gal) NA
6) If Drawdown Did Not Stabilize or Stabilized Drawdown >0.3 ft, is Total Purge Volume > Calculated Final Purge Volume? NA

Well Sampling Worksheet
WWW RAP Field Data
PERIMETER 2023-Q4 - WV-MW-15B
Kent County, MI

Well	WV-MW-15B / 2 in Diameter PVC
Sample Quarter	2023-Q4
Date	10/23/2023
Weather	Cloudy-51F
Sampler Initials	CRB
Purging Device	Bladder-Pump: NA, Peristaltic-Pump: PER-1, Centrifugal-Pump: NA
Meters Used	YSI: Agile Rental 1, Turbidimeter: Agile Rental 1, Water-Level-Meter: WLM-1
Reference Measuring Point	PVC
Well Screen (ft bmp)	32.8 - 37.8
Measured Bottom Depth (ft bmp)	37.8
Sample Comment	YSI Connected at 16:20.
Initial Water Level Date/Time	10/23/2023 15:30
Initial Water Level Depth (ft bmp)	5.06
Pump/Tubing Intake Depth (ft bmp)	35.3
Tubing Length (ft)	37.8
Tubing Inner Diameter (in)	0.17
Purging Initiation Date/Time	10/23/2023 15:30
Total Purge Volume (gal)	7.1
Modified Sample	No
If Modified, Reasoning	
Sample Collection Information	Bottling-Start: 10/23/2023 17:30:00, Bottling-Stop: 10/23/2023 17:35:00, Parameters-Sampled: PFAS

Reading Time	Depth To Water (ft)	Cumulative Drawdown (ft)	Purge Rate (ml/min)	Temperature (deg c)	Specific Conductivity (us/cm)	Dissolved Oxygen (mg/l)	pH (su)	Oxidation-Reduction Potential (mV)	Turbidity (ntu)
15:35	5.18	0.12	125	NR	NR	NR	NR	NR	NR
15:40	5.17	0.11	125	NR	NR	NR	NR	NR	147 +
15:55	5.19	0.13	125	NR	NR	NR	NR	NR	77 +
16:00	5.20	0.14	125	NR	NR	NR	NR	NR	75 +
16:20	5.20	0.14	125	11	406 +	<0.5	7.8	-54 +	22 +
16:25	5.20	0.14	125	11	407 +	<0.5	7.8	-73 +	25 +
16:35	5.21	0.15	125	11	405 +	<0.5	7.8	-93 +	18 +
16:40	5.20	0.14	125	11	405 +	<0.5	7.8	-98 +	15 +
16:45	5.20	0.14	125	11	405 +	<0.5	7.8	-102 +	13 +
16:50	5.20	0.14	125	11	405 +	<0.5	7.8	-105 +	14 +
16:55	5.20	0.14	125	11	405 +	<0.5	7.8	-109 +	16 +
17:10	5.20	0.14	125	11	405 +	<0.5	7.8	-114 +	11 +
17:15	5.20	0.14	125	11	405 +	<0.5	7.8	-116 +	9 +

Well Sampling Worksheet
WWW RAP Field Data
PERIMETER 2023-Q4 - WV-MW-15B
Kent County, MI

Well	WV-MW-15B / 2 in Diameter PVC
Sample Quarter	2023-Q4
Date	10/23/2023
Weather	Cloudy-51F
Sampler Initials	CRB
Purging Device	Bladder-Pump: NA, Peristaltic-Pump: PER-1, Centrifugal-Pump: NA
Meters Used	YSI: Agile Rental 1, Turbidimeter: Agile Rental 1, Water-Level-Meter: WLM-1
Reference Measuring Point	PVC
Well Screen (ft bmp)	32.8 - 37.8
Measured Bottom Depth (ft bmp)	37.8
Sample Comment	YSI Connected at 16:20.
Initial Water Level Date/Time	10/23/2023 15:30
Initial Water Level Depth (ft bmp)	5.06
Pump/Tubing Intake Depth (ft bmp)	35.3
Tubing Length (ft)	37.8
Tubing Inner Diameter (in)	0.17
Purging Initiation Date/Time	10/23/2023 15:30
Total Purge Volume (gal)	7.1
Modified Sample	No
If Modified, Reasoning	
Sample Collection Information	Bottling-Start: 10/23/2023 17:30:00, Bottling-Stop: 10/23/2023 17:35:00, Parameters-Sampled: PFAS

Reading Time	Depth To Water (ft)	Cumulative Drawdown (ft)	Purge Rate (ml/min)	Temperature (deg c)	Specific Conductivity (us/cm)	Dissolved Oxygen (mg/l)	pH (su)	Oxidation-Reduction Potential (mV)	Turbidity (ntu)
17:20	5.20	0.14	125	11	405 +	<0.5	7.8	-118 +	7 +
17:25	5.20	0.14	125	11	405 +	<0.5	7.8	-120 +	6 +
17:30	5.20	0.14	125	11	405 +	<0.5	7.8	-122 +	6 +

Notes:

1) Abbreviations include: "deg c" indicates degrees Celsius; "ft" indicates feet; "ft bmp" indicates feet below reference measuring point; "gal" indicates gallons; "in" indicates inches; "mg/l" indicates milligrams per liter; "ml/min" indicates milliliters per minute; "mV" indicates millivolts; "NA" indicates not applicable; "NR" indicates not recorded; "ntu" indicates Nephelometric Turbidity units; "su" indicates standard units; "us/cm" indicates microsiemens per centimeter; and "+" indicates the parameter(s) may be used for stabilization calculations but cannot be used for other purposes.
2) Weather temperature units are in degrees Fahrenheit, unless otherwise noted.
3) Did indicator parameters reach stabilization? Yes
4) Was the two hour time limit reached? Yes
5) Calculations:
   - Head Above Pump Intake (ft) 30.24
   - Total Drawdown (ft) 0.14
   - Calculated Final Purge Volume (gal) NA
6) If Drawdown Did Not Stabilize or Stabilized Drawdown >0.3 ft, is Total Purge Volume > Calculated Final Purge Volume? NA

Well Sampling Worksheet
WWW RAP Field Data
PERIMETER 2023-Q4 - WV-MW-15C
Kent County, MI

Well	WV-MW-15C / 2 in Diameter PVC
Sample Quarter	2023-Q4
Date	10/23/2023
Weather	Cloudy, 45F
Sampler Initials	RCP
Purging Device	Bladder-Pump: NA, Peristaltic-Pump: NA, Centrifugal-Pump: Mega Monsoon #2
Meters Used	YSI: Agile Rental 3, Turbidimeter: Agile Rental 3, Water-Level-Meter: WLM-2
Reference Measuring Point	PVC
Well Screen (ft bmp)	43.2 - 48.0
Measured Bottom Depth (ft bmp)	48
Sample Comment	11:45 - Water level is stable. 11:55 - Low turbidity observed and attached YSI.
Initial Water Level Date/Time	10/23/2023 11:25
Initial Water Level Depth (ft bmp)	4.9
Pump/Tubing Intake Depth (ft bmp)	45.6
Tubing Length (ft)	47.6
Tubing Inner Diameter (in)	0.17
Purging Initiation Date/Time	10/23/2023 11:30
Total Purge Volume (gal)	11
Modified Sample	No
If Modified, Reasoning	
Sample Collection Information	Bottling-Start: 10/23/2023 13:00:00, Bottling-Stop: 10/23/2023 13:05:00, Parameters-Sampled: PFAS

Reading Time	Depth To Water (ft)	Cumulative Drawdown (ft)	Purge Rate (ml/min)	Temperature (deg c)	Specific Conductivity (us/cm)	Dissolved Oxygen (mg/l)	pH (su)	Oxidation-Reduction Potential (mV)	Turbidity (ntu)
11:35	4.92	0.02	480	NR	NR	NR	NR	NR	NR
11:45	4.96	0.06	480	NR	NR	NR	NR	NR	155
11:55	4.96	0.06	480	NR	NR	NR	NR	NR	27
12:05	4.96	0.06	480	11	790 +	<0.5	7.5	98	18
12:30	4.96	0.06	480	11	787 +	<0.5	7.6	-57	7
12:40	4.96	0.06	480	11	781 +	<0.5	7.6	-83	7
12:45	4.96	0.06	480	11	779 +	<0.5	7.6	-91	<5
12:50	4.96	0.06	480	11	777 +	<0.5	7.6	-93	<5
12:55	4.96	0.06	480	11	774 +	<0.5	7.6	-98	<5

Notes:

1) Abbreviations include: "deg c" indicates degrees Celsius; "ft" indicates feet; "ft bmp" indicates feet below reference measuring point; "gal" indicates gallons; "in" indicates inches; "mg/l" indicates milligrams per liter; "ml/min" indicates milliliters per minute; "mV" indicates millivolts; "NA" indicates not applicable; "NR" indicates not recorded; "ntu" indicates Nephelometric Turbidity units; "su" indicates standard units; "us/cm" indicates microsiemens per centimeter; and "+" indicates the parameter(s) may be used for stabilization calculations but cannot be used for other purposes.
2) Weather temperature units are in degrees Fahrenheit, unless otherwise noted.
3) Did indicator parameters reach stabilization? Yes
4) Was the two hour time limit reached? No
5) Calculations:
   - Head Above Pump Intake (ft) 40.70
   - Total Drawdown (ft) 0.06
   - Calculated Final Purge Volume (gal) NA
6) If Drawdown Did Not Stabilize or Stabilized Drawdown >0.3 ft, is Total Purge Volume > Calculated Final Purge Volume? NA

Well Sampling Worksheet
WWW RAP Field Data
PERIMETER 2023-Q4 - WV-MW-15D
Kent County, MI

Well	WV-MW-15D / 2 in Diameter PVC
Sample Quarter	2023-Q4
Date	10/23/2023
Weather	47F Cloudy
Sampler Initials	JET
Purging Device	Bladder-Pump: NA, Peristaltic-Pump: NA, Centrifugal-Pump: Mega Monsoon #1
Meters Used	YSI: Agile Rental 2, Turbidimeter: Agile Rental 2, Water-Level-Meter: NA
Reference Measuring Point	PVC
Well Screen (ft bmp)	134.9 - 137.6
Measured Bottom Depth (ft bmp)	NR
Sample Comment	Artesian well. Flow of artesian well could not overcome the head in the tubing, a peristaltic pump with a pumping rate of 500 mL/min was used to maintain the static depth of water at the top of the PVC. YSI connected after 12:15 readings.
Initial Water Level Date/Time	10/23/2023 11:10
Initial Water Level Depth (ft bmp)	Artesian
Pump/Tubing Intake Depth (ft bmp)	136.25
Tubing Length (ft)	141.25
Tubing Inner Diameter (in)	0.17
Purging Initiation Date/Time	10/23/2023 11:15
Total Purge Volume (gal)	6
Modified Sample	No
If Modified, Reasoning	
Sample Collection Information	Bottling-Start: 10/23/2023 12:40:00, Bottling-Stop: 10/23/2023 12:45:00, Parameters-Sampled: PFAS

Reading Time	Depth To Water (ft)	Cumulative Drawdown (ft)	Purge Rate (ml/min)	Temperature (deg c)	Specific Conductivity (us/cm)	Dissolved Oxygen (mg/l)	pH (su)	Oxidation-Reduction Potential (mV)	Turbidity (ntu)
11:30	NA	NA	500	NR	NR	NR	NR	NR	72
11:50	NA	NA	500	NR	NR	NR	NR	NR	14
12:15	NA	NA	500	NR	NR	NR	NR	NR	<5
12:25	NA	NA	500	10 +	886 +	0.6	7.2	-77	<5
12:30	NA	NA	500	10 +	886 +	0.5	7.2	-79	<5
12:35	NA	NA	500	10 +	886 +	0.4	7.2	-80	<5

Notes:

1) Abbreviations include: "deg c" indicates degrees Celsius; "ft" indicates feet; "ft bmp" indicates feet below reference measuring point; "gal" indicates gallons; "in" indicates inches; "mg/l" indicates milligrams per liter; "ml/min" indicates milliliters per minute; "mV" indicates millivolts; "NA" indicates not applicable; "NR" indicates not recorded; "ntu" indicates Nephelometric Turbidity units; "su" indicates standard units; "us/cm" indicates microsiemens per centimeter; and "+" indicates the parameter(s) may be used for stabilization calculations but cannot be used for other purposes.
2) Weather temperature units are in degrees Fahrenheit, unless otherwise noted.
3) Did indicator parameters reach stabilization? Yes
4) Was the two hour time limit reached? No
5) Calculations:
   - Head Above Pump Intake (ft) 136.25
   - Total Drawdown (ft) 0.00
   - Calculated Final Purge Volume (gal) NA
6) If Drawdown Did Not Stabilize or Stabilized Drawdown >0.3 ft, is Total Purge Volume > Calculated Final Purge Volume? NA

Well Sampling Worksheet
WWW RAP Field Data
PERIMETER 2023-Q4 - WV-PMW-RI-101A
Kent County, MI

Well	WV-PMW-RI-101A / 2 in Diameter PVC
Sample Quarter	2023-Q4
Date	10/31/2023
Weather	Snow 35F
Sampler Initials	JMS
Purging Device	Bladder-Pump: NA, Peristaltic-Pump: NA, Centrifugal-Pump: Mega Monsoon #2
Meters Used	YSI: Agile Rental 2, Turbidimeter: Agile Rental 2, Water-Level-Meter: WLM-2
Reference Measuring Point	PVC
Well Screen (ft bmp)	42.6 - 47.6
Measured Bottom Depth (ft bmp)	NR
Sample Comment	YSI Connected after the 11:10 turbidity reading.
Initial Water Level Date/Time	10/31/2023 10:35
Initial Water Level Depth (ft bmp)	38.91
Pump/Tubing Intake Depth (ft bmp)	45.1
Tubing Length (ft)	50.1
Tubing Inner Diameter (in)	0.17
Purging Initiation Date/Time	10/31/2023 10:45
Total Purge Volume (gal)	7
Modified Sample	No
If Modified, Reasoning	
Sample Collection Information	Bottling-Start: 10/31/2023 11:40:00, Bottling-Stop: 10/31/2023 11:45:00, Parameters-Sampled: PFAS

Reading Time	Depth To Water (ft)	Cumulative Drawdown (ft)	Purge Rate (ml/min)	Temperature (deg c)	Specific Conductivity (us/cm)	Dissolved Oxygen (mg/l)	pH (su)	Oxidation-Reduction Potential (mV)	Turbidity (ntu)
11:00	39.01	0.10	500	NR	NR	NR	NR	NR	37
11:10	39.01	0.10	500	NR	NR	NR	NR	NR	12
11:20	39.01	0.10	500	10 +	996 +	9.6	6.8	121	7
11:25	39.01	0.10	500	10 +	996 +	9.7	6.7	119	<5
11:30	39.01	0.10	500	10 +	995 +	9.6	6.8	119	<5
11:35	39.01	0.10	500	10 +	995 +	9.6	6.8	119	<5

Notes:

1) Abbreviations include: "deg c" indicates degrees Celsius; "ft" indicates feet; "ft bmp" indicates feet below reference measuring point; "gal" indicates gallons; "in" indicates inches; "mg/l" indicates milligrams per liter; "ml/min" indicates milliliters per minute; "mV" indicates millivolts; "NA" indicates not applicable; "NR" indicates not recorded; "ntu" indicates Nephelometric Turbidity units; "su" indicates standard units; "us/cm" indicates microsiemens per centimeter; and "+" indicates the parameter(s) may be used for stabilization calculations but cannot be used for other purposes.
2) Weather temperature units are in degrees Fahrenheit, unless otherwise noted.
3) Did indicator parameters reach stabilization? Yes
4) Was the two hour time limit reached? No
5) Calculations:
   - Head Above Pump Intake (ft) 6.19
   - Total Drawdown (ft) 0.10
   - Calculated Final Purge Volume (gal) NA
6) If Drawdown Did Not Stabilize or Stabilized Drawdown >0.3 ft, is Total Purge Volume > Calculated Final Purge Volume? NA

Well Sampling Worksheet
WWW RAP Field Data
PERIMETER 2023-Q4 - WV-PMW-RI-101B
Kent County, MI

Well	WV-PMW-RI-101B / 2 in Diameter PVC
Sample Quarter	2023-Q4
Date	11/09/2023
Weather	Sunny, 40s-50s
Sampler Initials	JET
Purging Device	Bladder-Pump: BP-10, Peristaltic-Pump: NA, Centrifugal-Pump: NA
Meters Used	YSI: Agile Rental 1, Turbidimeter: Agile Rental 1, Water-Level-Meter: WLM-3
Reference Measuring Point	PVC
Well Screen (ft bmp)	281.5 - 286.5
Measured Bottom Depth (ft bmp)	NR
Sample Comment	YSI Connected at 11:20.
Initial Water Level Date/Time	11/09/2023 09:45
Initial Water Level Depth (ft bmp)	112.80
Pump/Tubing Intake Depth (ft bmp)	284
Tubing Length (ft)	286.5
Tubing Inner Diameter (in)	0.25
Purging Initiation Date/Time	11/09/2023 09:50
Total Purge Volume (gal)	3.5
Modified Sample	No
If Modified, Reasoning	
Sample Collection Information	Bottling-Start: 11/09/2023 11:55:00, Bottling-Stop: 11/09/2023 12:10:00, Parameters-Sampled: PFAS

Reading Time	Depth To Water (ft)	Cumulative Drawdown (ft)	Purge Rate (ml/min)	Temperature (deg c)	Specific Conductivity (us/cm)	Dissolved Oxygen (mg/l)	pH (su)	Oxidation-Reduction Potential (mV)	Turbidity (ntu)
10:20	112.16	-0.64	125	NR	NR	NR	NR	NR	NR
10:40	112.16	-0.64	125	NR	NR	NR	NR	NR	NR
11:00	112.16	-0.64	125	NR	NR	NR	NR	NR	NR
11:20	112.16	-0.64	125	11 +	534 +	0.7	7.5	51	31
11:30	112.16	-0.64	125	11 +	534 +	0.6	7.5	27	51
11:40	112.16	-0.64	125	11 +	534 +	0.5	7.5	113	57
11:45	112.16	-0.64	125	11 +	534 +	0.5	7.5	8	53
11:50	112.16	-0.64	125	11 +	534 +	0.5	7.5	4	60

Notes:

1) Abbreviations include: "deg c" indicates degrees Celsius; "ft" indicates feet; "ft bmp" indicates feet below reference measuring point; "gal" indicates gallons; "in" indicates inches; "mg/l" indicates milligrams per liter; "ml/min" indicates milliliters per minute; "mV" indicates millivolts; "NA" indicates not applicable; "NR" indicates not recorded; "ntu" indicates Nephelometric Turbidity units; "su" indicates standard units; "us/cm" indicates microsiemens per centimeter; and "+" indicates the parameter(s) may be used for stabilization calculations but cannot be used for other purposes.
2) Weather temperature units are in degrees Fahrenheit, unless otherwise noted.
3) Did indicator parameters reach stabilization? No
4) Was the two hour time limit reached? Yes
5) Calculations:
   - Head Above Pump Intake (ft) 171.20
   - Total Drawdown (ft) -0.64
   - Calculated Final Purge Volume (gal) 0.85
6) If Drawdown Did Not Stabilize or Stabilized Drawdown >0.3 ft, is Total Purge Volume > Calculated Final Purge Volume? Yes

Well Sampling Worksheet
WWW RAP Field Data
PERIMETER 2023-Q4 - WV-PMW-RI-102
Kent County, MI

Well	WV-PMW-RI-102 / 2 in Diameter PVC
Sample Quarter	2023-Q4
Date	10/30/2023
Weather	Partly Cloudy 40F
Sampler Initials	BPT
Purging Device	Bladder-Pump: NA, Peristaltic-Pump: NA, Centrifugal-Pump: Mega Monsoon #1
Meters Used	YSI: Agile Rental 2, Turbidimeter: Agile Rental 2, Water-Level-Meter: WLM-2
Reference Measuring Point	PVC
Well Screen (ft bmp)	47.2 - 52.2
Measured Bottom Depth (ft bmp)	NR
Sample Comment	
Initial Water Level Date/Time	10/30/2023 15:10
Initial Water Level Depth (ft bmp)	45.96
Pump/Tubing Intake Depth (ft bmp)	49.7
Tubing Length (ft)	54.7
Tubing Inner Diameter (in)	0.17
Purging Initiation Date/Time	10/30/2023 15:15
Total Purge Volume (gal)	6.5
Modified Sample	No
If Modified, Reasoning	
Sample Collection Information	Bottling-Start: 10/30/2023 16:05:00, Bottling-Stop: 10/30/2023 16:10:00, Parameters-Sampled: PFAS

Reading Time	Depth To Water (ft)	Cumulative Drawdown (ft)	Purge Rate (ml/min)	Temperature (deg c)	Specific Conductivity (us/cm)	Dissolved Oxygen (mg/l)	pH (su)	Oxidation-Reduction Potential (mV)	Turbidity (ntu)
15:30	45.99	0.03	500	11 +	674 +	10.3	7.2	184	35
15:40	45.99	0.03	500	11 +	698 +	10.2	7.5	170	14
15:45	45.99	0.03	500	11 +	698 +	10.2	7.1	175	7
15:50	45.99	0.03	500	11 +	696 +	10.2	7.1	175	<5
15:55	45.99	0.03	500	11 +	698 +	10.3	7.1	175	<5
16:00	45.99	0.03	500	11 +	697 +	10.2	7.1	173	<5

Notes:

1) Abbreviations include: "deg c" indicates degrees Celsius; "ft" indicates feet; "ft bmp" indicates feet below reference measuring point; "gal" indicates gallons; "in" indicates inches; "mg/l" indicates milligrams per liter; "ml/min" indicates milliliters per minute; "mV" indicates millivolts; "NA" indicates not applicable; "NR" indicates not recorded; "ntu" indicates Nephelometric Turbidity units; "su" indicates standard units; "us/cm" indicates microsiemens per centimeter; and "+" indicates the parameter(s) may be used for stabilization calculations but cannot be used for other purposes.
2) Weather temperature units are in degrees Fahrenheit, unless otherwise noted.
3) Did indicator parameters reach stabilization? Yes
4) Was the two hour time limit reached? No
5) Calculations:
   - Head Above Pump Intake (ft) 3.74
   - Total Drawdown (ft) 0.03
   - Calculated Final Purge Volume (gal) NA
6) If Drawdown Did Not Stabilize or Stabilized Drawdown >0.3 ft, is Total Purge Volume > Calculated Final Purge Volume? NA

Well Sampling Worksheet
WWW RAP Field Data
PERIMETER 2023-Q4 - WV-PMW-RI-104A
Kent County, MI

Well	WV-PMW-RI-104A / 2 in Diameter PVC
Sample Quarter	2023-Q4
Date	10/26/2023
Weather	Cloudy 60F
Sampler Initials	RCP
Purging Device	Bladder-Pump: NA, Peristaltic-Pump: PER-3, Centrifugal-Pump: NA
Meters Used	YSI: Agile Rental 2, Turbidimeter: Agile Rental 2, Water-Level-Meter: WLM-2
Reference Measuring Point	PVC
Well Screen (ft bmp)	25.6 - 30.6
Measured Bottom Depth (ft bmp)	NR
Sample Comment	10:25 - Water level is stable and turbidity is low. Connect YSI.
Initial Water Level Date/Time	10/26/2023 10:10
Initial Water Level Depth (ft bmp)	21.62
Pump/Tubing Intake Depth (ft bmp)	28.1
Tubing Length (ft)	33.1
Tubing Inner Diameter (in)	0.17
Purging Initiation Date/Time	10/26/2023 10:15
Total Purge Volume (gal)	2
Modified Sample	No
If Modified, Reasoning	
Sample Collection Information	Bottling-Start: 10/26/2023 10:55:00, Bottling-Stop: 10/26/2023 11:00:00, Parameters-Sampled: PFAS

Reading Time	Depth To Water (ft)	Cumulative Drawdown (ft)	Purge Rate (ml/min)	Temperature (deg c)	Specific Conductivity (us/cm)	Dissolved Oxygen (mg/l)	pH (su)	Oxidation-Reduction Potential (mV)	Turbidity (ntu)
10:20	21.62	0.00	200	NR	NR	NR	NR	NR	NR
10:25	21.62	0.00	200	NR	NR	NR	NR	NR	<5
10:35	21.62	0.00	200	11 +	680 +	5.1	7.0	98	<5
10:40	21.62	0.00	200	11 +	672 +	5.2	7.0	110	<5
10:45	21.62	0.00	200	11 +	671 +	5.3	7.0	117	<5
10:50	21.62	0.00	200	11 +	667 +	5.2	7.0	119	<5

Notes:

1) Abbreviations include: "deg c" indicates degrees Celsius; "ft" indicates feet; "ft bmp" indicates feet below reference measuring point; "gal" indicates gallons; "in" indicates inches; "mg/l" indicates milligrams per liter; "ml/min" indicates milliliters per minute; "mV" indicates millivolts; "NA" indicates not applicable; "NR" indicates not recorded; "ntu" indicates Nephelometric Turbidity units; "su" indicates standard units; "us/cm" indicates microsiemens per centimeter; and "+" indicates the parameter(s) may be used for stabilization calculations but cannot be used for other purposes.
2) Weather temperature units are in degrees Fahrenheit, unless otherwise noted.
3) Did indicator parameters reach stabilization? Yes
4) Was the two hour time limit reached? No
5) Calculations:
   - Head Above Pump Intake (ft) 6.48
   - Total Drawdown (ft) 0.00
   - Calculated Final Purge Volume (gal) NA
6) If Drawdown Did Not Stabilize or Stabilized Drawdown >0.3 ft, is Total Purge Volume > Calculated Final Purge Volume? NA

Well Sampling Worksheet
WWW RAP Field Data
PERIMETER 2023-Q4 - WV-PMW-RI-104B
Kent County, MI

Well	WV-PMW-RI-104B / 2 in Diameter PVC
Sample Quarter	2023-Q4
Date	10/26/2023
Weather	Cloud 60
Sampler Initials	NCK
Purging Device	Bladder-Pump: NA, Peristaltic-Pump: NA, Centrifugal-Pump: Mega Monsoon #1
Meters Used	YSI: Agile Rental 3, Turbidimeter: Agile Rental 3, Water-Level-Meter: WLM-1
Reference Measuring Point	PVC
Well Screen (ft bmp)	130.0 - 135.0
Measured Bottom Depth (ft bmp)	135
Sample Comment	10:25 - Purge water observed to be very turbid. 11:00 - Connected YSI. 12:00 - FB-RCP and FB-CRB collected.
Initial Water Level Date/Time	10/26/2023 10:15
Initial Water Level Depth (ft bmp)	16.70
Pump/Tubing Intake Depth (ft bmp)	132.5
Tubing Length (ft)	135.5
Tubing Inner Diameter (in)	0.17
Purging Initiation Date/Time	10/26/2023 10:15
Total Purge Volume (gal)	8
Modified Sample	No
If Modified, Reasoning	
Sample Collection Information	Bottling-Start: 10/26/2023 12:00:00, Bottling-Stop: 10/26/2023 12:05:00, Parameters-Sampled: PFAS

Reading Time	Depth To Water (ft)	Cumulative Drawdown (ft)	Purge Rate (ml/min)	Temperature (deg c)	Specific Conductivity (us/cm)	Dissolved Oxygen (mg/l)	pH (su)	Oxidation-Reduction Potential (mV)	Turbidity (ntu)
10:25	16.83	0.13	300	NR	NR	NR	NR	NR	NR
10:35	16.83	0.13	300	NR	NR	NR	NR	NR	NR
10:45	16.83	0.13	300	NR	NR	NR	NR	NR	NR
11:00	16.83	0.13	300	NR	NR	NR	NR	NR	NR
11:15	16.83	0.13	300	11	696 +	<0.5 +	7.6	-88	13
11:20	16.83	0.13	300	11	697 +	<0.5 +	7.6	-100	12
11:50	16.83	0.13	300	11	699 +	<0.5 +	7.7	-138	10
11:55	16.83	0.13	300	11	699 +	<0.5 +	7.7	-139	9
12:00	16.83	0.13	300	11	700 +	<0.5 +	7.7	-140	9

Notes:

1) Abbreviations include: "deg c" indicates degrees Celsius; "ft" indicates feet; "ft bmp" indicates feet below reference measuring point; "gal" indicates gallons; "in" indicates inches; "mg/l" indicates milligrams per liter; "ml/min" indicates milliliters per minute; "mV" indicates millivolts; "NA" indicates not applicable; "NR" indicates not recorded; "ntu" indicates Nephelometric Turbidity units; "su" indicates standard units; "us/cm" indicates microsiemens per centimeter; and "+" indicates the parameter(s) may be used for stabilization calculations but cannot be used for other purposes.
2) Weather temperature units are in degrees Fahrenheit, unless otherwise noted.
3) Did indicator parameters reach stabilization? Yes
4) Was the two hour time limit reached? No
5) Calculations:
   - Head Above Pump Intake (ft) 115.80
   - Total Drawdown (ft) 0.13
   - Calculated Final Purge Volume (gal) NA
6) If Drawdown Did Not Stabilize or Stabilized Drawdown >0.3 ft, is Total Purge Volume > Calculated Final Purge Volume? NA

Well Sampling Worksheet
WWW RAP Field Data
PERIMETER 2023-Q4 - WV-PMW-RI-105A
Kent County, MI

Well	WV-PMW-RI-105A / 2 in Diameter PVC
Sample Quarter	2023-Q4
Date	10/26/2023
Weather	Cloudy - 66F
Sampler Initials	CRB
Purging Device	Bladder-Pump: NA, Peristaltic-Pump: PER-1, Centrifugal-Pump: NA
Meters Used	YSI: Agile Rental 1, Turbidimeter: Agile Rental 1, Water-Level-Meter: WLM-1
Reference Measuring Point	PVC
Well Screen (ft bmp)	34.5 - 39.5
Measured Bottom Depth (ft bmp)	NR
Sample Comment	YSI Connected after 13:55 reading.
Initial Water Level Date/Time	10/26/2023 13:40
Initial Water Level Depth (ft bmp)	21.95
Pump/Tubing Intake Depth (ft bmp)	37
Tubing Length (ft)	39.5
Tubing Inner Diameter (in)	0.17
Purging Initiation Date/Time	10/26/2023 13:40
Total Purge Volume (gal)	3.7
Modified Sample	No
If Modified, Reasoning	
Sample Collection Information	Bottling-Start: 10/26/2023 14:20:00, Bottling-Stop: 10/26/2023 14:25:00, Parameters-Sampled: PFAS

Reading Time	Depth To Water (ft)	Cumulative Drawdown (ft)	Purge Rate (ml/min)	Temperature (deg c)	Specific Conductivity (us/cm)	Dissolved Oxygen (mg/l)	pH (su)	Oxidation-Reduction Potential (mV)	Turbidity (ntu)
13:45	21.95	0.00	350	NR	NR	NR	NR	NR	9
13:55	21.95	0.00	350	NR	NR	NR	NR	NR	<5
14:05	21.95	0.00	350	12	536 +	3.4	7.4	99	<5
14:10	21.95	0.00	350	12	535 +	3.4	7.4	98	<5
14:15	21.95	0.00	350	12	535 +	3.3	7.4	97	<5

Notes:

1) Abbreviations include: "deg c" indicates degrees Celsius; "ft" indicates feet; "ft bmp" indicates feet below reference measuring point; "gal" indicates gallons; "in" indicates inches; "mg/l" indicates milligrams per liter; "ml/min" indicates milliliters per minute; "mV" indicates millivolts; "NA" indicates not applicable; "NR" indicates not recorded; "ntu" indicates Nephelometric Turbidity units; "su" indicates standard units; "us/cm" indicates microsiemens per centimeter; and "+" indicates the parameter(s) may be used for stabilization calculations but cannot be used for other purposes.
2) Weather temperature units are in degrees Fahrenheit, unless otherwise noted.
3) Did indicator parameters reach stabilization? Yes
4) Was the two hour time limit reached? No
5) Calculations:
   - Head Above Pump Intake (ft) 15.05
   - Total Drawdown (ft) 0.00
   - Calculated Final Purge Volume (gal) NA
6) If Drawdown Did Not Stabilize or Stabilized Drawdown >0.3 ft, is Total Purge Volume > Calculated Final Purge Volume? NA

Well Sampling Worksheet
WWW RAP Field Data
PERIMETER 2023-Q4 - WV-PMW-RI-105B
Kent County, MI

Well	WV-PMW-RI-105B / 2 in Diameter PVC
Sample Quarter	2023-Q4
Date	10/26/2023
Weather	Cloudy-67
Sampler Initials	CRB
Purging Device	Bladder-Pump: NA, Peristaltic-Pump: PER-1, Centrifugal-Pump: NA
Meters Used	YSI: Agile Rental 1, Turbidimeter: Agile Rental 1, Water-Level-Meter: WLM-1
Reference Measuring Point	PVC
Well Screen (ft bmp)	79.1 - 84.1
Measured Bottom Depth (ft bmp)	NR
Sample Comment	YSI Connected after 10:40 reading.Last 3 water level readings were not the same per Standard Operating Procedure (SOP). Water level meters are considered accurate to +/- 0.01 feet and last 3 readings were within this range. GZA does not believe this impacts data quality.
Initial Water Level Date/Time	10/26/2023 10:15
Initial Water Level Depth (ft bmp)	18.71
Pump/Tubing Intake Depth (ft bmp)	81.6
Tubing Length (ft)	84.1
Tubing Inner Diameter (in)	0.17
Purging Initiation Date/Time	10/26/2023 10:15
Total Purge Volume (gal)	8.5
Modified Sample	No
If Modified, Reasoning	
Sample Collection Information	Bottling-Start: 10/26/2023 11:35:00, Bottling-Stop: 10/26/2023 11:40:00, Parameters-Sampled: PFAS

Reading Time	Depth To Water (ft)	Cumulative Drawdown (ft)	Purge Rate (ml/min)	Temperature (deg c)	Specific Conductivity (us/cm)	Dissolved Oxygen (mg/l)	pH (su)	Oxidation-Reduction Potential (mV)	Turbidity (ntu)
10:20	18.72	0.01	400	NR	NR	NR	NR	NR	894
10:40	18.72	0.01	400	NR	NR	NR	NR	NR	58
10:55	18.72	0.01	400	11	595 +	<0.5	7.7	-74	33
11:10	18.72	0.01	400	11	591 +	<0.5	7.7	-110	14
11:20	18.72	0.01	400	11	592 +	<0.5	7.7	-118	6
11:25	18.72	0.01	400	11	590 +	<0.5	7.7	-119	6
11:30	18.73	0.02	400	11	591 +	<0.5	7.7	-121	6

Notes:

1) Abbreviations include: "deg c" indicates degrees Celsius; "ft" indicates feet; "ft bmp" indicates feet below reference measuring point; "gal" indicates gallons; "in" indicates inches; "mg/l" indicates milligrams per liter; "ml/min" indicates milliliters per minute; "mV" indicates millivolts; "NA" indicates not applicable; "NR" indicates not recorded; "ntu" indicates Nephelometric Turbidity units; "su" indicates standard units; "us/cm" indicates microsiemens per centimeter; and "+" indicates the parameter(s) may be used for stabilization calculations but cannot be used for other purposes.
2) Weather temperature units are in degrees Fahrenheit, unless otherwise noted.
3) Did indicator parameters reach stabilization? Yes
4) Was the two hour time limit reached? No
5) Calculations:
   - Head Above Pump Intake (ft) 62.89
   - Total Drawdown (ft) 0.02
   - Calculated Final Purge Volume (gal) NA
6) If Drawdown Did Not Stabilize or Stabilized Drawdown >0.3 ft, is Total Purge Volume > Calculated Final Purge Volume? NA

Well Sampling Worksheet
WWW RAP Field Data
PERIMETER 2023-Q4 - WV-PMW-RI-106A
Kent County, MI

Well	WV-PMW-RI-106A / 2 in Diameter PVC
Sample Quarter	2023-Q4
Date	10/25/2023
Weather	Cloudy 60
Sampler Initials	NCK
Purging Device	Bladder-Pump: NA, Peristaltic-Pump: NA, Centrifugal-Pump: Mega Monsoon #1
Meters Used	YSI: Agile Rental 3, Turbidimeter: Agile Rental 3, Water-Level-Meter: WLM-2
Reference Measuring Point	PVC
Well Screen (ft bmp)	18.5 - 23.5
Measured Bottom Depth (ft bmp)	NR
Sample Comment	YSI Connected after 14:30.
Initial Water Level Date/Time	10/25/2023 13:55
Initial Water Level Depth (ft bmp)	9.17
Pump/Tubing Intake Depth (ft bmp)	21
Tubing Length (ft)	23
Tubing Inner Diameter (in)	0.17
Purging Initiation Date/Time	10/25/2023 14:00
Total Purge Volume (gal)	4
Modified Sample	No
If Modified, Reasoning	
Sample Collection Information	Bottling-Start: 10/25/2023 14:50:00, Bottling-Stop: 10/25/2023 14:55:00, Parameters-Sampled: PFAS

Reading Time	Depth To Water (ft)	Cumulative Drawdown (ft)	Purge Rate (ml/min)	Temperature (deg c)	Specific Conductivity (us/cm)	Dissolved Oxygen (mg/l)	pH (su)	Oxidation-Reduction Potential (mV)	Turbidity (ntu)
14:10	9.34	0.17	300	NR	NR	NR	NR	NR	NR
14:20	9.32	0.15	300	NR	NR	NR	NR	NR	NR
14:30	9.32	0.15	300	NR	NR	NR	NR	NR	NR
14:40	9.32	0.15	300	11	314 +	2.4	8.0	137 +	<5
14:45	9.32	0.15	300	11	314 +	2.3	8.0	140 +	<5
14:50	9.32	0.15	300	11	313 +	2.3	8.0	143 +	<5

Notes:

1) Abbreviations include: "deg c" indicates degrees Celsius; "ft" indicates feet; "ft bmp" indicates feet below reference measuring point; "gal" indicates gallons; "in" indicates inches; "mg/l" indicates milligrams per liter; "ml/min" indicates milliliters per minute; "mV" indicates millivolts; "NA" indicates not applicable; "NR" indicates not recorded; "ntu" indicates Nephelometric Turbidity units; "su" indicates standard units; "us/cm" indicates microsiemens per centimeter; and "+" indicates the parameter(s) may be used for stabilization calculations but cannot be used for other purposes.
2) Weather temperature units are in degrees Fahrenheit, unless otherwise noted.
3) Did indicator parameters reach stabilization? Yes
4) Was the two hour time limit reached? No
5) Calculations:
   - Head Above Pump Intake (ft) 11.83
   - Total Drawdown (ft) 0.15
   - Calculated Final Purge Volume (gal) NA
6) If Drawdown Did Not Stabilize or Stabilized Drawdown >0.3 ft, is Total Purge Volume > Calculated Final Purge Volume? NA

Well Sampling Worksheet
WWW RAP Field Data
PERIMETER 2023-Q4 - WV-PMW-RI-106B
Kent County, MI

Well	WV-PMW-RI-106B / 2 in Diameter PVC
Sample Quarter	2023-Q4
Date	10/25/2023
Weather	Cloudy 63°F
Sampler Initials	CRB
Purging Device	Bladder-Pump: NA, Peristaltic-Pump: PER-1, Centrifugal-Pump: NA
Meters Used	YSI: Agile Rental 2, Turbidimeter: Agile Rental 2, Water-Level-Meter: WLM-1
Reference Measuring Point	PVC
Well Screen (ft bmp)	34.0 - 39.0
Measured Bottom Depth (ft bmp)	NR
Sample Comment	YSI Connected after 14:45 readings. Turbidity did not stabilize per the Standard Operating Procedure (SOP).
Initial Water Level Date/Time	10/25/2023 14:10
Initial Water Level Depth (ft bmp)	8.75
Pump/Tubing Intake Depth (ft bmp)	36.5
Tubing Length (ft)	39
Tubing Inner Diameter (in)	0.17
Purging Initiation Date/Time	10/25/2023 14:10
Total Purge Volume (gal)	6.3
Modified Sample	No
If Modified, Reasoning	
Sample Collection Information	Bottling-Start: 10/25/2023 15:15:00, Bottling-Stop: 10/25/2023 15:20:00, Parameters-Sampled: PFAS

Reading Time	Depth To Water (ft)	Cumulative Drawdown (ft)	Purge Rate (ml/min)	Temperature (deg c)	Specific Conductivity (us/cm)	Dissolved Oxygen (mg/l)	pH (su)	Oxidation-Reduction Potential (mV)	Turbidity (ntu)
14:15	8.76	0.01	400	NR	NR	NR	NR	NR	74 +
14:25	8.76	0.01	400	NR	NR	NR	NR	NR	43 +
14:35	8.76	0.01	400	NR	NR	NR	NR	NR	23 +
14:45	8.76	0.01	400	NR	NR	NR	NR	NR	16 +
14:55	8.76	0.01	400	10 +	520 +	8.0	7.7	98	5 +
15:00	8.76	0.01	400	10 +	519 +	8.9	7.7	99	5 +
15:05	8.76	0.01	400	10 +	519 +	8.9	7.6	100	5 +
15:10	8.76	0.01	400	10 +	518 +	8.8	7.7	101	<5 +

Notes:

1) Abbreviations include: "deg c" indicates degrees Celsius; "ft" indicates feet; "ft bmp" indicates feet below reference measuring point; "gal" indicates gallons; "in" indicates inches; "mg/l" indicates milligrams per liter; "ml/min" indicates milliliters per minute; "mV" indicates millivolts; "NA" indicates not applicable; "NR" indicates not recorded; "ntu" indicates Nephelometric Turbidity units; "su" indicates standard units; "us/cm" indicates microsiemens per centimeter; and "+" indicates the parameter(s) may be used for stabilization calculations but cannot be used for other purposes.
2) Weather temperature units are in degrees Fahrenheit, unless otherwise noted.
3) Did indicator parameters reach stabilization? No
4) Was the two hour time limit reached? No
5) Calculations:
   - Head Above Pump Intake (ft) 27.75
   - Total Drawdown (ft) 0.01
   - Calculated Final Purge Volume (gal) NA
6) If Drawdown Did Not Stabilize or Stabilized Drawdown >0.3 ft, is Total Purge Volume > Calculated Final Purge Volume? NA

Well Sampling Worksheet
WWW RAP Field Data
PERIMETER 2023-Q4 - WV-PMW-RI-106C
Kent County, MI

Well	WV-PMW-RI-106C / 2 in Diameter PVC
Sample Quarter	2023-Q4
Date	10/25/2023
Weather	Rainy 60°F
Sampler Initials	RCP
Purging Device	Bladder-Pump: NA, Peristaltic-Pump: PER-3, Centrifugal-Pump: NA
Meters Used	YSI: Agile Rental 1, Turbidimeter: Agile Rental 1, Water-Level-Meter: WLM-3
Reference Measuring Point	PVC
Well Screen (ft bmp)	53.9 - 58.9
Measured Bottom Depth (ft bmp)	58.9
Sample Comment	14:20 - Low turbidity observed. Connected YSI.
Initial Water Level Date/Time	10/25/2023 14:05
Initial Water Level Depth (ft bmp)	9.02
Pump/Tubing Intake Depth (ft bmp)	56.4
Tubing Length (ft)	58
Tubing Inner Diameter (in)	0.17
Purging Initiation Date/Time	10/25/2023 14:10
Total Purge Volume (gal)	1
Modified Sample	No
If Modified, Reasoning	
Sample Collection Information	Bottling-Start: 10/25/2023 14:40:00, Bottling-Stop: 10/25/2023 14:45:00, Parameters-Sampled: PFAS

Reading Time	Depth To Water (ft)	Cumulative Drawdown (ft)	Purge Rate (ml/min)	Temperature (deg c)	Specific Conductivity (us/cm)	Dissolved Oxygen (mg/l)	pH (su)	Oxidation-Reduction Potential (mV)	Turbidity (ntu)
14:15	9.11	0.09	160	NR	NR	NR	NR	NR	NR
14:20	9.11	0.09	160	NR	NR	NR	NR	NR	<5
14:25	9.11	0.09	160	11	3,850 +	<0.5	7.5	161	<5
14:30	9.11	0.09	160	11	3,868 +	<0.5	7.6	157	<5
14:35	9.11	0.09	160	11	3,880 +	<0.5	7.6	155	<5

Notes:

1) Abbreviations include: "deg c" indicates degrees Celsius; "ft" indicates feet; "ft bmp" indicates feet below reference measuring point; "gal" indicates gallons; "in" indicates inches; "mg/l" indicates milligrams per liter; "ml/min" indicates milliliters per minute; "mV" indicates millivolts; "NA" indicates not applicable; "NR" indicates not recorded; "ntu" indicates Nephelometric Turbidity units; "su" indicates standard units; "us/cm" indicates microsiemens per centimeter; and "+" indicates the parameter(s) may be used for stabilization calculations but cannot be used for other purposes.
2) Weather temperature units are in degrees Fahrenheit, unless otherwise noted.
3) Did indicator parameters reach stabilization? Yes
4) Was the two hour time limit reached? No
5) Calculations:
   - Head Above Pump Intake (ft) 47.38
   - Total Drawdown (ft) 0.09
   - Calculated Final Purge Volume (gal) NA
6) If Drawdown Did Not Stabilize or Stabilized Drawdown >0.3 ft, is Total Purge Volume > Calculated Final Purge Volume? NA

Well Sampling Worksheet
WWW RAP Field Data
PERIMETER 2023-Q4 - WV-PMW-RI-106D
Kent County, MI

Well	WV-PMW-RI-106D / 2 in Diameter PVC
Sample Quarter	2023-Q4
Date	10/27/2023
Weather	Overcast-66
Sampler Initials	CRB
Purging Device	Bladder-Pump: NA, Peristaltic-Pump: PER-1, Centrifugal-Pump: NA
Meters Used	YSI: Agile Rental 3, Turbidimeter: Agile Rental 3, Water-Level-Meter: WLM-1
Reference Measuring Point	PVC
Well Screen (ft bmp)	70.2 - 75.2
Measured Bottom Depth (ft bmp)	NR
Sample Comment	YSI Connected at 10:25. Last 3 water level readings were not the same per Standard Operating Procedure (SOP). Water level meters are considered accurate to +/- 0.01 feet and last 3 readings were within this range. GZA does not believe this impacts data quality.
Initial Water Level Date/Time	10/27/2023 10:05
Initial Water Level Depth (ft bmp)	18.38
Pump/Tubing Intake Depth (ft bmp)	72.7
Tubing Length (ft)	75.2
Tubing Inner Diameter (in)	0.17
Purging Initiation Date/Time	10/27/2023 10:05
Total Purge Volume (gal)	3.3
Modified Sample	No
If Modified, Reasoning	
Sample Collection Information	Bottling-Start: 10/27/2023 11:25:00, Bottling-Stop: 10/27/2023 11:30:00, Parameters-Sampled: PFAS

Reading Time	Depth To Water (ft)	Cumulative Drawdown (ft)	Purge Rate (ml/min)	Temperature (deg c)	Specific Conductivity (us/cm)	Dissolved Oxygen (mg/l)	pH (su)	Oxidation-Reduction Potential (mV)	Turbidity (ntu)
10:10	18.41	0.03	125	NR	NR	NR	NR	NR	8
10:25	18.42	0.04	125	12	437 +	<0.5	7.9	68	6
10:40	18.43	0.05	125	12	438 +	<0.5	7.9	-56	5
10:50	18.43	0.05	125	12	438 +	<0.5	7.9	-95	<5
10:55	18.44	0.06	125	12	438 +	<0.5	7.9	-105	<5
11:05	18.44	0.06	125	12	437 +	<0.5	7.9	-121	<5
11:10	18.44	0.06	125	12	436 +	<0.5	7.9	-126	<5
11:15	18.45	0.07	125	12	435 +	<0.5	7.9	-130	<5
11:20	18.45	0.07	125	12	435 +	<0.5	7.9	-133	<5

Notes:

1) Abbreviations include: "deg c" indicates degrees Celsius; "ft" indicates feet; "ft bmp" indicates feet below reference measuring point; "gal" indicates gallons; "in" indicates inches; "mg/l" indicates milligrams per liter; "ml/min" indicates milliliters per minute; "mV" indicates millivolts; "NA" indicates not applicable; "NR" indicates not recorded; "ntu" indicates Nephelometric Turbidity units; "su" indicates standard units; "us/cm" indicates microsiemens per centimeter; and "+" indicates the parameter(s) may be used for stabilization calculations but cannot be used for other purposes.
2) Weather temperature units are in degrees Fahrenheit, unless otherwise noted.
3) Did indicator parameters reach stabilization? Yes
4) Was the two hour time limit reached? No
5) Calculations:
   - Head Above Pump Intake (ft) 54.32
   - Total Drawdown (ft) 0.07
   - Calculated Final Purge Volume (gal) NA
6) If Drawdown Did Not Stabilize or Stabilized Drawdown >0.3 ft, is Total Purge Volume > Calculated Final Purge Volume? NA

Well Sampling Worksheet
WWW RAP Field Data
PERIMETER 2023-Q4 - WV-PMW-RI-106E
Kent County, MI

Well	WV-PMW-RI-106E / 2 in Diameter PVC
Sample Quarter	2023-Q4
Date	11/02/2023
Weather	Cloudy 43°F
Sampler Initials	JMS
Purging Device	Bladder-Pump: BP-11, Peristaltic-Pump: NA, Centrifugal-Pump: NA
Meters Used	YSI: Agile Rental 2, Turbidimeter: Agile Rental 2, Water-Level-Meter: WLM-2
Reference Measuring Point	PVC
Well Screen (ft bmp)	176.0 - 181.0
Measured Bottom Depth (ft bmp)	NR
Sample Comment	13:10 - Flow rate lowered to 50 mL/min. 13:20 - YSI Connected.
Initial Water Level Date/Time	11/02/2023 12:25
Initial Water Level Depth (ft bmp)	141.06
Pump/Tubing Intake Depth (ft bmp)	178.5
Tubing Length (ft)	183
Tubing Inner Diameter (in)	0.25
Purging Initiation Date/Time	11/02/2023 12:30
Total Purge Volume (gal)	2.6
Modified Sample	No
If Modified, Reasoning	
Sample Collection Information	Bottling-Start: 11/02/2023 14:35:00, Bottling-Stop: 11/02/2023 14:40:00, Parameters-Sampled: PFAS

Reading Time	Depth To Water (ft)	Cumulative Drawdown (ft)	Purge Rate (ml/min)	Temperature (deg c)	Specific Conductivity (us/cm)	Dissolved Oxygen (mg/l)	pH (su)	Oxidation-Reduction Potential (mV)	Turbidity (ntu)
12:50	146.65	5.59	150	NR	NR	NR	NR	NR	55
13:10	149.42	8.36	150	NR	NR	NR	NR	NR	76
13:20	148.90	7.84	50	10 +	607 +	7.7	7.3	140	80
13:30	148.60	7.54	50	10 +	598 +	2.3	7.3	80	91
13:40	148.39	7.33	50	10 +	593 +	1.9	7.3	54	89
13:50	148.26	7.20	50	10 +	596 +	1.8	7.4	14	90
14:00	148.19	7.13	50	10 +	595 +	1.9	7.4	-5	90
14:10	148.13	7.07	50	10 +	593 +	1.8	7.4	-15	63
14:20	148.00	6.94	50	10 +	591 +	1.7	7.4	-25	60
14:25	147.98	6.92	50	10 +	591 +	1.7	7.4	-28	53
14:30	147.97	6.91	50	10 +	589 +	1.6	7.4	-31	59

Notes:

1) Abbreviations include: "deg c" indicates degrees Celsius; "ft" indicates feet; "ft bmp" indicates feet below reference measuring point; "gal" indicates gallons; "in" indicates inches; "mg/l" indicates milligrams per liter; "ml/min" indicates milliliters per minute; "mV" indicates millivolts; "NA" indicates not applicable; "NR" indicates not recorded; "ntu" indicates Nephelometric Turbidity units; "su" indicates standard units; "us/cm" indicates microsiemens per centimeter; and "+" indicates the parameter(s) may be used for stabilization calculations but cannot be used for other purposes.
2) Weather temperature units are in degrees Fahrenheit, unless otherwise noted.
3) Did indicator parameters reach stabilization? No
4) Was the two hour time limit reached? Yes
5) Calculations:
   - Head Above Pump Intake (ft) 37.44
   - Total Drawdown (ft) 6.91
   - Calculated Final Purge Volume (gal) 1.58
6) If Drawdown Did Not Stabilize or Stabilized Drawdown >0.3 ft, is Total Purge Volume > Calculated Final Purge Volume? Yes

Well Sampling Worksheet
WWW RAP Field Data
AREA 5 2024-Q1 - AREA5-RI-9C
Kent County, MI

Well	AREA5-RI-9C / 2 in Diameter PVC
Sample Quarter	2024-Q1
Date	01/31/2024
Weather	Cloudy, 38°F
Sampler Initials	JMS
Purging Device	Bladder-Pump: BP-11, Peristaltic-Pump: NA, Centrifugal-Pump: NA
Meters Used	YSI: Agile Rental 1, Turbidimeter: Agile Rental 1, Water-Level-Meter: WLM-4
Reference Measuring Point	PVC
Well Screen (ft bmp)	221.9 - 226.9
Measured Bottom Depth (ft bmp)	NR
Sample Comment	11:00 - Purge water observed to be very turbid. 12:40 - YSI Connected.
Initial Water Level Date/Time	01/31/2024 10:45
Initial Water Level Depth (ft bmp)	110.76
Pump/Tubing Intake Depth (ft bmp)	224.4
Tubing Length (ft)	229.4
Tubing Inner Diameter (in)	0.25
Purging Initiation Date/Time	01/31/2024 10:50
Total Purge Volume (gal)	4
Modified Sample	No
If Modified, Reasoning	
Sample Collection Information	Bottling-Start: 01/31/2024 12:55:00, Bottling-Stop: 01/31/2024 13:00:00, Parameters-Sampled: PFAS

Reading Time	Depth To Water (ft)	Cumulative Drawdown (ft)	Purge Rate (ml/min)	Temperature (deg c)	Specific Conductivity (us/cm)	Dissolved Oxygen (mg/l)	pH (su)	Oxidation-Reduction Potential (mV)	Turbidity (ntu)
11:00	110.77	0.01	150	NR	NR	NR	NR	NR	NR
12:20	110.75	-0.01	125	NR	NR	NR	NR	NR	565
12:40	110.75	-0.01	125	9	1,381 +	10.0	7.4	113	340
12:45	110.75	-0.01	125	9	1,380 +	5.2	7.2	83	208
12:50	110.75	-0.01	125	9	1,379 +	4.9	7.2	67	236

Notes:

1) Abbreviations include: "deg c" indicates degrees Celsius; "ft" indicates feet; "ft bmp" indicates feet below reference measuring point; "gal" indicates gallons; "in" indicates inches; "mg/l" indicates milligrams per liter; "ml/min" indicates milliliters per minute; "mV" indicates millivolts; "NA" indicates not applicable; "NR" indicates not recorded; "ntu" indicates Nephelometric Turbidity units; "su" indicates standard units; "us/cm" indicates microsiemens per centimeter; and "+" indicates the parameter(s) may be used for stabilization calculations but cannot be used for other purposes.
2) Weather temperature units are in degrees Fahrenheit, unless otherwise noted.
3) Did indicator parameters reach stabilization? No
4) Was the two hour time limit reached? Yes
5) Calculations:
   - Head Above Pump Intake (ft) 113.64
   - Total Drawdown (ft) -0.01
   - Calculated Final Purge Volume (gal) NA
6) If Drawdown Did Not Stabilize or Stabilized Drawdown >0.3 ft, is Total Purge Volume > Calculated Final Purge Volume? NA

Well Sampling Worksheet
WWW RAP Field Data
AREA 5 2024-Q1 - AREA5-RI-11A
Kent County, MI

Well	AREA5-RI-11A / 2 in Diameter PVC
Sample Quarter	2024-Q1
Date	01/29/2024
Weather	Cloudy, 35°F
Sampler Initials	RCP
Purging Device	Bladder-Pump: NA, Peristaltic-Pump: NA, Centrifugal-Pump: Mega Monsoon #2
Meters Used	YSI: Agile Rental 2, Turbidimeter: Agile Rental 2, Water-Level-Meter: WLM-1
Reference Measuring Point	PVC
Well Screen (ft bmp)	110.0 - 115.0
Measured Bottom Depth (ft bmp)	NR
Sample Comment	12:40 - Water level is stable. Connected YSI.
Initial Water Level Date/Time	01/29/2024 11:30
Initial Water Level Depth (ft bmp)	96.24
Pump/Tubing Intake Depth (ft bmp)	112.5
Tubing Length (ft)	115
Tubing Inner Diameter (in)	0.17
Purging Initiation Date/Time	01/29/2024 11:35
Total Purge Volume (gal)	8
Modified Sample	No
If Modified, Reasoning	
Sample Collection Information	Bottling-Start: 01/29/2024 13:25:00, Bottling-Stop: 01/29/2024 13:30:00, Parameters-Sampled: PFAS

Reading Time	Depth To Water (ft)	Cumulative Drawdown (ft)	Purge Rate (ml/min)	Temperature (deg c)	Specific Conductivity (us/cm)	Dissolved Oxygen (mg/l)	pH (su)	Oxidation-Reduction Potential (mV)	Turbidity (ntu)
12:20	96.28	0.04	270	NR	NR	NR	NR	NR	NR
12:40	96.28	0.04	270	NR	NR	NR	NR	NR	8
12:50	96.28	0.04	270	10	767 +	3.5	7.3	197	5
12:55	96.28	0.04	270	10	766 +	2.5	7.2	183	5
13:00	96.28	0.04	270	10	763 +	2.3	7.3	162	5
13:05	96.28	0.04	270	10	764 +	2.1	7.2	148	5
13:10	96.28	0.04	270	10	765 +	1.9	7.2	129	5
13:15	96.28	0.04	270	10	765 +	1.8	7.2	123	5
13:20	96.28	0.04	270	10	766 +	1.8	7.2	120	5

Notes:

1) Abbreviations include: "deg c" indicates degrees Celsius; "ft" indicates feet; "ft bmp" indicates feet below reference measuring point; "gal" indicates gallons; "in" indicates inches; "mg/l" indicates milligrams per liter; "ml/min" indicates milliliters per minute; "mV" indicates millivolts; "NA" indicates not applicable; "NR" indicates not recorded; "ntu" indicates Nephelometric Turbidity units; "su" indicates standard units; "us/cm" indicates microsiemens per centimeter; and "+" indicates the parameter(s) may be used for stabilization calculations but cannot be used for other purposes.
2) Weather temperature units are in degrees Fahrenheit, unless otherwise noted.
3) Did indicator parameters reach stabilization? Yes
4) Was the two hour time limit reached? No
5) Calculations:
   - Head Above Pump Intake (ft) 16.26
   - Total Drawdown (ft) 0.04
   - Calculated Final Purge Volume (gal) NA
6) If Drawdown Did Not Stabilize or Stabilized Drawdown >0.3 ft, is Total Purge Volume > Calculated Final Purge Volume? NA

Well Sampling Worksheet
WWW RAP Field Data
AREA 5 2024-Q1 - AREA5-RI-11B
Kent County, MI

Well	AREA5-RI-11B / 2 in Diameter PVC
Sample Quarter	2024-Q1
Date	01/29/2024
Weather	Cloudy, 30s°F
Sampler Initials	CLM
Purging Device	Bladder-Pump: NA, Peristaltic-Pump: NA, Centrifugal-Pump: Mega Monsoon #1
Meters Used	YSI: Agile Rental 3, Turbidimeter: Agile Rental 3, Water-Level-Meter: WLM-2
Reference Measuring Point	PVC
Well Screen (ft bmp)	140.0 - 145.0
Measured Bottom Depth (ft bmp)	NR
Sample Comment	11:45 - Decreased flow rate. 12:15 - Connected YSI. 12:25 - Missed reading due to assisting other staff. 13:10 - Split sample with AECOM.
Initial Water Level Date/Time	01/29/2024 12:29
Initial Water Level Depth (ft bmp)	96.62
Pump/Tubing Intake Depth (ft bmp)	142.5
Tubing Length (ft)	145
Tubing Inner Diameter (in)	0.17
Purging Initiation Date/Time	01/29/2024 11:40
Total Purge Volume (gal)	9
Modified Sample	No
If Modified, Reasoning	
Sample Collection Information	Bottling-Start: 01/29/2024 13:10:00, Bottling-Stop: 01/29/2024 13:15:00, Parameters-Sampled: PFAS

Reading Time	Depth To Water (ft)	Cumulative Drawdown (ft)	Purge Rate (ml/min)	Temperature (deg c)	Specific Conductivity (us/cm)	Dissolved Oxygen (mg/l)	pH (su)	Oxidation-Reduction Potential (mV)	Turbidity (ntu)
11:45	96.63	0.01	400	NR	NR	NR	NR	NR	NR
11:50	96.64	0.02	310	NR	NR	NR	NR	NR	NR
11:55	96.64	0.02	330	NR	NR	NR	NR	NR	NR
12:00	96.63	0.01	350	NR	NR	NR	NR	NR	NR
12:05	96.63	0.01	380	NR	NR	NR	NR	NR	17
12:10	96.64	0.02	380	NR	NR	NR	NR	NR	14
12:15	96.64	0.02	380	13 +	697 +	6.2	7.4	-102	12
12:20	96.64	0.02	380	13 +	695 +	4.6	7.5	-126	18
12:30	96.63	0.01	380	13 +	698 +	3.4	7.5	-135	11
12:35	96.63	0.01	380	13 +	698 +	4.3	7.5	-129	9
12:40	96.63	0.01	380	14 +	697 +	2.6	7.5	-127	6
12:45	96.63	0.01	380	13 +	695 +	2.9	7.5	-117	<5
12:50	96.63	0.01	380	13 +	694 +	2.6	7.5	-114	<5

Well Sampling Worksheet
WWW RAP Field Data
AREA 5 2024-Q1 - AREA5-RI-11B
Kent County, MI

Well	AREA5-RI-11B / 2 in Diameter PVC
Sample Quarter	2024-Q1
Date	01/29/2024
Weather	Cloudy, 30s°F
Sampler Initials	CLM
Purging Device	Bladder-Pump: NA, Peristaltic-Pump: NA, Centrifugal-Pump: Mega Monsoon #1
Meters Used	YSI: Agile Rental 3, Turbidimeter: Agile Rental 3, Water-Level-Meter: WLM-2
Reference Measuring Point	PVC
Well Screen (ft bmp)	140.0 - 145.0
Measured Bottom Depth (ft bmp)	NR
Sample Comment	11:45 - Decreased flow rate. 12:15 - Connected YSI. 12:25 - Missed reading due to assisting other staff. 13:10 - Split sample with AECOM.
Initial Water Level Date/Time	01/29/2024 12:29
Initial Water Level Depth (ft bmp)	96.62
Pump/Tubing Intake Depth (ft bmp)	142.5
Tubing Length (ft)	145
Tubing Inner Diameter (in)	0.17
Purging Initiation Date/Time	01/29/2024 11:40
Total Purge Volume (gal)	9
Modified Sample	No
If Modified, Reasoning	
Sample Collection Information	Bottling-Start: 01/29/2024 13:10:00, Bottling-Stop: 01/29/2024 13:15:00, Parameters-Sampled: PFAS

Reading Time	Depth To Water (ft)	Cumulative Drawdown (ft)	Purge Rate (ml/min)	Temperature (deg c)	Specific Conductivity (us/cm)	Dissolved Oxygen (mg/l)	pH (su)	Oxidation-Reduction Potential (mV)	Turbidity (ntu)
12:55	96.63	0.01	380	13 +	693 +	3.2	7.5	-109	<5
13:00	96.63	0.01	380	14 +	689 +	2.9	7.5	-106	<5
13:05	96.63	0.01	380	14 +	688 +	2.8	7.5	-102	<5

Notes:

1) Abbreviations include: "deg c" indicates degrees Celsius; "ft" indicates feet; "ft bmp" indicates feet below reference measuring point; "gal" indicates gallons; "in" indicates inches; "mg/l" indicates milligrams per liter; "ml/min" indicates milliliters per minute; "mV" indicates millivolts; "NA" indicates not applicable; "NR" indicates not recorded; "ntu" indicates Nephelometric Turbidity units; "su" indicates standard units; "us/cm" indicates microsiemens per centimeter; and "+" indicates the parameter(s) may be used for stabilization calculations but cannot be used for other purposes.
2) Weather temperature units are in degrees Fahrenheit, unless otherwise noted.
3) Did indicator parameters reach stabilization? Yes
4) Was the two hour time limit reached? No
5) Calculations:
   - Head Above Pump Intake (ft): 45.88
   - Total Drawdown (ft): 0.01
   - Calculated Final Purge Volume (gal): NA
6) If Drawdown Did Not Stabilize or Stabilized Drawdown >0.3 ft, is Total Purge Volume > Calculated Final Purge Volume? NA

Well Sampling Worksheet
WWW RAP Field Data
AREA 5 2024-Q1 - AREA5-RI-11C
Kent County, MI

Well	AREA5-RI-11C / 2 in Diameter PVC
Sample Quarter	2024-Q1
Date	01/29/2024
Weather	Cloudy, 38°F
Sampler Initials	JMS
Purging Device	Bladder-Pump: BP-10, Peristaltic-Pump: NA, Centrifugal-Pump: NA
Meters Used	YSI: Agile Rental 4, Turbidimeter: Agile Rental 4, Water-Level-Meter: WLM-4
Reference Measuring Point	PVC
Well Screen (ft bmp)	232.5 - 237.5
Measured Bottom Depth (ft bmp)	NR
Sample Comment	YSI Connected at 13:40.
Initial Water Level Date/Time	01/29/2024 11:45
Initial Water Level Depth (ft bmp)	106.40
Pump/Tubing Intake Depth (ft bmp)	235
Tubing Length (ft)	240
Tubing Inner Diameter (in)	0.17
Purging Initiation Date/Time	01/29/2024 11:50
Total Purge Volume (gal)	15.85
Modified Sample	No
If Modified, Reasoning	
Sample Collection Information	Bottling-Start: 01/29/2024 13:55:00, Bottling-Stop: 01/29/2024 14:00:00, Parameters-Sampled: PFAS

Reading Time	Depth To Water (ft)	Cumulative Drawdown (ft)	Purge Rate (ml/min)	Temperature (deg c)	Specific Conductivity (us/cm)	Dissolved Oxygen (mg/l)	pH (su)	Oxidation-Reduction Potential (mV)	Turbidity (ntu)
13:10	106.40	0.00	500	NR	NR	NR	NR	NR	45
13:40	106.40	0.00	500	8	1,305 +	15.0	7.8	129	27
13:45	106.40	0.00	500	8	1,308 +	13.0	7.4	102	25
13:50	106.40	0.00	500	8	1,209 +	13.2	7.5	110	29

Notes:

1) Abbreviations include: "deg c" indicates degrees Celsius; "ft" indicates feet; "ft bmp" indicates feet below reference measuring point; "gal" indicates gallons; "in" indicates inches; "mg/l" indicates milligrams per liter; "ml/min" indicates milliliters per minute; "mV" indicates millivolts; "NA" indicates not applicable; "NR" indicates not recorded; "ntu" indicates Nephelometric Turbidity units; "su" indicates standard units; "us/cm" indicates microsiemens per centimeter; and "-" indicates the parameter(s) may be used for stabilization calculations but cannot be used for other purposes.
2) Weather temperature units are in degrees Fahrenheit, unless otherwise noted.
3) Did indicator parameters reach stabilization? No
4) Was the two hour time limit reached? Yes
5) Calculations:
   - Head Above Pump Intake (ft) 128.60
   - Total Drawdown (ft) 0.00
   - Calculated Final Purge Volume (gal) NA
6) If Drawdown Did Not Stabilize or Stabilized Drawdown >0.3 ft, is Total Purge Volume > Calculated Final Purge Volume? NA

Well Sampling Worksheet
WWW RAP Field Data
AREA 5 2024-Q1 - AREA5-RI-11D
Kent County, MI

Well	AREA5-RI-11D / 2 in Diameter PVC
Sample Quarter	2024-Q1
Date	01/30/2024
Weather	Cloudy, 35°F
Sampler Initials	JMS
Purging Device	Bladder-Pump: BP-12, Peristaltic-Pump: NA, Centrifugal-Pump: NA
Meters Used	YSI: Agile Rental 3, Turbidimeter: Agile Rental 3, Water-Level-Meter: WLM-4
Reference Measuring Point	PVC
Well Screen (ft bmp)	262.0 - 267.0
Measured Bottom Depth (ft bmp)	NR
Sample Comment	
Initial Water Level Date/Time	01/30/2024 10:35
Initial Water Level Depth (ft bmp)	107.82
Pump/Tubing Intake Depth (ft bmp)	264.5
Tubing Length (ft)	269.5
Tubing Inner Diameter (in)	0.25
Purging Initiation Date/Time	01/30/2024 10:40
Total Purge Volume (gal)	3.2
Modified Sample	No
If Modified, Reasoning	
Sample Collection Information	Bottling-Start: 01/30/2024 12:45:00, Bottling-Stop: 01/30/2024 12:50:00, Parameters-Sampled: PFAS

Reading Time	Depth To Water (ft)	Cumulative Drawdown (ft)	Purge Rate (ml/min)	Temperature (deg c)	Specific Conductivity (us/cm)	Dissolved Oxygen (mg/l)	pH (su)	Oxidation-Reduction Potential (mV)	Turbidity (ntu)
11:45	107.82	0.00	100	8 +	626 +	13.0	7.7	154	<5
11:50	107.82	0.00	100	8 +	653 +	6.0	7.6	104	<5
11:55	107.82	0.00	100	8 +	1,595 +	4.0	7.3	-54	>999
12:00	107.82	0.00	100	8 +	1,548 +	2.7	7.2	-68	>999
12:05	107.82	0.00	100	8 +	1,395 +	4.3	7.2	-35	>999
12:30	107.82	0.00	100	10 +	1,556 +	8.2	7.2	-43	310
12:35	107.82	0.00	100	9 +	1,540 +	4.3	7.2	-44	163
12:40	107.82	0.00	100	9 +	1,535 +	3.7	7.2	-47	138

Notes:

1) Abbreviations include: "deg c" indicates degrees Celsius; "ft" indicates feet; "ft bmp" indicates feet below reference measuring point; "gal" indicates gallons; "in" indicates inches; "mg/l" indicates milligrams per liter; "ml/min" indicates milliliters per minute; "mV" indicates millivolts; "NA" indicates not applicable; "NR" indicates not recorded; "ntu" indicates Nephelometric Turbidity units; "su" indicates standard units; "us/cm" indicates microsiemens per centimeter; and "+" indicates the parameter(s) may be used for stabilization calculations but cannot be used for other purposes.
2) Weather temperature units are in degrees Fahrenheit, unless otherwise noted.
3) Did indicator parameters reach stabilization? No
4) Was the two hour time limit reached? Yes
5) Calculations:
   - Head Above Pump Intake (ft) 156.68
   - Total Drawdown (ft) 0.00
   - Calculated Final Purge Volume (gal) NA
6) If Drawdown Did Not Stabilize or Stabilized Drawdown >0.3 ft, is Total Purge Volume > Calculated Final Purge Volume? NA

Well Sampling Worksheet
WWW RAP Field Data
AREA 19 2024-Q1 - AREA19-MW-8A
Kent County, MI

Well	AREA19-MW-8A / 2 in Diameter PVC
Sample Quarter	2024-Q1
Date	01/30/2024
Weather	Foggy, 35°F
Sampler Initials	RCP
Purging Device	Bladder-Pump: NA, Peristaltic-Pump: NA, Centrifugal-Pump: Mega Monsoon #2
Meters Used	YSI: Agile Rental 1, Turbidimeter: Agile Rental 1, Water-Level-Meter: WLM-2
Reference Measuring Point	PVC
Well Screen (ft bmp)	29.5 - 34.5
Measured Bottom Depth (ft bmp)	NR
Sample Comment	15:50 - Water level is within the well screen. Tubing intake was placed halfway between the static water level and the bottom of the well. 16:20 - Water level is stable. 16:40 - Connected YSI.
Initial Water Level Date/Time	01/30/2024 15:25
Initial Water Level Depth (ft bmp)	32.75
Pump/Tubing Intake Depth (ft bmp)	33.6
Tubing Length (ft)	36
Tubing Inner Diameter (in)	0.17
Purging Initiation Date/Time	01/30/2024 15:30
Total Purge Volume (gal)	1.5
Modified Sample	Yes
If Modified, Reasoning	Initial Water Level Below Top of Well Screen
Sample Collection Information	Bottling-Start: 01/30/2024 17:15:00, Bottling-Stop: 01/30/2024 17:25:00, Parameters-Sampled: PFAS

Reading Time	Depth To Water (ft)	Cumulative Drawdown (ft)	Purge Rate (ml/min)	Temperature (deg c)	Specific Conductivity (us/cm)	Dissolved Oxygen (mg/l)	pH (su)	Oxidation-Reduction Potential (mV)	Turbidity (ntu)
15:50	32.78	0.03	50	NR	NR	NR	NR	NR	NR
16:20	32.78	0.03	50	NR	NR	NR	NR	NR	36
16:40	32.78	0.03	50	NR	NR	NR	NR	NR	17
16:50	32.78	0.03	50	11	582 +	9.9	7.4	78	9
16:55	32.78	0.03	50	12	579 +	9.9	7.4	80	7
17:00	32.78	0.03	50	11	581 +	10.0	7.3	88	<5
17:05	32.78	0.03	50	12	576 +	9.9	7.3	88	<5
17:10	32.78	0.03	50	11	577 +	10.0	7.3	89	<5

Notes:

1) Abbreviations include: "deg c" indicates degrees Celsius; "ft" indicates feet; "ft bmp" indicates feet below reference measuring point; "gal" indicates gallons; "in" indicates inches; "mg/l" indicates milligrams per liter; "ml/min" indicates milliliters per minute; "mV" indicates millivolts; "NA" indicates not applicable; "NR" indicates not recorded; "ntu" indicates Nephelometric Turbidity units; "su" indicates standard units; "us/cm" indicates microsiemens per centimeter; and "+" indicates the parameter(s) may be used for stabilization calculations but cannot be used for other purposes.
2) Weather temperature units are in degrees Fahrenheit, unless otherwise noted.
3) Did indicator parameters reach stabilization? Yes
4) Was the two hour time limit reached? No
5) Calculations:
   - Head Above Pump Intake (ft) 0.85
   - Total Drawdown (ft) 0.03
   - Calculated Final Purge Volume (gal) NA
6) If Drawdown Did Not Stabilize or Stabilized Drawdown >0.3 ft, is Total Purge Volume > Calculated Final Purge Volume? NA

Well Sampling Worksheet
WWW RAP Field Data
AREA 19 2024-Q1 - AREA19-MW-8B
Kent County, MI

Well	AREA19-MW-8B / 2 in Diameter PVC
Sample Quarter	2024-Q1
Date	01/30/2024
Weather	Cloudy, 35°F
Sampler Initials	CLM
Purging Device	Bladder-Pump: BP-12, Peristaltic-Pump: NA, Centrifugal-Pump: NA
Meters Used	YSI: Agile Rental 2, Turbidimeter: Agile Rental 2, Water-Level-Meter: WLM-1
Reference Measuring Point	PVC
Well Screen (ft bmp)	180.8 - 185.8
Measured Bottom Depth (ft bmp)	NR
Sample Comment	YSI Connected at 17:25.
Initial Water Level Date/Time	01/30/2024 15:25
Initial Water Level Depth (ft bmp)	89.97
Pump/Tubing Intake Depth (ft bmp)	183.3
Tubing Length (ft)	188.3
Tubing Inner Diameter (in)	0.25
Purging Initiation Date/Time	01/30/2024 15:30
Total Purge Volume (gal)	4
Modified Sample	No
If Modified, Reasoning	
Sample Collection Information	Bottling-Start: 01/30/2024 17:40:00, Bottling-Stop: 01/30/2024 17:46:00, Parameters-Sampled: PFAS

Reading Time	Depth To Water (ft)	Cumulative Drawdown (ft)	Purge Rate (ml/min)	Temperature (deg c)	Specific Conductivity (us/cm)	Dissolved Oxygen (mg/l)	pH (su)	Oxidation-Reduction Potential (mV)	Turbidity (ntu)
15:40	90.22	0.25	150	NR	NR	NR	NR	NR	NR
15:45	90.14	0.17	130	NR	NR	NR	NR	NR	NR
15:50	90.15	0.18	130	NR	NR	NR	NR	NR	NR
15:55	90.17	0.20	130	NR	NR	NR	NR	NR	NR
16:00	90.15	0.18	130	NR	NR	NR	NR	NR	NR
16:05	90.18	0.21	130	NR	NR	NR	NR	NR	NR
16:10	90.15	0.18	130	NR	NR	NR	NR	NR	NR
16:15	90.16	0.19	130	NR	NR	NR	NR	NR	NR
16:20	90.16	0.19	130	NR	NR	NR	NR	NR	>999
16:25	90.18	0.21	130	NR	NR	NR	NR	NR	NR
16:30	90.20	0.23	130	NR	NR	NR	NR	NR	NR
16:35	90.19	0.22	130	NR	NR	NR	NR	NR	NR
16:40	90.20	0.23	130	NR	NR	NR	NR	NR	>999
16:45	90.20	0.23	130	NR	NR	NR	NR	NR	NR
16:50	90.20	0.23	130	NR	NR	NR	NR	NR	NR
16:55	90.20	0.23	130	NR	NR	NR	NR	NR	498
17:00	90.20	0.23	130	NR	NR	NR	NR	NR	302
17:05	90.20	0.23	130	NR	NR	NR	NR	NR	211
17:10	90.20	0.23	130	NR	NR	NR	NR	NR	157
17:15	90.20	0.23	130	NR	NR	NR	NR	NR	132
17:20	90.20	0.23	130	NR	NR	NR	NR	NR	114

Well Sampling Worksheet
WWW RAP Field Data
AREA 19 2024-Q1 - AREA19-MW-8B
Kent County, MI

Well	AREA19-MW-8B / 2 in Diameter PVC
Sample Quarter	2024-Q1
Date	01/30/2024
Weather	Cloudy, 35°F
Sampler Initials	CLM
Purging Device	Bladder-Pump: BP-12, Peristaltic-Pump: NA, Centrifugal-Pump: NA
Meters Used	YSI: Agile Rental 2, Turbidimeter: Agile Rental 2, Water-Level-Meter: WLM-1
Reference Measuring Point	PVC
Well Screen (ft bmp)	180.8 - 185.8
Measured Bottom Depth (ft bmp)	NR
Sample Comment	YSI Connected at 17:25.
Initial Water Level Date/Time	01/30/2024 15:25
Initial Water Level Depth (ft bmp)	89.97
Pump/Tubing Intake Depth (ft bmp)	183.3
Tubing Length (ft)	188.3
Tubing Inner Diameter (in)	0.25
Purging Initiation Date/Time	01/30/2024 15:30
Total Purge Volume (gal)	4
Modified Sample	No
If Modified, Reasoning	
Sample Collection Information	Bottling-Start: 01/30/2024 17:40:00, Bottling-Stop: 01/30/2024 17:46:00, Parameters-Sampled: PFAS

Reading Time	Depth To Water (ft)	Cumulative Drawdown (ft)	Purge Rate (ml/min)	Temperature (deg c)	Specific Conductivity (us/cm)	Dissolved Oxygen (mg/l)	pH (su)	Oxidation-Reduction Potential (mV)	Turbidity (ntu)
17:25	90.20	0.23	130	8	514 +	2.2	7.9	218	99
17:30	90.20	0.23	130	8	516 +	2.2	8.0	167	91
17:35	90.20	0.23	130	8	513 +	2.1	7.9	123	184

Notes:

1) Abbreviations include: "deg c" indicates degrees Celsius; "ft" indicates feet; "ft bmp" indicates feet below reference measuring point; "gal" indicates gallons; "in" indicates inches; "mg/l" indicates milligrams per liter; "ml/min" indicates milliliters per minute; "mV" indicates millivolts; "NA" indicates not applicable; "NR" indicates not recorded; "ntu" indicates Nephelometric Turbidity units; "su" indicates standard units; "us/cm" indicates microsiemens per centimeter; and "+" indicates the parameter(s) may be used for stabilization calculations but cannot be used for other purposes.
2) Weather temperature units are in degrees Fahrenheit, unless otherwise noted.
3) Did indicator parameters reach stabilization? No
4) Was the two hour time limit reached? Yes
5) Calculations:
   - Head Above Pump Intake (ft) 93.33
   - Total Drawdown (ft) 0.23
   - Calculated Final Purge Volume (gal) NA
6) If Drawdown Did Not Stabilize or Stabilized Drawdown >0.3 ft, is Total Purge Volume > Calculated Final Purge Volume? NA

Well Sampling Worksheet
WWW RAP Field Data
AREA 19 2024-Q1 - AREA19-MW-8C
Kent County, MI

Well	AREA19-MW-8C / 2 in Diameter PVC
Sample Quarter	2024-Q1
Date	01/30/2024
Weather	Cloudy, 36°F
Sampler Initials	JMS
Purging Device	Bladder-Pump: BP-11, Peristaltic-Pump: NA, Centrifugal-Pump: NA
Meters Used	YSI: Agile Rental 4, Turbidimeter: Agile Rental 4, Water-Level-Meter: WLM-4
Reference Measuring Point	PVC
Well Screen (ft bmp)	247.0 - 252.0
Measured Bottom Depth (ft bmp)	NR
Sample Comment	17:10 - YSI Connected. Pump slipped down a few inches and was returned to original depth.
Initial Water Level Date/Time	01/30/2024 15:15
Initial Water Level Depth (ft bmp)	109.37
Pump/Tubing Intake Depth (ft bmp)	249.5
Tubing Length (ft)	254.5
Tubing Inner Diameter (in)	0.25
Purging Initiation Date/Time	01/30/2024 15:20
Total Purge Volume (gal)	3.1
Modified Sample	No
If Modified, Reasoning	
Sample Collection Information	Bottling-Start: 01/30/2024 17:25:00, Bottling-Stop: 01/30/2024 17:30:00, Parameters-Sampled: PFAS

Reading Time	Depth To Water (ft)	Cumulative Drawdown (ft)	Purge Rate (ml/min)	Temperature (deg c)	Specific Conductivity (us/cm)	Dissolved Oxygen (mg/l)	pH (su)	Oxidation-Reduction Potential (mV)	Turbidity (ntu)
16:05	109.81	0.44	100	NR	NR	NR	NR	NR	NR
16:20	109.75	0.38	100	NR	NR	NR	NR	NR	NR
16:30	109.65	0.28	100	NR	NR	NR	NR	NR	NR
16:40	109.65	0.28	100	NR	NR	NR	NR	NR	443
16:55	109.65	0.28	100	NR	NR	NR	NR	NR	245
17:05	109.65	0.28	100	NR	NR	NR	NR	NR	169

Well Sampling Worksheet
WWW RAP Field Data
AREA 19 2024-Q1 - AREA19-MW-8C
Kent County, MI

Well	AREA19-MW-8C / 2 in Diameter PVC
Sample Quarter	2024-Q1
Date	01/30/2024
Weather	Cloudy, 36°F
Sampler Initials	JMS
Purging Device	Bladder-Pump: BP-11, Peristaltic-Pump: NA, Centrifugal-Pump: NA
Meters Used	YSI: Agile Rental 4, Turbidimeter: Agile Rental 4, Water-Level-Meter: WLM-4
Reference Measuring Point	PVC
Well Screen (ft bmp)	247.0 - 252.0
Measured Bottom Depth (ft bmp)	NR
Sample Comment	17:10 - YSI Connected. Pump slipped down a few inches and was returned to original depth.
Initial Water Level Date/Time	01/30/2024 15:15
Initial Water Level Depth (ft bmp)	109.37
Pump/Tubing Intake Depth (ft bmp)	249.5
Tubing Length (ft)	254.5
Tubing Inner Diameter (in)	0.25
Purging Initiation Date/Time	01/30/2024 15:20
Total Purge Volume (gal)	3.1
Modified Sample	No
If Modified, Reasoning	
Sample Collection Information	Bottling-Start: 01/30/2024 17:25:00, Bottling-Stop: 01/30/2024 17:30:00, Parameters-Sampled: PFAS

Reading Time	Depth To Water (ft)	Cumulative Drawdown (ft)	Purge Rate (ml/min)	Temperature (deg c)	Specific Conductivity (us/cm)	Dissolved Oxygen (mg/l)	pH (su)	Oxidation-Reduction Potential (mV)	Turbidity (ntu)
17:10	109.65	0.28	100	7	750 +	6.4	7.5	49	212
17:15	109.65	0.28	100	7	752 +	1.0	7.5	-25	170
17:20	109.65	0.28	100	8	763 +	0.5	7.5	-64	172

Notes:

1) Abbreviations include: "deg c" indicates degrees Celsius; "ft" indicates feet; "ft bmp" indicates feet below reference measuring point; "gal" indicates gallons; "in" indicates inches; "mg/l" indicates milligrams per liter; "ml/min" indicates milliliters per minute; "mV" indicates millivolts; "NA" indicates not applicable; "NR" indicates not recorded; "ntu" indicates Nephelometric Turbidity units; "su" indicates standard units; "us/cm" indicates microsiemens per centimeter; and "+" indicates the parameter(s) may be used for stabilization calculations but cannot be used for other purposes.
2) Weather temperature units are in degrees Fahrenheit, unless otherwise noted.
3) Did indicator parameters reach stabilization? No
4) Was the two hour time limit reached? Yes
5) Calculations:
   - Head Above Pump Intake (ft) 140.13
   - Total Drawdown (ft) 0.28
   - Calculated Final Purge Volume (gal) NA
6) If Drawdown Did Not Stabilize or Stabilized Drawdown >0.3 ft, is Total Purge Volume > Calculated Final Purge Volume? NA

Well Sampling Worksheet
WWW RAP Field Data
AREA 19 2024-Q1 - AREA19-MW-9A
Kent County, MI

Well	AREA19-MW-9A / 2 in Diameter PVC
Sample Quarter	2024-Q1
Date	01/23/2024
Weather	Rain, 33°F
Sampler Initials	JMS
Purging Device	Bladder-Pump: NA, Peristaltic-Pump: Rental, Centrifugal-Pump: NA
Meters Used	YSI: Agile Rental 2, Turbidimeter: Agile Rental 2, Water-Level-Meter: WLM-3
Reference Measuring Point	PVC
Well Screen (ft bmp)	18.8 - 23.8
Measured Bottom Depth (ft bmp)	NR
Sample Comment	Last 3 water level readings were not the same per Standard Operating Procedure (SOP). Water level meters are considered accurate to +/- 0.01 feet and last 3 readings were within this range. GZA does not beli
Initial Water Level Date/Time	01/23/2024 11:10
Initial Water Level Depth (ft bmp)	4.77
Pump/Tubing Intake Depth (ft bmp)	21.3
Tubing Length (ft)	26.3
Tubing Inner Diameter (in)	0.17
Purging Initiation Date/Time	01/23/2024 11:15
Total Purge Volume (gal)	1
Modified Sample	No
If Modified, Reasoning	
Sample Collection Information	Bottling-Start: 01/23/2024 12:00:00, Bottling-Stop: 01/23/2024 12:05:00, Parameters-Sampled: PFAS

Reading Time	Depth To Water (ft)	Cumulative Drawdown (ft)	Purge Rate (ml/min)	Temperature (deg c)	Specific Conductivity (us/cm)	Dissolved Oxygen (mg/l)	pH (su)	Oxidation-Reduction Potential (mV)	Turbidity (ntu)
11:35	4.97	0.20	100	8	651 +	3.8	7.1	327	10
11:45	4.98	0.21	100	8	651 +	2.7	7.1	329	10
11:50	4.98	0.21	100	8	653 +	2.7	7.1	329	10
11:55	4.99	0.22	100	8	656 +	2.6	7.2	328	10

Notes:

1) Abbreviations include: "deg c" indicates degrees Celsius; "ft" indicates feet; "ft bmp" indicates feet below reference measuring point; "gal" indicates gallons; "in" indicates inches; "mg/l" indicates milligrams per liter; "ml/min" indicates milliliters per minute; "mV" indicates millivolts; "NA" indicates not applicable; "NR" indicates not recorded; "ntu" indicates Nephelometric Turbidity units; "su" indicates standard units; "us/cm" indicates microsiemens per centimeter; and "+" indicates the parameter(s) may be used for stabilization calculations but cannot be used for other purposes.
2) Weather temperature units are in degrees Fahrenheit, unless otherwise noted.
3) Did indicator parameters reach stabilization? Yes
4) Was the two hour time limit reached? No
5) Calculations:
   - Head Above Pump Intake (ft): 16.53
   - Total Drawdown (ft): 0.22
   - Calculated Final Purge Volume (gal): NA
6) If Drawdown Did Not Stabilize or Stabilized Drawdown >0.3 ft, is Total Purge Volume > Calculated Final Purge Volume? NA

Well Sampling Worksheet
WWW RAP Field Data
AREA 19 2024-Q1 - AREA19-MW-9B
Kent County, MI

Well	AREA19-MW-9B / 2 in Diameter PVC
Sample Quarter	2024-Q1
Date	01/23/2024
Weather	Rain, 30°F
Sampler Initials	RCP
Purging Device	Bladder-Pump: NA, Peristaltic-Pump: NA, Centrifugal-Pump: Mega Monsoon #2
Meters Used	YSI: Agile Rental 1, Turbidimeter: Agile Rental 1, Water-Level-Meter: WLM-1
Reference Measuring Point	PVC
Well Screen (ft bmp)	93.0 - 98.0
Measured Bottom Depth (ft bmp)	NR
Sample Comment	
Initial Water Level Date/Time	01/23/2024 11:05
Initial Water Level Depth (ft bmp)	50.65
Pump/Tubing Intake Depth (ft bmp)	95.5
Tubing Length (ft)	98
Tubing Inner Diameter (in)	0.17
Purging Initiation Date/Time	01/23/2024 11:05
Total Purge Volume (gal)	7.5
Modified Sample	No
If Modified, Reasoning	
Sample Collection Information	Bottling-Start: 01/23/2024 13:10:00, Bottling-Stop: 01/23/2024 13:15:00, Parameters-Sampled: PFAS

Reading Time	Depth To Water (ft)	Cumulative Drawdown (ft)	Purge Rate (ml/min)	Temperature (deg c)	Specific Conductivity (us/cm)	Dissolved Oxygen (mg/l)	pH (su)	Oxidation-Reduction Potential (mV)	Turbidity (ntu)
12:40	50.70	0.05	225	10	637 +	0.9	7.7	-38	21
12:45	50.70	0.05	225	10	633 +	0.7	7.7	-74	19
12:50	50.70	0.05	225	10	633 +	0.7	7.7	-74	17
12:55	50.70	0.05	225	10	632 +	0.7	7.7	-80	18
13:00	50.70	0.05	225	10	631 +	0.6	7.7	-85	17
13:05	50.70	0.05	225	10	631 +	0.6	7.7	-93	15

Notes:

1) Abbreviations include: "deg c" indicates degrees Celsius; "ft" indicates feet; "ft bmp" indicates feet below reference measuring point; "gal" indicates gallons; "in" indicates inches; "mg/l" indicates milligrams per liter; "ml/min" indicates milliliters per minute; "mV" indicates millivolts; "NA" indicates not applicable; "NR" indicates not recorded; "ntu" indicates Nephelometric Turbidity units; "su" indicates standard units; "us/cm" indicates microsiemens per centimeter; and "+" indicates the parameter(s) may be used for stabilization calculations but cannot be used for other purposes.
2) Weather temperature units are in degrees Fahrenheit, unless otherwise noted.
3) Did indicator parameters reach stabilization? No
4) Was the two hour time limit reached? Yes
5) Calculations:
   - Head Above Pump Intake (ft) 44.85
   - Total Drawdown (ft) 0.05
   - Calculated Final Purge Volume (gal) NA
6) If Drawdown Did Not Stabilize or Stabilized Drawdown >0.3 ft, is Total Purge Volume > Calculated Final Purge Volume? NA

Well Sampling Worksheet
WWW RAP Field Data
AREA 19 2024-Q1 - AREA19-MW-9C
Kent County, MI

Well	AREA19-MW-9C / 2 in Diameter PVC
Sample Quarter	2024-Q1
Date	01/23/2024
Weather	Rain, 30°F
Sampler Initials	NCK
Purging Device	Bladder-Pump: BP-10, Peristaltic-Pump: NA, Centrifugal-Pump: NA
Meters Used	YSI: Agile Rental 2, Turbidimeter: Agile Rental 2, Water-Level-Meter: WLM-4
Reference Measuring Point	PVC
Well Screen (ft bmp)	157.0 - 162.0
Measured Bottom Depth (ft bmp)	NR
Sample Comment	11:30 to 12:30 - Purge water observed to be very turbid. 13:00 - YSI connected.
Initial Water Level Date/Time	01/23/2024 11:20
Initial Water Level Depth (ft bmp)	49.94
Pump/Tubing Intake Depth (ft bmp)	159.5
Tubing Length (ft)	162.5
Tubing Inner Diameter (in)	0.25
Purging Initiation Date/Time	01/23/2024 11:25
Total Purge Volume (gal)	1.5
Modified Sample	No
If Modified, Reasoning	
Sample Collection Information	Bottling-Start: 01/23/2024 13:25:00, Bottling-Stop: 01/23/2024 13:35:00, Parameters-Sampled: PFAS

Reading Time	Depth To Water (ft)	Cumulative Drawdown (ft)	Purge Rate (ml/min)	Temperature (deg c)	Specific Conductivity (us/cm)	Dissolved Oxygen (mg/l)	pH (su)	Oxidation-Reduction Potential (mV)	Turbidity (ntu)
11:30	50.17	0.23	50	NR	NR	NR	NR	NR	NR
11:45	50.17	0.23	50	NR	NR	NR	NR	NR	NR
12:00	50.17	0.23	50	NR	NR	NR	NR	NR	NR
12:30	50.17	0.23	50	NR	NR	NR	NR	NR	NR
13:00	50.17	0.23	50	NR	NR	NR	NR	NR	NR
13:10	50.17	0.23	50	8	421 +	3.1	8.1	-72	200

Well Sampling Worksheet
WWW RAP Field Data
AREA 19 2024-Q1 - AREA19-MW-9C
Kent County, MI

Well	AREA19-MW-9C / 2 in Diameter PVC
Sample Quarter	2024-Q1
Date	01/23/2024
Weather	Rain, 30°F
Sampler Initials	NCK
Purging Device	Bladder-Pump: BP-10, Peristaltic-Pump: NA, Centrifugal-Pump: NA
Meters Used	YSI: Agile Rental 2, Turbidimeter: Agile Rental 2, Water-Level-Meter: WLM-4
Reference Measuring Point	PVC
Well Screen (ft bmp)	157.0 - 162.0
Measured Bottom Depth (ft bmp)	NR
Sample Comment	11:30 to 12:30 - Purge water observed to be very turbid. 13:00 - YSI connected.
Initial Water Level Date/Time	01/23/2024 11:20
Initial Water Level Depth (ft bmp)	49.94
Pump/Tubing Intake Depth (ft bmp)	159.5
Tubing Length (ft)	162.5
Tubing Inner Diameter (in)	0.25
Purging Initiation Date/Time	01/23/2024 11:25
Total Purge Volume (gal)	1.5
Modified Sample	No
If Modified, Reasoning	
Sample Collection Information	Bottling-Start: 01/23/2024 13:25:00, Bottling-Stop: 01/23/2024 13:35:00, Parameters-Sampled: PFAS

Reading Time	Depth To Water (ft)	Cumulative Drawdown (ft)	Purge Rate (ml/min)	Temperature (deg c)	Specific Conductivity (us/cm)	Dissolved Oxygen (mg/l)	pH (su)	Oxidation-Reduction Potential (mV)	Turbidity (ntu)
13:15	50.17	0.23	50	8	421 +	2.1	8.0	-50	200
13:20	50.17	0.23	50	8	422 +	1.2	8.0	-59	199
13:25	50.17	0.23	50	8	421 +	1.1	8.0	-67	290

Notes:

1) Abbreviations include: "deg c" indicates degrees Celsius; "ft" indicates feet; "ft bmp" indicates feet below reference measuring point; "gal" indicates gallons; "in" indicates inches; "mg/l" indicates milligrams per liter; "ml/min" indicates milliliters per minute; "mV" indicates millivolts; "NA" indicates not applicable; "NR" indicates not recorded; "ntu" indicates Nephelometric Turbidity units; "su" indicates standard units; "us/cm" indicates microsiemens per centimeter; and "+" indicates the parameter(s) may be used for stabilization calculations but cannot be used for other purposes.
2) Weather temperature units are in degrees Fahrenheit, unless otherwise noted.
3) Did indicator parameters reach stabilization? No
4) Was the two hour time limit reached? Yes
5) Calculations:
   - Head Above Pump Intake (ft) 109.56
   - Total Drawdown (ft) 0.23
   - Calculated Final Purge Volume (gal) NA
6) If Drawdown Did Not Stabilize or Stabilized Drawdown >0.3 ft, is Total Purge Volume > Calculated Final Purge Volume? NA

Well Sampling Worksheet
WWW RAP Field Data
AREA 19 2024-Q1 - AREA19-MW-14A
Kent County, MI

Well	AREA19-MW-14A / 2 in Diameter PVC
Sample Quarter	2024-Q1
Date	02/16/2024
Weather	Cloudy, 27°F
Sampler Initials	JMS
Purging Device	Bladder-Pump: BP-12, Peristaltic-Pump: NA, Centrifugal-Pump: NA
Meters Used	YSI: Agile Rental 1, Turbidimeter: Agile Rental 1, Water-Level-Meter: WLM-4
Reference Measuring Point	PVC
Well Screen (ft bmp)	152.2 - 157.2
Measured Bottom Depth (ft bmp)	NR
Sample Comment	
Initial Water Level Date/Time	02/16/2024 10:25
Initial Water Level Depth (ft bmp)	133.54
Pump/Tubing Intake Depth (ft bmp)	154.7
Tubing Length (ft)	159.7
Tubing Inner Diameter (in)	0.25
Purging Initiation Date/Time	02/16/2024 10:30
Total Purge Volume (gal)	2.25
Modified Sample	No
If Modified, Reasoning	
Sample Collection Information	Bottling-Start: 02/16/2024 12:35:00, Bottling-Stop: 02/16/2024 12:40:00, Parameters-Sampled: PFAS

Reading Time	Depth To Water (ft)	Cumulative Drawdown (ft)	Purge Rate (ml/min)	Temperature (deg c)	Specific Conductivity (us/cm)	Dissolved Oxygen (mg/l)	pH (su)	Oxidation-Reduction Potential (mV)	Turbidity (ntu)
12:15	133.71	0.17	75	8	396 +	1.3	8.1	135	45
12:20	133.71	0.17	75	8	397 +	1.0	8.1	103	32
12:25	133.71	0.17	75	8	398 +	1.1	8.1	91	24
12:30	133.71	0.17	75	8	398 +	1.1	8.1	83	22

Notes:

1) Abbreviations include: "deg c" indicates degrees Celsius; "ft" indicates feet; "ft bmp" indicates feet below reference measuring point; "gal" indicates gallons; "in" indicates inches; "mg/l" indicates milligrams per liter; "ml/min" indicates milliliters per minute; "mV" indicates millivolts; "NA" indicates not applicable; "NR" indicates not recorded; "ntu" indicates Nephelometric Turbidity units; "su" indicates standard units; "us/cm" indicates microsiemens per centimeter; and "+" indicates the parameter(s) may be used for stabilization calculations but cannot be used for other purposes.
2) Weather temperature units are in degrees Fahrenheit, unless otherwise noted.
3) Did indicator parameters reach stabilization? No
4) Was the two hour time limit reached? Yes
5) Calculations:
   - Head Above Pump Intake (ft) 21.16
   - Total Drawdown (ft) 0.17
   - Calculated Final Purge Volume (gal) NA
6) If Drawdown Did Not Stabilize or Stabilized Drawdown >0.3 ft, is Total Purge Volume > Calculated Final Purge Volume? NA

Well Sampling Worksheet
WWW RAP Field Data
AREA 19 2024-Q1 - AREA19-MW-14B
Kent County, MI

Well	AREA19-MW-14B / 2 in Diameter PVC
Sample Quarter	2024-Q1
Date	02/16/2024
Weather	Cloudy, 30°F
Sampler Initials	NCK
Purging Device	Bladder-Pump: BP-10, Peristaltic-Pump: NA, Centrifugal-Pump: NA
Meters Used	YSI: Agile Rental 3, Turbidimeter: Agile Rental 3, Water-Level-Meter: WLM-4
Reference Measuring Point	PVC
Well Screen (ft bmp)	166.6 - 171.6
Measured Bottom Depth (ft bmp)	NR
Sample Comment	12:20 - Turbidity is over range of meter. 12:30 - YSI Connected. Last 3 water level readings were not the same per Standard Operating Procedure (SOP). Water level was rising.
Initial Water Level Date/Time	02/16/2024 10:30
Initial Water Level Depth (ft bmp)	133.70
Pump/Tubing Intake Depth (ft bmp)	169.1
Tubing Length (ft)	173
Tubing Inner Diameter (in)	0.25
Purging Initiation Date/Time	02/16/2024 10:45
Total Purge Volume (gal)	1.5
Modified Sample	No
If Modified, Reasoning	
Sample Collection Information	Bottling-Start: 02/16/2024 12:50:00, Bottling-Stop: 02/16/2024 13:00:00, Parameters-Sampled: PFAS

Reading Time	Depth To Water (ft)	Cumulative Drawdown (ft)	Purge Rate (ml/min)	Temperature (deg c)	Specific Conductivity (us/cm)	Dissolved Oxygen (mg/l)	pH (su)	Oxidation-Reduction Potential (mV)	Turbidity (ntu)
10:55	134.50	0.80	50	NR	NR	NR	NR	NR	NR
11:10	135.52	1.82	50	NR	NR	NR	NR	NR	NR
11:30	136.83	3.13	50	NR	NR	NR	NR	NR	NR
12:00	137.36	3.66	50	NR	NR	NR	NR	NR	NR
12:20	137.47	3.77	50	NR	NR	NR	NR	NR	>999
12:30	137.54	3.84	50	5	1,069 +	5.4	7.8	177	>999

Well Sampling Worksheet
WWW RAP Field Data
AREA 19 2024-Q1 - AREA19-MW-14B
Kent County, MI

Well	AREA19-MW-14B / 2 in Diameter PVC
Sample Quarter	2024-Q1
Date	02/16/2024
Weather	Cloudy, 30°F
Sampler Initials	NCK
Purging Device	Bladder-Pump: BP-10, Peristaltic-Pump: NA, Centrifugal-Pump: NA
Meters Used	YSI: Agile Rental 3, Turbidimeter: Agile Rental 3, Water-Level-Meter: WLM-4
Reference Measuring Point	PVC
Well Screen (ft bmp)	166.6 - 171.6
Measured Bottom Depth (ft bmp)	NR
Sample Comment	12:20 - Turbidity is over range of meter. 12:30 - YSI Connected. Last 3 water level readings were not the same per Standard Operating Procedure (SOP). Water level was rising.
Initial Water Level Date/Time	02/16/2024 10:30
Initial Water Level Depth (ft bmp)	133.70
Pump/Tubing Intake Depth (ft bmp)	169.1
Tubing Length (ft)	173
Tubing Inner Diameter (in)	0.25
Purging Initiation Date/Time	02/16/2024 10:45
Total Purge Volume (gal)	1.5
Modified Sample	No
If Modified, Reasoning	
Sample Collection Information	Bottling-Start: 02/16/2024 12:50:00, Bottling-Stop: 02/16/2024 13:00:00, Parameters-Sampled: PFAS

Reading Time	Depth To Water (ft)	Cumulative Drawdown (ft)	Purge Rate (ml/min)	Temperature (deg c)	Specific Conductivity (us/cm)	Dissolved Oxygen (mg/l)	pH (su)	Oxidation-Reduction Potential (mV)	Turbidity (ntu)
12:35	137.60	3.90	50	5	1,070 +	5.4	7.8	174	>999
12:40	137.60	3.90	50	5	1,075 +	5.6	7.8	171	>999
12:45	137.54	3.84	50	5	620 +	5.6	7.8	176	>999

Notes:

1) Abbreviations include: "deg c" indicates degrees Celsius; "ft" indicates feet; "ft bmp" indicates feet below reference measuring point; "gal" indicates gallons; "in" indicates inches; "mg/l" indicates milligrams per liter; "ml/min" indicates milliliters per minute; "mV" indicates millivolts; "NA" indicates not applicable; "NR" indicates not recorded; "ntu" indicates Nephelometric Turbidity units; "su" indicates standard units; "us/cm" indicates microsiemens per centimeter; and "+" indicates the parameter(s) may be used for stabilization calculations but cannot be used for other purposes.
2) Weather temperature units are in degrees Fahrenheit, unless otherwise noted.
3) Did indicator parameters reach stabilization? No * Turbidity Out of Range
4) Was the two hour time limit reached? Yes
5) Calculations:
   - Head Above Pump Intake (ft) 35.40
   - Total Drawdown (ft) 3.84
   - Calculated Final Purge Volume (gal) 1.06
6) If Drawdown Did Not Stabilize or Stabilized Drawdown >0.3 ft, is Total Purge Volume > Calculated Final Purge Volume? Yes

Well Sampling Worksheet
WWW RAP Field Data
AREA 19 2024-Q1 - AREA19-MW-15A
Kent County, MI

Well	AREA19-MW-15A / 2 in Diameter PVC
Sample Quarter	2024-Q1
Date	02/01/2024
Weather	Cloudy, 41°F
Sampler Initials	JMS
Purging Device	Bladder-Pump: NA, Peristaltic-Pump: NA, Centrifugal-Pump: Mega Monsoon #1
Meters Used	YSI: Agile Rental 3, Turbidimeter: Agile Rental 3, Water-Level-Meter: WLM-1
Reference Measuring Point	PVC
Well Screen (ft bmp)	44.5 - 49.5
Measured Bottom Depth (ft bmp)	NR
Sample Comment	YSI connected at 12:20
Initial Water Level Date/Time	02/01/2024 10:25
Initial Water Level Depth (ft bmp)	43.18
Pump/Tubing Intake Depth (ft bmp)	47
Tubing Length (ft)	49.2
Tubing Inner Diameter (in)	0.17
Purging Initiation Date/Time	02/01/2024 10:30
Total Purge Volume (gal)	1.6
Modified Sample	No
If Modified, Reasoning	
Sample Collection Information	Bottling-Start: 02/01/2024 12:35:00, Bottling-Stop: 02/01/2024 12:40:00, Parameters-Sampled: PFAS

Reading Time	Depth To Water (ft)	Cumulative Drawdown (ft)	Purge Rate (ml/min)	Temperature (deg c)	Specific Conductivity (us/cm)	Dissolved Oxygen (mg/l)	pH (su)	Oxidation-Reduction Potential (mV)	Turbidity (ntu)
10:50	43.70	0.52	50	NR	NR	NR	NR	NR	NR
11:00	43.77	0.59	50	NR	NR	NR	NR	NR	NR
11:10	43.98	0.80	75	NR	NR	NR	NR	NR	192
11:30	44.33	1.15	50	NR	NR	NR	NR	NR	141
11:40	44.19	1.01	50	NR	NR	NR	NR	NR	52
11:50	44.16	0.98	50	NR	NR	NR	NR	NR	33
12:00	44.16	0.98	50	NR	NR	NR	NR	NR	27
12:10	44.17	0.99	50	NR	NR	NR	NR	NR	23

Well Sampling Worksheet
WWW RAP Field Data
AREA 19 2024-Q1 - AREA19-MW-15A
Kent County, MI

Well	AREA19-MW-15A / 2 in Diameter PVC
Sample Quarter	2024-Q1
Date	02/01/2024
Weather	Cloudy, 41°F
Sampler Initials	JMS
Purging Device	Bladder-Pump: NA, Peristaltic-Pump: NA, Centrifugal-Pump: Mega Monsoon #1
Meters Used	YSI: Agile Rental 3, Turbidimeter: Agile Rental 3, Water-Level-Meter: WLM-1
Reference Measuring Point	PVC
Well Screen (ft bmp)	44.5 - 49.5
Measured Bottom Depth (ft bmp)	NR
Sample Comment	YSI connected at 12:20
Initial Water Level Date/Time	02/01/2024 10:25
Initial Water Level Depth (ft bmp)	43.18
Pump/Tubing Intake Depth (ft bmp)	47
Tubing Length (ft)	49.2
Tubing Inner Diameter (in)	0.17
Purging Initiation Date/Time	02/01/2024 10:30
Total Purge Volume (gal)	1.6
Modified Sample	No
If Modified, Reasoning	
Sample Collection Information	Bottling-Start: 02/01/2024 12:35:00, Bottling-Stop: 02/01/2024 12:40:00, Parameters-Sampled: PFAS

Reading Time	Depth To Water (ft)	Cumulative Drawdown (ft)	Purge Rate (ml/min)	Temperature (deg c)	Specific Conductivity (us/cm)	Dissolved Oxygen (mg/l)	pH (su)	Oxidation-Reduction Potential (mV)	Turbidity (ntu)
12:20	44.17	0.99	50	11	817 +	3.6	7.5	186	21
12:25	44.17	0.99	50	11	822 +	3.6	7.5	184	17
12:30	44.17	0.99	50	11	817 +	3.6	7.5	183	17

Notes:

1) Abbreviations include: "deg c" indicates degrees Celsius; "ft" indicates feet; "ft bmp" indicates feet below reference measuring point; "gal" indicates gallons; "in" indicates inches; "mg/l" indicates milligrams per liter; "ml/min" indicates milliliters per minute; "mV" indicates millivolts; "NA" indicates not applicable; "NR" indicates not recorded; "ntu" indicates Nephelometric Turbidity units; "su" indicates standard units; "us/cm" indicates microsiemens per centimeter; and "+" indicates the parameter(s) may be used for stabilization calculations but cannot be used for other purposes.
2) Weather temperature units are in degrees Fahrenheit, unless otherwise noted.
3) Did indicator parameters reach stabilization? No
4) Was the two hour time limit reached? Yes
5) Calculations:
   - Head Above Pump Intake (ft) 3.82
   - Total Drawdown (ft) 0.99
   - Calculated Final Purge Volume (gal) 0.22
6) If Drawdown Did Not Stabilize or Stabilized Drawdown >0.3 ft, is Total Purge Volume > Calculated Final Purge Volume? Yes

Well Sampling Worksheet
WWW RAP Field Data
AREA 19 2024-Q1 - AREA19-MW-15B
Kent County, MI

Well	AREA19-MW-15B / 2 in Diameter PVC
Sample Quarter	2024-Q1
Date	02/01/2024
Weather	Cloudy, 40°F
Sampler Initials	RCP
Purging Device	Bladder-Pump: BP-11, Peristaltic-Pump: NA, Centrifugal-Pump: NA
Meters Used	YSI: Agile Rental 4, Turbidimeter: Agile Rental 4, Water-Level-Meter: WLM-2
Reference Measuring Point	PVC
Well Screen (ft bmp)	128.6 - 133.6
Measured Bottom Depth (ft bmp)	NR
Sample Comment	10:40 - Water level stabilized. 12:20 - YSI Connected.
Initial Water Level Date/Time	02/01/2024 10:25
Initial Water Level Depth (ft bmp)	90.79
Pump/Tubing Intake Depth (ft bmp)	131.1
Tubing Length (ft)	133
Tubing Inner Diameter (in)	0.25
Purging Initiation Date/Time	02/01/2024 10:30
Total Purge Volume (gal)	5
Modified Sample	No
If Modified, Reasoning	
Sample Collection Information	Bottling-Start: 02/01/2024 12:35:00, Bottling-Stop: 02/01/2024 12:40:00, Parameters-Sampled: PFAS

Reading Time	Depth To Water (ft)	Cumulative Drawdown (ft)	Purge Rate (ml/min)	Temperature (deg c)	Specific Conductivity (us/cm)	Dissolved Oxygen (mg/l)	pH (su)	Oxidation-Reduction Potential (mV)	Turbidity (ntu)
10:40	90.79	0.00	150	NR	NR	NR	NR	NR	374
11:10	90.79	0.00	150	NR	NR	NR	NR	NR	209
11:30	90.79	0.00	150	NR	NR	NR	NR	NR	88
11:50	90.79	0.00	150	NR	NR	NR	NR	NR	55
12:00	90.79	0.00	150	NR	NR	NR	NR	NR	24
12:20	90.79	0.00	150	10	620 +	0.7	7.9	39	11
12:25	90.79	0.00	150	10	619 +	0.7	7.9	36	9
12:30	90.79	0.00	150	10	618 +	0.7	7.9	38	8

Notes:

1) Abbreviations include: "deg c" indicates degrees Celsius; "ft" indicates feet; "ft bmp" indicates feet below reference measuring point; "gal" indicates gallons; "in" indicates inches; "mg/l" indicates milligrams per liter; "ml/min" indicates milliliters per minute; "mV" indicates millivolts; "NA" indicates not applicable; "NR" indicates not recorded; "ntu" indicates Nephelometric Turbidity units; "su" indicates standard units; "us/cm" indicates microsiemens per centimeter; and "+" indicates the parameter(s) may be used for stabilization calculations but cannot be used for other purposes.
2) Weather temperature units are in degrees Fahrenheit, unless otherwise noted.
3) Did indicator parameters reach stabilization? No
4) Was the two hour time limit reached? Yes
5) Calculations:
   - Head Above Pump Intake (ft) 40.31
   - Total Drawdown (ft) 0.00
   - Calculated Final Purge Volume (gal) NA
6) If Drawdown Did Not Stabilize or Stabilized Drawdown >0.3 ft, is Total Purge Volume > Calculated Final Purge Volume? NA

Well Sampling Worksheet
WWW RAP Field Data
AREA 19 2024-Q1 - AREA19-MW-15C
Kent County, MI

Well	AREA19-MW-15C / 2 in Diameter PVC
Sample Quarter	2024-Q1
Date	02/01/2024
Weather	Cloudy, 40s°F
Sampler Initials	CLM
Purging Device	Bladder-Pump: NA, Peristaltic-Pump: NA, Centrifugal-Pump: Mega Monsoon #2
Meters Used	YSI: Agile Rental 1, Turbidimeter: Agile Rental 1, Water-Level-Meter: WLM-4
Reference Measuring Point	PVC
Well Screen (ft bmp)	164.2 - 169.2
Measured Bottom Depth (ft bmp)	NR
Sample Comment	11:00 - Flow rate increased due to battery setup. Adjust flow rate. 11:55 - Missed reading. 12:15 - YSI Connected.
Initial Water Level Date/Time	02/01/2024 10:30
Initial Water Level Depth (ft bmp)	90.85
Pump/Tubing Intake Depth (ft bmp)	166.7
Tubing Length (ft)	169
Tubing Inner Diameter (in)	0.17
Purging Initiation Date/Time	02/01/2024 10:30
Total Purge Volume (gal)	3.8
Modified Sample	No
If Modified, Reasoning	
Sample Collection Information	Bottling-Start: 02/01/2024 12:35:00, Bottling-Stop: 02/01/2024 12:43:00, Parameters-Sampled: PFAS

Reading Time	Depth To Water (ft)	Cumulative Drawdown (ft)	Purge Rate (ml/min)	Temperature (deg c)	Specific Conductivity (us/cm)	Dissolved Oxygen (mg/l)	pH (su)	Oxidation-Reduction Potential (mV)	Turbidity (ntu)
10:50	90.95	0.10	140	NR	NR	NR	NR	NR	NR
10:55	90.95	0.10	140	NR	NR	NR	NR	NR	NR
11:00	91.00	0.15	200	NR	NR	NR	NR	NR	NR
11:05	90.94	0.09	120	NR	NR	NR	NR	NR	NR
11:10	90.90	0.05	120	NR	NR	NR	NR	NR	NR
11:15	90.90	0.05	120	NR	NR	NR	NR	NR	>999
11:20	90.90	0.05	120	NR	NR	NR	NR	NR	NR
11:25	90.90	0.05	120	NR	NR	NR	NR	NR	NR
11:30	90.90	0.05	120	NR	NR	NR	NR	NR	>999
11:35	90.90	0.05	120	NR	NR	NR	NR	NR	NR
11:40	90.90	0.05	120	NR	NR	NR	NR	NR	NR
11:45	90.90	0.05	120	NR	NR	NR	NR	NR	NR
11:50	90.90	0.05	120	NR	NR	NR	NR	NR	415
11:55	NR	NR	NR	NR	NR	NR	NR	NR	NR
12:00	90.90	0.05	120	NR	NR	NR	NR	NR	253
12:05	90.90	0.05	120	NR	NR	NR	NR	NR	193
12:10	90.90	0.05	120	NR	NR	NR	NR	NR	166
12:15	90.90	0.05	120	9	486 +	3.3	7.9	-9	138

Well Sampling Worksheet
WWW RAP Field Data
AREA 19 2024-Q1 - AREA19-MW-15C
Kent County, MI

Well	AREA19-MW-15C / 2 in Diameter PVC
Sample Quarter	2024-Q1
Date	02/01/2024
Weather	Cloudy, 40s°F
Sampler Initials	CLM
Purging Device	Bladder-Pump: NA, Peristaltic-Pump: NA, Centrifugal-Pump: Mega Monsoon #2
Meters Used	YSI: Agile Rental 1, Turbidimeter: Agile Rental 1, Water-Level-Meter: WLM-4
Reference Measuring Point	PVC
Well Screen (ft bmp)	164.2 - 169.2
Measured Bottom Depth (ft bmp)	NR
Sample Comment	11:00 - Flow rate increased due to battery setup. Adjust flow rate. 11:55 - Missed reading. 12:15 - YSI Connected.
Initial Water Level Date/Time	02/01/2024 10:30
Initial Water Level Depth (ft bmp)	90.85
Pump/Tubing Intake Depth (ft bmp)	166.7
Tubing Length (ft)	169
Tubing Inner Diameter (in)	0.17
Purging Initiation Date/Time	02/01/2024 10:30
Total Purge Volume (gal)	3.8
Modified Sample	No
If Modified, Reasoning	
Sample Collection Information	Bottling-Start: 02/01/2024 12:35:00, Bottling-Stop: 02/01/2024 12:43:00, Parameters-Sampled: PFAS

Reading Time	Depth To Water (ft)	Cumulative Drawdown (ft)	Purge Rate (ml/min)	Temperature (deg c)	Specific Conductivity (us/cm)	Dissolved Oxygen (mg/l)	pH (su)	Oxidation-Reduction Potential (mV)	Turbidity (ntu)
12:20	90.90	0.05	120	9	481 +	3.7	7.8	-76	118
12:25	90.90	0.05	120	9	479 +	3.3	7.8	-118	109
12:30	90.90	0.05	120	9	477 +	3.0	7.8	-133	96

Notes:

1) Abbreviations include: "deg c" indicates degrees Celsius; "ft" indicates feet; "ft bmp" indicates feet below reference measuring point; "gal" indicates gallons; "in" indicates inches; "mg/l" indicates milligrams per liter; "ml/min" indicates milliliters per minute; "mV" indicates millivolts; "NA" indicates not applicable; "NR" indicates not recorded; "ntu" indicates Nephelometric Turbidity units; "su" indicates standard units; "us/cm" indicates microsiemens per centimeter; and "+" indicates the parameter(s) may be used for stabilization calculations but cannot be used for other purposes.
2) Weather temperature units are in degrees Fahrenheit, unless otherwise noted.
3) Did indicator parameters reach stabilization? No
4) Was the two hour time limit reached? Yes
5) Calculations:
   - Head Above Pump Intake (ft) 75.85
   - Total Drawdown (ft) 0.05
   - Calculated Final Purge Volume (gal) NA
6) If Drawdown Did Not Stabilize or Stabilized Drawdown >0.3 ft, is Total Purge Volume > Calculated Final Purge Volume? NA

Well Sampling Worksheet
WWW RAP Field Data
AREA 6 2024-Q1 - HS-MW-13A
Kent County, MI

Well	HS-MW-13A / 2 in Diameter PVC
Sample Quarter	2024-Q1
Date	01/31/2024
Weather	Cloudy, 38°F
Sampler Initials	JMS
Purging Device	Bladder-Pump: NA, Peristaltic-Pump: NA, Centrifugal-Pump: Mega Monsoon #1
Meters Used	YSI: Agile Rental 3, Turbidimeter: Agile Rental 3, Water-Level-Meter: WLM-1
Reference Measuring Point	PVC
Well Screen (ft bmp)	81.7 - 86.5
Measured Bottom Depth (ft bmp)	NR
Sample Comment	YSI Connected at 16:10.
Initial Water Level Date/Time	01/31/2024 14:45
Initial Water Level Depth (ft bmp)	58.77
Pump/Tubing Intake Depth (ft bmp)	84.1
Tubing Length (ft)	89.1
Tubing Inner Diameter (in)	0.17
Purging Initiation Date/Time	01/31/2024 14:50
Total Purge Volume (gal)	15
Modified Sample	No
If Modified, Reasoning	
Sample Collection Information	Bottling-Start: 01/31/2024 16:50:00, Bottling-Stop: 01/31/2024 16:55:00, Parameters-Sampled: PFAS

Reading Time	Depth To Water (ft)	Cumulative Drawdown (ft)	Purge Rate (ml/min)	Temperature (deg c)	Specific Conductivity (us/cm)	Dissolved Oxygen (mg/l)	pH (su)	Oxidation-Reduction Potential (mV)	Turbidity (ntu)
15:00	58.80	0.03	500	NR	NR	NR	NR	NR	472
15:30	58.79	0.02	500	NR	NR	NR	NR	NR	107
16:00	58.79	0.02	500	NR	NR	NR	NR	NR	35
16:10	58.80	0.03	500	12 +	581 +	8.8 +	7.7	74	30
16:20	58.79	0.02	500	12 +	581 +	8.4 +	7.7	47	8
16:30	58.79	0.02	500	12 +	580 +	8.3 +	7.7	42	7

Well Sampling Worksheet
WWW RAP Field Data
AREA 6 2024-Q1 - HS-MW-13A
Kent County, MI

Well	HS-MW-13A / 2 in Diameter PVC
Sample Quarter	2024-Q1
Date	01/31/2024
Weather	Cloudy, 38°F
Sampler Initials	JMS
Purging Device	Bladder-Pump: NA, Peristaltic-Pump: NA, Centrifugal-Pump: Mega Monsoon #1
Meters Used	YSI: Agile Rental 3, Turbidimeter: Agile Rental 3, Water-Level-Meter: WLM-1
Reference Measuring Point	PVC
Well Screen (ft bmp)	81.7 - 86.5
Measured Bottom Depth (ft bmp)	NR
Sample Comment	YSI Connected at 16:10.
Initial Water Level Date/Time	01/31/2024 14:45
Initial Water Level Depth (ft bmp)	58.77
Pump/Tubing Intake Depth (ft bmp)	84.1
Tubing Length (ft)	89.1
Tubing Inner Diameter (in)	0.17
Purging Initiation Date/Time	01/31/2024 14:50
Total Purge Volume (gal)	15
Modified Sample	No
If Modified, Reasoning	
Sample Collection Information	Bottling-Start: 01/31/2024 16:50:00, Bottling-Stop: 01/31/2024 16:55:00, Parameters-Sampled: PFAS

Reading Time	Depth To Water (ft)	Cumulative Drawdown (ft)	Purge Rate (ml/min)	Temperature (deg c)	Specific Conductivity (us/cm)	Dissolved Oxygen (mg/l)	pH (su)	Oxidation-Reduction Potential (mV)	Turbidity (ntu)
16:35	58.79	0.02	500	12 +	581 +	8.2 +	7.7	40	5
16:40	58.79	0.02	500	12 +	580 +	8.2 +	7.7	40	5
16:45	58.79	0.02	500	12 +	579 +	8.2 +	7.7	39	5

Notes:

1) Abbreviations include: "deg c" indicates degrees Celsius; "ft" indicates feet; "ft bmp" indicates feet below reference measuring point; "gal" indicates gallons; "in" indicates inches; "mg/l" indicates milligrams per liter; "ml/min" indicates milliliters per minute; "mV" indicates millivolts; "NA" indicates not applicable; "NR" indicates not recorded; "ntu" indicates Nephelometric Turbidity units; "su" indicates standard units; "us/cm" indicates microsiemens per centimeter; and "+" indicates the parameter(s) may be used for stabilization calculations but cannot be used for other purposes.
2) Weather temperature units are in degrees Fahrenheit, unless otherwise noted.
3) Did indicator parameters reach stabilization? Yes
4) Was the two hour time limit reached? Yes
5) Calculations:
   - Head Above Pump Intake (ft) 25.33
   - Total Drawdown (ft) 0.02
   - Calculated Final Purge Volume (gal) NA
6) If Drawdown Did Not Stabilize or Stabilized Drawdown >0.3 ft, is Total Purge Volume > Calculated Final Purge Volume? NA

Well Sampling Worksheet
WWW RAP Field Data
AREA 6 2024-Q1 - HS-MW-13B
Kent County, MI

Well	HS-MW-13B / 2 in Diameter PVC
Sample Quarter	2024-Q1
Date	01/31/2024
Weather	Cloudy, 30s°F
Sampler Initials	CLM
Purging Device	Bladder-Pump: NA, Peristaltic-Pump: NA, Centrifugal-Pump: Mega Monsoon #2
Meters Used	YSI: Agile Rental 1, Turbidimeter: Agile Rental 1, Water-Level-Meter: WLM-2
Reference Measuring Point	PVC
Well Screen (ft bmp)	151.2 - 156.0
Measured Bottom Depth (ft bmp)	NR
Sample Comment	YSI Connected at 15:10.
Initial Water Level Date/Time	01/31/2024 14:45
Initial Water Level Depth (ft bmp)	58.79
Pump/Tubing Intake Depth (ft bmp)	153.6
Tubing Length (ft)	157
Tubing Inner Diameter (in)	0.17
Purging Initiation Date/Time	01/31/2024 14:45
Total Purge Volume (gal)	4.1
Modified Sample	No
If Modified, Reasoning	
Sample Collection Information	Bottling-Start: 01/31/2024 15:55:00, Bottling-Stop: 01/31/2024 16:00:00, Parameters-Sampled: PFAS

Reading Time	Depth To Water (ft)	Cumulative Drawdown (ft)	Purge Rate (ml/min)	Temperature (deg c)	Specific Conductivity (us/cm)	Dissolved Oxygen (mg/l)	pH (su)	Oxidation-Reduction Potential (mV)	Turbidity (ntu)
14:50	58.80	0.01	220	NR	NR	NR	NR	NR	NR
14:55	58.80	0.01	220	NR	NR	NR	NR	NR	NR
15:00	58.80	0.01	220	NR	NR	NR	NR	NR	NR
15:05	58.80	0.01	220	NR	NR	NR	NR	NR	80
15:10	58.80	0.01	220	9	926 +	6.3	7.6	105	49
15:15	58.80	0.01	220	10	925 +	6.2	7.4	107	27
15:20	58.80	0.01	220	10	924 +	6.1	7.4	107	13
15:25	58.80	0.01	220	10	925 +	6.1	7.4	108	11
15:30	58.80	0.01	220	10	925 +	6.0	7.4	108	9
15:35	58.80	0.01	220	10	925 +	5.9	7.4	108	8

Well Sampling Worksheet
WWW RAP Field Data
AREA 6 2024-Q1 - HS-MW-13B
Kent County, MI

Well	HS-MW-13B / 2 in Diameter PVC
Sample Quarter	2024-Q1
Date	01/31/2024
Weather	Cloudy, 30s°F
Sampler Initials	CLM
Purging Device	Bladder-Pump: NA, Peristaltic-Pump: NA, Centrifugal-Pump: Mega Monsoon #2
Meters Used	YSI: Agile Rental 1, Turbidimeter: Agile Rental 1, Water-Level-Meter: WLM-2
Reference Measuring Point	PVC
Well Screen (ft bmp)	151.2 - 156.0
Measured Bottom Depth (ft bmp)	NR
Sample Comment	YSI Connected at 15:10.
Initial Water Level Date/Time	01/31/2024 14:45
Initial Water Level Depth (ft bmp)	58.79
Pump/Tubing Intake Depth (ft bmp)	153.6
Tubing Length (ft)	157
Tubing Inner Diameter (in)	0.17
Purging Initiation Date/Time	01/31/2024 14:45
Total Purge Volume (gal)	4.1
Modified Sample	No
If Modified, Reasoning	
Sample Collection Information	Bottling-Start: 01/31/2024 15:55:00, Bottling-Stop: 01/31/2024 16:00:00, Parameters-Sampled: PFAS

Reading Time	Depth To Water (ft)	Cumulative Drawdown (ft)	Purge Rate (ml/min)	Temperature (deg c)	Specific Conductivity (us/cm)	Dissolved Oxygen (mg/l)	pH (su)	Oxidation-Reduction Potential (mV)	Turbidity (ntu)
15:40	58.80	0.01	220	10	925 +	6.0	7.4	109	5
15:45	58.80	0.01	220	10	926 +	5.9	7.4	110	5
15:50	58.80	0.01	220	10	926 +	5.9	7.4	110	5

Notes:

1) Abbreviations include: "deg c" indicates degrees Celsius; "ft" indicates feet; "ft bmp" indicates feet below reference measuring point; "gal" indicates gallons; "in" indicates inches; "mg/l" indicates milligrams per liter; "ml/min" indicates milliliters per minute; "mV" indicates millivolts; "NA" indicates not applicable; "NR" indicates not recorded; "ntu" indicates Nephelometric Turbidity units; "su" indicates standard units; "us/cm" indicates microsiemens per centimeter; and "+" indicates the parameter(s) may be used for stabilization calculations but cannot be used for other purposes.
2) Weather temperature units are in degrees Fahrenheit, unless otherwise noted.
3) Did indicator parameters reach stabilization? Yes
4) Was the two hour time limit reached? No
5) Calculations:
   - Head Above Pump Intake (ft) 94.81
   - Total Drawdown (ft) 0.01
   - Calculated Final Purge Volume (gal) NA
6) If Drawdown Did Not Stabilize or Stabilized Drawdown >0.3 ft, is Total Purge Volume > Calculated Final Purge Volume? NA

Well Sampling Worksheet
WWW RAP Field Data
AREA 6 2024-Q1 - HS-MW-13C
Kent County, MI

Well	HS-MW-13C / 2 in Diameter PVC
Sample Quarter	2024-Q1
Date	01/31/2024
Weather	Cloudy, 40°F
Sampler Initials	RCP
Purging Device	Bladder-Pump: BP-12, Peristaltic-Pump: NA, Centrifugal-Pump: NA
Meters Used	YSI: Agile Rental 4, Turbidimeter: Agile Rental 4, Water-Level-Meter: WLM-4
Reference Measuring Point	PVC
Well Screen (ft bmp)	201.7 - 206.5
Measured Bottom Depth (ft bmp)	NR
Sample Comment	15:40 - Water level is stable. Connected YSI.
Initial Water Level Date/Time	01/31/2024 14:50
Initial Water Level Depth (ft bmp)	58.06
Pump/Tubing Intake Depth (ft bmp)	204.1
Tubing Length (ft)	206
Tubing Inner Diameter (in)	0.25
Purging Initiation Date/Time	01/31/2024 14:55
Total Purge Volume (gal)	3
Modified Sample	No
If Modified, Reasoning	
Sample Collection Information	Bottling-Start: 01/31/2024 16:15:00, Bottling-Stop: 01/31/2024 16:25:00, Parameters-Sampled: PFAS

Reading Time	Depth To Water (ft)	Cumulative Drawdown (ft)	Purge Rate (ml/min)	Temperature (deg c)	Specific Conductivity (us/cm)	Dissolved Oxygen (mg/l)	pH (su)	Oxidation-Reduction Potential (mV)	Turbidity (ntu)
15:05	58.28	0.22	130	NR	NR	NR	NR	NR	NR
15:25	58.22	0.16	130	NR	NR	NR	NR	NR	37
15:40	58.22	0.16	130	NR	NR	NR	NR	NR	17
15:50	58.22	0.16	130	9	1,770 +	0.5	7.2	-11	14
16:00	58.22	0.16	130	8	1,768 +	0.5	7.2	-40	11
16:05	58.22	0.16	130	8	1,765 +	0.5	7.2	-45	10
16:10	58.22	0.16	130	8	1,763 +	0.5	7.2	-48	11

Notes:

1) Abbreviations include: "deg c" indicates degrees Celsius; "ft" indicates feet; "ft bmp" indicates feet below reference measuring point; "gal" indicates gallons; "in" indicates inches; "mg/l" indicates milligrams per liter; "ml/min" indicates milliliters per minute; "mV" indicates millivolts; "NA" indicates not applicable; "NR" indicates not recorded; "ntu" indicates Nephelometric Turbidity units; "su" indicates standard units; "us/cm" indicates microsiemens per centimeter; and "+" indicates the parameter(s) may be used for stabilization calculations but cannot be used for other purposes.
2) Weather temperature units are in degrees Fahrenheit, unless otherwise noted.
3) Did indicator parameters reach stabilization? Yes
4) Was the two hour time limit reached? No
5) Calculations:
   - Head Above Pump Intake (ft) 146.04
   - Total Drawdown (ft) 0.16
   - Calculated Final Purge Volume (gal) NA
6) If Drawdown Did Not Stabilize or Stabilized Drawdown >0.3 ft, is Total Purge Volume > Calculated Final Purge Volume? NA

Well Sampling Worksheet
WWW RAP Field Data
PERIMETER 2024-Q1 - HS-MW-32A
Kent County, MI

Well	HS-MW-32A / 2 in Diameter PVC
Sample Quarter	2024-Q1
Date	01/19/2024
Weather	Cloudy, 20F
Sampler Initials	RCP
Purging Device	Bladder-Pump: NA, Peristaltic-Pump: PER-1, Centrifugal-Pump: NA
Meters Used	YSI: Agile Rental 2, Turbidimeter: Agile Rental 1, Water-Level-Meter: WLM-2
Reference Measuring Point	PVC
Well Screen (ft bmp)	63.5 - 68.1
Measured Bottom Depth (ft bmp)	68.1
Sample Comment	
Initial Water Level Date/Time	01/19/2024 14:10
Initial Water Level Depth (ft bmp)	7.80
Pump/Tubing Intake Depth (ft bmp)	65.8
Tubing Length (ft)	67
Tubing Inner Diameter (in)	0.17
Purging Initiation Date/Time	01/19/2024 14:15
Total Purge Volume (gal)	3
Modified Sample	No
If Modified, Reasoning	
Sample Collection Information	Bottling-Start: 01/19/2024 16:20:00, Bottling-Stop: 01/19/2024 16:25:00, Parameters-Sampled: PFAS

Reading Time	Depth To Water (ft)	Cumulative Drawdown (ft)	Purge Rate (ml/min)	Temperature (deg c)	Specific Conductivity (us/cm)	Dissolved Oxygen (mg/l)	pH (us)	Oxidation-Reduction Potential (mV)	Turbidity (ntu)
15:30	7.80	0.00	250	9	1,095 +	<0.5	7.4	234	8
15:35	7.80	0.00	250	9	1,096 +	<0.5	7.4	134	<5
15:40	7.80	0.00	250	9	1,093 +	<0.5	7.4	62	<5
15:45	7.80	0.00	250	9	1,093 +	<0.5	7.4	26	<5
15:50	7.80	0.00	250	9	1,093 +	<0.5	7.4	-18	<5
15:55	7.80	0.00	250	9	1,093 +	<0.5	7.4	-38	<5
16:00	7.80	0.00	250	9	1,093 +	<0.5	7.4	-52	<5
16:05	7.80	0.00	250	9	1,093 +	<0.5	7.4	-61	<5
16:10	7.80	0.00	250	9	1,092 +	<0.5	7.4	-70	<5
16:15	7.80	0.00	250	9	1,092 +	<0.5	7.4	-75	<5

Notes:

1) Abbreviations include: "deg c" indicates degrees Celsius; "ft" indicates feet; "ft bmp" indicates feet below reference measuring point; "gal" indicates gallons; "in" indicates inches; "mg/l" indicates milligrams per liter; "ml/min" indicates milliliters per minute; "mV" indicates millivolts; "NA" indicates not applicable; "NR" indicates not recorded; "ntu" indicates Nephelometric Turbidity units; "su" indicates standard units; "us/cm" indicates microsiemens per centimeter; and "+" indicates the parameter(s) may be used for stabilization calculations but cannot be used for other purposes.
2) Weather temperature units are in degrees Fahrenheit, unless otherwise noted.
3) Did indicator parameters reach stabilization? Yes
4) Was the two hour time limit reached? Yes
5) Calculations:
   - Head Above Pump Intake (ft) 58.00
   - Total Drawdown (ft) 0.00
   - Calculated Final Purge Volume (gal) NA
6) If Drawdown Did Not Stabilize or Stabilized Drawdown >0.3 ft, is Total Purge Volume > Calculated Final Purge Volume? NA

Well Sampling Worksheet
WWW RAP Field Data
PERIMETER 2024-Q1 - HS-MW-32B
Kent County, MI

Well	HS-MW-32B / 2 in Diameter PVC
Sample Quarter	2024-Q1
Date	01/19/2024
Weather	Clear 20
Sampler Initials	NCK
Purging Device	Bladder-Pump: NA, Peristaltic-Pump: Rental, Centrifugal-Pump: NA
Meters Used	YSI: Agile Rental 3, Turbidimeter: Agile Rental 3, Water-Level-Meter: WLM-4
Reference Measuring Point	PVC
Well Screen (ft bmp)	81.8 - 86.4
Measured Bottom Depth (ft bmp)	NR
Sample Comment	YSI Connected after 15:00 readings.
Initial Water Level Date/Time	01/19/2024 14:05
Initial Water Level Depth (ft bmp)	8.20
Pump/Tubing Intake Depth (ft bmp)	84.1
Tubing Length (ft)	88
Tubing Inner Diameter (in)	0.17
Purging Initiation Date/Time	01/19/2024 14:10
Total Purge Volume (gal)	2
Modified Sample	No
If Modified, Reasoning	
Sample Collection Information	Bottling-Start: 01/19/2024 15:30:00, Bottling-Stop: 01/19/2024 15:35:00, Parameters-Sampled: PFAS

Reading Time	Depth To Water (ft)	Cumulative Drawdown (ft)	Purge Rate (ml/min)	Temperature (deg c)	Specific Conductivity (us/cm)	Dissolved Oxygen (mg/l)	pH (su)	Oxidation-Reduction Potential (mV)	Turbidity (ntu)
14:20	8.47	0.27	100	NR	NR	NR	NR	NR	NR
14:40	8.47	0.27	100	NR	NR	NR	NR	NR	NR
15:00	8.47	0.27	100	NR	NR	NR	NR	NR	NR
15:15	8.47	0.27	100	9 +	1,164 +	1.6	7.4	-131	<5
15:20	8.47	0.27	100	9 +	1,166 +	1.5	7.4	-131	<5
15:25	8.47	0.27	100	9 +	1,169 +	1.5	7.4	-132	<5

Notes:

1) Abbreviations include: "deg c" indicates degrees Celsius; "ft" indicates feet; "ft bmp" indicates feet below reference measuring point; "gal" indicates gallons; "in" indicates inches; "mg/l" indicates milligrams per liter; "ml/min" indicates milliliters per minute; "mV" indicates millivolts; "NA" indicates not applicable; "NR" indicates not recorded; "ntu" indicates Nephelometric Turbidity units; "su" indicates standard units; "us/cm" indicates microsiemens per centimeter; and "+" indicates the parameter(s) may be used for stabilization calculations but cannot be used for other purposes.
2) Weather temperature units are in degrees Fahrenheit, unless otherwise noted.
3) Did indicator parameters reach stabilization? Yes
4) Was the two hour time limit reached? No
5) Calculations:
   - Head Above Pump Intake (ft) 75.90
   - Total Drawdown (ft) 0.27
   - Calculated Final Purge Volume (gal) NA
6) If Drawdown Did Not Stabilize or Stabilized Drawdown >0.3 ft, is Total Purge Volume > Calculated Final Purge Volume? NA

Well Sampling Worksheet
WWW RAP Field Data
PERIMETER 2024-Q1 - HS-MW-32C
Kent County, MI

Well	HS-MW-32C / 2 in Diameter PVC
Sample Quarter	2024-Q1
Date	01/19/2024
Weather	21F, Cloudy
Sampler Initials	JMS
Purging Device	Bladder-Pump: NA, Peristaltic-Pump: PER-3, Centrifugal-Pump: NA
Meters Used	YSI: Agile Rental 1, Turbidimeter: Agile Rental 1, Water-Level-Meter: WLM-1
Reference Measuring Point	PVC
Well Screen (ft bmp)	111.4 - 116.0
Measured Bottom Depth (ft bmp)	NR
Sample Comment	
Initial Water Level Date/Time	01/19/2024 14:10
Initial Water Level Depth (ft bmp)	7.96
Pump/Tubing Intake Depth (ft bmp)	113.9
Tubing Length (ft)	118.9
Tubing Inner Diameter (in)	0.17
Purging Initiation Date/Time	01/19/2024 14:15
Total Purge Volume (gal)	4
Modified Sample	No
If Modified, Reasoning	
Sample Collection Information	Bottling-Start: 01/19/2024 15:20:00, Bottling-Stop: 01/19/2024 15:25:00, Parameters-Sampled: PFAS

Reading Time	Depth To Water (ft)	Cumulative Drawdown (ft)	Purge Rate (ml/min)	Temperature (deg c)	Specific Conductivity (us/cm)	Dissolved Oxygen (mg/l)	pH (su)	Oxidation-Reduction Potential (mV)	Turbidity (ntu)
14:35	8.23	0.27	250	9	1,117 +	0.8	7.5	55	<5
14:40	8.23	0.27	250	8	1,124 +	0.7	7.5	42	<5
14:45	8.23	0.27	250	8	1,126 +	0.7	7.5	16	<5
14:50	8.23	0.27	250	8	1,129 +	0.6	7.5	0	<5
14:55	8.23	0.27	250	8	1,118 +	0.6	7.5	-15	<5
15:00	8.23	0.27	250	8	1,128 +	0.6	7.5	-23	<5
15:05	8.23	0.27	250	8	1,129 +	0.6	7.5	-30	<5
15:10	8.23	0.27	250	8	1,117 +	0.6	7.5	-37	<5
15:15	8.23	0.27	250	8	1,129 +	0.6	7.5	-40	<5

Notes:

1) Abbreviations include: "deg c" indicates degrees Celsius; "ft" indicates feet; "ft bmp" indicates feet below reference measuring point; "gal" indicates gallons; "in" indicates inches; "mg/l" indicates milligrams per liter; "ml/min" indicates milliliters per minute; "mV" indicates millivolts; "NA" indicates not applicable; "NR" indicates not recorded; "ntu" indicates Nephelometric Turbidity units; "su" indicates standard units; "us/cm" indicates microsiemens per centimeter; and "+" indicates the parameter(s) may be used for stabilization calculations but cannot be used for other purposes.
2) Weather temperature units are in degrees Fahrenheit, unless otherwise noted.
3) Did indicator parameters reach stabilization? Yes
4) Was the two hour time limit reached? No
5) Calculations:
   - Head Above Pump Intake (ft) 105.94
   - Total Drawdown (ft) 0.27
   - Calculated Final Purge Volume (gal) NA
6) If Drawdown Did Not Stabilize or Stabilized Drawdown >0.3 ft, is Total Purge Volume > Calculated Final Purge Volume? NA

Well Sampling Worksheet
WWW RAP Field Data
PERIMETER 2024-Q1 - HS-MW-32D
Kent County, MI

Well	HS-MW-32D / 2 in Diameter PVC
Sample Quarter	2024-Q1
Date	03/01/2024
Weather	Sunny, 40F
Sampler Initials	NCK
Purging Device	Bladder-Pump: NA, Peristaltic-Pump: PER-1, Centrifugal-Pump: NA
Meters Used	YSI: Agile Rental 1, Turbidimeter: Agile Rental 1, Water-Level-Meter: WLM-1
Reference Measuring Point	PVC
Well Screen (ft bmp)	144.8 - 149.4
Measured Bottom Depth (ft bmp)	NR
Sample Comment	Pump stalled at flow rates below 70 mL/min. YSI connected at 11:00.
Initial Water Level Date/Time	03/01/2024 10:15
Initial Water Level Depth (ft bmp)	7.90
Pump/Tubing Intake Depth (ft bmp)	147.1
Tubing Length (ft)	149
Tubing Inner Diameter (in)	0.17
Purging Initiation Date/Time	03/01/2024 10:20
Total Purge Volume (gal)	1.5
Modified Sample	No
If Modified, Reasoning	
Sample Collection Information	Bottling-Start: 03/01/2024 11:45:00, Bottling-Stop: 03/01/2024 11:55:00, Parameters-Sampled: PFAS

Reading Time	Depth To Water (ft)	Cumulative Drawdown (ft)	Purge Rate (ml/min)	Temperature (deg c)	Specific Conductivity (us/cm)	Dissolved Oxygen (mg/l)	pH (su)	Oxidation-Reduction Potential (mV)	Turbidity (ntu)
11:00	9.29	1.39	70	NR	NR	NR	NR	NR	21
11:20	9.45	1.55	70	9	2,630 +	<0.5	7.5	-94	13
11:30	9.50	1.60	70	9	2,627 +	<0.5	7.5	-107	11
11:35	9.50	1.60	70	9	2,628 +	<0.5	7.5	-111	12
11:40	9.50	1.60	70	10	2,628 +	<0.5	7.5	-113	12

Notes:

1) Abbreviations include: "deg c" indicates degrees Celsius; "ft" indicates feet; "ft bmp" indicates feet below reference measuring point; "gal" indicates gallons; "in" indicates inches; "mg/l" indicates milligrams per liter; "ml/min" indicates milliliters per minute; "mV" indicates millivolts; "NA" indicates not applicable; "NR" indicates not recorded; "ntu" indicates Nephelometric Turbidity units; "su" indicates standard units; "us/cm" indicates microsiemens per centimeter; and "+" indicates the parameter(s) may be used for stabilization calculations but cannot be used for other purposes.
2) Weather temperature units are in degrees Fahrenheit, unless otherwise noted.
3) Did indicator parameters reach stabilization? Yes
4) Was the two hour time limit reached? No
5) Calculations:
   - Head Above Pump Intake (ft) 139.20
   - Total Drawdown (ft) 1.60
   - Calculated Final Purge Volume (gal) 0.43
6) If Drawdown Did Not Stabilize or Stabilized Drawdown >0.3 ft, is Total Purge Volume > Calculated Final Purge Volume? Yes

Well Sampling Worksheet
WWW RAP Field Data
AREA 6 2024-Q1 - HS-PMW-16A
Kent County, MI

Well	HS-PMW-16A / 2 in Diameter PVC
Sample Quarter	2024-Q1
Date	02/12/2024
Weather	Sunny, 30s°F
Sampler Initials	CBM
Purging Device	Bladder-Pump: NA, Peristaltic-Pump: NA, Centrifugal-Pump: Mega Monsoon #1
Meters Used	YSI: Agile Rental 3, Turbidimeter: Agile Rental 3, Water-Level-Meter: WLM-2
Reference Measuring Point	PVC
Well Screen (ft bmp)	89.0 - 94.0
Measured Bottom Depth (ft bmp)	94
Sample Comment	Collected DUP.
Initial Water Level Date/Time	02/12/2024 12:50
Initial Water Level Depth (ft bmp)	74.22
Pump/Tubing Intake Depth (ft bmp)	91.5
Tubing Length (ft)	94
Tubing Inner Diameter (in)	0.17
Purging Initiation Date/Time	02/12/2024 12:55
Total Purge Volume (gal)	4.75
Modified Sample	No
If Modified, Reasoning	
Sample Collection Information	Bottling-Start: 02/12/2024 14:00:00, Bottling-Stop: 02/12/2024 14:05:00, Parameters-Sampled: PFAS

Reading Time	Depth To Water (ft)	Cumulative Drawdown (ft)	Purge Rate (ml/min)	Temperature (deg c)	Specific Conductivity (us/cm)	Dissolved Oxygen (mg/l)	pH (su)	Oxidation-Reduction Potential (mV)	Turbidity (ntu)
13:40	74.22	0.00	300	11	807 +	7.4	7.1	181	7
13:45	74.22	0.00	300	12	808 +	7.5	7.1	179	<5
13:50	74.22	0.00	300	12	807 +	7.5	7.1	178	<5
13:55	74.22	0.00	300	11	806 +	7.4	7.2	180	<5

Notes:

1) Abbreviations include: "deg c" indicates degrees Celsius; "ft" indicates feet; "ft bmp" indicates feet below reference measuring point; "gal" indicates gallons; "in" indicates inches; "mg/l" indicates milligrams per liter; "ml/min" indicates milliliters per minute; "mV" indicates millivolts; "NA" indicates not applicable; "NR" indicates not recorded; "ntu" indicates Nephelometric Turbidity units; "su" indicates standard units; "us/cm" indicates microsiemens per centimeter; and "+" indicates the parameter(s) may be used for stabilization calculations but cannot be used for other purposes.
2) Weather temperature units are in degrees Fahrenheit, unless otherwise noted.
3) Did indicator parameters reach stabilization? Yes
4) Was the two hour time limit reached? No
5) Calculations:
   - Head Above Pump Intake (ft) 17.28
   - Total Drawdown (ft) 0.00
   - Calculated Final Purge Volume (gal) NA
6) If Drawdown Did Not Stabilize or Stabilized Drawdown >0.3 ft, is Total Purge Volume > Calculated Final Purge Volume? NA

Well Sampling Worksheet
WWW RAP Field Data
AREA 6 2024-Q1 - HS-PMW-16B
Kent County, MI

Well	HS-PMW-16B / 2 in Diameter PVC
Sample Quarter	2024-Q1
Date	02/12/2024
Weather	Sunny, 39°F
Sampler Initials	JMS
Purging Device	Bladder-Pump: NA, Peristaltic-Pump: NA, Centrifugal-Pump: Mega Monsoon #2
Meters Used	YSI: Agile Rental 1, Turbidimeter: Agile Rental 1, Water-Level-Meter: WLM-2
Reference Measuring Point	PVC
Well Screen (ft bmp)	118.1 - 123.1
Measured Bottom Depth (ft bmp)	NR
Sample Comment	YSI Connected at 14:40.
Initial Water Level Date/Time	02/12/2024 12:45
Initial Water Level Depth (ft bmp)	74.02
Pump/Tubing Intake Depth (ft bmp)	120.6
Tubing Length (ft)	125.6
Tubing Inner Diameter (in)	0.17
Purging Initiation Date/Time	02/12/2024 12:50
Total Purge Volume (gal)	15
Modified Sample	No
If Modified, Reasoning	
Sample Collection Information	Bottling-Start: 02/12/2024 14:55:00, Bottling-Stop: 02/12/2024 15:00:00, Parameters-Sampled: PFAS

Reading Time	Depth To Water (ft)	Cumulative Drawdown (ft)	Purge Rate (ml/min)	Temperature (deg c)	Specific Conductivity (us/cm)	Dissolved Oxygen (mg/l)	pH (su)	Oxidation-Reduction Potential (mV)	Turbidity (ntu)
13:05	74.11	0.09	500	NR	NR	NR	NR	NR	121
13:30	74.11	0.09	500	NR	NR	NR	NR	NR	56
13:45	74.11	0.09	500	NR	NR	NR	NR	NR	41
14:05	74.11	0.09	500	NR	NR	NR	NR	NR	27
14:25	74.11	0.09	500	NR	NR	NR	NR	NR	14
14:40	74.11	0.09	500	12	911 +	7.1	7.7	50	11
14:45	74.11	0.09	500	12	914 +	6.6	7.5	58	8
14:50	74.11	0.09	500	12	914 +	6.4	7.4	64	6

Notes:

1) Abbreviations include: "deg c" indicates degrees Celsius; "ft" indicates feet; "ft bmp" indicates feet below reference measuring point; "gal" indicates gallons; "in" indicates inches; "mg/l" indicates milligrams per liter; "ml/min" indicates milliliters per minute; "mV" indicates millivolts; "NA" indicates not applicable; "NR" indicates not recorded; "ntu" indicates Nephelometric Turbidity units; "su" indicates standard units; "us/cm" indicates microsiemens per centimeter; and "+" indicates the parameter(s) may be used for stabilization calculations but cannot be used for other purposes.
2) Weather temperature units are in degrees Fahrenheit, unless otherwise noted.
3) Did indicator parameters reach stabilization? No
4) Was the two hour time limit reached? Yes
5) Calculations:
   - Head Above Pump Intake (ft) 46.58
   - Total Drawdown (ft) 0.09
   - Calculated Final Purge Volume (gal) NA
6) If Drawdown Did Not Stabilize or Stabilized Drawdown >0.3 ft, is Total Purge Volume > Calculated Final Purge Volume? NA

Well Sampling Worksheet
WWW RAP Field Data
AREA 6 2024-Q1 - HS-PMW-16C
Kent County, MI

Well	HS-PMW-16C / 2 in Diameter PVC
Sample Quarter	2024-Q1
Date	02/12/2024
Weather	Sunny, 39°F
Sampler Initials	NCK
Purging Device	Bladder-Pump: BP-12, Peristaltic-Pump: NA, Centrifugal-Pump: NA
Meters Used	YSI: Agile Rental 2, Turbidimeter: Agile Rental 2, Water-Level-Meter: WLM-4
Reference Measuring Point	PVC
Well Screen (ft bmp)	161.3 - 166.3
Measured Bottom Depth (ft bmp)	NR
Sample Comment	YSI Connected at 14:20.
Initial Water Level Date/Time	02/12/2024 12:50
Initial Water Level Depth (ft bmp)	77.33
Pump/Tubing Intake Depth (ft bmp)	163.8
Tubing Length (ft)	168
Tubing Inner Diameter (in)	0.25
Purging Initiation Date/Time	02/12/2024 13:00
Total Purge Volume (gal)	7.9
Modified Sample	No
If Modified, Reasoning	
Sample Collection Information	Bottling-Start: 02/12/2024 14:45:00, Bottling-Stop: 02/12/2024 14:50:00, Parameters-Sampled: PFAS

Reading Time	Depth To Water (ft)	Cumulative Drawdown (ft)	Purge Rate (ml/min)	Temperature (deg c)	Specific Conductivity (us/cm)	Dissolved Oxygen (mg/l)	pH (su)	Oxidation-Reduction Potential (mV)	Turbidity (ntu)
13:10	77.54	0.21	300	NR	NR	NR	NR	NR	NR
13:20	77.54	0.21	300	NR	NR	NR	NR	NR	NR
13:40	77.54	0.21	300	NR	NR	NR	NR	NR	NR
14:20	77.54	0.21	300	9	665 +	0.9	7.4	-19	28
14:25	77.54	0.21	300	9	664 +	0.8	7.4	-22	26
14:30	77.54	0.21	300	9	665 +	0.8	7.4	-21	24
14:35	77.54	0.21	300	9	664 +	0.8	7.4	-22	22
14:40	77.54	0.21	300	9	663 +	0.8	7.4	-22	21

Notes:

1) Abbreviations include: "deg c" indicates degrees Celsius; "ft" indicates feet; "ft bmp" indicates feet below reference measuring point; "gal" indicates gallons; "in" indicates inches; "mg/l" indicates milligrams per liter; "ml/min" indicates milliliters per minute; "mV" indicates millivolts; "NA" indicates not applicable; "NR" indicates not recorded; "ntu" indicates Nephelometric Turbidity units; "su" indicates standard units; "us/cm" indicates microsiemens per centimeter; and "+" indicates the parameter(s) may be used for stabilization calculations but cannot be used for other purposes.
2) Weather temperature units are in degrees Fahrenheit, unless otherwise noted.
3) Did indicator parameters reach stabilization? Yes
4) Was the two hour time limit reached? No
5) Calculations:
   - Head Above Pump Intake (ft) 86.47
   - Total Drawdown (ft) 0.21
   - Calculated Final Purge Volume (gal) NA
6) If Drawdown Did Not Stabilize or Stabilized Drawdown >0.3 ft, is Total Purge Volume > Calculated Final Purge Volume? NA

Well Sampling Worksheet
WWW RAP Field Data
PERIMETER 2024-Q1 - HS-PMW-22
Kent County, MI

Well	HS-PMW-22 / 2 in Diameter PVC
Sample Quarter	2024-Q1
Date	02/15/2024
Weather	Cloudy, 30s
Sampler Initials	CBM
Purging Device	Bladder-Pump: BP-11, Peristaltic-Pump: NA, Centrifugal-Pump: NA
Meters Used	YSI: Agile Rental 1, Turbidimeter: Agile Rental 1, Water-Level-Meter: WLM-4
Reference Measuring Point	PVC
Well Screen (ft bmp)	171.6 - 176.6
Measured Bottom Depth (ft bmp)	176.6
Sample Comment	
Initial Water Level Date/Time	02/15/2024 13:05
Initial Water Level Depth (ft bmp)	96.63
Pump/Tubing Intake Depth (ft bmp)	174.1
Tubing Length (ft)	177
Tubing Inner Diameter (in)	0.25
Purging Initiation Date/Time	02/15/2024 13:35
Total Purge Volume (gal)	3.25
Modified Sample	No
If Modified, Reasoning	
Sample Collection Information	Bottling-Start: 02/15/2024 14:55:00, Bottling-Stop: 02/15/2024 16:00:00, Parameters-Sampled: PFAS

Reading Time	Depth To Water (ft)	Cumulative Drawdown (ft)	Purge Rate (ml/min)	Temperature (deg c)	Specific Conductivity (us/cm)	Dissolved Oxygen (mg/l)	pH (su)	Oxidation-Reduction Potential (mV)	Turbidity (ntu)
14:25	96.66	0.03	125	9	1,407 +	<0.5	7.4	64	19
14:30	96.66	0.03	125	9	1,402 +	<0.5	7.4	64	11
14:35	96.66	0.03	125	9	1,408 +	<0.5	7.4	61	9
14:40	96.66	0.03	125	9	1,406 +	<0.5	7.4	58	7
14:45	96.66	0.03	125	9	1,407 +	<0.5	7.4	57	7
14:50	96.66	0.03	125	9	1,405 +	<0.5	7.4	55	7

Notes:

1) Abbreviations include: "deg c" indicates degrees Celsius; "ft" indicates feet; "ft bmp" indicates feet below reference measuring point; "gal" indicates gallons; "in" indicates inches; "mg/l" indicates milligrams per liter; "ml/min" indicates milliliters per minute; "mV" indicates millivolts; "NA" indicates not applicable; "NR" indicates not recorded; "ntu" indicates Nephelometric Turbidity units; "su" indicates standard units; "us/cm" indicates microsiemens per centimeter; and "+" indicates the parameter(s) may be used for stabilization calculations but cannot be used for other purposes.
2) Weather temperature units are in degrees Fahrenheit, unless otherwise noted.
3) Did indicator parameters reach stabilization? Yes
4) Was the two hour time limit reached? No
5) Calculations:
   - Head Above Pump Intake (ft) 77.47
   - Total Drawdown (ft) 0.03
   - Calculated Final Purge Volume (gal) NA
6) If Drawdown Did Not Stabilize or Stabilized Drawdown >0.3 ft, is Total Purge Volume > Calculated Final Purge Volume? NA

Well Sampling Worksheet
WWW RAP Field Data
AREA 11/12 2024-Q1 - HS-PMW-RI-111B
Kent County, MI

Well	HS-PMW-RI-111B / 2 in Diameter PVC
Sample Quarter	2024-Q1
Date	02/01/2024
Weather	Cloudy, 45°F
Sampler Initials	JMS
Purging Device	Bladder-Pump: NA, Peristaltic-Pump: PER-3, Centrifugal-Pump: NA
Meters Used	YSI: Agile Rental 1, Turbidimeter: Agile Rental 1, Water-Level-Meter: WLM-1
Reference Measuring Point	PVC
Well Screen (ft bmp)	47.9 - 52.9
Measured Bottom Depth (ft bmp)	NR
Sample Comment	
Initial Water Level Date/Time	02/01/2024 14:50
Initial Water Level Depth (ft bmp)	7.27
Pump/Tubing Intake Depth (ft bmp)	50.4
Tubing Length (ft)	55.4
Tubing Inner Diameter (in)	0.17
Purging Initiation Date/Time	02/01/2024 14:55
Total Purge Volume (gal)	3
Modified Sample	No
If Modified, Reasoning	
Sample Collection Information	Bottling-Start: 02/01/2024 15:25:00, Bottling-Stop: 02/01/2024 15:30:00, Parameters-Sampled: PFAS

Reading Time	Depth To Water (ft)	Cumulative Drawdown (ft)	Purge Rate (ml/min)	Temperature (deg c)	Specific Conductivity (us/cm)	Dissolved Oxygen (mg/l)	pH (su)	Oxidation-Reduction Potential (mV)	Turbidity (ntu)
15:05	7.30	0.03	350	11	783 +	7.0	7.3	89	8
15:10	7.30	0.03	350	11	783 +	7.0	7.4	87	6
15:15	7.30	0.03	350	11	782 +	6.9	7.4	87	5
15:20	7.30	0.03	350	11	782 +	6.9	7.4	87	5

Notes:

1) Abbreviations include: "deg c" indicates degrees Celsius; "ft" indicates feet; "ft bmp" indicates feet below reference measuring point; "gal" indicates gallons; "in" indicates inches; "mg/l" indicates milligrams per liter; "ml/min" indicates milliliters per minute; "mV" indicates millivolts; "NA" indicates not applicable; "NR" indicates not recorded; "ntu" indicates Nephelometric Turbidity units; "su" indicates standard units; "us/cm" indicates microsiemens per centimeter; and "+" indicates the parameter(s) may be used for stabilization calculations but cannot be used for other purposes.
2) Weather temperature units are in degrees Fahrenheit, unless otherwise noted.
3) Did indicator parameters reach stabilization? Yes
4) Was the two hour time limit reached? No
5) Calculations:
   - Head Above Pump Intake (ft) 43.13
   - Total Drawdown (ft) 0.03
   - Calculated Final Purge Volume (gal) NA
6) If Drawdown Did Not Stabilize or Stabilized Drawdown >0.3 ft, is Total Purge Volume > Calculated Final Purge Volume? NA

Well Sampling Worksheet
WWW RAP Field Data
AREA 11/12 2024-Q1 - HS-PMW-RI-112A
Kent County, MI

Well	HS-PMW-RI-112A / 2 in Diameter PVC
Sample Quarter	2024-Q1
Date	02/02/2024
Weather	Cloudy, 30s°F
Sampler Initials	CLM
Purging Device	Bladder-Pump: NA, Peristaltic-Pump: PER-3, Centrifugal-Pump: NA
Meters Used	YSI: Agile Rental 3, Turbidimeter: Agile Rental 3, Water-Level-Meter: WLM-2
Reference Measuring Point	PVC
Well Screen (ft bmp)	24.3 - 29.3
Measured Bottom Depth (ft bmp)	NR
Sample Comment	10:20 - Missed reading while setting up YSI.
Initial Water Level Date/Time	02/02/2024 10:10
Initial Water Level Depth (ft bmp)	5.30
Pump/Tubing Intake Depth (ft bmp)	26.8
Tubing Length (ft)	29
Tubing Inner Diameter (in)	0.17
Purging Initiation Date/Time	02/02/2024 10:10
Total Purge Volume (gal)	2.8
Modified Sample	No
If Modified, Reasoning	
Sample Collection Information	Bottling-Start: 02/02/2024 11:25:00, Bottling-Stop: 02/02/2024 11:30:00, Parameters-Sampled: PFAS

Reading Time	Depth To Water (ft)	Cumulative Drawdown (ft)	Purge Rate (ml/min)	Temperature (deg c)	Specific Conductivity (us/cm)	Dissolved Oxygen (mg/l)	pH (su)	Oxidation-Reduction Potential (mV)	Turbidity (ntu)
10:15	5.31	0.01	NR	NR	NR	NR	NR	NR	9
10:20	NR	NR	NR	NR	NR	NR	NR	NR	NR
10:25	5.30	0.00	145.9	10 +	728 +	7.5	7.4	146	6
10:30	5.30	0.00	150	10 +	725 +	7.6	7.4	164	<5
10:35	5.30	0.00	150	10 +	723 +	7.7	7.4	179	<5
10:40	5.30	0.00	150	9 +	722 +	7.8	7.4	190	<5
10:45	5.30	0.00	150	9 +	722 +	7.7	7.4	196	<5
10:50	5.30	0.00	150	9 +	720 +	7.8	7.4	203	<5
10:55	5.30	0.00	150	9 +	722 +	7.7	7.4	210	<5
11:00	5.30	0.00	150	9 +	724 +	7.8	7.4	216	<5
11:05	5.30	0.00	150	9 +	720 +	7.8	7.4	222	<5

Well Sampling Worksheet
WWW RAP Field Data
AREA 11/12 2024-Q1 - HS-PMW-RI-112A
Kent County, MI

Well	HS-PMW-RI-112A / 2 in Diameter PVC
Sample Quarter	2024-Q1
Date	02/02/2024
Weather	Cloudy, 30s°F
Sampler Initials	CLM
Purging Device	Bladder-Pump: NA, Peristaltic-Pump: PER-3, Centrifugal-Pump: NA
Meters Used	YSI: Agile Rental 3, Turbidimeter: Agile Rental 3, Water-Level-Meter: WLM-2
Reference Measuring Point	PVC
Well Screen (ft bmp)	24.3 - 29.3
Measured Bottom Depth (ft bmp)	NR
Sample Comment	10:20 - Missed reading while setting up YSI.
Initial Water Level Date/Time	02/02/2024 10:10
Initial Water Level Depth (ft bmp)	5.30
Pump/Tubing Intake Depth (ft bmp)	26.8
Tubing Length (ft)	29
Tubing Inner Diameter (in)	0.17
Purging Initiation Date/Time	02/02/2024 10:10
Total Purge Volume (gal)	2.8
Modified Sample	No
If Modified, Reasoning	
Sample Collection Information	Bottling-Start: 02/02/2024 11:25:00, Bottling-Stop: 02/02/2024 11:30:00, Parameters-Sampled: PFAS

Reading Time	Depth To Water (ft)	Cumulative Drawdown (ft)	Purge Rate (ml/min)	Temperature (deg c)	Specific Conductivity (us/cm)	Dissolved Oxygen (mg/l)	pH (su)	Oxidation-Reduction Potential (mV)	Turbidity (ntu)
11:10	5.30	0.00	150	9 +	721 +	7.8	7.4	229	<5
11:15	5.30	0.00	150	9 +	721 +	7.9	7.4	235	<5
11:20	5.30	0.00	150	9 +	725 +	7.9	7.4	239	<5

Notes:

1) Abbreviations include: "deg c" indicates degrees Celsius; "ft" indicates feet; "ft bmp" indicates feet below reference measuring point; "gal" indicates gallons; "in" indicates inches; "mg/l" indicates milligrams per liter; "ml/min" indicates milliliters per minute; "mV" indicates millivolts; "NA" indicates not applicable; "NR" indicates not recorded; "ntu" indicates Nephelometric Turbidity units; "su" indicates standard units; "us/cm" indicates microsiemens per centimeter; and "+" indicates the parameter(s) may be used for stabilization calculations but cannot be used for other purposes.
2) Weather temperature units are in degrees Fahrenheit, unless otherwise noted.
3) Did indicator parameters reach stabilization? Yes
4) Was the two hour time limit reached? No
5) Calculations:
   - Head Above Pump Intake (ft): 21.50
   - Total Drawdown (ft): 0.00
   - Calculated Final Purge Volume (gal): NA
6) If Drawdown Did Not Stabilize or Stabilized Drawdown >0.3 ft, is Total Purge Volume > Calculated Final Purge Volume? NA

Well Sampling Worksheet
WWW RAP Field Data
PERIMETER 2024-Q1 - HS-PMW-RI-101A
Kent County, MI

Well	HS-PMW-RI-101A / 2 in Diameter PVC
Sample Quarter	2024-Q1
Date	02/07/2024
Weather	Partly cloudy, 30's.
Sampler Initials	CBM
Purging Device	Bladder-Pump: NA, Peristaltic-Pump: PER-1, Centrifugal-Pump: NA
Meters Used	YSI: Agile Rental 1, Turbidimeter: Agile Rental 1, Water-Level-Meter: WLM-4
Reference Measuring Point	PVC
Well Screen (ft bmp)	10.1 - 15.1
Measured Bottom Depth (ft bmp)	15.1
Sample Comment	Collected Field Blank at 14:50.
Initial Water Level Date/Time	02/07/2024 13:30
Initial Water Level Depth (ft bmp)	7.10
Pump/Tubing Intake Depth (ft bmp)	12.6
Tubing Length (ft)	15
Tubing Inner Diameter (in)	0.17
Purging Initiation Date/Time	02/07/2024 13:35
Total Purge Volume (gal)	2.6
Modified Sample	No
If Modified, Reasoning	
Sample Collection Information	Bottling-Start: 02/07/2024 14:40:00, Bottling-Stop: 02/07/2024 14:45:00, Parameters-Sampled: PFAS

Reading Time	Depth To Water (ft)	Cumulative Drawdown (ft)	Purge Rate (ml/min)	Temperature (deg c)	Specific Conductivity (us/cm)	Dissolved Oxygen (mg/l)	pH (su)	Oxidation-Reduction Potential (mV)	Turbidity (ntu)
14:25	7.14	0.04	150	10 +	332 +	3.7	5.9	129	<5
14:30	7.14	0.04	150	10 +	336 +	3.6	5.9	132	<5
14:35	7.14	0.04	150	10 +	335 +	3.4	5.9	132	<5

Notes:

1) Abbreviations include: "deg c" indicates degrees Celsius; "ft" indicates feet; "ft bmp" indicates feet below reference measuring point; "gal" indicates gallons; "in" indicates inches; "mg/l" indicates milligrams per liter; "ml/min" indicates milliliters per minute; "mV" indicates millivolts; "NA" indicates not applicable; "NR" indicates not recorded; "ntu" indicates Nephelometric Turbidity units; "su" indicates standard units; "us/cm" indicates microsiemens per centimeter; and "+" indicates the parameter(s) may be used for stabilization calculations but cannot be used for other purposes.
2) Weather temperature units are in degrees Fahrenheit, unless otherwise noted.
3) Did indicator parameters reach stabilization? Yes
4) Was the two hour time limit reached? No
5) Calculations:
   - Head Above Pump Intake (ft) 5.50
   - Total Drawdown (ft) 0.04
   - Calculated Final Purge Volume (gal) NA
6) If Drawdown Did Not Stabilize or Stabilized Drawdown >0.3 ft, is Total Purge Volume > Calculated Final Purge Volume? NA

R&W/GZA
Print Date: 6/23/2025

Well Sampling Worksheet
WWW RAP Field Data
PERIMETER 2024-Q1 - HS-PMW-RI-101B
Kent County, MI

Well	HS-PMW-RI-101B / 2 in Diameter PVC
Sample Quarter	2024-Q1
Date	02/07/2024
Weather	Cloudy 30s
Sampler Initials	NCK
Purging Device	Bladder-Pump: NA, Peristaltic-Pump: PER-3, Centrifugal-Pump: NA
Meters Used	YSI: Agile Rental 3, Turbidimeter: Agile Rental 3, Water-Level-Meter: WLM-2
Reference Measuring Point	PVC
Well Screen (ft bmp)	79.8 - 84.8
Measured Bottom Depth (ft bmp)	NR
Sample Comment	YSI connected after 14:20 readings. Collected Field Blank at 15:10.
Initial Water Level Date/Time	02/07/2024 13:30
Initial Water Level Depth (ft bmp)	8.05
Pump/Tubing Intake Depth (ft bmp)	82.3
Tubing Length (ft)	85
Tubing Inner Diameter (in)	0.17
Purging Initiation Date/Time	02/07/2024 13:40
Total Purge Volume (gal)	0.92
Modified Sample	No
If Modified, Reasoning	
Sample Collection Information	Bottling-Start: 02/07/2024 14:50:00, Bottling-Stop: 02/07/2024 15:00:00, Parameters-Sampled: PFAS

Reading Time	Depth To Water (ft)	Cumulative Drawdown (ft)	Purge Rate (ml/min)	Temperature (deg c)	Specific Conductivity (us/cm)	Dissolved Oxygen (mg/l)	pH (su)	Oxidation-Reduction Potential (mV)	Turbidity (ntu)
14:00	8.30	0.25	50	NR	NR	NR	NR	NR	NR
14:20	8.31	0.26	50	NR	NR	NR	NR	NR	NR
14:30	8.32	0.27	50	12 +	818 +	0.6	10.3	5	<5
14:35	8.32	0.27	50	12 +	819 +	0.6	10.3	2	<5
14:40	8.32	0.27	50	12 +	819 +	<0.5	10.3	-4	<5
14:45	8.32	0.27	50	12 +	822 +	<0.5	10.3	-9	<5
14:50	8.32	0.27	50	12 +	822 +	<0.5	10.3	-13	<5

Notes:

1) Abbreviations include: "deg c" indicates degrees Celsius; "ft" indicates feet; "ft bmp" indicates feet below reference measuring point; "gal" indicates gallons; "in" indicates inches; "mg/l" indicates milligrams per liter; "ml/min" indicates milliliters per minute; "mV" indicates millivolts; "NA" indicates not applicable; "NR" indicates not recorded; "ntu" indicates Nephelometric Turbidity units; "su" indicates standard units; "us/cm" indicates microsiemens per centimeter; and "+" indicates the parameter(s) may be used for stabilization calculations but cannot be used for other purposes.
2) Weather temperature units are in degrees Fahrenheit, unless otherwise noted.
3) Did indicator parameters reach stabilization? Yes
4) Was the two hour time limit reached? No
5) Calculations:
   - Head Above Pump Intake (ft) 74.25
   - Total Drawdown (ft) 0.27
   - Calculated Final Purge Volume (gal) NA
6) If Drawdown Did Not Stabilize or Stabilized Drawdown >0.3 ft, is Total Purge Volume > Calculated Final Purge Volume? NA

Well Sampling Worksheet
WWW RAP Field Data
PERIMETER 2024-Q1 - HS-PMW-RI-102A
Kent County, MI

Well	HS-PMW-RI-102A / 2 in Diameter PVC
Sample Quarter	2024-Q1
Date	02/08/2024
Weather	Sunny 50
Sampler Initials	NCK
Purging Device	Bladder-Pump: NA, Peristaltic-Pump: NA, Centrifugal-Pump: Mega Monsoon #1
Meters Used	YSI: Agile Rental 3, Turbidimeter: Agile Rental 3, Water-Level-Meter: WLM-4
Reference Measuring Point	PVC
Well Screen (ft bmp)	47.5 - 52.5
Measured Bottom Depth (ft bmp)	NR
Sample Comment	YSI connected after 14:15 readings. Collected MS/MSD.
Initial Water Level Date/Time	02/08/2024 13:45
Initial Water Level Depth (ft bmp)	43.98
Pump/Tubing Intake Depth (ft bmp)	50
Tubing Length (ft)	53
Tubing Inner Diameter (in)	0.17
Purging Initiation Date/Time	02/08/2024 13:50
Total Purge Volume (gal)	7.5
Modified Sample	No
If Modified, Reasoning	
Sample Collection Information	Bottling-Start: 02/08/2024 14:45:00, Bottling-Stop: 02/08/2024 14:55:00, Parameters-Sampled: PFAS

Reading Time	Depth To Water (ft)	Cumulative Drawdown (ft)	Purge Rate (ml/min)	Temperature (deg c)	Specific Conductivity (us/cm)	Dissolved Oxygen (mg/l)	pH (su)	Oxidation-Reduction Potential (mV)	Turbidity (ntu)
14:00	44.06	0.08	500	NR	NR	NR	NR	NR	NR
14:15	44.06	0.08	500	NR	NR	NR	NR	NR	NR
14:30	44.06	0.08	500	15 +	530 +	9.1	7.4	157	<5
14:35	44.06	0.08	500	15 +	525 +	8.7	7.4	159	<5
14:40	44.06	0.08	500	15 +	516 +	8.8	7.4	163	<5

Notes:

1) Abbreviations include: "deg c" indicates degrees Celsius; "ft" indicates feet; "ft bmp" indicates feet below reference measuring point; "gal" indicates gallons; "in" indicates inches; "mg/l" indicates milligrams per liter; "ml/min" indicates milliliters per minute; "mV" indicates millivolts; "NA" indicates not applicable; "NR" indicates not recorded; "ntu" indicates Nephelometric Turbidity units; "su" indicates standard units; "us/cm" indicates microsiemens per centimeter; and "+" indicates the parameter(s) may be used for stabilization calculations but cannot be used for other purposes.
2) Weather temperature units are in degrees Fahrenheit, unless otherwise noted.
3) Did indicator parameters reach stabilization? Yes
4) Was the two hour time limit reached? No
5) Calculations:
   - Head Above Pump Intake (ft) 6.02
   - Total Drawdown (ft) 0.08
   - Calculated Final Purge Volume (gal) NA
6) If Drawdown Did Not Stabilize or Stabilized Drawdown >0.3 ft, is Total Purge Volume > Calculated Final Purge Volume? NA

Well Sampling Worksheet
WWW RAP Field Data
PERIMETER 2024-Q1 - HS-PMW-RI-102B
Kent County, MI

Well	HS-PMW-RI-102B / 2 in Diameter PVC
Sample Quarter	2024-Q1
Date	02/08/2024
Weather	Sunny, 50s-60s
Sampler Initials	CBM
Purging Device	Bladder-Pump: NA, Peristaltic-Pump: NA, Centrifugal-Pump: Mega Monsoon #2
Meters Used	YSI: Agile Rental 1, Turbidimeter: Agile Rental 1, Water-Level-Meter: WLM-2
Reference Measuring Point	PVC
Well Screen (ft bmp)	101.5 - 106.5
Measured Bottom Depth (ft bmp)	106.5
Sample Comment	Collected MS/MSD
Initial Water Level Date/Time	02/08/2024 13:35
Initial Water Level Depth (ft bmp)	43.78
Pump/Tubing Intake Depth (ft bmp)	104
Tubing Length (ft)	107
Tubing Inner Diameter (in)	0.17
Purging Initiation Date/Time	02/08/2024 13:40
Total Purge Volume (gal)	6.8
Modified Sample	No
If Modified, Reasoning	
Sample Collection Information	Bottling-Start: 02/08/2024 14:45:00, Bottling-Stop: 02/08/2024 14:50:00, Parameters-Sampled: PFAS

Reading Time	Depth To Water (ft)	Cumulative Drawdown (ft)	Purge Rate (ml/min)	Temperature (deg c)	Specific Conductivity (us/cm)	Dissolved Oxygen (mg/l)	pH (su)	Oxidation-Reduction Potential (mV)	Turbidity (ntu)
14:20	43.79	0.01	400	11	623 +	0.5	7.3	67	11
14:30	43.79	0.01	400	11	622 +	0.5	7.4	64	7
14:35	43.79	0.01	400	11	621 +	0.5	7.4	63	6
14:40	43.79	0.01	400	11	622 +	0.5	7.4	63	6

Notes:

1) Abbreviations include: "deg c" indicates degrees Celsius; "ft" indicates feet; "ft bmp" indicates feet below reference measuring point; "gal" indicates gallons; "in" indicates inches; "mg/l" indicates milligrams per liter; "ml/min" indicates milliliters per minute; "mV" indicates millivolts; "NA" indicates not applicable; "NR" indicates not recorded; "ntu" indicates Nephelometric Turbidity units; "su" indicates standard units; "us/cm" indicates microsiemens per centimeter; and "+" indicates the parameter(s) may be used for stabilization calculations but cannot be used for other purposes.
2) Weather temperature units are in degrees Fahrenheit, unless otherwise noted.
3) Did indicator parameters reach stabilization? Yes
4) Was the two hour time limit reached? No
5) Calculations:
   - Head Above Pump Intake (ft): 60.22
   - Total Drawdown (ft): 0.01
   - Calculated Final Purge Volume (gal): NA
6) If Drawdown Did Not Stabilize or Stabilized Drawdown >0.3 ft, is Total Purge Volume > Calculated Final Purge Volume? NA

Well Sampling Worksheet
WWW RAP Field Data
PERIMETER 2024-Q1 - HS-PMW-RI-102C
Kent County, MI

Well	HS-PMW-RI-102C / 2 in Diameter PVC
Sample Quarter	2024-Q1
Date	02/08/2024
Weather	Partly sunny, 50's.
Sampler Initials	CBM
Purging Device	Bladder-Pump: NA, Peristaltic-Pump: NA, Centrifugal-Pump: Mega Monsoon #1
Meters Used	YSI: Agile Rental 1, Turbidimeter: Agile Rental 1, Water-Level-Meter: WLM-2
Reference Measuring Point	PVC
Well Screen (ft bmp)	136.5 - 141.5
Measured Bottom Depth (ft bmp)	141.5
Sample Comment	Collected Duplicate sample.
Initial Water Level Date/Time	02/08/2024 10:50
Initial Water Level Depth (ft bmp)	42.82
Pump/Tubing Intake Depth (ft bmp)	139
Tubing Length (ft)	143
Tubing Inner Diameter (in)	0.17
Purging Initiation Date/Time	02/08/2024 10:55
Total Purge Volume (gal)	4
Modified Sample	No
If Modified, Reasoning	
Sample Collection Information	Bottling-Start: 02/08/2024 12:10:00, Bottling-Stop: 02/08/2024 12:15:00, Parameters-Sampled: PFAS

Reading Time	Depth To Water (ft)	Cumulative Drawdown (ft)	Purge Rate (ml/min)	Temperature (deg c)	Specific Conductivity (us/cm)	Dissolved Oxygen (mg/l)	pH (su)	Oxidation-Reduction Potential (mV)	Turbidity (ntu)
11:40	42.84	0.02	200	11	476 +	<0.5	7.5	-103	26
11:50	42.84	0.02	200	11	475 +	<0.5	7.5	-105	18
11:55	42.84	0.02	200	11	476 +	<0.5	7.5	-106	16
12:00	42.84	0.02	200	11	476 +	<0.5	7.5	-106	15
12:05	42.84	0.02	200	11	475 +	<0.5	7.5	-108	14

Notes:

1) Abbreviations include: "deg c" indicates degrees Celsius; "ft" indicates feet; "ft bmp" indicates feet below reference measuring point; "gal" indicates gallons; "in" indicates inches; "mg/l" indicates milligrams per liter; "ml/min" indicates milliliters per minute; "mV" indicates millivolts; "NA" indicates not applicable; "NR" indicates not recorded; "ntu" indicates Nephelometric Turbidity units; "su" indicates standard units; "us/cm" indicates microsiemens per centimeter; and "+" indicates the parameter(s) may be used for stabilization calculations but cannot be used for other purposes.
2) Weather temperature units are in degrees Fahrenheit, unless otherwise noted.
3) Did indicator parameters reach stabilization? Yes
4) Was the two hour time limit reached? No
5) Calculations:
   - Head Above Pump Intake (ft) 96.18
   - Total Drawdown (ft) 0.02
   - Calculated Final Purge Volume (gal) NA
6) If Drawdown Did Not Stabilize or Stabilized Drawdown >0.3 ft, is Total Purge Volume > Calculated Final Purge Volume? NA

Well Sampling Worksheet
WWW RAP Field Data
PERIMETER 2024-Q1 - HS-PMW-RI-102D
Kent County, MI

Well	HS-PMW-RI-102D / 2 in Diameter PVC
Sample Quarter	2024-Q1
Date	02/08/2024
Weather	Sunny 50
Sampler Initials	NCK
Purging Device	Bladder-Pump: BP-12, Peristaltic-Pump: NA, Centrifugal-Pump: NA
Meters Used	YSI: Agile Rental 3, Turbidimeter: Agile Rental 3, Water-Level-Meter: WLM-4
Reference Measuring Point	PVC
Well Screen (ft bmp)	176.5 - 181.5
Measured Bottom Depth (ft bmp)	NR
Sample Comment	YSI connected after 11:20 readings. Collected Duplicate sample.
Initial Water Level Date/Time	02/08/2024 10:40
Initial Water Level Depth (ft bmp)	43.84
Pump/Tubing Intake Depth (ft bmp)	179
Tubing Length (ft)	183
Tubing Inner Diameter (in)	0.25
Purging Initiation Date/Time	02/08/2024 10:50
Total Purge Volume (gal)	7
Modified Sample	No
If Modified, Reasoning	
Sample Collection Information	Bottling-Start: 02/08/2024 12:20:00, Bottling-Stop: 02/08/2024 12:30:00, Parameters-Sampled: PFAS

Reading Time	Depth To Water (ft)	Cumulative Drawdown (ft)	Purge Rate (ml/min)	Temperature (deg c)	Specific Conductivity (us/cm)	Dissolved Oxygen (mg/l)	pH (su)	Oxidation-Reduction Potential (mV)	Turbidity (ntu)
11:00	43.93	0.09	300	NR	NR	NR	NR	NR	NR
11:20	43.93	0.09	300	NR	NR	NR	NR	NR	NR
11:50	43.93	0.09	300	11 +	691 +	<0.5	7.6	-90	30
12:10	43.93	0.09	300	11 +	697 +	<0.5	7.6	-104	12
12:15	43.93	0.09	300	11 +	697 +	<0.5	7.6	-104	12
12:20	43.93	0.09	300	11 +	695 +	<0.5	7.6	-99	13

Notes:

1) Abbreviations include: "deg c" indicates degrees Celsius; "ft" indicates feet; "ft bmp" indicates feet below reference measuring point; "gal" indicates gallons; "in" indicates inches; "mg/l" indicates milligrams per liter; "ml/min" indicates milliliters per minute; "mV" indicates millivolts; "NA" indicates not applicable; "NR" indicates not recorded; "ntu" indicates Nephelometric Turbidity units; "su" indicates standard units; "us/cm" indicates microsiemens per centimeter; and "+" indicates the parameter(s) may be used for stabilization calculations but cannot be used for other purposes.
2) Weather temperature units are in degrees Fahrenheit, unless otherwise noted.
3) Did indicator parameters reach stabilization? Yes
4) Was the two hour time limit reached? No
5) Calculations:
   - Head Above Pump Intake (ft) 135.16
   - Total Drawdown (ft) 0.09
   - Calculated Final Purge Volume (gal) NA
6) If Drawdown Did Not Stabilize or Stabilized Drawdown >0.3 ft, is Total Purge Volume > Calculated Final Purge Volume? NA

Well Sampling Worksheet
WWW RAP Field Data
AREA 5 2024-Q1 - HS-PMW-RI-103A
Kent County, MI

Well	HS-PMW-RI-103A / 2 in Diameter PVC
Sample Quarter	2024-Q1
Date	02/15/2024
Weather	Cloudy, 35°F
Sampler Initials	NCK
Purging Device	Bladder-Pump: NA, Peristaltic-Pump: NA, Centrifugal-Pump: Mega Monsoon #2
Meters Used	YSI: Agile Rental 3, Turbidimeter: Agile Rental 3, Water-Level-Meter: WLM-3
Reference Measuring Point	PVC
Well Screen (ft bmp)	89.6 - 94.6
Measured Bottom Depth (ft bmp)	NR
Sample Comment	YSI Connected at 13:35.
Initial Water Level Date/Time	02/15/2024 12:30
Initial Water Level Depth (ft bmp)	75.38
Pump/Tubing Intake Depth (ft bmp)	92.1
Tubing Length (ft)	95
Tubing Inner Diameter (in)	0.17
Purging Initiation Date/Time	02/15/2024 12:40
Total Purge Volume (gal)	8.5
Modified Sample	No
If Modified, Reasoning	
Sample Collection Information	Bottling-Start: 02/15/2024 13:45:00, Bottling-Stop: 02/15/2024 13:50:00, Parameters-Sampled: PFAS

Reading Time	Depth To Water (ft)	Cumulative Drawdown (ft)	Purge Rate (ml/min)	Temperature (deg c)	Specific Conductivity (us/cm)	Dissolved Oxygen (mg/l)	pH (su)	Oxidation-Reduction Potential (mV)	Turbidity (ntu)
12:50	75.41	0.03	500	NR	NR	NR	NR	NR	NR
13:10	75.41	0.03	500	NR	NR	NR	NR	NR	NR
13:20	75.41	0.03	500	NR	NR	NR	NR	NR	NR
13:35	75.41	0.03	500	12	711 +	1.4	7.5	138	<5
13:40	75.41	0.03	500	12	711 +	1.3	7.5	137	<5
13:45	75.41	0.03	500	12	710 +	1.4	7.5	136	<5

Notes:

1) Abbreviations include: "deg c" indicates degrees Celsius; "ft" indicates feet; "ft bmp" indicates feet below reference measuring point; "gal" indicates gallons; "in" indicates inches; "mg/l" indicates milligrams per liter; "ml/min" indicates milliliters per minute; "mV" indicates millivolts; "NA" indicates not applicable; "NR" indicates not recorded; "ntu" indicates Nephelometric Turbidity units; "su" indicates standard units; "us/cm" indicates microsiemens per centimeter; and "+" indicates the parameter(s) may be used for stabilization calculations but cannot be used for other purposes.
2) Weather temperature units are in degrees Fahrenheit, unless otherwise noted.
3) Did indicator parameters reach stabilization? Yes
4) Was the two hour time limit reached? No
5) Calculations:
   - Head Above Pump Intake (ft): 16.72
   - Total Drawdown (ft): 0.03
   - Calculated Final Purge Volume (gal): NA
6) If Drawdown Did Not Stabilize or Stabilized Drawdown >0.3 ft, is Total Purge Volume > Calculated Final Purge Volume? NA

Well Sampling Worksheet
WWW RAP Field Data
AREA 5 2024-Q1 - HS-PMW-RI-103B
Kent County, MI

Well	HS-PMW-RI-103B / 2 in Diameter PVC
Sample Quarter	2024-Q1
Date	02/15/2024
Weather	Cloudy, 36°F
Sampler Initials	JMS
Purging Device	Bladder-Pump: NA, Peristaltic-Pump: NA, Centrifugal-Pump: Mega Monsoon #1
Meters Used	YSI: Agile Rental 2, Turbidimeter: Agile Rental 2, Water-Level-Meter: WLM-2
Reference Measuring Point	PVC
Well Screen (ft bmp)	108.7 - 113.7
Measured Bottom Depth (ft bmp)	NR
Sample Comment	
Initial Water Level Date/Time	02/15/2024 12:40
Initial Water Level Depth (ft bmp)	76.91
Pump/Tubing Intake Depth (ft bmp)	111.20
Tubing Length (ft)	116.2
Tubing Inner Diameter (in)	0.17
Purging Initiation Date/Time	02/15/2024 12:45
Total Purge Volume (gal)	3
Modified Sample	No
If Modified, Reasoning	
Sample Collection Information	Bottling-Start: 02/15/2024 14:50:00, Bottling-Stop: 02/15/2024 14:55:00, Parameters-Sampled: PFAS

Reading Time	Depth To Water (ft)	Cumulative Drawdown (ft)	Purge Rate (ml/min)	Temperature (deg c)	Specific Conductivity (us/cm)	Dissolved Oxygen (mg/l)	pH (su)	Oxidation-Reduction Potential (mV)	Turbidity (ntu)
14:35	77.00	0.09	100	9	781 +	<0.5	7.4	-32	25
14:40	77.00	0.09	100	9	781 +	<0.5	7.4	-34	20
14:45	77.00	0.09	100	9	779 +	<0.5	7.4	-38	18

Notes:

1) Abbreviations include: "deg c" indicates degrees Celsius; "ft" indicates feet; "ft bmp" indicates feet below reference measuring point; "gal" indicates gallons; "in" indicates inches; "mg/l" indicates milligrams per liter; "ml/min" indicates milliliters per minute; "mV" indicates millivolts; "NA" indicates not applicable; "NR" indicates not recorded; "ntu" indicates Nephelometric Turbidity units; "su" indicates standard units; "us/cm" indicates microsiemens per centimeter; and "+" indicates the parameter(s) may be used for stabilization calculations but cannot be used for other purposes.
2) Weather temperature units are in degrees Fahrenheit, unless otherwise noted.
3) Did indicator parameters reach stabilization? No
4) Was the two hour time limit reached? Yes
5) Calculations:
   - Head Above Pump Intake (ft) 34.29
   - Total Drawdown (ft) 0.09
   - Calculated Final Purge Volume (gal) NA
6) If Drawdown Did Not Stabilize or Stabilized Drawdown >0.3 ft, is Total Purge Volume > Calculated Final Purge Volume? NA

Well Sampling Worksheet
WWW RAP Field Data
AREA 5 2024-Q1 - HS-PMW-RI-104A
Kent County, MI

Well	HS-PMW-RI-104A / 2 in Diameter PVC
Sample Quarter	2024-Q1
Date	01/17/2024
Weather	Snow, 19°F
Sampler Initials	JMS
Purging Device	Bladder-Pump: NA, Peristaltic-Pump: PER-3, Centrifugal-Pump: NA
Meters Used	YSI: Agile Rental 2, Turbidimeter: Agile Rental 2, Water-Level-Meter: WLM-2
Reference Measuring Point	PVC
Well Screen (ft bmp)	14.6 - 19.6
Measured Bottom Depth (ft bmp)	NR
Sample Comment	
Initial Water Level Date/Time	01/17/2024 14:30
Initial Water Level Depth (ft bmp)	14.10
Pump/Tubing Intake Depth (ft bmp)	17.1
Tubing Length (ft)	22.1
Tubing Inner Diameter (in)	0.17
Purging Initiation Date/Time	01/17/2024 14:35
Total Purge Volume (gal)	2
Modified Sample	No
If Modified, Reasoning	
Sample Collection Information	Bottling-Start: 01/17/2024 15:20:00, Bottling-Stop: 01/17/2024 15:25:00, Parameters-Sampled: PFAS

Reading Time	Depth To Water (ft)	Cumulative Drawdown (ft)	Purge Rate (ml/min)	Temperature (deg c)	Specific Conductivity (us/cm)	Dissolved Oxygen (mg/l)	pH (su)	Oxidation-Reduction Potential (mV)	Turbidity (ntu)
15:00	14.10	0.00	250	8	833 +	7.9	7.1	339	<5
15:05	14.10	0.00	250	8	879 +	7.2	7.1	342	<5
15:10	14.10	0.00	250	8	903 +	7.0	7.1	336	<5
15:15	14.10	0.00	250	8	917 +	7.0	7.2	335	<5

Notes:

1) Abbreviations include: "deg c" indicates degrees Celsius; "ft" indicates feet; "ft bmp" indicates feet below reference measuring point; "gal" indicates gallons; "in" indicates inches; "mg/l" indicates milligrams per liter; "ml/min" indicates milliliters per minute; "mV" indicates millivolts; "NA" indicates not applicable; "NR" indicates not recorded; "ntu" indicates Nephelometric Turbidity units; "su" indicates standard units; "us/cm" indicates microsiemens per centimeter; and "+" indicates the parameter(s) may be used for stabilization calculations but cannot be used for other purposes.
2) Weather temperature units are in degrees Fahrenheit, unless otherwise noted.
3) Did indicator parameters reach stabilization? Yes
4) Was the two hour time limit reached? No
5) Calculations:
   - Head Above Pump Intake (ft) 3.00
   - Total Drawdown (ft) 0.00
   - Calculated Final Purge Volume (gal) NA
6) If Drawdown Did Not Stabilize or Stabilized Drawdown >0.3 ft, is Total Purge Volume > Calculated Final Purge Volume? NA

Well Sampling Worksheet
WWW RAP Field Data
AREA 5 2024-Q1 - HS-PMW-RI-104B
Kent County, MI

Well	HS-PMW-RI-104B / 2 in Diameter PVC
Sample Quarter	2024-Q1
Date	01/17/2024
Weather	Snowy, Windy, 16°F
Sampler Initials	RCP
Purging Device	Bladder-Pump: NA, Peristaltic-Pump: Rental, Centrifugal-Pump: NA
Meters Used	YSI: Agile Rental 3, Turbidimeter: Agile Rental 3, Water-Level-Meter: WLM-4
Reference Measuring Point	PVC
Well Screen (ft bmp)	45.4 - 50.4
Measured Bottom Depth (ft bmp)	50.4
Sample Comment	YSI Connected at 15:05.
Initial Water Level Date/Time	01/17/2024 14:50
Initial Water Level Depth (ft bmp)	14.22
Pump/Tubing Intake Depth (ft bmp)	47.8
Tubing Length (ft)	49
Tubing Inner Diameter (in)	0.17
Purging Initiation Date/Time	01/17/2024 14:55
Total Purge Volume (gal)	2.5
Modified Sample	No
If Modified, Reasoning	
Sample Collection Information	Bottling-Start: 01/17/2024 15:45:00, Bottling-Stop: 01/17/2024 15:50:00, Parameters-Sampled: PFAS

Reading Time	Depth To Water (ft)	Cumulative Drawdown (ft)	Purge Rate (ml/min)	Temperature (deg c)	Specific Conductivity (us/cm)	Dissolved Oxygen (mg/l)	pH (su)	Oxidation-Reduction Potential (mV)	Turbidity (ntu)
15:05	14.22	0.00	200	NR	NR	NR	NR	NR	<5
15:20	14.22	0.00	200	12	879 +	0.9	7.5	222	<5
15:25	14.22	0.00	200	11	848 +	0.8	7.5	220	<5
15:30	14.22	0.00	200	11	792 +	0.5	7.5	218	<5
15:35	14.22	0.00	200	12	787 +	0.5	7.5	217	<5
15:40	14.22	0.00	200	12	798 +	0.5	7.5	215	<5

Notes:

1) Abbreviations include: "deg c" indicates degrees Celsius; "ft" indicates feet; "ft bmp" indicates feet below reference measuring point; "gal" indicates gallons; "in" indicates inches; "mg/l" indicates milligrams per liter; "ml/min" indicates milliliters per minute; "mV" indicates millivolts; "NA" indicates not applicable; "NR" indicates not recorded; "ntu" indicates Nephelometric Turbidity units; "su" indicates standard units; "us/cm" indicates microsiemens per centimeter; and "+" indicates the parameter(s) may be used for stabilization calculations but cannot be used for other purposes.
2) Weather temperature units are in degrees Fahrenheit, unless otherwise noted.
3) Did indicator parameters reach stabilization? Yes
4) Was the two hour time limit reached? No
5) Calculations:
   - Head Above Pump Intake (ft) 33.58
   - Total Drawdown (ft) 0.00
   - Calculated Final Purge Volume (gal) NA
6) If Drawdown Did Not Stabilize or Stabilized Drawdown >0.3 ft, is Total Purge Volume > Calculated Final Purge Volume? NA

Well Sampling Worksheet
WWW RAP Field Data
AREA 5 2024-Q1 - HS-PMW-RI-104C
Kent County, MI

Well	HS-PMW-RI-104C / 2 in Diameter PVC
Sample Quarter	2024-Q1
Date	01/17/2024
Weather	Snow, 17°F
Sampler Initials	CBM
Purging Device	Bladder-Pump: NA, Peristaltic-Pump: PER-1, Centrifugal-Pump: NA
Meters Used	YSI: Agile Rental 1, Turbidimeter: Agile Rental 1, Water-Level-Meter: WLM-3
Reference Measuring Point	PVC
Well Screen (ft bmp)	74.3 - 79.3
Measured Bottom Depth (ft bmp)	79.3
Sample Comment	15:25 - ORP dropping quickly. 15:55 - Collected duplicate and MS/MSD.
Initial Water Level Date/Time	01/17/2024 14:30
Initial Water Level Depth (ft bmp)	14.23
Pump/Tubing Intake Depth (ft bmp)	76.8
Tubing Length (ft)	78
Tubing Inner Diameter (in)	0.17
Purging Initiation Date/Time	01/17/2024 14:40
Total Purge Volume (gal)	3.5
Modified Sample	No
If Modified, Reasoning	
Sample Collection Information	Bottling-Start: 01/17/2024 15:55:00, Bottling-Stop: 01/17/2024 16:10:00, Parameters-Sampled: PFAS

Reading Time	Depth To Water (ft)	Cumulative Drawdown (ft)	Purge Rate (ml/min)	Temperature (deg c)	Specific Conductivity (us/cm)	Dissolved Oxygen (mg/l)	pH (su)	Oxidation-Reduction Potential (mV)	Turbidity (ntu)
15:15	14.23	0.00	175	10	823 +	1.8	7.3	14	<5
15:20	14.23	0.00	175	10	822 +	1.6	7.3	-5	<5
15:25	14.23	0.00	175	10	821 +	1.7	7.4	-20	<5
15:40	14.23	0.00	175	10	822 +	1.4	7.4	-45	<5
15:45	14.23	0.00	175	10	821 +	1.4	7.4	-49	<5
15:50	14.23	0.00	175	10	822 +	1.5	7.4	-52	<5

Notes:

1) Abbreviations include: "deg c" indicates degrees Celsius; "ft" indicates feet; "ft bmp" indicates feet below reference measuring point; "gal" indicates gallons; "in" indicates inches; "mg/l" indicates milligrams per liter; "ml/min" indicates milliliters per minute; "mV" indicates millivolts; "NA" indicates not applicable; "NR" indicates not recorded; "ntu" indicates Nephelometric Turbidity units; "su" indicates standard units; "us/cm" indicates microsiemens per centimeter; and "+" indicates the parameter(s) may be used for stabilization calculations but cannot be used for other purposes.
2) Weather temperature units are in degrees Fahrenheit, unless otherwise noted.
3) Did indicator parameters reach stabilization? Yes
4) Was the two hour time limit reached? No
5) Calculations:
   - Head Above Pump Intake (ft) 62.57
   - Total Drawdown (ft) 0.00
   - Calculated Final Purge Volume (gal) NA
6) If Drawdown Did Not Stabilize or Stabilized Drawdown >0.3 ft, is Total Purge Volume > Calculated Final Purge Volume? NA

Well Sampling Worksheet
WWW RAP Field Data
AREA 5 2024-Q1 - HS-PMW-RI-104D
Kent County, MI

Well	HS-PMW-RI-104D / 2 in Diameter PVC
Sample Quarter	2024-Q1
Date	01/17/2024
Weather	Snow, 17°F
Sampler Initials	NCK
Purging Device	Bladder-Pump: NA, Peristaltic-Pump: NA, Centrifugal-Pump: Mega Monsoon #1
Meters Used	YSI: Agile Rental 4, Turbidimeter: Agile Rental 4, Water-Level-Meter: WLM-1
Reference Measuring Point	PVC
Well Screen (ft bmp)	111.4 - 116.4
Measured Bottom Depth (ft bmp)	NR
Sample Comment	YSI Connected at 15:30.
Initial Water Level Date/Time	01/17/2024 14:30
Initial Water Level Depth (ft bmp)	8.05
Pump/Tubing Intake Depth (ft bmp)	113.9
Tubing Length (ft)	118
Tubing Inner Diameter (in)	0.17
Purging Initiation Date/Time	01/17/2024 14:35
Total Purge Volume (gal)	9.5
Modified Sample	No
If Modified, Reasoning	
Sample Collection Information	Bottling-Start: 01/17/2024 15:50:00, Bottling-Stop: 01/17/2024 15:55:00, Parameters-Sampled: PFAS

Reading Time	Depth To Water (ft)	Cumulative Drawdown (ft)	Purge Rate (ml/min)	Temperature (deg c)	Specific Conductivity (us/cm)	Dissolved Oxygen (mg/l)	pH (su)	Oxidation-Reduction Potential (mV)	Turbidity (ntu)
14:40	8.13	0.08	450	NR	NR	NR	NR	NR	NR
14:50	8.13	0.08	450	NR	NR	NR	NR	NR	NR
15:00	8.13	0.08	450	NR	NR	NR	NR	NR	NR
15:30	8.13	0.08	450	NR	NR	NR	NR	NR	7
15:35	8.13	0.08	450	11	1,348 +	<0.5	7.2	-75	<5
15:40	8.13	0.08	450	11	1,348 +	<0.5	7.2	-79	<5
15:45	8.13	0.08	450	11	1,348 +	<0.5	7.2	-81	<5

Notes:

1) Abbreviations include: "deg c" indicates degrees Celsius; "ft" indicates feet; "ft bmp" indicates feet below reference measuring point; "gal" indicates gallons; "in" indicates inches; "mg/l" indicates milligrams per liter; "ml/min" indicates milliliters per minute; "mV" indicates millivolts; "NA" indicates not applicable; "NR" indicates not recorded; "ntu" indicates Nephelometric Turbidity units; "su" indicates standard units; "us/cm" indicates microsiemens per centimeter; and "+" indicates the parameter(s) may be used for stabilization calculations but cannot be used for other purposes.
2) Weather temperature units are in degrees Fahrenheit, unless otherwise noted.
3) Did indicator parameters reach stabilization? Yes
4) Was the two hour time limit reached? No
5) Calculations:
   - Head Above Pump Intake (ft): 105.85
   - Total Drawdown (ft): 0.08
   - Calculated Final Purge Volume (gal): NA
6) If Drawdown Did Not Stabilize or Stabilized Drawdown >0.3 ft, is Total Purge Volume > Calculated Final Purge Volume? NA

Well Sampling Worksheet
WWW RAP Field Data
PERIMETER 2024-Q1 - HS-PMW-RI-106A
Kent County, MI

Well	HS-PMW-RI-106A / 2 in Diameter PVC
Sample Quarter	2024-Q1
Date	02/09/2024
Weather	Sunny, 40's - 50's.
Sampler Initials	CBM
Purging Device	Bladder-Pump: NA, Peristaltic-Pump: NA, Centrifugal-Pump: Mega Monsoon #2
Meters Used	YSI: Agile Rental 3, Turbidimeter: Agile Rental 3, Water-Level-Meter: WLM-4
Reference Measuring Point	PVC
Well Screen (ft bmp)	44.7 - 49.7
Measured Bottom Depth (ft bmp)	49.7
Sample Comment	
Initial Water Level Date/Time	02/09/2024 10:35
Initial Water Level Depth (ft bmp)	37.11
Pump/Tubing Intake Depth (ft bmp)	47.2
Tubing Length (ft)	50
Tubing Inner Diameter (in)	0.17
Purging Initiation Date/Time	02/09/2024 10:40
Total Purge Volume (gal)	5.5
Modified Sample	No
If Modified, Reasoning	
Sample Collection Information	Bottling-Start: 02/09/2024 11:50:00, Bottling-Stop: 02/09/2024 11:55:00, Parameters-Sampled: PFAS

Reading Time	Depth To Water (ft)	Cumulative Drawdown (ft)	Purge Rate (ml/min)	Temperature (deg c)	Specific Conductivity (us/cm)	Dissolved Oxygen (mg/l)	pH (su)	Oxidation-Reduction Potential (mV)	Turbidity (ntu)
11:35	37.11	0.00	300	12	683 +	<0.5	7.4	31	<5
11:40	37.11	0.00	300	12	684 +	<0.5	7.4	27	<5
11:45	37.11	0.00	300	12	685 +	<0.5	7.4	25	<5

Notes:

1) Abbreviations include: "deg c" indicates degrees Celsius; "ft" indicates feet; "ft bmp" indicates feet below reference measuring point; "gal" indicates gallons; "in" indicates inches; "mg/l" indicates milligrams per liter; "ml/min" indicates milliliters per minute; "mV" indicates millivolts; "NA" indicates not applicable; "NR" indicates not recorded; "ntu" indicates Nephelometric Turbidity units; "su" indicates standard units; "us/cm" indicates microsiemens per centimeter; and "+" indicates the parameter(s) may be used for stabilization calculations but cannot be used for other purposes.
2) Weather temperature units are in degrees Fahrenheit, unless otherwise noted.
3) Did indicator parameters reach stabilization? Yes
4) Was the two hour time limit reached? No
5) Calculations:
   - Head Above Pump Intake (ft) 10.09
   - Total Drawdown (ft) 0.00
   - Calculated Final Purge Volume (gal) NA
6) If Drawdown Did Not Stabilize or Stabilized Drawdown >0.3 ft, is Total Purge Volume > Calculated Final Purge Volume? NA

Well Sampling Worksheet
WWW RAP Field Data
PERIMETER 2024-Q1 - HS-PMW-RI-106B
Kent County, MI

Well	HS-PMW-RI-106B / 2 in Diameter PVC
Sample Quarter	2024-Q1
Date	02/09/2024
Weather	Sunny 50
Sampler Initials	NCK
Purging Device	Bladder-Pump: BP-10, Peristaltic-Pump: NA, Centrifugal-Pump: NA
Meters Used	YSI: Agile Rental 1, Turbidimeter: Agile Rental 1, Water-Level-Meter: WLM-2
Reference Measuring Point	PVC
Well Screen (ft bmp)	204.7 - 209.7
Measured Bottom Depth (ft bmp)	NR
Sample Comment	11:00 - Purge water observed to be very turbid. 11:30 - Purge water observed to be very turbid. YSI connected after 11:30 readings.
Initial Water Level Date/Time	02/09/2024 10:45
Initial Water Level Depth (ft bmp)	37.30
Pump/Tubing Intake Depth (ft bmp)	207.2
Tubing Length (ft)	210
Tubing Inner Diameter (in)	0.25
Purging Initiation Date/Time	02/09/2024 10:50
Total Purge Volume (gal)	13.5
Modified Sample	No
If Modified, Reasoning	
Sample Collection Information	Bottling-Start: 02/09/2024 12:25:00, Bottling-Stop: 02/09/2024 12:30:00, Parameters-Sampled: PFAS

Reading Time	Depth To Water (ft)	Cumulative Drawdown (ft)	Purge Rate (ml/min)	Temperature (deg c)	Specific Conductivity (us/cm)	Dissolved Oxygen (mg/l)	pH (su)	Oxidation-Reduction Potential (mV)	Turbidity (ntu)
11:00	37.32	0.02	400	NR	NR	NR	NR	NR	NR
11:30	37.32	0.02	400	NR	NR	NR	NR	NR	NR
12:00	37.32	0.02	400	10	2,265 +	<0.5	7.1	95	200
12:05	37.32	0.02	400	10	2,265 +	<0.5	7.1	85	230
12:10	37.32	0.02	400	10	2,272 +	<0.5	7.1	78	220
12:15	37.32	0.02	400	10	2,272 +	<0.5	7.1	72	212
12:20	37.32	0.02	400	10	2,280 +	<0.5	7.1	69	208

Notes:

1) Abbreviations include: "deg c" indicates degrees Celsius; "ft" indicates feet; "ft bmp" indicates feet below reference measuring point; "gal" indicates gallons; "in" indicates inches; "mg/l" indicates milligrams per liter; "ml/min" indicates milliliters per minute; "mV" indicates millivolts; "NA" indicates not applicable; "NR" indicates not recorded; "ntu" indicates Nephelometric Turbidity units; "su" indicates standard units; "us/cm" indicates microsiemens per centimeter; and "+" indicates the parameter(s) may be used for stabilization calculations but cannot be used for other purposes.
2) Weather temperature units are in degrees Fahrenheit, unless otherwise noted.
3) Did indicator parameters reach stabilization? Yes
4) Was the two hour time limit reached? No
5) Calculations:
   - Head Above Pump Intake (ft) 169.90
   - Total Drawdown (ft) 0.02
   - Calculated Final Purge Volume (gal) NA
6) If Drawdown Did Not Stabilize or Stabilized Drawdown >0.3 ft, is Total Purge Volume > Calculated Final Purge Volume? NA

Well Sampling Worksheet
WWW RAP Field Data
AREA 5 2024-Q1 - HS-PMW-RI-107A
Kent County, MI

Well	HS-PMW-RI-107A / 2 in Diameter PVC
Sample Quarter	2024-Q1
Date	02/13/2024
Weather	Cloudy, 33°F
Sampler Initials	JMS
Purging Device	Bladder-Pump: NA, Peristaltic-Pump: NA, Centrifugal-Pump: Mega Monsoon #2
Meters Used	YSI: Agile Rental 3, Turbidimeter: Agile Rental 3, Water-Level-Meter: WLM-2
Reference Measuring Point	PVC
Well Screen (ft bmp)	79.2 - 84.2
Measured Bottom Depth (ft bmp)	NR
Sample Comment	YSI Connected at 10:25.
Initial Water Level Date/Time	02/13/2024 09:35
Initial Water Level Depth (ft bmp)	48.79
Pump/Tubing Intake Depth (ft bmp)	81.7
Tubing Length (ft)	86.7
Tubing Inner Diameter (in)	0.17
Purging Initiation Date/Time	02/13/2024 09:40
Total Purge Volume (gal)	7.5
Modified Sample	No
If Modified, Reasoning	
Sample Collection Information	Bottling-Start: 02/13/2024 10:40:00, Bottling-Stop: 02/13/2024 10:45:00, Parameters-Sampled: PFAS

Reading Time	Depth To Water (ft)	Cumulative Drawdown (ft)	Purge Rate (ml/min)	Temperature (deg c)	Specific Conductivity (us/cm)	Dissolved Oxygen (mg/l)	pH (su)	Oxidation-Reduction Potential (mV)	Turbidity (ntu)
09:55	48.81	0.02	500	NR	NR	NR	NR	NR	30
10:10	48.81	0.02	500	NR	NR	NR	NR	NR	11
10:25	48.81	0.02	500	11	643 +	<0.5	7.6	-33	5
10:30	48.81	0.02	500	11	642 +	<0.5	7.6	-35	5
10:35	48.81	0.02	500	11	640 +	<0.5	7.6	-39	5

Notes:

1) Abbreviations include: "deg c" indicates degrees Celsius; "ft" indicates feet; "ft bmp" indicates feet below reference measuring point; "gal" indicates gallons; "in" indicates inches; "mg/l" indicates milligrams per liter; "ml/min" indicates milliliters per minute; "mV" indicates millivolts; "NA" indicates not applicable; "NR" indicates not recorded; "ntu" indicates Nephelometric Turbidity units; "su" indicates standard units; "us/cm" indicates microsiemens per centimeter; and "+" indicates the parameter(s) may be used for stabilization calculations but cannot be used for other purposes.
2) Weather temperature units are in degrees Fahrenheit, unless otherwise noted.
3) Did indicator parameters reach stabilization? Yes
4) Was the two hour time limit reached? No
5) Calculations:
   - Head Above Pump Intake (ft) 32.91
   - Total Drawdown (ft) 0.02
   - Calculated Final Purge Volume (gal) NA
6) If Drawdown Did Not Stabilize or Stabilized Drawdown >0.3 ft, is Total Purge Volume > Calculated Final Purge Volume? NA

Well Sampling Worksheet
WWW RAP Field Data
AREA 5 2024-Q1 - HS-PMW-RI-107B
Kent County, MI

Well	HS-PMW-RI-107B / 2 in Diameter PVC
Sample Quarter	2024-Q1
Date	02/13/2024
Weather	Cloudy, 35°F
Sampler Initials	JMS
Purging Device	Bladder-Pump: BP-12, Peristaltic-Pump: NA, Centrifugal-Pump: NA
Meters Used	YSI: Agile Rental 3, Turbidimeter: Agile Rental 3, Water-Level-Meter: WLM-2
Reference Measuring Point	PVC
Well Screen (ft bmp)	175.2 - 180.2
Measured Bottom Depth (ft bmp)	NR
Sample Comment	YSI Connected at 12:20.
Initial Water Level Date/Time	02/13/2024 11:00
Initial Water Level Depth (ft bmp)	62.91
Pump/Tubing Intake Depth (ft bmp)	177.7
Tubing Length (ft)	182.7
Tubing Inner Diameter (in)	0.25
Purging Initiation Date/Time	02/13/2024 11:05
Total Purge Volume (gal)	4.5
Modified Sample	No
If Modified, Reasoning	
Sample Collection Information	Bottling-Start: 02/13/2024 12:35:00, Bottling-Stop: 02/13/2024 12:40:00, Parameters-Sampled: PFAS

Reading Time	Depth To Water (ft)	Cumulative Drawdown (ft)	Purge Rate (ml/min)	Temperature (deg c)	Specific Conductivity (us/cm)	Dissolved Oxygen (mg/l)	pH (su)	Oxidation-Reduction Potential (mV)	Turbidity (ntu)
11:40	62.97	0.06	200	NR	NR	NR	NR	NR	90
11:55	62.97	0.06	200	NR	NR	NR	NR	NR	25
12:20	62.97	0.06	200	9	1,164 +	2.5	7.2	22	11
12:25	62.97	0.06	200	9	1,168 +	2.3	7.2	26	10
12:30	62.97	0.06	200	9	1,167 +	2.2	7.2	28	11

Notes:

1) Abbreviations include: "deg c" indicates degrees Celsius; "ft" indicates feet; "ft bmp" indicates feet below reference measuring point; "gal" indicates gallons; "in" indicates inches; "mg/l" indicates milligrams per liter; "ml/min" indicates milliliters per minute; "mV" indicates millivolts; "NA" indicates not applicable; "NR" indicates not recorded; "ntu" indicates Nephelometric Turbidity units; "su" indicates standard units; "us/cm" indicates microsiemens per centimeter; and "+" indicates the parameter(s) may be used for stabilization calculations but cannot be used for other purposes.
2) Weather temperature units are in degrees Fahrenheit, unless otherwise noted.
3) Did indicator parameters reach stabilization? Yes
4) Was the two hour time limit reached? No
5) Calculations:
   - Head Above Pump Intake (ft) 114.79
   - Total Drawdown (ft) 0.06
   - Calculated Final Purge Volume (gal) NA
6) If Drawdown Did Not Stabilize or Stabilized Drawdown >0.3 ft, is Total Purge Volume > Calculated Final Purge Volume? NA

Well Sampling Worksheet
WWW RAP Field Data
AREA 5 2024-Q1 - HS-PMW-RI-107C
Kent County, MI

Well	HS-PMW-RI-107C / 2 in Diameter PVC
Sample Quarter	2024-Q1
Date	02/13/2024
Weather	Partly Cloudy, 30s°F
Sampler Initials	CBM
Purging Device	Bladder-Pump: BP-10, Peristaltic-Pump: NA, Centrifugal-Pump: NA
Meters Used	YSI: Agile Rental 1, Turbidimeter: Agile Rental 1, Water-Level-Meter: WLM-1
Reference Measuring Point	PVC
Well Screen (ft bmp)	184.7 - 189.7
Measured Bottom Depth (ft bmp)	189.7
Sample Comment	Collected MS/MSD
Initial Water Level Date/Time	02/13/2024 10:20
Initial Water Level Depth (ft bmp)	63.01
Pump/Tubing Intake Depth (ft bmp)	187.2
Tubing Length (ft)	190
Tubing Inner Diameter (in)	0.25
Purging Initiation Date/Time	02/13/2024 10:30
Total Purge Volume (gal)	4.75
Modified Sample	No
If Modified, Reasoning	
Sample Collection Information	Bottling-Start: 02/13/2024 11:30:00, Bottling-Stop: 02/13/2024 11:35:00, Parameters-Sampled: PFAS

Reading Time	Depth To Water (ft)	Cumulative Drawdown (ft)	Purge Rate (ml/min)	Temperature (deg c)	Specific Conductivity (us/cm)	Dissolved Oxygen (mg/l)	pH (su)	Oxidation-Reduction Potential (mV)	Turbidity (ntu)
11:10	63.04	0.03	300	9	1,223 +	0.6	7.2	115	26
11:15	63.05	0.04	300	9	1,230 +	0.6	7.2	119	<5
11:20	63.05	0.04	300	9	1,226 +	0.6	7.2	122	<5
11:25	63.05	0.04	300	9	1,229 +	0.6	7.2	124	<5

Notes:

1) Abbreviations include: "deg c" indicates degrees Celsius; "ft" indicates feet; "ft bmp" indicates feet below reference measuring point; "gal" indicates gallons; "in" indicates inches; "mg/l" indicates milligrams per liter; "ml/min" indicates milliliters per minute; "mV" indicates millivolts; "NA" indicates not applicable; "NR" indicates not recorded; "ntu" indicates Nephelometric Turbidity units; "su" indicates standard units; "us/cm" indicates microsiemens per centimeter; and "+" indicates the parameter(s) may be used for stabilization calculations but cannot be used for other purposes.
2) Weather temperature units are in degrees Fahrenheit, unless otherwise noted.
3) Did indicator parameters reach stabilization? Yes
4) Was the two hour time limit reached? No
5) Calculations:
   - Head Above Pump Intake (ft) 124.19
   - Total Drawdown (ft) 0.04
   - Calculated Final Purge Volume (gal) NA
6) If Drawdown Did Not Stabilize or Stabilized Drawdown >0.3 ft, is Total Purge Volume > Calculated Final Purge Volume? NA

Well Sampling Worksheet
WWW RAP Field Data
AREA 5 2024-Q1 - HS-PMW-RI-107D
Kent County, MI

Well	HS-PMW-RI-107D / 2 in Diameter PVC
Sample Quarter	2024-Q1
Date	02/13/2024
Weather	Clear, 35°F
Sampler Initials	NCK
Purging Device	Bladder-Pump: BP-12, Peristaltic-Pump: NA, Centrifugal-Pump: NA
Meters Used	YSI: Agile Rental 2, Turbidimeter: Agile Rental 2, Water-Level-Meter: WLM-4
Reference Measuring Point	PVC
Well Screen (ft bmp)	198.7 - 203.7
Measured Bottom Depth (ft bmp)	NR
Sample Comment	YSI Connected at 11:25.
Initial Water Level Date/Time	02/13/2024 10:00
Initial Water Level Depth (ft bmp)	63.49
Pump/Tubing Intake Depth (ft bmp)	201.2
Tubing Length (ft)	204
Tubing Inner Diameter (in)	0.25
Purging Initiation Date/Time	02/13/2024 10:10
Total Purge Volume (gal)	6.7
Modified Sample	No
If Modified, Reasoning	
Sample Collection Information	Bottling-Start: 02/13/2024 11:40:00, Bottling-Stop: 02/13/2024 11:45:00, Parameters-Sampled: PFAS

Reading Time	Depth To Water (ft)	Cumulative Drawdown (ft)	Purge Rate (ml/min)	Temperature (deg c)	Specific Conductivity (us/cm)	Dissolved Oxygen (mg/l)	pH (su)	Oxidation-Reduction Potential (mV)	Turbidity (ntu)
10:20	63.45	-0.04	300	NR	NR	NR	NR	NR	NR
10:40	63.39	-0.10	300	NR	NR	NR	NR	NR	NR
11:00	63.39	-0.10	300	NR	NR	NR	NR	NR	NR
11:25	63.39	-0.10	300	9	1,450 +	<0.5	7.1	-23	33
11:30	63.39	-0.10	300	9	1,451 +	<0.5	7.1	-22	34
11:35	63.39	-0.10	300	9	1,453 +	<0.5	7.1	-21	32

Notes:

1) Abbreviations include: "deg c" indicates degrees Celsius; "ft" indicates feet; "ft bmp" indicates feet below reference measuring point; "gal" indicates gallons; "in" indicates inches; "mg/l" indicates milligrams per liter; "ml/min" indicates milliliters per minute; "mV" indicates millivolts; "NA" indicates not applicable; "NR" indicates not recorded; "ntu" indicates Nephelometric Turbidity units; "su" indicates standard units; "us/cm" indicates microsiemens per centimeter; and "+" indicates the parameter(s) may be used for stabilization calculations but cannot be used for other purposes.
2) Weather temperature units are in degrees Fahrenheit, unless otherwise noted.
3) Did indicator parameters reach stabilization? Yes
4) Was the two hour time limit reached? No
5) Calculations:
   - Head Above Pump Intake (ft) 137.71
   - Total Drawdown (ft) -0.10
   - Calculated Final Purge Volume (gal) NA
6) If Drawdown Did Not Stabilize or Stabilized Drawdown >0.3 ft, is Total Purge Volume > Calculated Final Purge Volume? NA

Well Sampling Worksheet
WWW RAP Field Data
AREA 6 2024-Q1 - HS-PMW-RI-108A
Kent County, MI

Well	HS-PMW-RI-108A / 2 in Diameter PVC
Sample Quarter	2024-Q1
Date	02/13/2024
Weather	Cloudy, 36°F
Sampler Initials	JMS
Purging Device	Bladder-Pump: NA, Peristaltic-Pump: PER-3, Centrifugal-Pump: NA
Meters Used	YSI: Agile Rental 2, Turbidimeter: Agile Rental 2, Water-Level-Meter: WLM-1
Reference Measuring Point	PVC
Well Screen (ft bmp)	65.2 - 70.2
Measured Bottom Depth (ft bmp)	NR
Sample Comment	YSI Connected at 14:55.
Initial Water Level Date/Time	02/13/2024 14:00
Initial Water Level Depth (ft bmp)	16.98
Pump/Tubing Intake Depth (ft bmp)	67.7
Tubing Length (ft)	72.7
Tubing Inner Diameter (in)	0.17
Purging Initiation Date/Time	02/13/2024 14:05
Total Purge Volume (gal)	1.5
Modified Sample	No
If Modified, Reasoning	
Sample Collection Information	Bottling-Start: 02/13/2024 15:15:00, Bottling-Stop: 02/13/2024 15:20:00, Parameters-Sampled: PFAS

Reading Time	Depth To Water (ft)	Cumulative Drawdown (ft)	Purge Rate (ml/min)	Temperature (deg c)	Specific Conductivity (us/cm)	Dissolved Oxygen (mg/l)	pH (su)	Oxidation-Reduction Potential (mV)	Turbidity (ntu)
14:30	17.02	0.04	100	NR	NR	NR	NR	NR	16
14:50	17.03	0.05	80	NR	NR	NR	NR	NR	12
14:55	17.03	0.05	80	10	631 +	<0.5	7.6	-91	8
15:00	17.03	0.05	80	10	632 +	<0.5	7.6	-95	6
15:05	17.03	0.05	80	10	634 +	<0.5	7.6	-99	6
15:10	17.03	0.05	80	10	633 +	<0.5	7.6	-100	6

Notes:

1) Abbreviations include: "deg c" indicates degrees Celsius; "ft" indicates feet; "ft bmp" indicates feet below reference measuring point; "gal" indicates gallons; "in" indicates inches; "mg/l" indicates milligrams per liter; "ml/min" indicates milliliters per minute; "mV" indicates millivolts; "NA" indicates not applicable; "NR" indicates not recorded; "ntu" indicates Nephelometric Turbidity units; "su" indicates standard units; "us/cm" indicates microsiemens per centimeter; and "+" indicates the parameter(s) may be used for stabilization calculations but cannot be used for other purposes.
2) Weather temperature units are in degrees Fahrenheit, unless otherwise noted.
3) Did indicator parameters reach stabilization? Yes
4) Was the two hour time limit reached? No
5) Calculations:
   - Head Above Pump Intake (ft) 50.72
   - Total Drawdown (ft) 0.05
   - Calculated Final Purge Volume (gal) NA
6) If Drawdown Did Not Stabilize or Stabilized Drawdown >0.3 ft, is Total Purge Volume > Calculated Final Purge Volume? NA

Well Sampling Worksheet
WWW RAP Field Data
AREA 6 2024-Q1 - HS-PMW-RI-108B
Kent County, MI

Well	HS-PMW-RI-108B / 2 in Diameter PVC
Sample Quarter	2024-Q1
Date	02/13/2024
Weather	Clear, 35°F
Sampler Initials	NCK
Purging Device	Bladder-Pump: NA, Peristaltic-Pump: NA, Centrifugal-Pump: Mega Monsoon #2
Meters Used	YSI: Agile Rental 1, Turbidimeter: Agile Rental 1, Water-Level-Meter: WLM-3
Reference Measuring Point	PVC
Well Screen (ft bmp)	131.6 - 136.6
Measured Bottom Depth (ft bmp)	NR
Sample Comment	YSI Connected at 15:20.
Initial Water Level Date/Time	02/13/2024 14:05
Initial Water Level Depth (ft bmp)	74.45
Pump/Tubing Intake Depth (ft bmp)	134.1
Tubing Length (ft)	137
Tubing Inner Diameter (in)	0.17
Purging Initiation Date/Time	02/13/2024 14:10
Total Purge Volume (gal)	1
Modified Sample	No
If Modified, Reasoning	
Sample Collection Information	Bottling-Start: 02/13/2024 15:35:00, Bottling-Stop: 02/13/2024 15:45:00, Parameters-Sampled: PFAS

Reading Time	Depth To Water (ft)	Cumulative Drawdown (ft)	Purge Rate (ml/min)	Temperature (deg c)	Specific Conductivity (us/cm)	Dissolved Oxygen (mg/l)	pH (su)	Oxidation-Reduction Potential (mV)	Turbidity (ntu)
14:20	74.60	0.15	50	NR	NR	NR	NR	NR	NR
14:30	74.81	0.36	50	NR	NR	NR	NR	NR	NR
14:50	75.10	0.65	50	NR	NR	NR	NR	NR	NR
15:10	75.43	0.98	50	NR	NR	NR	NR	NR	NR
15:20	75.50	1.05	50	8	782 +	<0.5	8.2	89	138
15:25	75.50	1.05	50	8	785 +	<0.5	8.2	87	130
15:30	75.50	1.05	50	8	777 +	<0.5	8.2	83	127

Notes:

1) Abbreviations include: "deg c" indicates degrees Celsius; "ft" indicates feet; "ft bmp" indicates feet below reference measuring point; "gal" indicates gallons; "in" indicates inches; "mg/l" indicates milligrams per liter; "ml/min" indicates milliliters per minute; "mV" indicates millivolts; "NA" indicates not applicable; "NR" indicates not recorded; "ntu" indicates Nephelometric Turbidity units; "su" indicates standard units; "us/cm" indicates microsiemens per centimeter; and "+" indicates the parameter(s) may be used for stabilization calculations but cannot be used for other purposes.
2) Weather temperature units are in degrees Fahrenheit, unless otherwise noted.
3) Did indicator parameters reach stabilization? Yes
4) Was the two hour time limit reached? No
5) Calculations:
   - Head Above Pump Intake (ft) 59.65
   - Total Drawdown (ft) 1.05
   - Calculated Final Purge Volume (gal) 0.33
6) If Drawdown Did Not Stabilize or Stabilized Drawdown >0.3 ft, is Total Purge Volume > Calculated Final Purge Volume? Yes

Well Sampling Worksheet
WWW RAP Field Data
AREA 6 2024-Q1 - HS-PMW-RI-108D
Kent County, MI

Well	HS-PMW-RI-108D / 2 in Diameter PVC
Sample Quarter	2024-Q1
Date	02/13/2024
Weather	Cloudy, 30s°F
Sampler Initials	CBM
Purging Device	Bladder-Pump: BP-10, Peristaltic-Pump: NA, Centrifugal-Pump: NA
Meters Used	YSI: Agile Rental 3, Turbidimeter: Agile Rental 3, Water-Level-Meter: WLM-4
Reference Measuring Point	PVC
Well Screen (ft bmp)	223.0 - 228.0
Measured Bottom Depth (ft bmp)	228
Sample Comment	
Initial Water Level Date/Time	02/13/2024 14:10
Initial Water Level Depth (ft bmp)	74.91
Pump/Tubing Intake Depth (ft bmp)	225.5
Tubing Length (ft)	229
Tubing Inner Diameter (in)	0.17
Purging Initiation Date/Time	02/13/2024 14:18
Total Purge Volume (gal)	4
Modified Sample	No
If Modified, Reasoning	
Sample Collection Information	Bottling-Start: 02/13/2024 16:05:00, Bottling-Stop: 02/13/2024 16:10:00, Parameters-Sampled: PFAS

Reading Time	Depth To Water (ft)	Cumulative Drawdown (ft)	Purge Rate (ml/min)	Temperature (deg c)	Specific Conductivity (us/cm)	Dissolved Oxygen (mg/l)	pH (su)	Oxidation-Reduction Potential (mV)	Turbidity (ntu)
15:40	75.05	0.14	85	9	611 +	<0.5	7.6	-65	25
15:45	75.05	0.14	85	9	615 +	<0.5	7.6	-66	20
15:50	75.05	0.14	85	9	612 +	<0.5	7.6	-66	18
15:55	75.05	0.14	85	9	613 +	<0.5	7.6	-66	19
16:00	75.05	0.14	85	9	612 +	<0.5	7.6	-66	18

Notes:

1) Abbreviations include: "deg c" indicates degrees Celsius; "ft" indicates feet; "ft bmp" indicates feet below reference measuring point; "gal" indicates gallons; "in" indicates inches; "mg/l" indicates milligrams per liter; "ml/min" indicates milliliters per minute; "mV" indicates millivolts; "NA" indicates not applicable; "NR" indicates not recorded; "ntu" indicates Nephelometric Turbidity units; "su" indicates standard units; "us/cm" indicates microsiemens per centimeter; and "+" indicates the parameter(s) may be used for stabilization calculations but cannot be used for other purposes.
2) Weather temperature units are in degrees Fahrenheit, unless otherwise noted.
3) Did indicator parameters reach stabilization? Yes
4) Was the two hour time limit reached? No
5) Calculations:
   - Head Above Pump Intake (ft) 150.59
   - Total Drawdown (ft) 0.14
   - Calculated Final Purge Volume (gal) NA
6) If Drawdown Did Not Stabilize or Stabilized Drawdown >0.3 ft, is Total Purge Volume > Calculated Final Purge Volume? NA

Well Sampling Worksheet
WWW RAP Field Data
AREA 6 2024-Q1 - HS-PMW-RI-109A
Kent County, MI

Well	HS-PMW-RI-109A / 2 in Diameter PVC
Sample Quarter	2024-Q1
Date	01/24/2024
Weather	Cloudy, Rain Off and On, 30s°F
Sampler Initials	CBM
Purging Device	Bladder-Pump: NA, Peristaltic-Pump: PER-1, Centrifugal-Pump: NA
Meters Used	YSI: Agile Rental 1, Turbidimeter: Agile Rental 1, Water-Level-Meter: WLM-2
Reference Measuring Point	PVC
Well Screen (ft bmp)	13.6 - 18.6
Measured Bottom Depth (ft bmp)	18.6
Sample Comment	11:45 - Lowest purge rate possible with this pump is 75 mL/min without the pump stalling. 12:00 - Was able to turn the pump speed down. Water level was not stable per the Standard Operating Procedure (SOP) but variability was improving. Remaining indicator parameters were stable.
Initial Water Level Date/Time	01/24/2024 10:50
Initial Water Level Depth (ft bmp)	9.08
Pump/Tubing Intake Depth (ft bmp)	16.1
Tubing Length (ft)	22
Tubing Inner Diameter (in)	0.17
Purging Initiation Date/Time	01/24/2024 10:55
Total Purge Volume (gal)	3.46
Modified Sample	Yes
If Modified, Reasoning	> 0.3 feet Drawdown
Sample Collection Information	Bottling-Start: 01/24/2024 12:40:00, Bottling-Stop: 01/24/2024 12:45:00, Parameters-Sampled: PFAS

Reading Time	Depth To Water (ft)	Cumulative Drawdown (ft)	Purge Rate (ml/min)	Temperature (deg c)	Specific Conductivity (us/cm)	Dissolved Oxygen (mg/l)	pH (su)	Oxidation-Reduction Potential (mV)	Turbidity (ntu)
11:15	9.60 +	0.52	125	9	578 +	10.0	7.4	94	<5
11:40	10.05 +	0.97	125	9	573 +	9.8	7.4	106	<5
11:45	10.23 +	1.15	125	9	572 +	9.8	7.4	108	<5
11:50	10.34 +	1.26	125	9	571 +	9.7	7.4	109	<5
11:55	10.42 +	1.34	125	9	570 +	9.7	7.4	110	<5
12:00	10.49 +	1.41	100	9	570 +	9.6	7.4	112	<5
12:15	10.64 +	1.56	100	9	569 +	9.4	7.4	113	<5
12:20	10.68 +	1.60	100	9	571 +	9.3	7.4	114	<5

Well Sampling Worksheet
WWW RAP Field Data
AREA 6 2024-Q1 - HS-PMW-RI-109A
Kent County, MI

Well	HS-PMW-RI-109A / 2 in Diameter PVC
Sample Quarter	2024-Q1
Date	01/24/2024
Weather	Cloudy, Rain Off and On, 30s°F
Sampler Initials	CBM
Purging Device	Bladder-Pump: NA, Peristaltic-Pump: PER-1, Centrifugal-Pump: NA
Meters Used	YSI: Agile Rental 1, Turbidimeter: Agile Rental 1, Water-Level-Meter: WLM-2
Reference Measuring Point	PVC
Well Screen (ft bmp)	13.6 - 18.6
Measured Bottom Depth (ft bmp)	18.6
Sample Comment	11:45 - Lowest purge rate possible with this pump is 75 mL/min without the pump stalling. 12:00 - Was able to turn the pump speed down. Water level was not stable per the Standard Operating Procedure (SOP) but variability was improving. Remaining indicator parameters were stable.
Initial Water Level Date/Time	01/24/2024 10:50
Initial Water Level Depth (ft bmp)	9.08
Pump/Tubing Intake Depth (ft bmp)	16.1
Tubing Length (ft)	22
Tubing Inner Diameter (in)	0.17
Purging Initiation Date/Time	01/24/2024 10:55
Total Purge Volume (gal)	3.46
Modified Sample	Yes
If Modified, Reasoning	> 0.3 feet Drawdown
Sample Collection Information	Bottling-Start: 01/24/2024 12:40:00, Bottling-Stop: 01/24/2024 12:45:00, Parameters-Sampled: PFAS

Reading Time	Depth To Water (ft)	Cumulative Drawdown (ft)	Purge Rate (ml/min)	Temperature (deg c)	Specific Conductivity (us/cm)	Dissolved Oxygen (mg/l)	pH (su)	Oxidation-Reduction Potential (mV)	Turbidity (ntu)
12:25	10.70 +	1.62	100	9	571 +	9.3	7.4	115	<5
12:30	10.72 +	1.64	100	9	571 +	9.3	7.4	115	<5
12:35	10.72 +	1.64	100	9	569 +	9.2	7.4	117	<5

Notes:

1) Abbreviations include: "deg c" indicates degrees Celsius; "ft" indicates feet; "ft bmp" indicates feet below reference measuring point; "gal" indicates gallons; "in" indicates inches; "mg/l" indicates milligrams per liter; "ml/min" indicates milliliters per minute; "mV" indicates millivolts; "NA" indicates not applicable; "NR" indicates not recorded; "ntu" indicates Nephelometric Turbidity units; "su" indicates standard units; "us/cm" indicates microsiemens per centimeter; and "+" indicates the parameter(s) may be used for stabilization calculations but cannot be used for other purposes.
2) Weather temperature units are in degrees Fahrenheit, unless otherwise noted.
3) Did indicator parameters reach stabilization? No
4) Was the two hour time limit reached? No
5) Calculations:
   - Head Above Pump Intake (ft) 7.02
   - Total Drawdown (ft) 1.64
   - Calculated Final Purge Volume (gal) 0.29
6) If Drawdown Did Not Stabilize or Stabilized Drawdown >0.3 ft, is Total Purge Volume > Calculated Final Purge Volume? Yes

Well Sampling Worksheet
WWW RAP Field Data
AREA 6 2024-Q1 - HS-PMW-RI-109B
Kent County, MI

Well	HS-PMW-RI-109B / 2 in Diameter PVC
Sample Quarter	2024-Q1
Date	01/24/2024
Weather	Cloudy, 35°F
Sampler Initials	JMS
Purging Device	Bladder-Pump: NA, Peristaltic-Pump: NA, Centrifugal-Pump: Mega Monsoon #2
Meters Used	YSI: Agile Rental 2, Turbidimeter: Agile Rental 2, Water-Level-Meter: WLM-1
Reference Measuring Point	PVC
Well Screen (ft bmp)	124.6 - 129.6
Measured Bottom Depth (ft bmp)	NR
Sample Comment	YSI Connected at 12:15.
Initial Water Level Date/Time	01/24/2024 10:35
Initial Water Level Depth (ft bmp)	65.11
Pump/Tubing Intake Depth (ft bmp)	127.1
Tubing Length (ft)	132.1
Tubing Inner Diameter (in)	0.17
Purging Initiation Date/Time	01/24/2024 10:40
Total Purge Volume (gal)	4
Modified Sample	No
If Modified, Reasoning	
Sample Collection Information	Bottling-Start: 01/24/2024 12:30:00, Bottling-Stop: 01/24/2024 12:35:00, Parameters-Sampled: PFAS

Reading Time	Depth To Water (ft)	Cumulative Drawdown (ft)	Purge Rate (ml/min)	Temperature (deg c)	Specific Conductivity (us/cm)	Dissolved Oxygen (mg/l)	pH (su)	Oxidation-Reduction Potential (mV)	Turbidity (ntu)
11:10	65.12	0.01	350	NR	NR	NR	NR	NR	48
11:20	65.12	0.01	150	NR	NR	NR	NR	NR	91
11:30	65.12	0.01	150	NR	NR	NR	NR	NR	77
11:40	65.12	0.01	150	NR	NR	NR	NR	NR	55
11:50	65.12	0.01	150	NR	NR	NR	NR	NR	42
12:00	65.12	0.01	150	NR	NR	NR	NR	NR	28
12:10	65.11	0.00	150	NR	NR	NR	NR	NR	26

Well Sampling Worksheet
WWW RAP Field Data
AREA 6 2024-Q1 - HS-PMW-RI-109B
Kent County, MI

Well	HS-PMW-RI-109B / 2 in Diameter PVC
Sample Quarter	2024-Q1
Date	01/24/2024
Weather	Cloudy, 35°F
Sampler Initials	JMS
Purging Device	Bladder-Pump: NA, Peristaltic-Pump: NA, Centrifugal-Pump: Mega Monsoon #2
Meters Used	YSI: Agile Rental 2, Turbidimeter: Agile Rental 2, Water-Level-Meter: WLM-1
Reference Measuring Point	PVC
Well Screen (ft bmp)	124.6 - 129.6
Measured Bottom Depth (ft bmp)	NR
Sample Comment	YSI Connected at 12:15.
Initial Water Level Date/Time	01/24/2024 10:35
Initial Water Level Depth (ft bmp)	65.11
Pump/Tubing Intake Depth (ft bmp)	127.1
Tubing Length (ft)	132.1
Tubing Inner Diameter (in)	0.17
Purging Initiation Date/Time	01/24/2024 10:40
Total Purge Volume (gal)	4
Modified Sample	No
If Modified, Reasoning	
Sample Collection Information	Bottling-Start: 01/24/2024 12:30:00, Bottling-Stop: 01/24/2024 12:35:00, Parameters-Sampled: PFAS

Reading Time	Depth To Water (ft)	Cumulative Drawdown (ft)	Purge Rate (ml/min)	Temperature (deg c)	Specific Conductivity (us/cm)	Dissolved Oxygen (mg/l)	pH (su)	Oxidation-Reduction Potential (mV)	Turbidity (ntu)
12:15	65.11	0.00	150	10 +	939 +	3.4	7.0	296	24
12:20	65.11	0.00	150	10 +	937 +	3.2	7.0	303	22
12:25	65.11	0.00	150	10 +	936 +	3.2	7.0	306	23

Notes:

1) Abbreviations include: "deg c" indicates degrees Celsius; "ft" indicates feet; "ft bmp" indicates feet below reference measuring point; "gal" indicates gallons; "in" indicates inches; "mg/l" indicates milligrams per liter; "ml/min" indicates milliliters per minute; "mV" indicates millivolts; "NA" indicates not applicable; "NR" indicates not recorded; "ntu" indicates Nephelometric Turbidity units; "su" indicates standard units; "us/cm" indicates microsiemens per centimeter; and "+" indicates the parameter(s) may be used for stabilization calculations but cannot be used for other purposes.
2) Weather temperature units are in degrees Fahrenheit, unless otherwise noted.
3) Did indicator parameters reach stabilization? Yes
4) Was the two hour time limit reached? No
5) Calculations:
   - Head Above Pump Intake (ft) 61.99
   - Total Drawdown (ft) 0.00
   - Calculated Final Purge Volume (gal) NA
6) If Drawdown Did Not Stabilize or Stabilized Drawdown >0.3 ft, is Total Purge Volume > Calculated Final Purge Volume? NA

Well Sampling Worksheet
WWW RAP Field Data
AREA 6 2024-Q1 - HS-PMW-RI-109C
Kent County, MI

Well	HS-PMW-RI-109C / 2 in Diameter PVC
Sample Quarter	2024-Q1
Date	01/24/2024
Weather	Cloudy, 35°F
Sampler Initials	RCP
Purging Device	Bladder-Pump: BP-11, Peristaltic-Pump: NA, Centrifugal-Pump: NA
Meters Used	YSI: Agile Rental 4, Turbidimeter: Agile Rental 4, Water-Level-Meter: WLM-4
Reference Measuring Point	PVC
Well Screen (ft bmp)	143.7 - 148.7
Measured Bottom Depth (ft bmp)	NR
Sample Comment	11:55 - Intermittent flow observed at first. Then consistent flow. 12:15 - YSI connected.
Initial Water Level Date/Time	01/24/2024 10:45
Initial Water Level Depth (ft bmp)	64.98
Pump/Tubing Intake Depth (ft bmp)	146.2
Tubing Length (ft)	148
Tubing Inner Diameter (in)	0.25
Purging Initiation Date/Time	01/24/2024 10:55
Total Purge Volume (gal)	2
Modified Sample	No
If Modified, Reasoning	
Sample Collection Information	Bottling-Start: 01/24/2024 13:00:00, Bottling-Stop: 01/24/2024 13:10:00, Parameters-Sampled: PFAS

Reading Time	Depth To Water (ft)	Cumulative Drawdown (ft)	Purge Rate (ml/min)	Temperature (deg c)	Specific Conductivity (us/cm)	Dissolved Oxygen (mg/l)	pH (su)	Oxidation-Reduction Potential (mV)	Turbidity (ntu)
11:55	65.15	0.17	60	NR	NR	NR	NR	NR	NR
12:15	65.15	0.17	60	NR	NR	NR	NR	NR	328
12:35	65.15	0.17	60	8	445 +	0.6	7.6	-38	374
12:40	65.15	0.17	60	9	447 +	<0.5	7.6	-38	328
12:45	65.15	0.17	60	9	447 +	<0.5	7.6	-38	320
12:50	65.15	0.17	60	9	446 +	<0.5	7.5	-37	304
12:55	65.15	0.17	60	9	446 +	<0.5	7.6	-38	239

Notes:

1) Abbreviations include: "deg c" indicates degrees Celsius; "ft" indicates feet; "ft bmp" indicates feet below reference measuring point; "gal" indicates gallons; "in" indicates inches; "mg/l" indicates milligrams per liter; "ml/min" indicates milliliters per minute; "mV" indicates millivolts; "NA" indicates not applicable; "NR" indicates not recorded; "ntu" indicates Nephelometric Turbidity units; "su" indicates standard units; "us/cm" indicates microsiemens per centimeter; and "+" indicates the parameter(s) may be used for stabilization calculations but cannot be used for other purposes.
2) Weather temperature units are in degrees Fahrenheit, unless otherwise noted.
3) Did indicator parameters reach stabilization? No
4) Was the two hour time limit reached? Yes
5) Calculations:
   - Head Above Pump Intake (ft): 81.22
   - Total Drawdown (ft): 0.17
   - Calculated Final Purge Volume (gal): NA
6) If Drawdown Did Not Stabilize or Stabilized Drawdown >0.3 ft, is Total Purge Volume > Calculated Final Purge Volume? NA

Well Sampling Worksheet
WWW RAP Field Data
AREA 11/12 2024-Q1 - HS-PMW-RI-111A
Kent County, MI

Well	HS-PMW-RI-111A / 2 in Diameter PVC
Sample Quarter	2024-Q1
Date	02/01/2024
Weather	Cloudy, 45°F
Sampler Initials	RCP
Purging Device	Bladder-Pump: NA, Peristaltic-Pump: Rental, Centrifugal-Pump: NA
Meters Used	YSI: Agile Rental 4, Turbidimeter: Agile Rental 4, Water-Level-Meter: WLM-2
Reference Measuring Point	PVC
Well Screen (ft bmp)	12.9 - 17.9
Measured Bottom Depth (ft bmp)	NR
Sample Comment	YSI Connected at 15:00.
Initial Water Level Date/Time	02/01/2024 14:50
Initial Water Level Depth (ft bmp)	6.95
Pump/Tubing Intake Depth (ft bmp)	15.4
Tubing Length (ft)	17
Tubing Inner Diameter (in)	0.17
Purging Initiation Date/Time	02/01/2024 14:55
Total Purge Volume (gal)	2
Modified Sample	No
If Modified, Reasoning	
Sample Collection Information	Bottling-Start: 02/01/2024 15:30:00, Bottling-Stop: 02/01/2024 14:35:00, Parameters-Sampled: PFAS

Reading Time	Depth To Water (ft)	Cumulative Drawdown (ft)	Purge Rate (ml/min)	Temperature (deg c)	Specific Conductivity (us/cm)	Dissolved Oxygen (mg/l)	pH (su)	Oxidation-Reduction Potential (mV)	Turbidity (ntu)
15:00	6.97	0.02	240	NR	NR	NR	NR	NR	<5
15:15	6.97	0.02	240	11	639 +	6.3	7.1	97	<5
15:20	6.97	0.02	240	11	639 +	6.2	7.1	97	<5
15:25	6.97	0.02	240	11	639 +	6.2	7.1	98	<5

Notes:

1) Abbreviations include: "deg c" indicates degrees Celsius; "ft" indicates feet; "ft bmp" indicates feet below reference measuring point; "gal" indicates gallons; "in" indicates inches; "mg/l" indicates milligrams per liter; "ml/min" indicates milliliters per minute; "mV" indicates millivolts; "NA" indicates not applicable; "NR" indicates not recorded; "ntu" indicates Nephelometric Turbidity units; "su" indicates standard units; "us/cm" indicates microsiemens per centimeter; and "+" indicates the parameter(s) may be used for stabilization calculations but cannot be used for other purposes.
2) Weather temperature units are in degrees Fahrenheit, unless otherwise noted.
3) Did indicator parameters reach stabilization? Yes
4) Was the two hour time limit reached? No
5) Calculations:
   - Head Above Pump Intake (ft) 8.45
   - Total Drawdown (ft) 0.02
   - Calculated Final Purge Volume (gal) NA
6) If Drawdown Did Not Stabilize or Stabilized Drawdown >0.3 ft, is Total Purge Volume > Calculated Final Purge Volume? NA

Well Sampling Worksheet
WWW RAP Field Data
AREA 11/12 2024-Q1 - HS-PMW-RI-112B
Kent County, MI

Well	HS-PMW-RI-112B / 2 in Diameter PVC
Sample Quarter	2024-Q1
Date	02/02/2024
Weather	Overcast; 40°F
Sampler Initials	MKM
Purging Device	Bladder-Pump: NA, Peristaltic-Pump: Rental, Centrifugal-Pump: NA
Meters Used	YSI: Agile Rental 1, Turbidimeter: Agile Rental 1, Water-Level-Meter: WLM-1
Reference Measuring Point	PVC
Well Screen (ft bmp)	69.4 - 74.4
Measured Bottom Depth (ft bmp)	NR
Sample Comment	Grand River under flood warning - these wells are less than 1/4 mile away from the river. YSI Connected 10:35.
Initial Water Level Date/Time	02/02/2024 10:00
Initial Water Level Depth (ft bmp)	5.15
Pump/Tubing Intake Depth (ft bmp)	71.9
Tubing Length (ft)	75
Tubing Inner Diameter (in)	0.17
Purging Initiation Date/Time	02/02/2024 10:10
Total Purge Volume (gal)	5
Modified Sample	No
If Modified, Reasoning	
Sample Collection Information	Bottling-Start: 02/02/2024 11:45:00, Bottling-Stop: 02/02/2024 11:50:00, Parameters-Sampled: PFAS

Reading Time	Depth To Water (ft)	Cumulative Drawdown (ft)	Purge Rate (ml/min)	Temperature (deg c)	Specific Conductivity (us/cm)	Dissolved Oxygen (mg/l)	pH (su)	Oxidation-Reduction Potential (mV)	Turbidity (ntu)
10:15	5.17	0.02	200	NR	NR	NR	NR	NR	NR
10:25	5.17	0.02	200	NR	NR	NR	NR	NR	37
10:35	5.17	0.02	200	9	1,439 +	<0.5	7.1	137	20
10:40	5.17	0.02	200	9	1,438 +	2.0	7.1	120	20
10:45	5.17	0.02	200	9	1,427 +	1.0	7.2	103	14
10:55	5.17	0.02	200	9	1,426 +	0.9	7.2	84	11
11:05	5.17	0.02	200	9	1,424 +	0.8	7.2	69	6
11:15	5.17	0.02	200	9	1,423 +	0.9	7.2	56	5
11:25	5.17	0.02	200	9	1,417 +	0.8	7.2	46	<5

Well Sampling Worksheet
WWW RAP Field Data
AREA 11/12 2024-Q1 - HS-PMW-RI-112B
Kent County, MI

Well	HS-PMW-RI-112B / 2 in Diameter PVC
Sample Quarter	2024-Q1
Date	02/02/2024
Weather	Overcast; 40°F
Sampler Initials	MKM
Purging Device	Bladder-Pump: NA, Peristaltic-Pump: Rental, Centrifugal-Pump: NA
Meters Used	YSI: Agile Rental 1, Turbidimeter: Agile Rental 1, Water-Level-Meter: WLM-1
Reference Measuring Point	PVC
Well Screen (ft bmp)	69.4 - 74.4
Measured Bottom Depth (ft bmp)	NR
Sample Comment	Grand River under flood warning - these wells are less than 1/4 mile away from the river. YSI Connected 10:35.
Initial Water Level Date/Time	02/02/2024 10:00
Initial Water Level Depth (ft bmp)	5.15
Pump/Tubing Intake Depth (ft bmp)	71.9
Tubing Length (ft)	75
Tubing Inner Diameter (in)	0.17
Purging Initiation Date/Time	02/02/2024 10:10
Total Purge Volume (gal)	5
Modified Sample	No
If Modified, Reasoning	
Sample Collection Information	Bottling-Start: 02/02/2024 11:45:00, Bottling-Stop: 02/02/2024 11:50:00, Parameters-Sampled: PFAS

Reading Time	Depth To Water (ft)	Cumulative Drawdown (ft)	Purge Rate (ml/min)	Temperature (deg c)	Specific Conductivity (us/cm)	Dissolved Oxygen (mg/l)	pH (su)	Oxidation-Reduction Potential (mV)	Turbidity (ntu)
11:30	5.17	0.02	200	9	1,418 +	0.7	7.3	38	<5
11:35	5.17	0.02	200	10	1,416 +	0.7	7.2	36	<5
11:40	5.17	0.02	200	9	1,421 +	0.7	7.2	29	<5

Notes:

1) Abbreviations include: "deg c" indicates degrees Celsius; "ft" indicates feet; "ft bmp" indicates feet below reference measuring point; "gal" indicates gallons; "in" indicates inches; "mg/l" indicates milligrams per liter; "ml/min" indicates milliliters per minute; "mV" indicates millivolts; "NA" indicates not applicable; "NR" indicates not recorded; "ntu" indicates Nephelometric Turbidity units; "su" indicates standard units; "us/cm" indicates microsiemens per centimeter; and "+" indicates the parameter(s) may be used for stabilization calculations but cannot be used for other purposes.
2) Weather temperature units are in degrees Fahrenheit, unless otherwise noted.
3) Did indicator parameters reach stabilization? Yes
4) Was the two hour time limit reached? No
5) Calculations:
   - Head Above Pump Intake (ft): 66.75
   - Total Drawdown (ft): 0.02
   - Calculated Final Purge Volume (gal): NA
6) If Drawdown Did Not Stabilize or Stabilized Drawdown >0.3 ft, is Total Purge Volume > Calculated Final Purge Volume? NA

Well Sampling Worksheet
WWW RAP Field Data
PERIMETER 2024-Q1 - HS-PMW-RI-105A
Kent County, MI

Well	HS-PMW-RI-105A / 2 in Diameter PVC
Sample Quarter	2024-Q1
Date	01/19/2024
Weather	Cloudy, 17°
Sampler Initials	CBM
Purging Device	Bladder-Pump: NA, Peristaltic-Pump: PER-2, Centrifugal-Pump: NA
Meters Used	YSI: Agile Rental 3, Turbidimeter: Agile Rental 3, Water-Level-Meter: WLM-3
Reference Measuring Point	PVC
Well Screen (ft bmp)	24.5 - 29.5
Measured Bottom Depth (ft bmp)	29.5
Sample Comment	
Initial Water Level Date/Time	01/19/2024 10:15
Initial Water Level Depth (ft bmp)	22.49
Pump/Tubing Intake Depth (ft bmp)	27
Tubing Length (ft)	29.5
Tubing Inner Diameter (in)	0.17
Purging Initiation Date/Time	01/19/2024 10:20
Total Purge Volume (gal)	1.25
Modified Sample	No
If Modified, Reasoning	
Sample Collection Information	Bottling-Start: 01/19/2024 10:55:00, Bottling-Stop: 01/19/2024 11:00:00, Parameters-Sampled: PFAS

Reading Time	Depth To Water (ft)	Cumulative Drawdown (ft)	Purge Rate (ml/min)	Temperature (deg c)	Specific Conductivity (us/cm)	Dissolved Oxygen (mg/l)	pH (su)	Oxidation-Reduction Potential (mV)	Turbidity (ntu)
10:40	22.49	0.00	125	14 +	838 +	7.1	7.4	233	<5
10:45	22.49	0.00	125	14 +	834 +	7.0	7.4	237	<5
10:50	22.49	0.00	125	14 +	835 +	7.1	7.4	241	<5

Notes:

1) Abbreviations include: "deg c" indicates degrees Celsius; "ft" indicates feet; "ft bmp" indicates feet below reference measuring point; "gal" indicates gallons; "in" indicates inches; "mg/l" indicates milligrams per liter; "ml/min" indicates milliliters per minute; "mV" indicates millivolts; "NA" indicates not applicable; "NR" indicates not recorded; "ntu" indicates Nephelometric Turbidity units; "su" indicates standard units; "us/cm" indicates microsiemens per centimeter; and "+" indicates the parameter(s) may be used for stabilization calculations but cannot be used for other purposes.
2) Weather temperature units are in degrees Fahrenheit, unless otherwise noted.
3) Did indicator parameters reach stabilization? Yes
4) Was the two hour time limit reached? No
5) Calculations:
   - Head Above Pump Intake (ft): 4.51
   - Total Drawdown (ft): 0.00
   - Calculated Final Purge Volume (gal): NA
6) If Drawdown Did Not Stabilize or Stabilized Drawdown >0.3 ft, is Total Purge Volume > Calculated Final Purge Volume? NA

Well Sampling Worksheet
WWW RAP Field Data
PERIMETER 2024-Q1 - HS-PMW-RI-105B
Kent County, MI

Well	HS-PMW-RI-105B / 2 in Diameter PVC
Sample Quarter	2024-Q1
Date	01/19/2024
Weather	Clear 20
Sampler Initials	NCK
Purging Device	Bladder-Pump: NA, Peristaltic-Pump: Rental, Centrifugal-Pump: NA
Meters Used	YSI: Agile Rental 4, Turbidimeter: Agile Rental 4, Water-Level-Meter: WLM-2
Reference Measuring Point	PVC
Well Screen (ft bmp)	152.8 - 157.8
Measured Bottom Depth (ft bmp)	NR
Sample Comment	10:25 - Purge water observed to be very turbid. 10:50 - Centrifugal Pump died, switched to Peristaltic Pump for remainder of purge. 11:15 - Purge water observed to be turbid. YSI connected after 11:15 readings.
Initial Water Level Date/Time	01/19/2024 10:15
Initial Water Level Depth (ft bmp)	11.33
Pump/Tubing Intake Depth (ft bmp)	155.3
Tubing Length (ft)	158
Tubing Inner Diameter (in)	0.17
Purging Initiation Date/Time	01/19/2024 10:20
Total Purge Volume (gal)	13
Modified Sample	No
If Modified, Reasoning	
Sample Collection Information	Bottling-Start: 01/19/2024 12:25:00, Bottling-Stop: 01/19/2024 12:30:00, Parameters-Sampled: PFAS

Reading Time	Depth To Water (ft)	Cumulative Drawdown (ft)	Purge Rate (ml/min)	Temperature (deg c)	Specific Conductivity (us/cm)	Dissolved Oxygen (mg/l)	pH (su)	Oxidation-Reduction Potential (mV)	Turbidity (ntu)
10:25	11.35	0.02	500	NR	NR	NR	NR	NR	NR
10:50	NR	NR	NR	NR	NR	NR	NR	NR	NR
11:15	11.35	0.02	400	NR	NR	NR	NR	NR	NR
11:35	11.35	0.02	400	11	1,441 +	<0.5	7.4	-62	350
11:50	11.35	0.02	400	11	1,443 +	<0.5	7.4	-84	90
12:10	11.35	0.02	400	11	1,442 +	<0.5	7.4	-93	33
12:15	11.35	0.02	400	11	1,443 +	<0.5	7.4	-94	23
12:20	11.35	0.02	400	11	1,442 +	<0.5	7.4	-96	19

Notes:

1) Abbreviations include: "deg c" indicates degrees Celsius; "ft" indicates feet; "ft bmp" indicates feet below reference measuring point; "gal" indicates gallons; "in" indicates inches; "mg/l" indicates milligrams per liter; "ml/min" indicates milliliters per minute; "mV" indicates millivolts; "NA" indicates not applicable; "NR" indicates not recorded; "ntu" indicates Nephelometric Turbidity units; "su" indicates standard units; "us/cm" indicates microsiemens per centimeter; and "+" indicates the parameter(s) may be used for stabilization calculations but cannot be used for other purposes.
2) Weather temperature units are in degrees Fahrenheit, unless otherwise noted.
3) Did indicator parameters reach stabilization? No
4) Was the two hour time limit reached? Yes
5) Calculations:
   - Head Above Pump Intake (ft) 143.97
   - Total Drawdown (ft) 0.02
   - Calculated Final Purge Volume (gal) NA
6) If Drawdown Did Not Stabilize or Stabilized Drawdown >0.3 ft, is Total Purge Volume > Calculated Final Purge Volume? NA

Well Sampling Worksheet
WWW RAP Field Data
PERIMETER 2024-Q1 - WV-MW-4
Kent County, MI

Well	WV-MW-4 / 2 in Diameter PVC
Sample Quarter	2024-Q1
Date	02/14/2024
Weather	Cloudy, 30's - 40's.
Sampler Initials	CBM
Purging Device	Bladder-Pump: BP-10, Peristaltic-Pump: NA, Centrifugal-Pump: NA
Meters Used	YSI: Agile Rental 1, Turbidimeter: Agile Rental 1, Water-Level-Meter: WLM-4
Reference Measuring Point	PVC
Well Screen (ft bmp)	132.7 - 137.7
Measured Bottom Depth (ft bmp)	137.7
Sample Comment	16:30 - Air observed in discharge line. Likely reason for high Dissolved Oxygen readings. 16:45 - Check valve not working properly. 17:20 - Reset check valve and restarted pump.
Initial Water Level Date/Time	02/14/2024 15:30
Initial Water Level Depth (ft bmp)	103.04
Pump/Tubing Intake Depth (ft bmp)	135.2
Tubing Length (ft)	138
Tubing Inner Diameter (in)	0.25
Purging Initiation Date/Time	02/14/2024 15:35
Total Purge Volume (gal)	1.5
Modified Sample	No
If Modified, Reasoning	
Sample Collection Information	Bottling-Start: 02/14/2024 17:40:00, Bottling-Stop: 02/14/2024 17:45:00, Parameters-Sampled: PFAS

Reading Time	Depth To Water (ft)	Cumulative Drawdown (ft)	Purge Rate (ml/min)	Temperature (deg c)	Specific Conductivity (us/cm)	Dissolved Oxygen (mg/l)	pH (su)	Oxidation-Reduction Potential (mV)	Turbidity (ntu)
16:30	103.19	0.15	50	8	326 +	9.1	8.0	85	189
16:35	103.19	0.15	50	8	175 +	9.7	8.0	86	167
16:40	103.19	0.15	50	7	328 +	9.6	8.0	85	152
16:45	103.19	0.15	50	8	326 +	7.8	8.0	81	130
17:20	103.19	0.15	50	8	330 +	<0.5	7.9	48	168
17:25	103.19	0.15	50	8	330 +	<0.5	7.9	2	193
17:30	103.19	0.15	50	8	331 +	<0.5	7.9	-9	149
17:35	103.19	0.15	50	8	332 +	<0.5	7.9	-28	138

Notes:

1) Abbreviations include: "deg c" indicates degrees Celsius; "ft" indicates feet; "ft bmp" indicates feet below reference measuring point; "gal" indicates gallons; "in" indicates inches; "mg/l" indicates milligrams per liter; "ml/min" indicates milliliters per minute; "mV" indicates millivolts; "NA" indicates not applicable; "NR" indicates not recorded; "ntu" indicates Nephelometric Turbidity units; "su" indicates standard units; "us/cm" indicates microsiemens per centimeter; and "+" indicates the parameter(s) may be used for stabilization calculations but cannot be used for other purposes.
2) Weather temperature units are in degrees Fahrenheit, unless otherwise noted.
3) Did indicator parameters reach stabilization? No
4) Was the two hour time limit reached? Yes
5) Calculations:
   - Head Above Pump Intake (ft) 32.16
   - Total Drawdown (ft) 0.15
   - Calculated Final Purge Volume (gal) NA
6) If Drawdown Did Not Stabilize or Stabilized Drawdown >0.3 ft, is Total Purge Volume > Calculated Final Purge Volume? NA

Well Sampling Worksheet
WWW RAP Field Data
PERIMETER 2024-Q1 - WV-MW-5D
Kent County, MI

Well	WV-MW-5D / 2 in Diameter PVC
Sample Quarter	2024-Q1
Date	02/14/2024
Weather	34 Sunny
Sampler Initials	JMS
Purging Device	Bladder-Pump: NA, Peristaltic-Pump: NA, Centrifugal-Pump: Mega Monsoon #1
Meters Used	YSI: Agile Rental 2, Turbidimeter: Agile Rental 2, Water-Level-Meter: WLM-2
Reference Measuring Point	PVC
Well Screen (ft bmp)	71.8 - 76.8
Measured Bottom Depth (ft bmp)	NR
Sample Comment	YSI Connected after 12:00 readings.
Initial Water Level Date/Time	02/14/2024 11:50
Initial Water Level Depth (ft bmp)	66.02
Pump/Tubing Intake Depth (ft bmp)	74.3
Tubing Length (ft)	79.3
Tubing Inner Diameter (in)	0.17
Purging Initiation Date/Time	02/14/2024 11:55
Total Purge Volume (gal)	6
Modified Sample	No
If Modified, Reasoning	
Sample Collection Information	Bottling-Start: 02/14/2024 12:50:00, Bottling-Stop: 02/14/2024 12:55:00, Parameters-Sampled: PFAS

Reading Time	Depth To Water (ft)	Cumulative Drawdown (ft)	Purge Rate (ml/min)	Temperature (deg c)	Specific Conductivity (us/cm)	Dissolved Oxygen (mg/l)	pH (su)	Oxidation-Reduction Potential (mV)	Turbidity (ntu)
12:00	66.04	0.02	450	NR	NR	NR	NR	NR	196
12:35	66.02	0.00	450	12	722 +	8.0	7.2	154	5
12:40	66.02	0.00	450	12	722 +	8.1	7.2	149	5
12:45	66.02	0.00	450	12	722 +	8.1	7.2	145	5

Notes:

1) Abbreviations include: "deg c" indicates degrees Celsius; "ft" indicates feet; "ft bmp" indicates feet below reference measuring point; "gal" indicates gallons; "in" indicates inches; "mg/l" indicates milligrams per liter; "ml/min" indicates milliliters per minute; "mV" indicates millivolts; "NA" indicates not applicable; "NR" indicates not recorded; "ntu" indicates Nephelometric Turbidity units; "su" indicates standard units; "us/cm" indicates microsiemens per centimeter; and "+" indicates the parameter(s) may be used for stabilization calculations but cannot be used for other purposes.
2) Weather temperature units are in degrees Fahrenheit, unless otherwise noted.
3) Did indicator parameters reach stabilization? Yes
4) Was the two hour time limit reached? No
5) Calculations:
   - Head Above Pump Intake (ft): 8.28
   - Total Drawdown (ft): 0.00
   - Calculated Final Purge Volume (gal): NA
6) If Drawdown Did Not Stabilize or Stabilized Drawdown >0.3 ft, is Total Purge Volume > Calculated Final Purge Volume? NA

Well Sampling Worksheet
WWW RAP Field Data
PERIMETER 2024-Q1 - WV-MW-5S
Kent County, MI

Well	WV-MW-5S / 2 in Diameter PVC
Sample Quarter	2024-Q1
Date	02/14/2024
Weather	Sunny 35
Sampler Initials	NCK
Purging Device	Bladder-Pump: NA, Peristaltic-Pump: NA, Centrifugal-Pump: Mega Monsoon #2
Meters Used	YSI: Agile Rental 3, Turbidimeter: Agile Rental 3, Water-Level-Meter: WLM-1
Reference Measuring Point	PVC
Well Screen (ft bmp)	64.4 - 69.4
Measured Bottom Depth (ft bmp)	NR
Sample Comment	Pump intake set at midpoint of static water level and bottom of the well screen. YSI connected after 12:10 readings.
Initial Water Level Date/Time	02/14/2024 11:50
Initial Water Level Depth (ft bmp)	65.81
Pump/Tubing Intake Depth (ft bmp)	67.6
Tubing Length (ft)	70
Tubing Inner Diameter (in)	0.17
Purging Initiation Date/Time	02/14/2024 11:55
Total Purge Volume (gal)	0.6
Modified Sample	Yes
If Modified, Reasoning	Water Below Top of Well Screen
Sample Collection Information	Bottling-Start: 02/14/2024 12:40:00, Bottling-Stop: 02/14/2024 12:50:00, Parameters-Sampled: PFAS

Reading Time	Depth To Water (ft)	Cumulative Drawdown (ft)	Purge Rate (ml/min)	Temperature (deg c)	Specific Conductivity (us/cm)	Dissolved Oxygen (mg/l)	pH (su)	Oxidation-Reduction Potential (mV)	Turbidity (ntu)
12:00	65.81	0.00	50	NR	NR	NR	NR	NR	NR
12:10	65.81	0.00	50	NR	NR	NR	NR	NR	NR
12:30	65.81	0.00	50	12	660 +	7.8	7.3	130	<5
12:35	65.81	0.00	50	12	659 +	7.8	7.3	132	<5
12:40	65.81	0.00	50	11	661 +	7.7	7.3	137	<5

Notes:

1) Abbreviations include: "deg c" indicates degrees Celsius; "ft" indicates feet; "ft bmp" indicates feet below reference measuring point; "gal" indicates gallons; "in" indicates inches; "mg/l" indicates milligrams per liter; "ml/min" indicates milliliters per minute; "mV" indicates millivolts; "NA" indicates not applicable; "NR" indicates not recorded; "ntu" indicates Nephelometric Turbidity units; "su" indicates standard units; "us/cm" indicates microsiemens per centimeter; and "+" indicates the parameter(s) may be used for stabilization calculations but cannot be used for other purposes.
2) Weather temperature units are in degrees Fahrenheit, unless otherwise noted.
3) Did indicator parameters reach stabilization? Yes
4) Was the two hour time limit reached? No
5) Calculations:
   - Head Above Pump Intake (ft) 1.79
   - Total Drawdown (ft) 0.00
   - Calculated Final Purge Volume (gal) NA
6) If Drawdown Did Not Stabilize or Stabilized Drawdown >0.3 ft, is Total Purge Volume > Calculated Final Purge Volume? NA

Well Sampling Worksheet
WWW RAP Field Data
PERIMETER 2024-Q1 - WV-MW-11D
Kent County, MI

Well	WV-MW-11D / 2 in Diameter PVC
Sample Quarter	2024-Q1
Date	01/26/2024
Weather	35F, cloudy
Sampler Initials	RCP
Purging Device	Bladder-Pump: NA, Peristaltic-Pump: Rental, Centrifugal-Pump: NA
Meters Used	YSI: Agile Rental 4, Turbidimeter: Agile Rental 4, Water-Level-Meter: NA
Reference Measuring Point	PVC
Well Screen (ft bmp)	161.9 - 166.9
Measured Bottom Depth (ft bmp)	NR
Sample Comment	Artesian. Flow of artesian well could not overcome the head in the tubing, a peristaltic pump with a pumping rate of 500 mL/min was used to maintain the static depth of water at the top of the PVC. Collected duplicate and MS/MSD.
Initial Water Level Date/Time	01/26/2024 09:50
Initial Water Level Depth (ft bmp)	Artesian
Pump/Tubing Intake Depth (ft bmp)	164.4
Tubing Length (ft)	166
Tubing Inner Diameter (in)	0.17
Purging Initiation Date/Time	01/26/2024 09:55
Total Purge Volume (gal)	4
Modified Sample	No
If Modified, Reasoning	
Sample Collection Information	Bottling-Start: 01/26/2024 10:25:00, Bottling-Stop: 01/26/2024 10:30:00, Parameters-Sampled: PFAS

Reading Time	Depth To Water (ft)	Cumulative Drawdown (ft)	Purge Rate (ml/min)	Temperature (deg c)	Specific Conductivity (us/cm)	Dissolved Oxygen (mg/l)	pH (su)	Oxidation-Reduction Potential (mV)	Turbidity (ntu)
10:00	0.00	0.00	500	NR	NR	NR	NR	NR	NR
10:05	0.00	0.00	500	10 +	642 +	<0.5	7.5	-60	<5
10:10	0.00	0.00	500	10 +	642 +	<0.5	7.5	-76	<5
10:15	0.00	0.00	500	10 +	643 +	<0.5	7.5	-83	<5
10:20	0.00	0.00	500	10 +	643 +	<0.5	7.5	-85	<5

Notes:

1) Abbreviations include: "deg c" indicates degrees Celsius; "ft" indicates feet; "ft bmp" indicates feet below reference measuring point; "gal" indicates gallons; "in" indicates inches; "mg/l" indicates milligrams per liter; "ml/min" indicates milliliters per minute; "mV" indicates millivolts; "NA" indicates not applicable; "NR" indicates not recorded; "ntu" indicates Nephelometric Turbidity units; "su" indicates standard units; "us/cm" indicates microsiemens per centimeter; and "+" indicates the parameter(s) may be used for stabilization calculations but cannot be used for other purposes.
2) Weather temperature units are in degrees Fahrenheit, unless otherwise noted.
3) Did indicator parameters reach stabilization? Yes
4) Was the two hour time limit reached? No
5) Calculations:
   - Head Above Pump Intake (ft) 164.40
   - Total Drawdown (ft) 0.00
   - Calculated Final Purge Volume (gal) NA
6) If Drawdown Did Not Stabilize or Stabilized Drawdown >0.3 ft, is Total Purge Volume > Calculated Final Purge Volume? NA

Well Sampling Worksheet
WWW RAP Field Data
PERIMETER 2024-Q1 - WV-MW-11S
Kent County, MI

Well	WV-MW-11S / 2 in Diameter PVC
Sample Quarter	2024-Q1
Date	01/26/2024
Weather	36 Cloudy
Sampler Initials	JMS
Purging Device	Bladder-Pump: NA, Peristaltic-Pump: PER-3, Centrifugal-Pump: NA
Meters Used	YSI: Agile Rental 2, Turbidimeter: Agile Rental 2, Water-Level-Meter: WLM-2
Reference Measuring Point	PVC
Well Screen (ft bmp)	32.5 - 37.5
Measured Bottom Depth (ft bmp)	NR
Sample Comment	
Initial Water Level Date/Time	01/26/2024 09:55
Initial Water Level Depth (ft bmp)	13.34
Pump/Tubing Intake Depth (ft bmp)	35
Tubing Length (ft)	40
Tubing Inner Diameter (in)	0.17
Purging Initiation Date/Time	01/26/2024 10:00
Total Purge Volume (gal)	6.6
Modified Sample	No
If Modified, Reasoning	
Sample Collection Information	Bottling-Start: 01/26/2024 10:55:00, Bottling-Stop: 01/26/2024 11:00:00, Parameters-Sampled: PFAS

Reading Time	Depth To Water (ft)	Cumulative Drawdown (ft)	Purge Rate (ml/min)	Temperature (deg c)	Specific Conductivity (us/cm)	Dissolved Oxygen (mg/l)	pH (su)	Oxidation-Reduction Potential (mV)	Turbidity (ntu)
10:35	13.36	0.02	500	10 +	583 +	1.0	7.1	245	7
10:40	13.36	0.02	500	10 +	584 +	1.0	7.1	245	5
10:45	13.36	0.02	500	10 +	584 +	1.0	7.1	245	5
10:50	13.36	0.02	500	10 +	583 +	1.0	7.1	245	5

Notes:

1) Abbreviations include: "deg c" indicates degrees Celsius; "ft" indicates feet; "ft bmp" indicates feet below reference measuring point; "gal" indicates gallons; "in" indicates inches; "mg/l" indicates milligrams per liter; "ml/min" indicates milliliters per minute; "mV" indicates millivolts; "NA" indicates not applicable; "NR" indicates not recorded; "ntu" indicates Nephelometric Turbidity units; "su" indicates standard units; "us/cm" indicates microsiemens per centimeter; and "+" indicates the parameter(s) may be used for stabilization calculations but cannot be used for other purposes.
2) Weather temperature units are in degrees Fahrenheit, unless otherwise noted.
3) Did indicator parameters reach stabilization? Yes
4) Was the two hour time limit reached? No
5) Calculations:
   - Head Above Pump Intake (ft): 21.66
   - Total Drawdown (ft): 0.02
   - Calculated Final Purge Volume (gal): NA
6) If Drawdown Did Not Stabilize or Stabilized Drawdown >0.3 ft, is Total Purge Volume > Calculated Final Purge Volume? NA

Well Sampling Worksheet
WWW RAP Field Data
PERIMETER 2024-Q1 - WV-MW-15A
Kent County, MI

Well	WV-MW-15A / 2 in Diameter PVC
Sample Quarter	2024-Q1
Date	01/18/2024
Weather	24 Snow
Sampler Initials	JMS
Purging Device	Bladder-Pump: NA, Peristaltic-Pump: PER-3, Centrifugal-Pump: NA
Meters Used	YSI: Agile Rental 3, Turbidimeter: Agile Rental 3, Water-Level-Meter: WLM-2
Reference Measuring Point	PVC
Well Screen (ft bmp)	8.8 - 13.8
Measured Bottom Depth (ft bmp)	NR
Sample Comment	YSI Connected after 15:00 readings.
Initial Water Level Date/Time	01/18/2024 14:05
Initial Water Level Depth (ft bmp)	4.86
Pump/Tubing Intake Depth (ft bmp)	11.3
Tubing Length (ft)	16.3
Tubing Inner Diameter (in)	0.17
Purging Initiation Date/Time	01/18/2024 14:10
Total Purge Volume (gal)	4.75
Modified Sample	No
If Modified, Reasoning	
Sample Collection Information	Bottling-Start: 01/18/2024 15:30:00, Bottling-Stop: 01/18/2024 15:35:00, Parameters-Sampled: PFAS

Reading Time	Depth To Water (ft)	Cumulative Drawdown (ft)	Purge Rate (ml/min)	Temperature (deg c)	Specific Conductivity (us/cm)	Dissolved Oxygen (mg/l)	pH (su)	Oxidation-Reduction Potential (mV)	Turbidity (ntu)
14:15	4.87	0.01	225	NR	NR	NR	NR	NR	88
14:30	4.87	0.01	225	NR	NR	NR	NR	NR	53
14:45	4.87	0.01	225	NR	NR	NR	NR	NR	23
15:00	4.87	0.01	225	NR	NR	NR	NR	NR	7
15:05	4.87	0.01	225	11 +	386 +	0.8	7.8	-124	5
15:10	4.87	0.01	225	11 +	389 +	0.7	7.8	-121	5
15:15	4.87	0.01	225	11 +	388 +	0.7	7.8	-125	<5
15:20	4.87	0.01	225	11 +	392 +	0.7	7.8	-126	<5
15:25	4.87	0.01	225	11 +	390 +	0.7	7.8	-129	<5

Notes:

1) Abbreviations include: "deg c" indicates degrees Celsius; "ft" indicates feet; "ft bmp" indicates feet below reference measuring point; "gal" indicates gallons; "in" indicates inches; "mg/l" indicates milligrams per liter; "ml/min" indicates milliliters per minute; "mV" indicates millivolts; "NA" indicates not applicable; "NR" indicates not recorded; "ntu" indicates Nephelometric Turbidity units; "su" indicates standard units; "us/cm" indicates microsiemens per centimeter; and "+" indicates the parameter(s) may be used for stabilization calculations but cannot be used for other purposes.
2) Weather temperature units are in degrees Fahrenheit, unless otherwise noted.
3) Did indicator parameters reach stabilization? Yes
4) Was the two hour time limit reached? No
5) Calculations:
   - Head Above Pump Intake (ft): 6.44
   - Total Drawdown (ft): 0.01
   - Calculated Final Purge Volume (gal): NA
6) If Drawdown Did Not Stabilize or Stabilized Drawdown >0.3 ft, is Total Purge Volume > Calculated Final Purge Volume? NA

Well Sampling Worksheet
WWW RAP Field Data
PERIMETER 2024-Q1 - WV-MW-15B
Kent County, MI

Well	WV-MW-15B / 2 in Diameter PVC
Sample Quarter	2024-Q1
Date	01/18/2024
Weather	23F, Snowy
Sampler Initials	RCP
Purging Device	Bladder-Pump: NA, Peristaltic-Pump: PER-1, Centrifugal-Pump: NA
Meters Used	YSI: Agile Rental 4, Turbidimeter: Agile Rental 4, Water-Level-Meter: WLM-1
Reference Measuring Point	PVC
Well Screen (ft bmp)	32.8 - 37.8
Measured Bottom Depth (ft bmp)	37.8
Sample Comment	YSI Connected at 14:35
Initial Water Level Date/Time	01/18/2024 14:00
Initial Water Level Depth (ft bmp)	4.80
Pump/Tubing Intake Depth (ft bmp)	35.3
Tubing Length (ft)	37
Tubing Inner Diameter (in)	0.17
Purging Initiation Date/Time	01/18/2024 14:10
Total Purge Volume (gal)	3
Modified Sample	No
If Modified, Reasoning	
Sample Collection Information	Bottling-Start: 01/18/2024 15:40:00, Bottling-Stop: 01/18/2024 15:45:00, Parameters-Sampled: PFAS

Reading Time	Depth To Water (ft)	Cumulative Drawdown (ft)	Purge Rate (ml/min)	Temperature (deg c)	Specific Conductivity (us/cm)	Dissolved Oxygen (mg/l)	pH (su)	Oxidation-Reduction Potential (mV)	Turbidity (ntu)
14:20	4.95	0.15	125	NR	NR	NR	NR	NR	NR
14:35	4.95	0.15	125	NR	NR	NR	NR	NR	10
14:55	4.95	0.15	125	9 +	375 +	<0.5	7.7	29	<5
15:00	4.95	0.15	125	9 +	375 +	<0.5	7.7	-3	<5
15:05	4.95	0.15	125	9 +	376 +	<0.5	7.7	-33	<5
15:10	4.95	0.15	125	9 +	376 +	<0.5	7.7	-46	<5
15:15	4.95	0.15	125	9 +	376 +	<0.5	7.7	-59	<5
15:20	4.95	0.15	125	9 +	487 +	<0.5	7.7	-70	<5

Well Sampling Worksheet
WWW RAP Field Data
PERIMETER 2024-Q1 - WV-MW-15B
Kent County, MI

Well	WV-MW-15B / 2 in Diameter PVC
Sample Quarter	2024-Q1
Date	01/18/2024
Weather	23F, Snowy
Sampler Initials	RCP
Purging Device	Bladder-Pump: NA, Peristaltic-Pump: PER-1, Centrifugal-Pump: NA
Meters Used	YSI: Agile Rental 4, Turbidimeter: Agile Rental 4, Water-Level-Meter: WLM-1
Reference Measuring Point	PVC
Well Screen (ft bmp)	32.8 - 37.8
Measured Bottom Depth (ft bmp)	37.8
Sample Comment	YSI Connected at 14:35
Initial Water Level Date/Time	01/18/2024 14:00
Initial Water Level Depth (ft bmp)	4.80
Pump/Tubing Intake Depth (ft bmp)	35.3
Tubing Length (ft)	37
Tubing Inner Diameter (in)	0.17
Purging Initiation Date/Time	01/18/2024 14:10
Total Purge Volume (gal)	3
Modified Sample	No
If Modified, Reasoning	
Sample Collection Information	Bottling-Start: 01/18/2024 15:40:00, Bottling-Stop: 01/18/2024 15:45:00, Parameters-Sampled: PFAS

Reading Time	Depth To Water (ft)	Cumulative Drawdown (ft)	Purge Rate (ml/min)	Temperature (deg c)	Specific Conductivity (us/cm)	Dissolved Oxygen (mg/l)	pH (su)	Oxidation-Reduction Potential (mV)	Turbidity (ntu)
15:25	4.95	0.15	125	9 +	487 +	<0.5	7.7	-78	<5
15:30	4.95	0.15	125	9 +	487 +	<0.5	7.7	-84	<5
15:35	4.95	0.15	125	9 +	487 +	<0.5	7.7	-87	<5

Notes:

1) Abbreviations include: "deg c" indicates degrees Celsius; "ft" indicates feet; "ft bmp" indicates feet below reference measuring point; "gal" indicates gallons; "in" indicates inches; "mg/l" indicates milligrams per liter; "ml/min" indicates milliliters per minute; "mV" indicates millivolts; "NA" indicates not applicable; "NR" indicates not recorded; "ntu" indicates Nephelometric Turbidity units; "su" indicates standard units; "us/cm" indicates microsiemens per centimeter; and "+" indicates the parameter(s) may be used for stabilization calculations but cannot be used for other purposes.
2) Weather temperature units are in degrees Fahrenheit, unless otherwise noted.
3) Did indicator parameters reach stabilization? Yes
4) Was the two hour time limit reached? No
5) Calculations:
   - Head Above Pump Intake (ft) 30.50
   - Total Drawdown (ft) 0.15
   - Calculated Final Purge Volume (gal) NA
6) If Drawdown Did Not Stabilize or Stabilized Drawdown >0.3 ft, is Total Purge Volume > Calculated Final Purge Volume? NA

R&W/GZA
Print Date: 6/23/2025

Well Sampling Worksheet
WWW RAP Field Data
PERIMETER 2024-Q1 - WV-MW-15C
Kent County, MI

Well	WV-MW-15C / 2 in Diameter PVC
Sample Quarter	2024-Q1
Date	01/18/2024
Weather	Snow, 23°
Sampler Initials	CBM
Purging Device	Bladder-Pump: NA, Peristaltic-Pump: PER-2, Centrifugal-Pump: NA
Meters Used	YSI: Agile Rental 2, Turbidimeter: Agile Rental 2, Water-Level-Meter: WLM-4
Reference Measuring Point	PVC
Well Screen (ft bmp)	43.2 - 48.0
Measured Bottom Depth (ft bmp)	48
Sample Comment	
Initial Water Level Date/Time	01/18/2024 14:10
Initial Water Level Depth (ft bmp)	4.64
Pump/Tubing Intake Depth (ft bmp)	45.6
Tubing Length (ft)	47
Tubing Inner Diameter (in)	0.17
Purging Initiation Date/Time	01/18/2024 14:15
Total Purge Volume (gal)	3
Modified Sample	No
If Modified, Reasoning	
Sample Collection Information	Bottling-Start: 01/18/2024 15:30:00, Bottling-Stop: 01/18/2024 15:35:00, Parameters-Sampled: PFAS

Reading Time	Depth To Water (ft)	Cumulative Drawdown (ft)	Purge Rate (ml/min)	Temperature (deg c)	Specific Conductivity (us/cm)	Dissolved Oxygen (mg/l)	pH (su)	Oxidation-Reduction Potential (mV)	Turbidity (ntu)
15:15	4.69	0.05	225	9	818 +	0.5	7.4	-102	<5
15:20	4.69	0.05	225	9	818 +	0.5	7.4	-103	<5
15:25	4.69	0.05	225	9	816 +	0.4	7.4	-105	<5

Notes:

1) Abbreviations include: "deg c" indicates degrees Celsius; "ft" indicates feet; "ft bmp" indicates feet below reference measuring point; "gal" indicates gallons; "in" indicates inches; "mg/l" indicates milligrams per liter; "ml/min" indicates milliliters per minute; "mV" indicates millivolts; "NA" indicates not applicable; "NR" indicates not recorded; "ntu" indicates Nephelometric Turbidity units; "su" indicates standard units; "us/cm" indicates microsiemens per centimeter; and "+" indicates the parameter(s) may be used for stabilization calculations but cannot be used for other purposes.
2) Weather temperature units are in degrees Fahrenheit, unless otherwise noted.
3) Did indicator parameters reach stabilization? Yes
4) Was the two hour time limit reached? No
5) Calculations:
   - Head Above Pump Intake (ft): 40.96
   - Total Drawdown (ft): 0.05
   - Calculated Final Purge Volume (gal): NA
6) If Drawdown Did Not Stabilize or Stabilized Drawdown >0.3 ft, is Total Purge Volume > Calculated Final Purge Volume? NA

R&W/GZA
Print Date: 6/23/2025

Well Sampling Worksheet
WWW RAP Field Data
PERIMETER 2024-Q1 - WV-MW-15D
Kent County, MI

Well	WV-MW-15D / 2 in Diameter PVC
Sample Quarter	2024-Q1
Date	01/18/2024
Weather	Cold 20
Sampler Initials	NCK
Purging Device	Bladder-Pump: NA, Peristaltic-Pump: NA, Centrifugal-Pump: Mega Monsoon #1
Meters Used	YSI: Agile Rental 1, Turbidimeter: Agile Rental 1, Water-Level-Meter: WLM-3
Reference Measuring Point	PVC
Well Screen (ft bmp)	134.9 - 137.6
Measured Bottom Depth (ft bmp)	NR
Sample Comment	Artesian. Flow of artesian well could not overcome the head in the tubing, a peristaltic pump with a pumping rate of 500 mL/min was used to maintain the static depth of water at the top of the PVC. YSI Connected at 15:30.
Initial Water Level Date/Time	01/18/2024 14:10
Initial Water Level Depth (ft bmp)	Artesian
Pump/Tubing Intake Depth (ft bmp)	136.2
Tubing Length (ft)	139
Tubing Inner Diameter (in)	0.17
Purging Initiation Date/Time	01/18/2024 14:15
Total Purge Volume (gal)	15
Modified Sample	No
If Modified, Reasoning	
Sample Collection Information	Bottling-Start: 01/18/2024 16:15:00, Bottling-Stop: 01/18/2024 16:20:00, Parameters-Sampled: PFAS

Reading Time	Depth To Water (ft)	Cumulative Drawdown (ft)	Purge Rate (ml/min)	Temperature (deg c)	Specific Conductivity (us/cm)	Dissolved Oxygen (mg/l)	pH (su)	Oxidation-Reduction Potential (mV)	Turbidity (ntu)
14:20	0.00	0.00	500	NR	NR	NR	NR	NR	NR
14:30	0.00	0.00	500	NR	NR	NR	NR	NR	NR
15:00	0.00	0.00	500	NR	NR	NR	NR	NR	400
15:30	0.00	0.00	500	NR	NR	NR	NR	NR	35
15:35	0.00	0.00	500	10	857 +	0.6	7.4	-29 +	35
15:45	0.00	0.00	500	10	858 +	0.5	7.4	-41 +	7
16:05	0.00	0.00	500	11	855 +	0.5	7.4	-49 +	<5
16:10	0.00	0.00	500	11	856 +	0.5	7.4	-50 +	<5
16:15	0.00	0.00	500	11	855 +	0.5	7.4	-53 +	<5

Notes:

1) Abbreviations include: "deg c" indicates degrees Celsius; "ft" indicates feet; "ft bmp" indicates feet below reference measuring point; "gal" indicates gallons; "in" indicates inches; "mg/l" indicates milligrams per liter; "ml/min" indicates milliliters per minute; "mV" indicates millivolts; "NA" indicates not applicable; "NR" indicates not recorded; "ntu" indicates Nephelometric Turbidity units; "su" indicates standard units; "us/cm" indicates microsiemens per centimeter; and "+" indicates the parameter(s) may be used for stabilization calculations but cannot be used for other purposes.
2) Weather temperature units are in degrees Fahrenheit, unless otherwise noted.
3) Did indicator parameters reach stabilization? Yes
4) Was the two hour time limit reached? Yes
5) Calculations:
   - Head Above Pump Intake (ft) 136.20
   - Total Drawdown (ft) 0.00
   - Calculated Final Purge Volume (gal) NA
6) If Drawdown Did Not Stabilize or Stabilized Drawdown >0.3 ft, is Total Purge Volume > Calculated Final Purge Volume? NA

R&W/GZA
Print Date: 6/23/2025

Well Sampling Worksheet
WWW RAP Field Data
PERIMETER 2024-Q1 - WV-PMW-RI-106C
Kent County, MI

Well	WV-PMW-RI-106C / 2 in Diameter PVC
Sample Quarter	2024-Q1
Date	01/22/2024
Weather	27 Cloudy
Sampler Initials	JMS
Purging Device	Bladder-Pump: NA, Peristaltic-Pump: PER-3, Centrifugal-Pump: NA
Meters Used	YSI: Agile Rental 3, Turbidimeter: Agile Rental 3, Water-Level-Meter: WLM-4
Reference Measuring Point	PVC
Well Screen (ft bmp)	53.9 - 58.9
Measured Bottom Depth (ft bmp)	NR
Sample Comment	
Initial Water Level Date/Time	01/22/2024 11:40
Initial Water Level Depth (ft bmp)	8.30
Pump/Tubing Intake Depth (ft bmp)	56.4
Tubing Length (ft)	61.4
Tubing Inner Diameter (in)	0.17
Purging Initiation Date/Time	01/22/2024 11:45
Total Purge Volume (gal)	1.4
Modified Sample	No
If Modified, Reasoning	
Sample Collection Information	Bottling-Start: 01/22/2024 12:25:00, Bottling-Stop: 01/22/2024 12:30:00, Parameters-Sampled: PFAS

Reading Time	Depth To Water (ft)	Cumulative Drawdown (ft)	Purge Rate (ml/min)	Temperature (deg c)	Specific Conductivity (us/cm)	Dissolved Oxygen (mg/l)	pH (su)	Oxidation-Reduction Potential (mV)	Turbidity (ntu)
12:00	8.36	0.06	150	11 +	3,222 +	1.9 +	7.5	209	<5
12:05	8.36	0.06	150	11 +	3,231 +	1.6 +	7.5	205	<5
12:10	8.36	0.06	150	11 +	3,237 +	1.4 +	7.5	202	<5
12:15	8.36	0.06	150	11 +	3,241 +	1.3 +	7.6	198	<5
12:20	8.36	0.06	150	11 +	3,241 +	1.2 +	7.6	195	<5

Notes:

1) Abbreviations include: "deg c" indicates degrees Celsius; "ft" indicates feet; "ft bmp" indicates feet below reference measuring point; "gal" indicates gallons; "in" indicates inches; "mg/l" indicates milligrams per liter; "ml/min" indicates milliliters per minute; "mV" indicates millivolts; "NA" indicates not applicable; "NR" indicates not recorded; "ntu" indicates Nephelometric Turbidity units; "su" indicates standard units; "us/cm" indicates microsiemens per centimeter; and "+" indicates the parameter(s) may be used for stabilization calculations but cannot be used for other purposes.
2) Weather temperature units are in degrees Fahrenheit, unless otherwise noted.
3) Did indicator parameters reach stabilization? Yes
4) Was the two hour time limit reached? No
5) Calculations:
   - Head Above Pump Intake (ft) 48.10
   - Total Drawdown (ft) 0.06
   - Calculated Final Purge Volume (gal) NA
6) If Drawdown Did Not Stabilize or Stabilized Drawdown >0.3 ft, is Total Purge Volume > Calculated Final Purge Volume? NA

Well Sampling Worksheet
WWW RAP Field Data
PERIMETER 2024-Q1 - WV-PMW-RI-101A
Kent County, MI

Well	WV-PMW-RI-101A / 2 in Diameter PVC
Sample Quarter	2024-Q1
Date	02/14/2024
Weather	31 Sunny
Sampler Initials	JMS
Purging Device	Bladder-Pump: NA, Peristaltic-Pump: NA, Centrifugal-Pump: Mega Monsoon #2
Meters Used	YSI: Agile Rental 2, Turbidimeter: Agile Rental 2, Water-Level-Meter: WLM-2
Reference Measuring Point	PVC
Well Screen (ft bmp)	42.6 - 47.6
Measured Bottom Depth (ft bmp)	NR
Sample Comment	YSI connected after 11:00 readings.
Initial Water Level Date/Time	02/14/2024 10:20
Initial Water Level Depth (ft bmp)	39.50
Pump/Tubing Intake Depth (ft bmp)	45.1
Tubing Length (ft)	50.1
Tubing Inner Diameter (in)	0.17
Purging Initiation Date/Time	02/14/2024 10:25
Total Purge Volume (gal)	6.6
Modified Sample	No
If Modified, Reasoning	
Sample Collection Information	Bottling-Start: 02/14/2024 11:20:00, Bottling-Stop: 02/14/2024 11:25:00, Parameters-Sampled: PFAS

Reading Time	Depth To Water (ft)	Cumulative Drawdown (ft)	Purge Rate (ml/min)	Temperature (deg c)	Specific Conductivity (us/cm)	Dissolved Oxygen (mg/l)	pH (su)	Oxidation-Reduction Potential (mV)	Turbidity (ntu)
10:45	39.60	0.10	500	NR	NR	NR	NR	NR	33
10:50	39.61	0.11	500	NR	NR	NR	NR	NR	15
11:00	39.61	0.11	500	NR	NR	NR	NR	NR	7
11:05	39.61	0.11	500	11	1,133 +	8.5	7.0	195	5
11:10	39.61	0.11	500	11	1,133 +	8.5	7.0	192	5
11:15	39.61	0.11	500	11	1,135 +	8.5	7.0	190	5

Notes:

1) Abbreviations include: "deg c" indicates degrees Celsius; "ft" indicates feet; "ft bmp" indicates feet below reference measuring point; "gal" indicates gallons; "in" indicates inches; "mg/l" indicates milligrams per liter; "ml/min" indicates milliliters per minute; "mV" indicates millivolts; "NA" indicates not applicable; "NR" indicates not recorded; "ntu" indicates Nephelometric Turbidity units; "su" indicates standard units; "us/cm" indicates microsiemens per centimeter; and "+" indicates the parameter(s) may be used for stabilization calculations but cannot be used for other purposes.
2) Weather temperature units are in degrees Fahrenheit, unless otherwise noted.
3) Did indicator parameters reach stabilization? Yes
4) Was the two hour time limit reached? No
5) Calculations:
   - Head Above Pump Intake (ft) 5.60
   - Total Drawdown (ft) 0.11
   - Calculated Final Purge Volume (gal) NA
6) If Drawdown Did Not Stabilize or Stabilized Drawdown >0.3 ft, is Total Purge Volume > Calculated Final Purge Volume? NA

Well Sampling Worksheet
WWW RAP Field Data
PERIMETER 2024-Q1 - WV-PMW-RI-101B
Kent County, MI

Well	WV-PMW-RI-101B / 2 in Diameter PVC
Sample Quarter	2024-Q1
Date	02/14/2024
Weather	Sunny, 30s
Sampler Initials	CBM
Purging Device	Bladder-Pump: BP-12, Peristaltic-Pump: NA, Centrifugal-Pump: NA
Meters Used	YSI: Agile Rental 1, Turbidimeter: Agile Rental 1, Water-Level-Meter: WLM-4
Reference Measuring Point	PVC
Well Screen (ft bmp)	281.5 - 286.5
Measured Bottom Depth (ft bmp)	286.5
Sample Comment	
Initial Water Level Date/Time	02/14/2024 10:25
Initial Water Level Depth (ft bmp)	111.76
Pump/Tubing Intake Depth (ft bmp)	284
Tubing Length (ft)	287
Tubing Inner Diameter (in)	0.25
Purging Initiation Date/Time	02/14/2024 10:30
Total Purge Volume (gal)	6
Modified Sample	No
If Modified, Reasoning	
Sample Collection Information	Bottling-Start: 02/14/2024 12:35:00, Bottling-Stop: 02/14/2024 12:40:00, Parameters-Sampled: PFAS

Reading Time	Depth To Water (ft)	Cumulative Drawdown (ft)	Purge Rate (ml/min)	Temperature (deg c)	Specific Conductivity (us/cm)	Dissolved Oxygen (mg/l)	pH (su)	Oxidation-Reduction Potential (mV)	Turbidity (ntu)
11:25	111.59	-0.17	300	9	536 +	<0.5	7.6	87	<5
11:30	111.60	-0.16	300	9	538 +	<0.5	7.6	78	<5
11:35	111.60	-0.16	300	9	535 +	<0.5	7.6	57	<5
11:40	111.60	-0.16	300	9	533 +	<0.5	7.6	45	<5
11:45	111.60	-0.16	300	9	533 +	<0.5	7.6	30	<5
11:50	111.60	-0.16	300	9	532 +	<0.5	7.6	17	<5
12:10	111.60	-0.16	300	9	528 +	<0.5	7.6	-13	<5
12:15	111.60	-0.16	300	9	528 +	<0.5	7.6	-19	<5

Well Sampling Worksheet
WWW RAP Field Data
PERIMETER 2024-Q1 - WV-PMW-RI-101B
Kent County, MI

Well	WV-PMW-RI-101B / 2 in Diameter PVC
Sample Quarter	2024-Q1
Date	02/14/2024
Weather	Sunny, 30s
Sampler Initials	CBM
Purging Device	Bladder-Pump: BP-12, Peristaltic-Pump: NA, Centrifugal-Pump: NA
Meters Used	YSI: Agile Rental 1, Turbidimeter: Agile Rental 1, Water-Level-Meter: WLM-4
Reference Measuring Point	PVC
Well Screen (ft bmp)	281.5 - 286.5
Measured Bottom Depth (ft bmp)	286.5
Sample Comment	
Initial Water Level Date/Time	02/14/2024 10:25
Initial Water Level Depth (ft bmp)	111.76
Pump/Tubing Intake Depth (ft bmp)	284
Tubing Length (ft)	287
Tubing Inner Diameter (in)	0.25
Purging Initiation Date/Time	02/14/2024 10:30
Total Purge Volume (gal)	6
Modified Sample	No
If Modified, Reasoning	
Sample Collection Information	Bottling-Start: 02/14/2024 12:35:00, Bottling-Stop: 02/14/2024 12:40:00, Parameters-Sampled: PFAS

Reading Time	Depth To Water (ft)	Cumulative Drawdown (ft)	Purge Rate (ml/min)	Temperature (deg c)	Specific Conductivity (us/cm)	Dissolved Oxygen (mg/l)	pH (su)	Oxidation-Reduction Potential (mV)	Turbidity (ntu)
12:20	111.60	-0.16	300	9	528 +	<0.5	7.6	-24	<5
12:25	111.60	-0.16	300	9	526 +	<0.5	7.6	-30	<5
12:30	111.60	-0.16	300	9	526 +	<0.5	7.6	-34	<5

Notes:

1) Abbreviations include: "deg c" indicates degrees Celsius; "ft" indicates feet; "ft bmp" indicates feet below reference measuring point; "gal" indicates gallons; "in" indicates inches; "mg/l" indicates milligrams per liter; "ml/min" indicates milliliters per minute; "mV" indicates millivolts; "NA" indicates not applicable; "NR" indicates not recorded; "ntu" indicates Nephelometric Turbidity units; "su" indicates standard units; "us/cm" indicates microsiemens per centimeter; and "+" indicates the parameter(s) may be used for stabilization calculations but cannot be used for other purposes.
2) Weather temperature units are in degrees Fahrenheit, unless otherwise noted.
3) Did indicator parameters reach stabilization? Yes
4) Was the two hour time limit reached? Yes
5) Calculations:
   - Head Above Pump Intake (ft) 172.24
   - Total Drawdown (ft) -0.16
   - Calculated Final Purge Volume (gal) NA
6) If Drawdown Did Not Stabilize or Stabilized Drawdown >0.3 ft, is Total Purge Volume > Calculated Final Purge Volume? NA

Well Sampling Worksheet
WWW RAP Field Data
PERIMETER 2024-Q1 - WV-PMW-RI-102
Kent County, MI

Well	WV-PMW-RI-102 / 2 in Diameter PVC
Sample Quarter	2024-Q1
Date	02/14/2024
Weather	Clear 35
Sampler Initials	NCK
Purging Device	Bladder-Pump: NA, Peristaltic-Pump: NA, Centrifugal-Pump: Mega Monsoon #1
Meters Used	YSI: Agile Rental 3, Turbidimeter: Agile Rental 3, Water-Level-Meter: WLM-1
Reference Measuring Point	PVC
Well Screen (ft bmp)	47.2 - 52.2
Measured Bottom Depth (ft bmp)	NR
Sample Comment	YSI connected after 10:40 readings. Collected duplicate sample.
Initial Water Level Date/Time	02/14/2024 10:20
Initial Water Level Depth (ft bmp)	46.52
Pump/Tubing Intake Depth (ft bmp)	49.7
Tubing Length (ft)	53
Tubing Inner Diameter (in)	0.17
Purging Initiation Date/Time	02/14/2024 10:30
Total Purge Volume (gal)	5.3
Modified Sample	No
If Modified, Reasoning	
Sample Collection Information	Bottling-Start: 02/14/2024 11:10:00, Bottling-Stop: 02/14/2024 11:15:00, Parameters-Sampled: PFAS

Reading Time	Depth To Water (ft)	Cumulative Drawdown (ft)	Purge Rate (ml/min)	Temperature (deg c)	Specific Conductivity (us/cm)	Dissolved Oxygen (mg/l)	pH (su)	Oxidation-Reduction Potential (mV)	Turbidity (ntu)
10:40	46.55	0.03	500	NR	NR	NR	NR	NR	NR
11:00	46.55	0.03	500	11	658 +	9.3	7.4	108	<5
11:05	46.55	0.03	500	11	658 +	9.3	7.4	108	<5
11:10	46.55	0.03	500	11	658 +	9.3	7.4	108	<5

Notes:

1) Abbreviations include: "deg c" indicates degrees Celsius; "ft" indicates feet; "ft bmp" indicates feet below reference measuring point; "gal" indicates gallons; "in" indicates inches; "mg/l" indicates milligrams per liter; "ml/min" indicates milliliters per minute; "mV" indicates millivolts; "NA" indicates not applicable; "NR" indicates not recorded; "ntu" indicates Nephelometric Turbidity units; "su" indicates standard units; "us/cm" indicates microsiemens per centimeter; and "+" indicates the parameter(s) may be used for stabilization calculations but cannot be used for other purposes.
2) Weather temperature units are in degrees Fahrenheit, unless otherwise noted.
3) Did indicator parameters reach stabilization? Yes
4) Was the two hour time limit reached? No
5) Calculations:
   - Head Above Pump Intake (ft): 3.18
   - Total Drawdown (ft): 0.03
   - Calculated Final Purge Volume (gal): NA
6) If Drawdown Did Not Stabilize or Stabilized Drawdown >0.3 ft, is Total Purge Volume > Calculated Final Purge Volume? NA

Well Sampling Worksheet
WWW RAP Field Data
PERIMETER 2024-Q1 - WV-PMW-RI-104A
Kent County, MI

Well	WV-PMW-RI-104A / 2 in Diameter PVC
Sample Quarter	2024-Q1
Date	01/18/2024
Weather	19 Snow
Sampler Initials	JMS
Purging Device	Bladder-Pump: NA, Peristaltic-Pump: PER-2, Centrifugal-Pump: NA
Meters Used	YSI: Agile Rental 3, Turbidimeter: Agile Rental 3, Water-Level-Meter: WLM-2
Reference Measuring Point	PVC
Well Screen (ft bmp)	25.6 - 30.6
Measured Bottom Depth (ft bmp)	NR
Sample Comment	
Initial Water Level Date/Time	01/18/2024 10:25
Initial Water Level Depth (ft bmp)	21.49
Pump/Tubing Intake Depth (ft bmp)	28.1
Tubing Length (ft)	33.1
Tubing Inner Diameter (in)	0.17
Purging Initiation Date/Time	01/18/2024 10:30
Total Purge Volume (gal)	1
Modified Sample	No
If Modified, Reasoning	
Sample Collection Information	Bottling-Start: 01/18/2024 10:55:00, Bottling-Stop: 01/18/2024 11:00:00, Parameters-Sampled: PFAS

Reading Time	Depth To Water (ft)	Cumulative Drawdown (ft)	Purge Rate (ml/min)	Temperature (deg c)	Specific Conductivity (us/cm)	Dissolved Oxygen (mg/l)	pH (su)	Oxidation-Reduction Potential (mV)	Turbidity (ntu)
10:40	21.49	0.00	200	11 +	712 +	4.5	7.3	220	<5
10:45	21.49	0.00	200	10 +	715 +	4.4	7.3	224	<5
10:50	21.49	0.00	200	10 +	714 +	4.4	7.3	230	<5

Notes:

1) Abbreviations include: "deg c" indicates degrees Celsius; "ft" indicates feet; "ft bmp" indicates feet below reference measuring point; "gal" indicates gallons; "in" indicates inches; "mg/l" indicates milligrams per liter; "ml/min" indicates milliliters per minute; "mV" indicates millivolts; "NA" indicates not applicable; "NR" indicates not recorded; "ntu" indicates Nephelometric Turbidity units; "su" indicates standard units; "us/cm" indicates microsiemens per centimeter; and "+" indicates the parameter(s) may be used for stabilization calculations but cannot be used for other purposes.
2) Weather temperature units are in degrees Fahrenheit, unless otherwise noted.
3) Did indicator parameters reach stabilization? Yes
4) Was the two hour time limit reached? No
5) Calculations:
   - Head Above Pump Intake (ft) 6.61
   - Total Drawdown (ft) 0.00
   - Calculated Final Purge Volume (gal) NA
6) If Drawdown Did Not Stabilize or Stabilized Drawdown >0.3 ft, is Total Purge Volume > Calculated Final Purge Volume? NA

R&W/GZA
Print Date: 6/23/2025

Well Sampling Worksheet
WWW RAP Field Data
PERIMETER 2024-Q1 - WV-PMW-RI-104B
Kent County, MI

Well	WV-PMW-RI-104B / 2 in Diameter PVC
Sample Quarter	2024-Q1
Date	01/18/2024
Weather	19°F, Snowy
Sampler Initials	RCP
Purging Device	Bladder-Pump: NA, Peristaltic-Pump: PER-3, Centrifugal-Pump: NA
Meters Used	YSI: Agile Rental 3, Turbidimeter: Agile Rental 3, Water-Level-Meter: WLM-4
Reference Measuring Point	PVC
Well Screen (ft bmp)	130.0 - 135.0
Measured Bottom Depth (ft bmp)	135
Sample Comment	10:40 - Purge water observed to be very turbid. 11:15 - YSI connected.
Initial Water Level Date/Time	01/18/2024 10:10
Initial Water Level Depth (ft bmp)	16.62
Pump/Tubing Intake Depth (ft bmp)	132.5
Tubing Length (ft)	135
Tubing Inner Diameter (in)	0.17
Purging Initiation Date/Time	01/18/2024 10:30
Total Purge Volume (gal)	5
Modified Sample	No
If Modified, Reasoning	
Sample Collection Information	Bottling-Start: 01/18/2024 11:45:00, Bottling-Stop: 01/18/2024 11:50:00, Parameters-Sampled: PFAS

Reading Time	Depth To Water (ft)	Cumulative Drawdown (ft)	Purge Rate (ml/min)	Temperature (deg c)	Specific Conductivity (us/cm)	Dissolved Oxygen (mg/l)	pH (su)	Oxidation-Reduction Potential (mV)	Turbidity (ntu)
10:40	16.68	0.06	240	NR	NR	NR	NR	NR	NR
10:55	16.68	0.06	240	NR	NR	NR	NR	NR	123
11:10	16.68	0.06	240	NR	NR	NR	NR	NR	41
11:15	16.68	0.06	240	NR	NR	NR	NR	NR	18
11:25	16.68	0.06	240	10 +	588 +	0.8	7.7	-140	31
11:30	16.68	0.06	240	10 +	587 +	0.7	7.7	-154	22
11:35	16.68	0.06	240	10 +	588 +	0.7	7.7	-160	24
11:40	16.68	0.06	240	10 +	589 +	0.7	7.7	-162	23

Notes:

1) Abbreviations include: "deg c" indicates degrees Celsius; "ft" indicates feet; "ft bmp" indicates feet below reference measuring point; "gal" indicates gallons; "in" indicates inches; "mg/l" indicates milligrams per liter; "ml/min" indicates milliliters per minute; "mV" indicates millivolts; "NA" indicates not applicable; "NR" indicates not recorded; "ntu" indicates Nephelometric Turbidity units; "su" indicates standard units; "us/cm" indicates microsiemens per centimeter; and "+" indicates the parameter(s) may be used for stabilization calculations but cannot be used for other purposes.
2) Weather temperature units are in degrees Fahrenheit, unless otherwise noted.
3) Did indicator parameters reach stabilization? Yes
4) Was the two hour time limit reached? No
5) Calculations:
   - Head Above Pump Intake (ft) 115.88
   - Total Drawdown (ft) 0.06
   - Calculated Final Purge Volume (gal) NA
6) If Drawdown Did Not Stabilize or Stabilized Drawdown >0.3 ft, is Total Purge Volume > Calculated Final Purge Volume? NA

Well Sampling Worksheet
WWW RAP Field Data
PERIMETER 2024-Q1 - WV-PMW-RI-105A
Kent County, MI

Well	WV-PMW-RI-105A / 2 in Diameter PVC
Sample Quarter	2024-Q1
Date	01/19/2024
Weather	15°F, Windy, Very Cold
Sampler Initials	RCP
Purging Device	Bladder-Pump: NA, Peristaltic-Pump: PER-3, Centrifugal-Pump: NA
Meters Used	YSI: Agile Rental 2, Turbidimeter: Agile Rental 2, Water-Level-Meter: WLM-1
Reference Measuring Point	PVC
Well Screen (ft bmp)	34.5 - 39.5
Measured Bottom Depth (ft bmp)	39.5
Sample Comment	Attached YSI at 10:55. MS/MSD Collected.
Initial Water Level Date/Time	01/19/2024 10:25
Initial Water Level Depth (ft bmp)	21.78
Pump/Tubing Intake Depth (ft bmp)	37
Tubing Length (ft)	39
Tubing Inner Diameter (in)	0.17
Purging Initiation Date/Time	01/19/2024 10:30
Total Purge Volume (gal)	0.5
Modified Sample	No
If Modified, Reasoning	
Sample Collection Information	Bottling-Start: 01/19/2024 11:20:00, Bottling-Stop: 01/19/2024 11:25:00, Parameters-Sampled: PFAS

Reading Time	Depth To Water (ft)	Cumulative Drawdown (ft)	Purge Rate (ml/min)	Temperature (deg c)	Specific Conductivity (us/cm)	Dissolved Oxygen (mg/l)	pH (su)	Oxidation-Reduction Potential (mV)	Turbidity (ntu)
10:55	21.78	0.00	250	NR	NR	NR	NR	NR	<5
11:00	21.78	0.00	250	10	580 +	4.2	7.1	315	<5
11:05	21.78	0.00	250	10	578 +	3.9	7.1	322	<5
11:10	21.78	0.00	250	10	577 +	3.8	7.1	327	<5
11:15	21.78	0.00	250	10	577 +	3.6	7.1	328	<5

Notes:

1) Abbreviations include: "deg c" indicates degrees Celsius; "ft" indicates feet; "ft bmp" indicates feet below reference measuring point; "gal" indicates gallons; "in" indicates inches; "mg/l" indicates milligrams per liter; "ml/min" indicates milliliters per minute; "mV" indicates millivolts; "NA" indicates not applicable; "NR" indicates not recorded; "ntu" indicates Nephelometric Turbidity units; "su" indicates standard units; "us/cm" indicates microsiemens per centimeter; and "+" indicates the parameter(s) may be used for stabilization calculations but cannot be used for other purposes.
2) Weather temperature units are in degrees Fahrenheit, unless otherwise noted.
3) Did indicator parameters reach stabilization? Yes
4) Was the two hour time limit reached? No
5) Calculations:
   - Head Above Pump Intake (ft) 15.22
   - Total Drawdown (ft) 0.00
   - Calculated Final Purge Volume (gal) NA
6) If Drawdown Did Not Stabilize or Stabilized Drawdown >0.3 ft, is Total Purge Volume > Calculated Final Purge Volume? NA

Well Sampling Worksheet
WWW RAP Field Data
PERIMETER 2024-Q1 - WV-PMW-RI-105B
Kent County, MI

Well	WV-PMW-RI-105B / 2 in Diameter PVC
Sample Quarter	2024-Q1
Date	01/19/2024
Weather	17 Sunny
Sampler Initials	JMS
Purging Device	Bladder-Pump: NA, Peristaltic-Pump: PER-1, Centrifugal-Pump: NA
Meters Used	YSI: Agile Rental 1, Turbidimeter: Agile Rental 1, Water-Level-Meter: WLM-4
Reference Measuring Point	PVC
Well Screen (ft bmp)	79.1 - 84.1
Measured Bottom Depth (ft bmp)	NR
Sample Comment	YSI connected after 11:35 readings.
Initial Water Level Date/Time	01/19/2024 10:30
Initial Water Level Depth (ft bmp)	18.68
Pump/Tubing Intake Depth (ft bmp)	81.6
Tubing Length (ft)	86.6
Tubing Inner Diameter (in)	0.17
Purging Initiation Date/Time	01/19/2024 10:35
Total Purge Volume (gal)	6.9
Modified Sample	No
If Modified, Reasoning	
Sample Collection Information	Bottling-Start: 01/19/2024 12:10:00, Bottling-Stop: 01/19/2024 12:15:00, Parameters-Sampled: PFAS

Reading Time	Depth To Water (ft)	Cumulative Drawdown (ft)	Purge Rate (ml/min)	Temperature (deg c)	Specific Conductivity (us/cm)	Dissolved Oxygen (mg/l)	pH (su)	Oxidation-Reduction Potential (mV)	Turbidity (ntu)
10:50	18.68	0.00	275	NR	NR	NR	NR	NR	288
10:55	18.68	0.00	275	NR	NR	NR	NR	NR	106
11:05	18.68	0.00	275	NR	NR	NR	NR	NR	46
11:15	18.68	0.00	275	NR	NR	NR	NR	NR	24
11:25	18.68	0.00	275	NR	NR	NR	NR	NR	13
11:35	18.68	0.00	275	NR	NR	NR	NR	NR	8
11:45	18.68	0.00	275	9	586 +	0.5	7.7	-46	6
11:50	18.68	0.00	275	10	587 +	0.5	7.7	-56	5

Well Sampling Worksheet
WWW RAP Field Data
PERIMETER 2024-Q1 - WV-PMW-RI-105B
Kent County, MI

Well	WV-PMW-RI-105B / 2 in Diameter PVC
Sample Quarter	2024-Q1
Date	01/19/2024
Weather	17 Sunny
Sampler Initials	JMS
Purging Device	Bladder-Pump: NA, Peristaltic-Pump: PER-1, Centrifugal-Pump: NA
Meters Used	YSI: Agile Rental 1, Turbidimeter: Agile Rental 1, Water-Level-Meter: WLM-4
Reference Measuring Point	PVC
Well Screen (ft bmp)	79.1 - 84.1
Measured Bottom Depth (ft bmp)	NR
Sample Comment	YSI connected after 11:35 readings.
Initial Water Level Date/Time	01/19/2024 10:30
Initial Water Level Depth (ft bmp)	18.68
Pump/Tubing Intake Depth (ft bmp)	81.6
Tubing Length (ft)	86.6
Tubing Inner Diameter (in)	0.17
Purging Initiation Date/Time	01/19/2024 10:35
Total Purge Volume (gal)	6.9
Modified Sample	No
If Modified, Reasoning	
Sample Collection Information	Bottling-Start: 01/19/2024 12:10:00, Bottling-Stop: 01/19/2024 12:15:00, Parameters-Sampled: PFAS

Reading Time	Depth To Water (ft)	Cumulative Drawdown (ft)	Purge Rate (ml/min)	Temperature (deg c)	Specific Conductivity (us/cm)	Dissolved Oxygen (mg/l)	pH (su)	Oxidation-Reduction Potential (mV)	Turbidity (ntu)
11:55	18.68	0.00	275	9	585 +	0.5	7.7	-63	<5
12:00	18.68	0.00	275	9	584 +	0.5	7.7	-68	<5
12:05	18.68	0.00	275	9	586 +	0.5	7.7	-72	<5

Notes:

1) Abbreviations include: "deg c" indicates degrees Celsius; "ft" indicates feet; "ft bmp" indicates feet below reference measuring point; "gal" indicates gallons; "in" indicates inches; "mg/l" indicates milligrams per liter; "ml/min" indicates milliliters per minute; "mV" indicates millivolts; "NA" indicates not applicable; "NR" indicates not recorded; "ntu" indicates Nephelometric Turbidity units; "su" indicates standard units; "us/cm" indicates microsiemens per centimeter; and "+" indicates the parameter(s) may be used for stabilization calculations but cannot be used for other purposes.
2) Weather temperature units are in degrees Fahrenheit, unless otherwise noted.
3) Did indicator parameters reach stabilization? Yes
4) Was the two hour time limit reached? No
5) Calculations:
   - Head Above Pump Intake (ft) 62.92
   - Total Drawdown (ft) 0.00
   - Calculated Final Purge Volume (gal) NA
6) If Drawdown Did Not Stabilize or Stabilized Drawdown >0.3 ft, is Total Purge Volume > Calculated Final Purge Volume? NA

Well Sampling Worksheet
WWW RAP Field Data
PERIMETER 2024-Q1 - WV-PMW-RI-106A
Kent County, MI

Well	WV-PMW-RI-106A / 2 in Diameter PVC
Sample Quarter	2024-Q1
Date	01/22/2024
Weather	29F Cloudy
Sampler Initials	RCP
Purging Device	Bladder-Pump: NA, Peristaltic-Pump: PER-3, Centrifugal-Pump: NA
Meters Used	YSI: Agile Rental 1, Turbidimeter: Agile Rental 1, Water-Level-Meter: WLM-1
Reference Measuring Point	PVC
Well Screen (ft bmp)	18.5 - 23.5
Measured Bottom Depth (ft bmp)	NR
Sample Comment	14:50: Connected YSI
Initial Water Level Date/Time	01/22/2024 14:25
Initial Water Level Depth (ft bmp)	8.45
Pump/Tubing Intake Depth (ft bmp)	21
Tubing Length (ft)	26
Tubing Inner Diameter (in)	0.17
Purging Initiation Date/Time	01/22/2024 14:30
Total Purge Volume (gal)	2.5
Modified Sample	No
If Modified, Reasoning	
Sample Collection Information	Bottling-Start: 01/22/2024 15:25:00, Bottling-Stop: 01/22/2024 15:30:00, Parameters-Sampled: PFAS

Reading Time	Depth To Water (ft)	Cumulative Drawdown (ft)	Purge Rate (ml/min)	Temperature (deg c)	Specific Conductivity (us/cm)	Dissolved Oxygen (mg/l)	pH (su)	Oxidation-Reduction Potential (mV)	Turbidity (ntu)
14:45	8.52	0.07	125	NR	NR	NR	NR	NR	NR
14:50	8.52	0.07	125	NR	NR	NR	NR	NR	5
15:00	8.52	0.07	125	9	337 +	2.6	8.0	56 +	<5
15:10	8.52	0.07	125	9	337 +	2.5	8.0	60 +	<5
15:15	8.52	0.07	125	9	338 +	2.6	8.0	60 +	<5
15:20	8.52	0.07	125	9	338 +	2.6	8.0	62 +	<5

Notes:

1) Abbreviations include: "deg c" indicates degrees Celsius; "ft" indicates feet; "ft bmp" indicates feet below reference measuring point; "gal" indicates gallons; "in" indicates inches; "mg/l" indicates milligrams per liter; "ml/min" indicates milliliters per minute; "mV" indicates millivolts; "NA" indicates not applicable; "NR" indicates not recorded; "ntu" indicates Nephelometric Turbidity units; "su" indicates standard units; "us/cm" indicates microsiemens per centimeter; and "+" indicates the parameter(s) may be used for stabilization calculations but cannot be used for other purposes.
2) Weather temperature units are in degrees Fahrenheit, unless otherwise noted.
3) Did indicator parameters reach stabilization? Yes
4) Was the two hour time limit reached? No
5) Calculations:
   - Head Above Pump Intake (ft) 12.55
   - Total Drawdown (ft) 0.07
   - Calculated Final Purge Volume (gal) NA
6) If Drawdown Did Not Stabilize or Stabilized Drawdown >0.3 ft, is Total Purge Volume > Calculated Final Purge Volume? NA

Well Sampling Worksheet
WWW RAP Field Data
PERIMETER 2024-Q1 - WV-PMW-RI-106B
Kent County, MI

Well	WV-PMW-RI-106B / 2 in Diameter PVC
Sample Quarter	2024-Q1
Date	01/22/2024
Weather	27, cloudy
Sampler Initials	JMS
Purging Device	Bladder-Pump: NA, Peristaltic-Pump: PER-2, Centrifugal-Pump: NA
Meters Used	YSI: Agile Rental 3, Turbidimeter: Agile Rental 3, Water-Level-Meter: WLM-4
Reference Measuring Point	PVC
Well Screen (ft bmp)	34.0 - 39.0
Measured Bottom Depth (ft bmp)	NR
Sample Comment	
Initial Water Level Date/Time	01/22/2024 14:25
Initial Water Level Depth (ft bmp)	8.02
Pump/Tubing Intake Depth (ft bmp)	36.5
Tubing Length (ft)	39.5
Tubing Inner Diameter (in)	0.17
Purging Initiation Date/Time	01/22/2024 14:30
Total Purge Volume (gal)	7.9
Modified Sample	No
If Modified, Reasoning	
Sample Collection Information	Bottling-Start: 01/22/2024 15:30:00, Bottling-Stop: 01/22/2024 15:35:00, Parameters-Sampled: PFAS

Reading Time	Depth To Water (ft)	Cumulative Drawdown (ft)	Purge Rate (ml/min)	Temperature (deg c)	Specific Conductivity (us/cm)	Dissolved Oxygen (mg/l)	pH (su)	Oxidation-Reduction Potential (mV)	Turbidity (ntu)
14:50	8.05	0.03	500	11 +	496 +	7.2 +	8.0	71	<5
14:55	8.05	0.03	500	11 +	497 +	7.0 +	8.0	82	<5
15:00	8.05	0.03	500	11 +	499 +	6.8 +	8.0	95	<5
15:05	8.05	0.03	500	11 +	496 +	6.8 +	8.0	105	<5
15:10	8.05	0.03	500	11 +	491 +	6.9 +	8.0	112	<5
15:15	8.05	0.03	500	11 +	493 +	6.8 +	8.0	122	<5
15:20	8.05	0.03	500	11 +	491 +	6.9 +	8.0	128	<5
15:25	8.05	0.03	500	11 +	494 +	6.9 +	8.0	132	<5

Notes:

1) Abbreviations include: "deg c" indicates degrees Celsius; "ft" indicates feet; "ft bmp" indicates feet below reference measuring point; "gal" indicates gallons; "in" indicates inches; "mg/l" indicates milligrams per liter; "ml/min" indicates milliliters per minute; "mV" indicates millivolts; "NA" indicates not applicable; "NR" indicates not recorded; "ntu" indicates Nephelometric Turbidity units; "su" indicates standard units; "us/cm" indicates microsiemens per centimeter; and "+" indicates the parameter(s) may be used for stabilization calculations but cannot be used for other purposes.
2) Weather temperature units are in degrees Fahrenheit, unless otherwise noted.
3) Did indicator parameters reach stabilization? Yes
4) Was the two hour time limit reached? No
5) Calculations:
   - Head Above Pump Intake (ft) 28.48
   - Total Drawdown (ft) 0.03
   - Calculated Final Purge Volume (gal) NA
6) If Drawdown Did Not Stabilize or Stabilized Drawdown >0.3 ft, is Total Purge Volume > Calculated Final Purge Volume? NA

Well Sampling Worksheet
WWW RAP Field Data
PERIMETER 2024-Q1 - WV-PMW-RI-106D
Kent County, MI

Well	WV-PMW-RI-106D / 2 in Diameter PVC
Sample Quarter	2024-Q1
Date	01/22/2024
Weather	24F, light snow
Sampler Initials	RCP
Purging Device	Bladder-Pump: NA, Peristaltic-Pump: Rental, Centrifugal-Pump: NA
Meters Used	YSI: Agile Rental 1, Turbidimeter: Agile Rental 1, Water-Level-Meter: WLM-1
Reference Measuring Point	PVC
Well Screen (ft bmp)	70.2 - 75.2
Measured Bottom Depth (ft bmp)	75.2
Sample Comment	Attached YSI at 11:50
Initial Water Level Date/Time	01/22/2024 11:35
Initial Water Level Depth (ft bmp)	17.62
Pump/Tubing Intake Depth (ft bmp)	72.7
Tubing Length (ft)	75
Tubing Inner Diameter (in)	0.17
Purging Initiation Date/Time	01/22/2024 11:40
Total Purge Volume (gal)	2.5
Modified Sample	No
If Modified, Reasoning	
Sample Collection Information	Bottling-Start: 01/22/2024 12:50:00, Bottling-Stop: 01/22/2024 12:55:00, Parameters-Sampled: PFAS

Reading Time	Depth To Water (ft)	Cumulative Drawdown (ft)	Purge Rate (ml/min)	Temperature (deg c)	Specific Conductivity (us/cm)	Dissolved Oxygen (mg/l)	pH (su)	Oxidation-Reduction Potential (mV)	Turbidity (ntu)
11:45	17.65	0.03	125	NR	NR	NR	NR	NR	NR
11:50	17.65	0.03	125	NR	NR	NR	NR	NR	5
12:00	17.65	0.03	125	9	423 +	2.8	8.0	85 +	<5
12:05	17.65	0.03	125	9	424 +	2.0	8.0	52 +	<5
12:15	17.65	0.03	125	9	422 +	1.3	8.0	-22 +	<5
12:25	17.65	0.03	125	9	422 +	1.1	8.0	-64 +	<5
12:30	17.65	0.03	125	9	421 +	1.0	8.0	-80 +	<5
12:35	17.65	0.03	125	9	422 +	0.9	8.0	-86 +	<5
12:40	17.65	0.03	125	9	421 +	0.8	8.0	-93 +	<5
12:45	17.65	0.03	125	9	421 +	0.8	8.0	-95 +	<5

Notes:

1) Abbreviations include: "deg c" indicates degrees Celsius; "ft" indicates feet; "ft bmp" indicates feet below reference measuring point; "gal" indicates gallons; "in" indicates inches; "mg/l" indicates milligrams per liter; "ml/min" indicates milliliters per minute; "mV" indicates millivolts; "NA" indicates not applicable; "NR" indicates not recorded; "ntu" indicates Nephelometric Turbidity units; "su" indicates standard units; "us/cm" indicates microsiemens per centimeter; and "+" indicates the parameter(s) may be used for stabilization calculations but cannot be used for other purposes.
2) Weather temperature units are in degrees Fahrenheit, unless otherwise noted.
3) Did indicator parameters reach stabilization? Yes
4) Was the two hour time limit reached? No
5) Calculations:
   - Head Above Pump Intake (ft): 55.08
   - Total Drawdown (ft): 0.03
   - Calculated Final Purge Volume (gal): NA
6) If Drawdown Did Not Stabilize or Stabilized Drawdown >0.3 ft, is Total Purge Volume > Calculated Final Purge Volume? NA

Well Sampling Worksheet
WWW RAP Field Data
PERIMETER 2024-Q1 - WV-PMW-RI-106E
Kent County, MI

Well	WV-PMW-RI-106E / 2 in Diameter PVC
Sample Quarter	2024-Q1
Date	02/16/2024
Weather	Cloudy, 30s
Sampler Initials	CBM
Purging Device	Bladder-Pump: BP-11, Peristaltic-Pump: NA, Centrifugal-Pump: NA
Meters Used	YSI: Agile Rental 2, Turbidimeter: Agile Rental 2, Water-Level-Meter: WLM-2
Reference Measuring Point	PVC
Well Screen (ft bmp)	176.0 - 181.0
Measured Bottom Depth (ft bmp)	181
Sample Comment	
Initial Water Level Date/Time	02/16/2024 11:05
Initial Water Level Depth (ft bmp)	140.69
Pump/Tubing Intake Depth (ft bmp)	178.5
Tubing Length (ft)	182
Tubing Inner Diameter (in)	0.25
Purging Initiation Date/Time	02/16/2024 11:10
Total Purge Volume (gal)	1.5
Modified Sample	Yes
If Modified, Reasoning	> 0.3 ft drawdown at 50 mL/min and water level was not stable.
Sample Collection Information	Bottling-Start: 02/16/2024 13:15:00, Bottling-Stop: 02/16/2024 13:25:00, Parameters-Sampled: PFAS

Reading Time	Depth To Water (ft)	Cumulative Drawdown (ft)	Purge Rate (ml/min)	Temperature (deg c)	Specific Conductivity (us/cm)	Dissolved Oxygen (mg/l)	pH (su)	Oxidation-Reduction Potential (mV)	Turbidity (ntu)
12:30	142.80	2.11	50	7	593 +	2.5	7.5	111	21
12:55	142.80	2.11	50	6	592 +	2.5	7.5	110	25
13:00	142.69	2.00	50	7	590 +	2.6	7.4	111	19
13:05	142.75	2.06	50	7	585 +	2.6	7.4	112	30
13:10	142.70	2.01	50	7	585 +	2.6	7.4	113	22

Notes:

1) Abbreviations include: "deg c" indicates degrees Celsius; "ft" indicates feet; "ft bmp" indicates feet below reference measuring point; "gal" indicates gallons; "in" indicates inches; "mg/l" indicates milligrams per liter; "ml/min" indicates milliliters per minute; "mV" indicates millivolts; "NA" indicates not applicable; "NR" indicates not recorded; "ntu" indicates Nephelometric Turbidity units; "su" indicates standard units; "us/cm" indicates microsiemens per centimeter; and "+" indicates the parameter(s) may be used for stabilization calculations but cannot be used for other purposes.
2) Weather temperature units are in degrees Fahrenheit, unless otherwise noted.
3) Did indicator parameters reach stabilization? No
4) Was the two hour time limit reached? Yes
5) Calculations:
   - Head Above Pump Intake (ft) 37.81
   - Total Drawdown (ft) 2.01
   - Calculated Final Purge Volume (gal) 0.79
6) If Drawdown Did Not Stabilize or Stabilized Drawdown >0.3 ft, is Total Purge Volume > Calculated Final Purge Volume? Yes

Well Sampling Worksheet
WWW RAP Field Data
PERIMETER 2024-Q1 - WV-PMW-RI-107
Kent County, MI

Well	WV-PMW-RI-107 / 2 in Diameter PVC
Sample Quarter	2024-Q1
Date	02/14/2024
Weather	Clear 40
Sampler Initials	NCK
Purging Device	Bladder-Pump: BP-11, Peristaltic-Pump: NA, Centrifugal-Pump: NA
Meters Used	YSI: Agile Rental 3, Turbidimeter: Agile Rental 3, Water-Level-Meter: WLM-2
Reference Measuring Point	PVC
Well Screen (ft bmp)	189.5 - 194.5
Measured Bottom Depth (ft bmp)	NR
Sample Comment	15:00 - Purge water was observed to be extremely turbid. 16:40 - YSI Connected.
Initial Water Level Date/Time	02/14/2024 14:05
Initial Water Level Depth (ft bmp)	99.24
Pump/Tubing Intake Depth (ft bmp)	192
Tubing Length (ft)	195
Tubing Inner Diameter (in)	0.25
Purging Initiation Date/Time	02/14/2024 14:55
Total Purge Volume (gal)	1.5
Modified Sample	No
If Modified, Reasoning	
Sample Collection Information	Bottling-Start: 02/14/2024 16:55:00, Bottling-Stop: 02/14/2024 17:05:00, Parameters-Sampled: PFAS

Reading Time	Depth To Water (ft)	Cumulative Drawdown (ft)	Purge Rate (ml/min)	Temperature (deg c)	Specific Conductivity (us/cm)	Dissolved Oxygen (mg/l)	pH (su)	Oxidation-Reduction Potential (mV)	Turbidity (ntu)
15:00	99.35	0.11	50	NR	NR	NR	NR	NR	NR
15:10	99.61	0.37	50	NR	NR	NR	NR	NR	NR
15:40	99.71	0.47	50	NR	NR	NR	NR	NR	NR
16:10	99.71	0.47	50	NR	NR	NR	NR	NR	NR
16:40	99.71	0.47	50	NR	NR	NR	NR	NR	NR
16:45	99.71	0.47	50	9	395 +	0.7	7.8	-73	>999
16:50	99.71	0.47	50	9	396 +	<0.5	7.8	-81	>999
16:55	99.71	0.47	50	9	395 +	<0.5	7.8	-93	>999

Notes:

1) Abbreviations include: "deg c" indicates degrees Celsius; "ft" indicates feet; "ft bmp" indicates feet below reference measuring point; "gal" indicates gallons; "in" indicates inches; "mg/l" indicates milligrams per liter; "ml/min" indicates milliliters per minute; "mV" indicates millivolts; "NA" indicates not applicable; "NR" indicates not recorded; "ntu" indicates Nephelometric Turbidity units; "su" indicates standard units; "us/cm" indicates microsiemens per centimeter; and "+" indicates the parameter(s) may be used for stabilization calculations but cannot be used for other purposes.
2) Weather temperature units are in degrees Fahrenheit, unless otherwise noted.
3) Did indicator parameters reach stabilization? No * Turbidity Out of Range
4) Was the two hour time limit reached? Yes
5) Calculations:
   - Head Above Pump Intake (ft) 92.76
   - Total Drawdown (ft) 0.47
   - Calculated Final Purge Volume (gal) 0.58
6) If Drawdown Did Not Stabilize or Stabilized Drawdown >0.3 ft, is Total Purge Volume > Calculated Final Purge Volume? Yes

Well Sampling Worksheet
WWW RAP Field Data
PERIMETER 2024-Q1 - WV-PMW-RI-108
Kent County, MI

Well	WV-PMW-RI-108 / 2 in Diameter PVC
Sample Quarter	2024-Q1
Date	02/14/2024
Weather	40 Clear
Sampler Initials	JMS
Purging Device	Bladder-Pump: NA, Peristaltic-Pump: PER-3, Centrifugal-Pump: NA
Meters Used	YSI: Agile Rental 2, Turbidimeter: Agile Rental 2, Water-Level-Meter: WLM-1
Reference Measuring Point	PVC
Well Screen (ft bmp)	12.9 - 17.9
Measured Bottom Depth (ft bmp)	NR
Sample Comment	
Initial Water Level Date/Time	02/14/2024 16:05
Initial Water Level Depth (ft bmp)	11.85
Pump/Tubing Intake Depth (ft bmp)	15.4
Tubing Length (ft)	20.4
Tubing Inner Diameter (in)	0.17
Purging Initiation Date/Time	02/14/2024 16:10
Total Purge Volume (gal)	2.1
Modified Sample	No
If Modified, Reasoning	
Sample Collection Information	Bottling-Start: 02/14/2024 16:35:00, Bottling-Stop: 02/14/2024 16:40:00, Parameters-Sampled: PFAS

Reading Time	Depth To Water (ft)	Cumulative Drawdown (ft)	Purge Rate (ml/min)	Temperature (deg c)	Specific Conductivity (us/cm)	Dissolved Oxygen (mg/l)	pH (su)	Oxidation-Reduction Potential (mV)	Turbidity (ntu)
16:20	12.01	0.16	400	8	391 +	6.1	7.5	230	5
16:25	12.01	0.16	400	8	392 +	6.0	7.4	228	5
16:30	12.01	0.16	400	8	393 +	5.6	7.4	227	5

Notes:

1) Abbreviations include: "deg c" indicates degrees Celsius; "ft" indicates feet; "ft bmp" indicates feet below reference measuring point; "gal" indicates gallons; "in" indicates inches; "mg/l" indicates milligrams per liter; "ml/min" indicates milliliters per minute; "mV" indicates millivolts; "NA" indicates not applicable; "NR" indicates not recorded; "ntu" indicates Nephelometric Turbidity units; "su" indicates standard units; "us/cm" indicates microsiemens per centimeter; and "+" indicates the parameter(s) may be used for stabilization calculations but cannot be used for other purposes.
2) Weather temperature units are in degrees Fahrenheit, unless otherwise noted.
3) Did indicator parameters reach stabilization? Yes
4) Was the two hour time limit reached? No
5) Calculations:
   - Head Above Pump Intake (ft): 3.55
   - Total Drawdown (ft): 0.16
   - Calculated Final Purge Volume (gal): NA
6) If Drawdown Did Not Stabilize or Stabilized Drawdown >0.3 ft, is Total Purge Volume > Calculated Final Purge Volume? NA

Well Sampling Worksheet
WWW RAP Field Data
AREA 5 2024-Q1 - AREA5-RI-3A
Kent County, MI

Well	AREA5-RI-3A / 2 in Diameter PVC
Sample Quarter	2024-Q1
Date	02/09/2024
Weather	Sunny, 50s °F
Sampler Initials	CBM
Purging Device	Bladder-Pump: NA, Peristaltic-Pump: NA, Centrifugal-Pump: Mega Monsoon #1
Meters Used	YSI: Agile Rental 3, Turbidimeter: Agile Rental 3, Water-Level-Meter: WLM-4
Reference Measuring Point	PVC
Well Screen (ft bmp)	61.8 - 66.8
Measured Bottom Depth (ft bmp)	66.8
Sample Comment	15:10 - Increased pump speed from 9.8 to 10.0 Volts because pump was stalling.
Initial Water Level Date/Time	02/09/2024 13:50
Initial Water Level Depth (ft bmp)	32.57
Pump/Tubing Intake Depth (ft bmp)	64.3
Tubing Length (ft)	67
Tubing Inner Diameter (in)	0.17
Purging Initiation Date/Time	02/09/2024 13:55
Total Purge Volume (gal)	3
Modified Sample	No
If Modified, Reasoning	
Sample Collection Information	Bottling-Start: 02/09/2024 15:45:00, Bottling-Stop: 02/09/2024 15:50:00, Parameters-Sampled: PFAS

Reading Time	Depth To Water (ft)	Cumulative Drawdown (ft)	Purge Rate (ml/min)	Temperature (deg c)	Specific Conductivity (us/cm)	Dissolved Oxygen (mg/l)	pH (su)	Oxidation-Reduction Potential (mV)	Turbidity (ntu)
15:10	32.59	0.02	100	12	753 +	4.3	7.5	213	5
15:15	32.69	0.12	100	12	753 +	4.7	7.5	215	5
15:20	32.69	0.12	100	12	753 +	4.7	7.5	212	<5
15:25	32.66	0.09	100	12	754 +	4.7	7.5	212	<5
15:30	32.69	0.12	100	12	753 +	4.7	7.5	212	<5
15:35	32.69	0.12	100	12	755 +	4.7	7.5	210	<5
15:40	32.69	0.12	100	12	755 +	4.7	7.5	211	<5

Notes:

1) Abbreviations include: "deg c" indicates degrees Celsius; "ft" indicates feet; "ft bmp" indicates feet below reference measuring point; "gal" indicates gallons; "in" indicates inches; "mg/l" indicates milligrams per liter; "ml/min" indicates milliliters per minute; "mV" indicates millivolts; "NA" indicates not applicable; "NR" indicates not recorded; "ntu" indicates Nephelometric Turbidity units; "su" indicates standard units; "us/cm" indicates microsiemens per centimeter; and "+" indicates the parameter(s) may be used for stabilization calculations but cannot be used for other purposes.
2) Weather temperature units are in degrees Fahrenheit, unless otherwise noted.
3) Did indicator parameters reach stabilization? Yes
4) Was the two hour time limit reached? No
5) Calculations:
   - Head Above Pump Intake (ft) 31.73
   - Total Drawdown (ft) 0.12
   - Calculated Final Purge Volume (gal) NA
6) If Drawdown Did Not Stabilize or Stabilized Drawdown >0.3 ft, is Total Purge Volume > Calculated Final Purge Volume? NA

Well Sampling Worksheet
WWW RAP Field Data
AREA 5 2024-Q1 - AREA5-RI-3B
Kent County, MI

Well	AREA5-RI-3B / 2 in Diameter PVC
Sample Quarter	2024-Q1
Date	02/09/2024
Weather	Sunny 50°F
Sampler Initials	NCK
Purging Device	Bladder-Pump: NA, Peristaltic-Pump: NA, Centrifugal-Pump: Mega Monsoon #2
Meters Used	YSI: Agile Rental 1, Turbidimeter: Agile Rental 1, Water-Level-Meter: WLM-2
Reference Measuring Point	PVC
Well Screen (ft bmp)	109.0 - 114.0
Measured Bottom Depth (ft bmp)	NR
Sample Comment	YSI Connected at 15:20.
Initial Water Level Date/Time	02/09/2024 13:55
Initial Water Level Depth (ft bmp)	34.03
Pump/Tubing Intake Depth (ft bmp)	111.5
Tubing Length (ft)	115
Tubing Inner Diameter (in)	0.17
Purging Initiation Date/Time	02/09/2024 14:00
Total Purge Volume (gal)	1.8
Modified Sample	No
If Modified, Reasoning	
Sample Collection Information	Bottling-Start: 02/09/2024 15:35:00, Bottling-Stop: 02/09/2024 15:45:00, Parameters-Sampled: PFAS

Reading Time	Depth To Water (ft)	Cumulative Drawdown (ft)	Purge Rate (ml/min)	Temperature (deg c)	Specific Conductivity (us/cm)	Dissolved Oxygen (mg/l)	pH (su)	Oxidation-Reduction Potential (mV)	Turbidity (ntu)
14:05	34.10	0.07	50	NR	NR	NR	NR	NR	NR
14:10	34.16	0.13	50	NR	NR	NR	NR	NR	NR
14:15	34.20	0.17	50	NR	NR	NR	NR	NR	NR
15:00	34.20	0.17	50	NR	NR	NR	NR	NR	NR
15:20	34.20	0.17	50	12	2,135 +	<0.5	7.0	5	40
15:25	34.20	0.17	50	12	2,137 +	<0.5	7.0	3	38
15:30	34.20	0.17	50	12	2,139 +	<0.5	7.0	-3	37

Notes:

1) Abbreviations include: "deg c" indicates degrees Celsius; "ft" indicates feet; "ft bmp" indicates feet below reference measuring point; "gal" indicates gallons; "in" indicates inches; "mg/l" indicates milligrams per liter; "ml/min" indicates milliliters per minute; "mV" indicates millivolts; "NA" indicates not applicable; "NR" indicates not recorded; "ntu" indicates Nephelometric Turbidity units; "su" indicates standard units; "us/cm" indicates microsiemens per centimeter; and "+" indicates the parameter(s) may be used for stabilization calculations but cannot be used for other purposes.
2) Weather temperature units are in degrees Fahrenheit, unless otherwise noted.
3) Did indicator parameters reach stabilization? Yes
4) Was the two hour time limit reached? No
5) Calculations:
   - Head Above Pump Intake (ft) 77.47
   - Total Drawdown (ft) 0.17
   - Calculated Final Purge Volume (gal) NA
6) If Drawdown Did Not Stabilize or Stabilized Drawdown >0.3 ft, is Total Purge Volume > Calculated Final Purge Volume? NA

Well Sampling Worksheet
WWW RAP Field Data
AREA 5 2024-Q1 - AREA5-RI-8A
Kent County, MI

Well	AREA5-RI-8A / 2 in Diameter PVC
Sample Quarter	2024-Q1
Date	01/30/2024
Weather	Cloudy/Foggy, 35°F
Sampler Initials	CLM
Purging Device	Bladder-Pump: NA, Peristaltic-Pump: NA, Centrifugal-Pump: Mega Monsoon #2
Meters Used	YSI: Agile Rental 2, Turbidimeter: Agile Rental 2, Water-Level-Meter: WLM-1
Reference Measuring Point	PVC
Well Screen (ft bmp)	85.1 - 90.1
Measured Bottom Depth (ft bmp)	NR
Sample Comment	Turbidity did not stabilize per the Standard Operating Procedure (SOP). YSI Connected at 11:25.
Initial Water Level Date/Time	01/30/2024 10:40
Initial Water Level Depth (ft bmp)	81.32
Pump/Tubing Intake Depth (ft bmp)	87.6
Tubing Length (ft)	92.6
Tubing Inner Diameter (in)	0.17
Purging Initiation Date/Time	01/30/2024 10:45
Total Purge Volume (gal)	8.9
Modified Sample	No
If Modified, Reasoning	
Sample Collection Information	Bottling-Start: 01/30/2024 12:25:00, Bottling-Stop: 01/30/2024 12:30:00, Parameters-Sampled: PFAS

Reading Time	Depth To Water (ft)	Cumulative Drawdown (ft)	Purge Rate (ml/min)	Temperature (deg c)	Specific Conductivity (us/cm)	Dissolved Oxygen (mg/l)	pH (su)	Oxidation-Reduction Potential (mV)	Turbidity (ntu)
10:50	81.32	0.00	320	NR	NR	NR	NR	NR	NR
10:55	81.35	0.03	320	NR	NR	NR	NR	NR	NR
11:00	81.35	0.03	320	NR	NR	NR	NR	NR	NR
11:05	81.35	0.03	320	NR	NR	NR	NR	NR	NR
11:10	81.35	0.03	320	NR	NR	NR	NR	NR	NR
11:15	81.34	0.02	320	NR	NR	NR	NR	NR	NR
11:20	81.34	0.02	320	NR	NR	NR	NR	NR	16
11:25	81.34	0.02	320	13	629 +	13.2	7.2	209	12 +
11:30	81.34	0.02	320	13	629 +	11.3	7.1	230	12 +
11:35	81.34	0.02	320	13	632 +	11.0	7.1	242	7 +
11:40	81.34	0.02	320	13	633 +	10.8	7.1	244	8 +
11:45	81.34	0.02	320	13	635 +	10.9	7.1	251	6 +
11:50	81.34	0.02	320	13	636 +	10.9	7.1	255	5 +
11:55	81.34	0.02	320	13	637 +	10.7	7.1	263	<5 +
12:00	81.34	0.02	320	12	639 +	10.7	7.1	267	6 +
12:05	81.34	0.02	320	12	641 +	10.5	7.1	240	<5 +

Well Sampling Worksheet
WWW RAP Field Data
AREA 5 2024-Q1 - AREA5-RI-8A
Kent County, MI

Well	AREA5-RI-8A / 2 in Diameter PVC
Sample Quarter	2024-Q1
Date	01/30/2024
Weather	Cloudy/Foggy, 35°F
Sampler Initials	CLM
Purging Device	Bladder-Pump: NA, Peristaltic-Pump: NA, Centrifugal-Pump: Mega Monsoon #2
Meters Used	YSI: Agile Rental 2, Turbidimeter: Agile Rental 2, Water-Level-Meter: WLM-1
Reference Measuring Point	PVC
Well Screen (ft bmp)	85.1 - 90.1
Measured Bottom Depth (ft bmp)	NR
Sample Comment	Turbidity did not stabilize per the Standard Operating Procedure (SOP). YSI Connected at 11:25.
Initial Water Level Date/Time	01/30/2024 10:40
Initial Water Level Depth (ft bmp)	81.32
Pump/Tubing Intake Depth (ft bmp)	87.6
Tubing Length (ft)	92.6
Tubing Inner Diameter (in)	0.17
Purging Initiation Date/Time	01/30/2024 10:45
Total Purge Volume (gal)	8.9
Modified Sample	No
If Modified, Reasoning	
Sample Collection Information	Bottling-Start: 01/30/2024 12:25:00, Bottling-Stop: 01/30/2024 12:30:00, Parameters-Sampled: PFAS

Reading Time	Depth To Water (ft)	Cumulative Drawdown (ft)	Purge Rate (ml/min)	Temperature (deg c)	Specific Conductivity (us/cm)	Dissolved Oxygen (mg/l)	pH (su)	Oxidation-Reduction Potential (mV)	Turbidity (ntu)
12:10	81.34	0.02	320	12	641 +	10.6	7.1	185	6 +
12:15	81.34	0.02	320	12	640 +	10.5	7.1	179	<5 +
12:20	81.34	0.02	320	12	642 +	10.6	7.1	181	<5 +

Notes:

1) Abbreviations include: "deg c" indicates degrees Celsius; "ft" indicates feet; "ft bmp" indicates feet below reference measuring point; "gal" indicates gallons; "in" indicates inches; "mg/l" indicates milligrams per liter; "ml/min" indicates milliliters per minute; "mV" indicates millivolts; "NA" indicates not applicable; "NR" indicates not recorded; "ntu" indicates Nephelometric Turbidity units; "su" indicates standard units; "us/cm" indicates microsiemens per centimeter; and "+" indicates the parameter(s) may be used for stabilization calculations but cannot be used for other purposes.
2) Weather temperature units are in degrees Fahrenheit, unless otherwise noted.
3) Did indicator parameters reach stabilization? No
4) Was the two hour time limit reached? No
5) Calculations:
   - Head Above Pump Intake (ft) 6.28
   - Total Drawdown (ft) 0.02
   - Calculated Final Purge Volume (gal) NA
6) If Drawdown Did Not Stabilize or Stabilized Drawdown >0.3 ft, is Total Purge Volume > Calculated Final Purge Volume? NA

Well Sampling Worksheet
WWW RAP Field Data
AREA 5 2024-Q1 - AREA5-RI-8B
Kent County, MI

Well	AREA5-RI-8B / 2 in Diameter PVC
Sample Quarter	2024-Q1
Date	01/30/2024
Weather	Cloudy/Foggy, 35°F
Sampler Initials	RCP
Purging Device	Bladder-Pump: NA, Peristaltic-Pump: NA, Centrifugal-Pump: Mega Monsoon #1
Meters Used	YSI: Agile Rental 1, Turbidimeter: Agile Rental 1, Water-Level-Meter: WLM-2
Reference Measuring Point	PVC
Well Screen (ft bmp)	156.5 - 161.5
Measured Bottom Depth (ft bmp)	NR
Sample Comment	YSI Connected at 11:30. Split sample with AECOM.
Initial Water Level Date/Time	01/30/2024 10:35
Initial Water Level Depth (ft bmp)	81.04
Pump/Tubing Intake Depth (ft bmp)	154.1
Tubing Length (ft)	156
Tubing Inner Diameter (in)	0.17
Purging Initiation Date/Time	01/30/2024 10:40
Total Purge Volume (gal)	10.5
Modified Sample	No
If Modified, Reasoning	
Sample Collection Information	Bottling-Start: 01/30/2024 12:10:00, Bottling-Stop: 01/30/2024 12:15:00, Parameters-Sampled: PFAS

Reading Time	Depth To Water (ft)	Cumulative Drawdown (ft)	Purge Rate (ml/min)	Temperature (deg c)	Specific Conductivity (us/cm)	Dissolved Oxygen (mg/l)	pH (su)	Oxidation-Reduction Potential (mV)	Turbidity (ntu)
11:00	81.07	0.03	450	NR	NR	NR	NR	NR	NR
11:20	81.07	0.03	450	NR	NR	NR	NR	NR	46
11:30	81.07	0.03	450	NR	NR	NR	NR	NR	14
11:40	81.07	0.03	450	12	994 +	1.4	7.2	15	11
11:50	81.07	0.03	450	12	994 +	0.9	7.1	-22	10
11:55	81.07	0.03	450	12	993 +	0.8	7.1	-32	9
12:00	81.07	0.03	450	12	994 +	0.8	7.1	-38	9
12:05	81.07	0.03	450	12	993 +	0.8	7.1	-40	9

Notes:

1) Abbreviations include: "deg c" indicates degrees Celsius; "ft" indicates feet; "ft bmp" indicates feet below reference measuring point; "gal" indicates gallons; "in" indicates inches; "mg/l" indicates milligrams per liter; "ml/min" indicates milliliters per minute; "mV" indicates millivolts; "NA" indicates not applicable; "NR" indicates not recorded; "ntu" indicates Nephelometric Turbidity units; "su" indicates standard units; "us/cm" indicates microsiemens per centimeter; and "+" indicates the parameter(s) may be used for stabilization calculations but cannot be used for other purposes.
2) Weather temperature units are in degrees Fahrenheit, unless otherwise noted.
3) Did indicator parameters reach stabilization? Yes
4) Was the two hour time limit reached? No
5) Calculations:
   - Head Above Pump Intake (ft) 73.06
   - Total Drawdown (ft) 0.03
   - Calculated Final Purge Volume (gal) NA
6) If Drawdown Did Not Stabilize or Stabilized Drawdown >0.3 ft, is Total Purge Volume > Calculated Final Purge Volume? NA

Well Sampling Worksheet
WWW RAP Field Data
AREA 5 2024-Q1 - AREA5-RI-8C
Kent County, MI

Well	AREA5-RI-8C / 2 in Diameter PVC
Sample Quarter	2024-Q1
Date	01/30/2024
Weather	Overcast/misty, 35°F
Sampler Initials	MKM
Purging Device	Bladder-Pump: BP-11, Peristaltic-Pump: NA, Centrifugal-Pump: NA
Meters Used	YSI: Agile Rental 4, Turbidimeter: Agile Rental 4, Water-Level-Meter: WLM-3
Reference Measuring Point	PVC
Well Screen (ft bmp)	174.4 - 179.4
Measured Bottom Depth (ft bmp)	NR
Sample Comment	YSI Connected at 12:15.
Initial Water Level Date/Time	01/30/2024 10:30
Initial Water Level Depth (ft bmp)	85.10
Pump/Tubing Intake Depth (ft bmp)	176.9
Tubing Length (ft)	180
Tubing Inner Diameter (in)	0.25
Purging Initiation Date/Time	01/30/2024 11:00
Total Purge Volume (gal)	4.75
Modified Sample	No
If Modified, Reasoning	
Sample Collection Information	Bottling-Start: 01/30/2024 13:05:00, Bottling-Stop: 01/30/2024 13:15:00, Parameters-Sampled: PFAS

Reading Time	Depth To Water (ft)	Cumulative Drawdown (ft)	Purge Rate (ml/min)	Temperature (deg c)	Specific Conductivity (us/cm)	Dissolved Oxygen (mg/l)	pH (su)	Oxidation-Reduction Potential (mV)	Turbidity (ntu)
11:10	85.10	0.00	150	NR	NR	NR	NR	NR	NR
11:20	85.10	0.00	150	NR	NR	NR	NR	NR	452
11:45	85.10	0.00	150	NR	NR	NR	NR	NR	60
12:00	85.10	0.00	150	NR	NR	NR	NR	NR	40
12:15	85.10	0.00	150	9	930 +	7.2	7.2	103	78
12:25	85.10	0.00	150	10	920 +	7.1	7.2	114	34
12:30	85.10	0.00	150	10	921 +	7.1	7.2	118	29
12:35	85.10	0.00	150	10	922 +	7.4	7.2	123	29
12:40	85.10	0.00	150	10	924 +	7.2	7.2	128	26
12:45	85.10	0.00	150	10	922 +	7.1	7.2	132	24

Well Sampling Worksheet
WWW RAP Field Data
AREA 5 2024-Q1 - AREA5-RI-8C
Kent County, MI

Well	AREA5-RI-8C / 2 in Diameter PVC
Sample Quarter	2024-Q1
Date	01/30/2024
Weather	Overcast/misty, 35°F
Sampler Initials	MKM
Purging Device	Bladder-Pump: BP-11, Peristaltic-Pump: NA, Centrifugal-Pump: NA
Meters Used	YSI: Agile Rental 4, Turbidimeter: Agile Rental 4, Water-Level-Meter: WLM-3
Reference Measuring Point	PVC
Well Screen (ft bmp)	174.4 - 179.4
Measured Bottom Depth (ft bmp)	NR
Sample Comment	YSI Connected at 12:15.
Initial Water Level Date/Time	01/30/2024 10:30
Initial Water Level Depth (ft bmp)	85.10
Pump/Tubing Intake Depth (ft bmp)	176.9
Tubing Length (ft)	180
Tubing Inner Diameter (in)	0.25
Purging Initiation Date/Time	01/30/2024 11:00
Total Purge Volume (gal)	4.75
Modified Sample	No
If Modified, Reasoning	
Sample Collection Information	Bottling-Start: 01/30/2024 13:05:00, Bottling-Stop: 01/30/2024 13:15:00, Parameters-Sampled: PFAS

Reading Time	Depth To Water (ft)	Cumulative Drawdown (ft)	Purge Rate (ml/min)	Temperature (deg c)	Specific Conductivity (us/cm)	Dissolved Oxygen (mg/l)	pH (su)	Oxidation-Reduction Potential (mV)	Turbidity (ntu)
12:50	85.10	0.00	150	10	923 +	7.0	7.2	133	21
12:55	85.10	0.00	150	10	923 +	6.8	7.2	137	20
13:00	85.10	0.00	150	10	923 +	6.9	7.2	138	18

Notes:

1) Abbreviations include: "deg c" indicates degrees Celsius; "ft" indicates feet; "ft bmp" indicates feet below reference measuring point; "gal" indicates gallons; "in" indicates inches; "mg/l" indicates milligrams per liter; "ml/min" indicates milliliters per minute; "mV" indicates millivolts; "NA" indicates not applicable; "NR" indicates not recorded; "ntu" indicates Nephelometric Turbidity units; "su" indicates standard units; "us/cm" indicates microsiemens per centimeter; and "+" indicates the parameter(s) may be used for stabilization calculations but cannot be used for other purposes.
2) Weather temperature units are in degrees Fahrenheit, unless otherwise noted.
3) Did indicator parameters reach stabilization? Yes
4) Was the two hour time limit reached? Yes
5) Calculations:
   - Head Above Pump Intake (ft) 91.80
   - Total Drawdown (ft) 0.00
   - Calculated Final Purge Volume (gal) NA
6) If Drawdown Did Not Stabilize or Stabilized Drawdown >0.3 ft, is Total Purge Volume > Calculated Final Purge Volume? NA

Well Sampling Worksheet
WWW RAP Field Data
AREA 5 2024-Q1 - AREA5-RI-9A
Kent County, MI

Well	AREA5-RI-9A / 2 in Diameter PVC
Sample Quarter	2024-Q1
Date	01/31/2024
Weather	Cloudy, 38°F
Sampler Initials	RCP
Purging Device	Bladder-Pump: NA, Peristaltic-Pump: NA, Centrifugal-Pump: Mega Monsoon #1
Meters Used	YSI: Agile Rental 3, Turbidimeter: Agile Rental 3, Water-Level-Meter: WLM-1
Reference Measuring Point	PVC
Well Screen (ft bmp)	98.5 - 103.5
Measured Bottom Depth (ft bmp)	NR
Sample Comment	YSI Connected at 11:45
Initial Water Level Date/Time	01/31/2024 10:30
Initial Water Level Depth (ft bmp)	95.77
Pump/Tubing Intake Depth (ft bmp)	101
Tubing Length (ft)	103
Tubing Inner Diameter (in)	0.17
Purging Initiation Date/Time	01/31/2024 10:35
Total Purge Volume (gal)	1.5
Modified Sample	No
If Modified, Reasoning	
Sample Collection Information	Bottling-Start: 01/31/2024 14:40:00, Bottling-Stop: 01/31/2024 12:50:00, Parameters-Sampled: PFAS

Reading Time	Depth To Water (ft)	Cumulative Drawdown (ft)	Purge Rate (ml/min)	Temperature (deg c)	Specific Conductivity (us/cm)	Dissolved Oxygen (mg/l)	pH (su)	Oxidation-Reduction Potential (mV)	Turbidity (ntu)
10:45	95.95	0.18	50	NR	NR	NR	NR	NR	NR
11:10	95.95	0.18	50	NR	NR	NR	NR	NR	283
11:30	95.95	0.18	50	NR	NR	NR	NR	NR	41
11:45	95.95	0.18	50	NR	NR	NR	NR	NR	22
12:15	95.95	0.18	50	11 +	746 +	4.5 +	7.4	89	35
12:20	95.95	0.18	50	13 +	753 +	3.8 +	7.4	64	31
12:25	95.95	0.18	50	13 +	758 +	3.8 +	7.4	61	28
12:30	95.95	0.18	50	13 +	760 +	3.8 +	7.4	58	25
12:35	95.95	0.18	50	13 +	760 +	3.7 +	7.4	57	21

Notes:

1) Abbreviations include: "deg c" indicates degrees Celsius; "ft" indicates feet; "ft bmp" indicates feet below reference measuring point; "gal" indicates gallons; "in" indicates inches; "mg/l" indicates milligrams per liter; "ml/min" indicates milliliters per minute; "mV" indicates millivolts; "NA" indicates not applicable; "NR" indicates not recorded; "ntu" indicates Nephelometric Turbidity units; "su" indicates standard units; "us/cm" indicates microsiemens per centimeter; and "+" indicates the parameter(s) may be used for stabilization calculations but cannot be used for other purposes.
2) Weather temperature units are in degrees Fahrenheit, unless otherwise noted.
3) Did indicator parameters reach stabilization? No
4) Was the two hour time limit reached? Yes
5) Calculations:
   - Head Above Pump Intake (ft) 5.23
   - Total Drawdown (ft) 0.18
   - Calculated Final Purge Volume (gal) NA
6) If Drawdown Did Not Stabilize or Stabilized Drawdown >0.3 ft, is Total Purge Volume > Calculated Final Purge Volume? NA

Well Sampling Worksheet
WWW RAP Field Data
AREA 5 2024-Q1 - AREA5-RI-9B
Kent County, MI

Well	AREA5-RI-9B / 2 in Diameter PVC
Sample Quarter	2024-Q1
Date	01/31/2024
Weather	Cloudy, 30s°F
Sampler Initials	CLM
Purging Device	Bladder-Pump: NA, Peristaltic-Pump: NA, Centrifugal-Pump: Mega Monsoon #2
Meters Used	YSI: Agile Rental 4, Turbidimeter: Agile Rental 4, Water-Level-Meter: WLM-2
Reference Measuring Point	PVC
Well Screen (ft bmp)	151.6 - 156.6
Measured Bottom Depth (ft bmp)	NR
Sample Comment	11:10 - Adjusted purge rate. Connected YSI at 12:30.
Initial Water Level Date/Time	01/31/2024 11:00
Initial Water Level Depth (ft bmp)	110.30
Pump/Tubing Intake Depth (ft bmp)	154.1
Tubing Length (ft)	157
Tubing Inner Diameter (in)	0.17
Purging Initiation Date/Time	01/31/2024 11:00
Total Purge Volume (gal)	9.2
Modified Sample	No
If Modified, Reasoning	
Sample Collection Information	Bottling-Start: 01/31/2024 13:05:00, Bottling-Stop: 01/31/2024 13:10:00, Parameters-Sampled: PFAS

Reading Time	Depth To Water (ft)	Cumulative Drawdown (ft)	Purge Rate (ml/min)	Temperature (deg c)	Specific Conductivity (us/cm)	Dissolved Oxygen (mg/l)	pH (su)	Oxidation-Reduction Potential (mV)	Turbidity (ntu)
11:05	110.36	0.06	350	NR	NR	NR	NR	NR	NR
11:10	110.35	0.05	290	NR	NR	NR	NR	NR	NR
11:15	110.33	0.03	290	NR	NR	NR	NR	NR	NR
11:20	110.34	0.04	290	NR	NR	NR	NR	NR	>999
11:25	110.34	0.04	290	NR	NR	NR	NR	NR	NR
11:30	110.34	0.04	290	NR	NR	NR	NR	NR	587
11:35	110.34	0.04	290	NR	NR	NR	NR	NR	279
11:40	110.34	0.04	290	NR	NR	NR	NR	NR	230
11:45	110.34	0.04	290	NR	NR	NR	NR	NR	170
11:50	110.34	0.04	290	NR	NR	NR	NR	NR	134
11:55	110.34	0.04	290	NR	NR	NR	NR	NR	94
12:00	110.34	0.04	290	NR	NR	NR	NR	NR	80
12:05	110.34	0.04	290	NR	NR	NR	NR	NR	69
12:10	110.34	0.04	290	NR	NR	NR	NR	NR	58
12:15	110.34	0.04	290	NR	NR	NR	NR	NR	63
12:20	110.32	0.02	290	NR	NR	NR	NR	NR	48
12:25	110.32	0.02	290	NR	NR	NR	NR	NR	46
12:30	110.32	0.02	290	11	925 +	1.3	7.4	-2	40
12:35	110.32	0.02	290	11	925 +	<0.5	7.4	-73	30
12:40	110.32	0.02	290	11	924 +	<0.5	7.3	-97	27
12:45	110.32	0.02	290	11	927 +	<0.5	7.4	-107	24

Well Sampling Worksheet
WWW RAP Field Data
AREA 5 2024-Q1 - AREA5-RI-9B
Kent County, MI

Well	AREA5-RI-9B / 2 in Diameter PVC
Sample Quarter	2024-Q1
Date	01/31/2024
Weather	Cloudy, 30s°F
Sampler Initials	CLM
Purging Device	Bladder-Pump: NA, Peristaltic-Pump: NA, Centrifugal-Pump: Mega Monsoon #2
Meters Used	YSI: Agile Rental 4, Turbidimeter: Agile Rental 4, Water-Level-Meter: WLM-2
Reference Measuring Point	PVC
Well Screen (ft bmp)	151.6 - 156.6
Measured Bottom Depth (ft bmp)	NR
Sample Comment	11:10 - Adjusted purge rate. Connected YSI at 12:30.
Initial Water Level Date/Time	01/31/2024 11:00
Initial Water Level Depth (ft bmp)	110.30
Pump/Tubing Intake Depth (ft bmp)	154.1
Tubing Length (ft)	157
Tubing Inner Diameter (in)	0.17
Purging Initiation Date/Time	01/31/2024 11:00
Total Purge Volume (gal)	9.2
Modified Sample	No
If Modified, Reasoning	
Sample Collection Information	Bottling-Start: 01/31/2024 13:05:00, Bottling-Stop: 01/31/2024 13:10:00, Parameters-Sampled: PFAS

Reading Time	Depth To Water (ft)	Cumulative Drawdown (ft)	Purge Rate (ml/min)	Temperature (deg c)	Specific Conductivity (us/cm)	Dissolved Oxygen (mg/l)	pH (su)	Oxidation-Reduction Potential (mV)	Turbidity (ntu)
12:50	110.32	0.02	290	11	924 +	<0.5	7.4	-114	25
12:55	110.32	0.02	290	11	923 +	<0.5	7.4	-116	28
13:00	110.32	0.02	290	11	924 +	<0.5	7.4	-121	49

Notes:

1) Abbreviations include: "deg c" indicates degrees Celsius; "ft" indicates feet; "ft bmp" indicates feet below reference measuring point; "gal" indicates gallons; "in" indicates inches; "mg/l" indicates milligrams per liter; "ml/min" indicates milliliters per minute; "mV" indicates millivolts; "NA" indicates not applicable; "NR" indicates not recorded; "ntu" indicates Nephelometric Turbidity units; "su" indicates standard units; "us/cm" indicates microsiemens per centimeter; and "+" indicates the parameter(s) may be used for stabilization calculations but cannot be used for other purposes.
2) Weather temperature units are in degrees Fahrenheit, unless otherwise noted.
3) Did indicator parameters reach stabilization? No
4) Was the two hour time limit reached? Yes
5) Calculations:
   - Head Above Pump Intake (ft) 43.80
   - Total Drawdown (ft) 0.02
   - Calculated Final Purge Volume (gal) NA
6) If Drawdown Did Not Stabilize or Stabilized Drawdown >0.3 ft, is Total Purge Volume > Calculated Final Purge Volume? NA

APPENDIX E

STAGE 4 DATA VALIDATION MEMORANDUM

ENVIRONMENTAL® STANDARDS
Montrose Environmental Group

Stage 4 Data Validation Report
Perimeter Plan
Per- and Polyfluoroalkyl Substances Investigation Program
Sample Delivery Group: YI01015

INTRODUCTION

This quality assurance (QA) review is based upon an examination of the data generated from the analyses of the samples collected as part of the Per- and Polyfluoroalkyl Substances (PFAS) Investigation Program at Wolverine World Wide, Inc.'s (Wolverine's) Perimeter Plan in Rockford, Michigan, in accordance with an interim version of the Quality Assurance Project Plan Former Wolverine Tannery, House Street Property, and Wolven/Jewell Area (QAPP; GZA GeoEnvironmental, Inc. [GZA], November 1, 2018; Revision June 2022). The samples were analyzed for select PFAS by Pace Analytical Services, LLC (Pace) of West Columbia, South Carolina. Data were examined to determine compliance relative to Pace's standard operating procedure (SOP) "Determination of Per- and Polyfluoroalkyl Substances (PFAS) by LC/MS/MS (Isotope Dilution)" (Pace Document Number: ME00213-18) and the quality of the analytical results in accordance with the Data Validation SOP for PFAS data for samples generated by this Pace SOP.

The analytical results for the organic target analytes are presented on the validated data summary tables in Section 2 of this report. These validated data summary tables were generated from the GZA database. The "Validation Result," "Validation LOQ" (*i.e.*, the limit of quantitation [LOQ]), and "Validation Detect Flag" fields on the validated data summary tables have been updated to reflect all final data validation qualifiers and results. Validation qualifier codes have been placed in the "Validation Qualifiers" fields on the data tables to enable the data user to quickly assess the qualitative and/or quantitative reliability of a result based on the criteria evaluated during this QA review. Finally, the "Validation Reason Code" field has been populated with codes that indicate the reason for the validation qualifiers. Definitions of the validation qualifiers and reason codes are presented with the validated data summary tables in Section 2.

The data reviewer has included copies of validation forms, quality control (QC) summary forms, and other documentation needed to support the findings in this QA review in the Data Support Documentation (Section 3). The cover sheet for this section is a checklist of the QA procedures required by the protocol and examined in this data review. The Case Narrative and Chain-of-Custody (COC) Record are included in Section 4.

The 16 samples that have undergone a QA review for PFAS are on Table 1.

TABLE 1 – SUMMARY OF SAMPLES REVIEWED

Sample Identification	Laboratory Sample Identification	Matrix	Collection Date
WV-MW-15C	YI01015-001	Aqueous	8/31/23
WV-MW-15D	YI01015-002	Aqueous	8/31/23
WV-MW-15B	YI01015-003	Aqueous	8/31/23
WV-MW-15A	YI01015-004	Aqueous	8/31/23
HS-PMW-RI-105A	YI01015-005	Aqueous	8/31/23
HS-PMW-RI-105B	YI01015-006	Aqueous	8/31/23
WV-PMW-RI-105B	YI01015-007	Aqueous	8/31/23
WV-PMW-RI-105A	YI01015-008	Aqueous	8/31/23
FB/8/31-MKM (Field Blank)	YI01015-009	Aqueous	8/31/23
FB/8/31-JMS (Field Blank)	YI01015-010	Aqueous	8/31/23
FB/8/31-BPT (Field Blank)	YI01015-011	Aqueous	8/31/23
FB/8/31-JET (Field Blank)	YI01015-012	Aqueous	8/31/23
EQB-WLM (Equipment Blank)	YI01015-013	Aqueous	8/31/23
EB-MM (Equipment Blank)	YI01015-014	Aqueous	8/31/23
EB-BP (Equipment Blank)	YI01015-015	Aqueous	8/31/23
WV-PMW-RI-107	YI01015-016	Aqueous	8/30/23

SECTION 1 QUALITY ASSURANCE REVIEW

The findings offered in this report for analyses that underwent a Stage 4 QA review are based upon a rigorous review of the tabulated summary forms and raw data, including the following checks and QC measures as applicable to this data set:

- Data completeness
- COC Record and sample condition upon laboratory receipt
- Sample preparation and analysis holding times
- Field and laboratory blank analysis results
- Laboratory control sample (LCS) analyses
- Matrix spike/matrix spike duplicate (MS/MSD) analyses
- Surrogate/labeled pre-extraction internal standard recoveries
- Mass spectrometer tune checks
- Instrument calibration and verification
- Quantitation and qualitative identification

Data were examined to determine compliance and quality of the analytical results relative to the QAPP and SOP referenced above. Any findings are identified in the sections below.

Data Completeness

The Level 4 data deliverables were prepared by the laboratory and were reviewed by Environmental Standards, Inc. (Environmental Standards). The analytical data package was checked for completeness to ensure that all data requested were actually present in the data deliverables (refer to completeness forms in the Data Support Documentation [Section 3]). The data package was complete with any exceptions noted on the completeness forms.

Chain-of-Custody Record and Sample Condition upon Laboratory Receipt

All sample identifications (IDs) were consistent with the COC Record.

The sample reports were consistent with the analytical request designated on the COC Record, with the following exception. Sample WV-PMW-RI-107 was recorded without sample collection information (grab vs composite, matrix), sample container or preservation type, or requested analyses completed. The data reviewer assumed these missing fields were consistent with all other COC Record samples and did not request a revised COC Record as a result.

The samples for PFAS analysis were received in good condition and within the method acceptance criterion of ≤ 10°C.

Sample Preparation and Analysis Holding Times

All samples were extracted and analyzed within the QAPP-specified holding times.

The Case Narrative indicated that sample HS-PMW-RI-105B contained excessive solids and required centrifugation (following the laboratories PFAS Aqueous Centrifuge Protocol). The original sample bottle was spiked with extracted internal standard and shaken vigorously before being poured into a conical bottle and centrifuged. The centrifuged aqueous sample was decanted from the condensed solids remaining in the centrifuge bottle back into the original sample bottle. The centrifuge bottle was rinsed with 4 mL of MeOH, with the rinsate added to the sample elution. The original sample bottle was rinsed as normal. Based on these descriptions, appropriate sample preparation and sample container rinses were performed, and the data reviewer determined qualification of data was not warranted.

Field and Laboratory Blank Analyses

Laboratory blank analyses were performed at the required frequencies. Laboratory blank contamination was not observed; therefore, qualification of data was not warranted.

Instrument blanks were analyzed daily, at a minimum, and were evaluated to the LOQ. Instrument blank contamination was not observed; therefore, qualification of data was not warranted.

Laboratory method blanks were evaluated to the LOQ for samples prepared within the same preparation batch. Laboratory method blank contamination was not observed; therefore, qualification of data was not warranted.

Four aqueous field blanks and three equipment blanks listed on Table 1 were evaluated to the LOQ for the aqueous samples included in this SDG. Field and equipment blank contamination was not observed; therefore, qualification of data was not warranted.

Laboratory Control Sample Analyses

LCSs were included in each extraction batch prepared for this data set.

All LCS percent recoveries (%Rs) were within QC acceptance limits.

Matrix Spike/Matrix Spike Duplicate Analyses

An MS/MSD pair was included in one of the two extraction batches as required.

The MS/MSD pair provided in this data set had been prepared from a non-SDG sample and was not applicable to this SDG.

An MS/MSD pair was not included in the extraction batch containing samples HS-PMW-RI-105B, WV-PMW-RI-105B, WV-PMW-RI-105A, and field blanks, and all equipment blanks. Based on the COC Record, insufficient sample volume was submitted to

the laboratory to perform an MS/MSD with these samples. The data reviewer was unable to evaluate potential matrix interference within the extraction batch due to this issue.

Surrogate/Labeled Pre-extraction Internal Standard Recoveries

Surrogates were spiked prior to extraction and used as internal standards for the quantitation of target PFAS results. All surrogate (labeled pre-extraction internal standard) %Rs were within the QAPP acceptance criterion; therefore, qualification of data was not warranted.

Mass Spectrometer Tune Checks

The liquid chromatograph/tandem mass spectrometer (LC/MS/MS) tune check was performed at the required frequency and met acceptance criteria.

Instrument Calibration and Verification

Instrument calibration, second-source initial calibration verification (ICV), and continuing calibration verification (CCV) analyses were performed at the required frequency and met acceptance criteria.

The data reviewer noted that ICV 1000_SVLC-3027 analyzed on 9/7/23, at 16:47 on instrument LCMSMS01 was reported with erroneous percent recoveries for the extracted internal standards presumably as a result of an injection volume difference (according to the analysis log). The data reviewer evaluated the raw ICV data confirming both the native target compounds as well as the extracted internal standards yielded acceptable %Rs. All bracketing CCVs were acceptable. Data quality was not impacted due to this error.

Quantitation and Qualitative Identification

The laboratory-reported values (*e.g.*, sample results, instrument calibration results) were verified by recalculating the values using the raw instrument data provided by the laboratory. In addition, the raw data chromatograms were checked to ensure that the laboratory-reported analytes were correctly identified and quantitated. These checks were performed on a fraction of the results. Additional results were verified and/or recalculated if any issues were noted with the initial checks. Issues were not noted. In addition, qualification of data due to quantitative and qualitative identification was not warranted.

Conclusions

Based on the items included in this QA review, qualification of data was not warranted. The analytical data should be considered acceptable for use unless otherwise indicated in the QA review. In order to use any of the data, the data user should understand the limitations specified in this QA review.

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Date: 11/8/24

SECTION 2

ANALYTICAL RESULTS

Validation Qualifier and Reason Code Definitions

Table 1. Validation Qualifiers and Definitions

Validation Qualifier	Definition
U	The analyte was analyzed for, but was not detected above the level of the reported sample method detection limit (MDL) or sample limit of quantitation (LOQ), depending on reporting requirements.
J	The result is an estimated quantity. The associated numerical value is the approximate concentration of the analyte in the sample.
J -	The result is an estimated quantity. The associated numerical value is possibly biased low.
J +	The result is an estimated quantity. The associated numerical value is possibly biased high.
N	The analyte has been “tentatively identified” or considered “presumptively” present.
UJ	The analyte was analyzed for, but was not detected. The reported MDL and/or LOQ are approximate and may be inaccurate or imprecise.
R	The positive result is unusable. The sample result is rejected due to serious deficiencies in meeting QC criteria. The analyte may or may not be present in the sample.
UR	The not-detected result is unusable. The sample result is rejected due to serious deficiencies in meeting QC criteria. The analyte may or may not be present in the sample.
UB	The analyte was not detected substantially above the level reported in the associated laboratory, equipment, field, or trip blank.

Table 2. Validation Reason Codes and Descriptions

Validation Reason Code	Description
CI	Chromatographic interference
CR	Calculated result in which one or more of the components has been qualified, potential bias indeterminate
CRH	Calculated result in which one or more of the components has been qualified, potential high bias
CRL	Calculated result in which one or more of the components has been qualified potential low bias
CV	Continuing calibration verification evaluation criteria not met, potential bias indeterminate
CVH	Continuing calibration verification evaluation criteria not met, potential high bias
CVL	Continuing calibration verification evaluation criteria not met, potential low bias
DC	Reporting limit exceeds decision criteria (for non-detects)
DL	The analysis meets all qualitative identification criteria, but the measured concentration is less than the detection limit.

Validation Qualifier and Reason Code Definitions

Validation Reason Code	Description
DT	Dissolved metals concentration exceeded total metals concentration in the sample above the acceptance criteria
DV	Missing deliverables
EB	Equipment blank contamination
EC	Result exceeds the calibration range, potential bias indeterminate
ECH	Result exceeds the calibration range, potential high bias
ECL	Result exceeds the calibration range, potential low bias
EP	Estimated Maximum Possible Concentration (EMPC)
FB	Field blank contamination
FD	Field duplicate imprecision, potential bias indeterminate
FP	Potential false positive
FR	Field replicate imprecision, potential bias indeterminate
HA	Holding time - preparation to analysis, potential bias indeterminate
HAH	Holding time - preparation to analysis, potential high bias
HAL	Holding time - preparation to analysis, potential low bias
HC	Holding time - collection to analysis, potential bias indeterminate
HCH	Holding time - collection to analysis, potential high bias
HCL	Holding time - collection to analysis, potential low bias
HP	Holding time - collection to preparation, potential bias indeterminate
HPH	Holding time - collection to preparation, potential high bias
HPL	Holding time - collection to preparation, potential low bias
HV	Headspace present in volatile vials, potential bias indeterminate
HVL	Headspace present in volatile vials, potential low bias
IB	Instrument (including initial calibration or continuing calibration) blank contamination
IC	Initial calibration evaluation criteria not met, potential bias indeterminate
ICH	Initial calibration evaluation criteria not met, potential high bias
ICL	Initial calibration evaluation criteria not met, potential low bias
ID	Target compound identification criteria not met
IN	Interference (i.e., laboratory, chemical, and/or matrix), potential bias indeterminate
INH	Interference (i.e., laboratory, chemical, and/or matrix), potential high bias
INL	Interference (i.e., laboratory, chemical, and/or matrix), potential low bias
IR	Interference check standard recovery criteria not met, potential bias indeterminate
IRH	Interference check standard recovery criteria not met, potential high bias
IRL	Interference check standard recovery criteria not met, potential low bias
IS	Internal standard evaluation criteria not met, potential bias indeterminate
ISH	Internal standard evaluation criteria not met, potential high bias
ISL	Internal standard evaluation criteria not met, potential low bias

Validation Qualifier and Reason Code Definitions

Validation Reason Code	Description
LA	Laboratory control sample/laboratory control sample duplicate recovery criteria not met, potential bias indeterminate
LAH	Laboratory control sample/laboratory control sample duplicate recovery criteria not met, potential high bias
LAL	Laboratory control sample/laboratory control sample duplicate recovery criteria not met, potential low bias
LB	Composition (linear/branched) of the PFAS analyte in the sample is significantly different than the composition (linear/branched) of the PFAS analyte in the calibration standards used for quantitation, potential bias indeterminate
LD	Laboratory duplicate precision criteria not met, potential bias indeterminate
LM	The lock mass SICPs indicate that ion suppression evident
LP	Laboratory control sample/laboratory control sample duplicate precision criteria not met, potential bias indeterminate
LPH	Laboratory control sample/laboratory control sample duplicate precision criteria not met, potential high bias
LPL	Laboratory control sample/laboratory control sample duplicate precision criteria not met, potential low bias
LR	Linear range exceeded, potential bias indeterminate
MA	Matrix spike (MS &/or MSD) recovery criteria not met, potential bias indeterminate
MAH	Matrix spike (MS &/or MSD) recovery criteria not met, potential high bias
MAL	Matrix spike (MS &/or MSD) recovery criteria not met, potential low bias
MB	Method blank or preparation blank contamination
MP	Matrix spike (MS/MSD) or laboratory duplicate precision criteria not met, potential bias indeterminate
NB	Elevated detection limit or estimated result due to instrument drift (i.e., negative ICB or CCB result with an absolute value > 2× the MDL)
PD	Post-digestion spike recovery outside acceptance range, potential bias indeterminate
PDH	Post-digestion spike recovery outside acceptance range, potential high bias
PDL	Post-digestion spike recovery outside acceptance range, potential low bias
PJ	Professional judgment, potential bias indeterminate
PJH	Professional judgment, potential high bias
PJL	Professional judgment, potential low bias
PM	Performance evaluation mixture criteria not met, potential bias indeterminate
PMH	Performance evaluation mixture criteria not met, potential high bias
PML	Performance evaluation mixture criteria not met, potential low bias
PR	Peak(s) not adequately resolved, potential bias indeterminate
PRH	Peak(s) not adequately resolved, potential high bias
PRL	Peak(s) not adequately resolved, potential low bias
PS	Low percent solids could affect accuracy, potential bias indeterminate

Validation Qualifier and Reason Code Definitions

Validation Reason Code	Description
PT	Chromatographic pattern in sample does not match pattern of calibration standard
RA	Reference material recovery criteria not met, potential bias indeterminate
RAH	Reference material recovery criteria not met, potential high bias
RAL	Reference material recovery criteria not met, potential low bias
RB	Rinsate blank contamination
RL	The analysis meets all qualitative identification criteria, but the measured concentration is less than the quantitation or reporting limit, potential bias indeterminate
SA	Method of standard additions correction coefficient <0.995, potential bias indeterminate
SC	RPD Between two columns exceeds criteria, potential bias indeterminate
SD	Serial dilution results did not meet evaluation criteria, potential bias indeterminate
SDH	Serial dilution results did not meet evaluation criteria, potential high bias
SDL	Serial dilution results did not meet evaluation criteria, potential low bias
SP	Sample preservation / cooler temperature criteria not met, potential bias indeterminate
SPH	Sample preservation / cooler temperature criteria not met, potential high bias
SPL	Sample preservation / cooler temperature criteria not met, potential low bias
SR	Surrogate recovery outside acceptance range, potential bias indeterminate
SRH	Surrogate recovery outside acceptance range, potential high bias
SRL	Surrogate recovery outside acceptance range, potential low bias
SS	Second source evaluation criteria not met, potential bias indeterminate
SSH	Second source evaluation criteria not met, potential high bias
SSL	Second source evaluation criteria not met, potential low bias
ST	Compound not quantitated against an authentic standard, potential bias indeterminate
TB	Trip blank contamination
TD	Result for dissolved constituent significantly exceeded result for total constituent, potential bias indeterminate
TIC	Tentative identification, quantified using an assumed calibration factor, potential bias indeterminate.
TIR	Tentative identification and was observed in an associated laboratory, equipment, field, or trip blank.
TN	Instrument performance (tuning) criteria not met
YH	Potential high bias due to a y-intercept in the calibration curve that significantly contributes to the analyte response.
YL	Potential high bias due to a y-intercept in the calibration curve that significantly decreases the analyte response.

Lab Sample ID	YI01015-001
Sample Name	WV-MW-15C
Sample Type	N
Sample Date	8/31/2023 12:55:00 PM
Sample Matrix	WG
Validated?	Y
Validation Level	Level 4

ANALYTIC METHOD	Chemical Name	CAS	Test Type	DF	Validation Result	Validation LOQ	UNIT	Lab Qualifiers	Validation Qualifiers	Validation Detect Flag	Validation Reason Code	Reportable?
QSM-PFASbyLC/MS/MS	11-chloroeicosafluoro-3-oxaundecane-1-sulfonic acid (11Cl-PF	763051-92-9	INITIAL	1		7.2	ng/l	U	U	N		Yes
	1H, 1H, 2H, 2H-perfluohexane sulfonic acid (4:2 FTS)	757124-72-4	INITIAL	1		7.2	ng/l	U	U	N		Yes
	1H, 1H, 2H, 2H-perfluorodecane sulfonic acid (8:2 FTS)	39108-34-4	INITIAL	1		7.2	ng/l	U	U	N		Yes
	1H, 1H, 2H, 2H-perfluorooctane sulfonic acid (6:2 FTS)	27619-97-2	INITIAL	1		7.2	ng/l	U	U	N		Yes
	4,8-dioxa-3H-perfluorononanoic acid (ADONA)	919005-14-4	INITIAL	1		7.2	ng/l	U	U	N		Yes
	9-chlorohexadecafluoro-3-oxanone-1-sulfonic acid (9Cl-PF3ONS	756426-58-1	INITIAL	1		7.2	ng/l	U	U	N		Yes
	Hexafluoropropylene oxide dimer acid (GenX)	13252-13-6	INITIAL	1		7.2	ng/l	U	U	N		Yes
	N-ethylperfluoro-1-octanesulfonamidoacetic acid (EtFOSAA)	2991-50-6	INITIAL	1		7.2	ng/l	U	U	N		Yes
	N-methylperfluoro-1-octanesulfonamidoacetic acid (MeFOSAA)	2355-31-9	INITIAL	1		7.2	ng/l	U	U	N		Yes
	Perfluoro-1-nonane sulfonic acid (PFNS)	68259-12-1	INITIAL	1		3.6	ng/l	U	U	N		Yes
	Perfluoro-1-octanesulfonamide (PFOSA)	754-91-6	INITIAL	1		3.6	ng/l	U	U	N		Yes
	Perfluoro-1-pentane sulfonic acid (PFPeS)	2706-91-4	INITIAL	1		3.6	ng/l	U	U	N		Yes
	Perfluorobutanesulfonic acid (PFBS)	375-73-5	INITIAL	1		3.6	ng/l	U	U	N		Yes
	Perfluorobutanoic Acid (PFBA)	375-22-4	INITIAL	1		3.6	ng/l	U	U	N		Yes
	Perfluorodecanesulfonic acid (PFDS)	335-77-3	INITIAL	1		3.6	ng/l	U	U	N		Yes
	Perfluorodecanoic acid (PFDA)	335-76-2	INITIAL	1		3.6	ng/l	U	U	N		Yes
	Perfluorododecanoic acid (PFDoA)	307-55-1	INITIAL	1		3.6	ng/l	U	U	N		Yes
	Perfluoroheptanesulfonic acid (PFHPS)	375-92-8	INITIAL	1		3.6	ng/l	U	U	N		Yes
	Perfluoroheptanoic acid (PFHpA)	375-85-9	INITIAL	1		3.6	ng/l	U	U	N		Yes
	Perfluorohexanesulfonic acid (PFHxS)	355-46-4	INITIAL	1		3.6	ng/l	U	U	N		Yes
	Perfluorohexanoic acid (PFHxA)	307-24-4	INITIAL	1		3.6	ng/l	U	U	N		Yes
	Perfluorononanoic acid (PFNA)	375-95-1	INITIAL	1		3.6	ng/l	U	U	N		Yes
	Perfluorooctanesulfonic acid (PFOS)	1763-23-1	INITIAL	1		3.6	ng/l	U	U	N		Yes
	Perfluorooctanoic acid (PFOA)	335-67-1	INITIAL	1		3.6	ng/l	U	U	N		Yes
	Perfluoropentanoic Acid (PFPeA)	2706-90-3	INITIAL	1		3.6	ng/l	U	U	N		Yes

Lab Sample ID	YI01015-001
Sample Name	WV-MW-15C
Sample Type	N
Sample Date	8/31/2023 12:55:00 PM
Sample Matrix	WG
Validated?	Y
Validation Level	Level 4

ANALYTIC METHOD	Chemical Name	CAS	Test Type	DF	Validation Result	Validation LOQ	UNIT	Lab Qualifiers	Validation Qualifiers	Validation Detect Flag	Validation Reason Code	Reportable?
QSM-PFASbyLC/MS/MS	Perfluorotetradecanoic acid (PFTA)	376-06-7	INITIAL	1		3.6	ng/l	U	U	N		Yes
	Perfluorotridecanoic Acid (PFTriA)	72629-94-8	INITIAL	1		3.6	ng/l	U	U	N		Yes
	Perfluoroundecanoic Acid (PFUnA)	2058-94-8	INITIAL	1		3.6	ng/l	U	U	N		Yes

Lab Sample ID	YI01015-002
Sample Name	WV-MW-15D
Sample Type	N
Sample Date	8/31/2023 1:25:00 PM
Sample Matrix	WG
Validated?	Y
Validation Level	Level 4

ANALYTIC METHOD	Chemical Name	CAS	Test Type	DF	Validation Result	Validation LOQ	UNIT	Lab Qualifiers	Validation Qualifiers	Validation Detect Flag	Validation Reason Code	Reportable?
QSM-PFASbyLC/MS/MS	11-chloroeicosafluoro-3-oxaundecane-1-sulfonic acid (11Cl-PF	763051-92-9	INITIAL	1		6.9	ng/l	U	U	N		Yes
	1H, 1H, 2H, 2H-perfluohexane sulfonic acid (4:2 FTS)	757124-72-4	INITIAL	1		6.9	ng/l	U	U	N		Yes
	1H, 1H, 2H, 2H-perfluorodecane sulfonic acid (8:2 FTS)	39108-34-4	INITIAL	1		6.9	ng/l	U	U	N		Yes
	1H, 1H, 2H, 2H-perfluorooctane sulfonic acid (6:2 FTS)	27619-97-2	INITIAL	1		6.9	ng/l	U	U	N		Yes
	4,8-dioxa-3H-perfluorononanoic acid (ADONA)	919005-14-4	INITIAL	1		6.9	ng/l	U	U	N		Yes
	9-chlorohexadecafluoro-3-oxanone-1-sulfonic acid (9Cl-PF3ONS	756426-58-1	INITIAL	1		6.9	ng/l	U	U	N		Yes
	Hexafluoropropylene oxide dimer acid (GenX)	13252-13-6	INITIAL	1		6.9	ng/l	U	U	N		Yes
	N-ethylperfluoro-1-octanesulfonamidoacetic acid (EtFOSAA)	2991-50-6	INITIAL	1		6.9	ng/l	U	U	N		Yes
	N-methylperfluoro-1-octanesulfonamidoacetic acid (MeFOSAA)	2355-31-9	INITIAL	1		6.9	ng/l	U	U	N		Yes
	Perfluoro-1-nonane sulfonic acid (PFNS)	68259-12-1	INITIAL	1		3.4	ng/l	U	U	N		Yes
	Perfluoro-1-octanesulfonamide (PFOSA)	754-91-6	INITIAL	1		3.4	ng/l	U	U	N		Yes
	Perfluoro-1-pentane sulfonic acid (PFPeS)	2706-91-4	INITIAL	1		3.4	ng/l	U	U	N		Yes
	Perfluorobutanesulfonic acid (PFBS)	375-73-5	INITIAL	1		3.4	ng/l	U	U	N		Yes
	Perfluorobutanoic Acid (PFBA)	375-22-4	INITIAL	1		3.4	ng/l	U	U	N		Yes
	Perfluorodecanesulfonic acid (PFDS)	335-77-3	INITIAL	1		3.4	ng/l	U	U	N		Yes
	Perfluorodecanoic acid (PFDA)	335-76-2	INITIAL	1		3.4	ng/l	U	U	N		Yes
	Perfluorododecanoic acid (PFDoA)	307-55-1	INITIAL	1		3.4	ng/l	U	U	N		Yes
	Perfluoroheptanesulfonic acid (PFHPS)	375-92-8	INITIAL	1		3.4	ng/l	U	U	N		Yes
	Perfluoroheptanoic acid (PFHpA)	375-85-9	INITIAL	1		3.4	ng/l	U	U	N		Yes
	Perfluorohexanesulfonic acid (PFHxS)	355-46-4	INITIAL	1		3.4	ng/l	U	U	N		Yes
	Perfluorohexanoic acid (PFHxA)	307-24-4	INITIAL	1		3.4	ng/l	U	U	N		Yes
	Perfluorononanoic acid (PFNA)	375-95-1	INITIAL	1		3.4	ng/l	U	U	N		Yes
	Perfluorooctanesulfonic acid (PFOS)	1763-23-1	INITIAL	1		3.4	ng/l	U	U	N		Yes
	Perfluorooctanoic acid (PFOA)	335-67-1	INITIAL	1		3.4	ng/l	U	U	N		Yes
	Perfluoropentanoic Acid (PFPeA)	2706-90-3	INITIAL	1		3.4	ng/l	U	U	N		Yes

Lab Sample ID	YI01015-002
Sample Name	WV-MW-15D
Sample Type	N
Sample Date	8/31/2023 1:25:00 PM
Sample Matrix	WG
Validated?	Y
Validation Level	Level 4

ANALYTIC METHOD	Chemical Name	CAS	Test Type	DF	Validation Result	Validation LOQ	UNIT	Lab Qualifiers	Validation Qualifiers	Validation Detect Flag	Validation Reason Code	Reportable?
QSM-PFASbyLC/MS/MS	Perfluorotetradecanoic acid (PFTA)	376-06-7	INITIAL	1		3.4	ng/l	U	U	N		Yes
	Perfluorotridecanoic Acid (PFTriA)	72629-94-8	INITIAL	1		3.4	ng/l	U	U	N		Yes
	Perfluoroundecanoic Acid (PFUnA)	2058-94-8	INITIAL	1		3.4	ng/l	U	U	N		Yes

Lab Sample ID	YI01015-003
Sample Name	WV-MW-15B
Sample Type	N
Sample Date	8/31/2023 12:45:00 PM
Sample Matrix	WG
Validated?	Y
Validation Level	Level 4

ANALYTIC METHOD	Chemical Name	CAS	Test Type	DF	Validation Result	Validation LOQ	UNIT	Lab Qualifiers	Validation Qualifiers	Validation Detect Flag	Validation Reason Code	Reportable?
QSM-PFASbyLC/MS/MS	11-chloroeicosafluoro-3-oxaundecane-1-sulfonic acid (11Cl-PF	763051-92-9	INITIAL	1		7.3	ng/l	U	U	N		Yes
	1H, 1H, 2H, 2H-perfluohexane sulfonic acid (4:2 FTS)	757124-72-4	INITIAL	1		7.3	ng/l	U	U	N		Yes
	1H, 1H, 2H, 2H-perfluorodecane sulfonic acid (8:2 FTS)	39108-34-4	INITIAL	1		7.3	ng/l	U	U	N		Yes
	1H, 1H, 2H, 2H-perfluorooctane sulfonic acid (6:2 FTS)	27619-97-2	INITIAL	1		7.3	ng/l	U	U	N		Yes
	4,8-dioxa-3H-perfluorononanoic acid (ADONA)	919005-14-4	INITIAL	1		7.3	ng/l	U	U	N		Yes
	9-chlorohexadecafluoro-3-oxanone-1-sulfonic acid (9Cl-PF3ONS	756426-58-1	INITIAL	1		7.3	ng/l	U	U	N		Yes
	Hexafluoropropylene oxide dimer acid (GenX)	13252-13-6	INITIAL	1		7.3	ng/l	U	U	N		Yes
	N-ethylperfluoro-1-octanesulfonamidoacetic acid (EtFOSAA)	2991-50-6	INITIAL	1		7.3	ng/l	U	U	N		Yes
	N-methylperfluoro-1-octanesulfonamidoacetic acid (MeFOSAA)	2355-31-9	INITIAL	1		7.3	ng/l	U	U	N		Yes
	Perfluoro-1-nonane sulfonic acid (PFNS)	68259-12-1	INITIAL	1		3.7	ng/l	U	U	N		Yes
	Perfluoro-1-octanesulfonamide (PFOSA)	754-91-6	INITIAL	1		3.7	ng/l	U	U	N		Yes
	Perfluoro-1-pentane sulfonic acid (PFPeS)	2706-91-4	INITIAL	1		3.7	ng/l	U	U	N		Yes
	Perfluorobutanesulfonic acid (PFBS)	375-73-5	INITIAL	1		3.7	ng/l	U	U	N		Yes
	Perfluorobutanoic Acid (PFBA)	375-22-4	INITIAL	1		3.7	ng/l	U	U	N		Yes
	Perfluorodecanesulfonic acid (PFDS)	335-77-3	INITIAL	1		3.7	ng/l	U	U	N		Yes
	Perfluorodecanoic acid (PFDA)	335-76-2	INITIAL	1		3.7	ng/l	U	U	N		Yes
	Perfluorododecanoic acid (PFDoA)	307-55-1	INITIAL	1		3.7	ng/l	U	U	N		Yes
	Perfluoroheptanesulfonic acid (PFHPS)	375-92-8	INITIAL	1		3.7	ng/l	U	U	N		Yes
	Perfluoroheptanoic acid (PFHpA)	375-85-9	INITIAL	1		3.7	ng/l	U	U	N		Yes
	Perfluorohexanesulfonic acid (PFHxS)	355-46-4	INITIAL	1		3.7	ng/l	U	U	N		Yes
	Perfluorohexanoic acid (PFHxA)	307-24-4	INITIAL	1		3.7	ng/l	U	U	N		Yes
	Perfluorononanoic acid (PFNA)	375-95-1	INITIAL	1		3.7	ng/l	U	U	N		Yes
	Perfluorooctanesulfonic acid (PFOS)	1763-23-1	INITIAL	1		3.7	ng/l	U	U	N		Yes
	Perfluorooctanoic acid (PFOA)	335-67-1	INITIAL	1		3.7	ng/l	U	U	N		Yes
	Perfluoropentanoic Acid (PFPeA)	2706-90-3	INITIAL	1		3.7	ng/l	U	U	N		Yes

Lab Sample ID	YI01015-003
Sample Name	WV-MW-15B
Sample Type	N
Sample Date	8/31/2023 12:45:00 PM
Sample Matrix	WG
Validated?	Y
Validation Level	Level 4

ANALYTIC METHOD	Chemical Name	CAS	Test Type	DF	Validation Result	Validation LOQ	UNIT	Lab Qualifiers	Validation Qualifiers	Validation Detect Flag	Validation Reason Code	Reportable?
QSM-PFASbyLC/MS/MS	Perfluorotetradecanoic acid (PFTA)	376-06-7	INITIAL	1		3.7	ng/l	U	U	N		Yes
	Perfluorotridecanoic Acid (PFTriA)	72629-94-8	INITIAL	1		3.7	ng/l	U	U	N		Yes
	Perfluoroundecanoic Acid (PFUnA)	2058-94-8	INITIAL	1		3.7	ng/l	U	U	N		Yes

Lab Sample ID	YI01015-004
Sample Name	WV-MW-15A
Sample Type	N
Sample Date	8/31/2023 12:25:00 PM
Sample Matrix	WG
Validated?	Y
Validation Level	Level 4

ANALYTIC METHOD	Chemical Name	CAS	Test Type	DF	Validation Result	Validation LOQ	UNIT	Lab Qualifiers	Validation Qualifiers	Validation Detect Flag	Validation Reason Code	Reportable?
QSM-PFASbyLC/MS/MS	11-chloroeicosafluoro-3-oxaundecane-1-sulfonic acid (11Cl-PF	763051-92-9	INITIAL	1		7.7	ng/l	U	U	N		Yes
	1H, 1H, 2H, 2H-perfluohexane sulfonic acid (4:2 FTS)	757124-72-4	INITIAL	1		7.7	ng/l	U	U	N		Yes
	1H, 1H, 2H, 2H-perfluorodecane sulfonic acid (8:2 FTS)	39108-34-4	INITIAL	1		7.7	ng/l	U	U	N		Yes
	1H, 1H, 2H, 2H-perfluorooctane sulfonic acid (6:2 FTS)	27619-97-2	INITIAL	1		7.7	ng/l	U	U	N		Yes
	4,8-dioxa-3H-perfluorononanoic acid (ADONA)	919005-14-4	INITIAL	1		7.7	ng/l	U	U	N		Yes
	9-chlorohexadecafluoro-3-oxanone-1-sulfonic acid (9Cl-PF3ONS	756426-58-1	INITIAL	1		7.7	ng/l	U	U	N		Yes
	Hexafluoropropylene oxide dimer acid (GenX)	13252-13-6	INITIAL	1		7.7	ng/l	U	U	N		Yes
	N-ethylperfluoro-1-octanesulfonamidoacetic acid (EtFOSAA)	2991-50-6	INITIAL	1		7.7	ng/l	U	U	N		Yes
	N-methylperfluoro-1-octanesulfonamidoacetic acid (MeFOSAA)	2355-31-9	INITIAL	1		7.7	ng/l	U	U	N		Yes
	Perfluoro-1-nonane sulfonic acid (PFNS)	68259-12-1	INITIAL	1		3.9	ng/l	U	U	N		Yes
	Perfluoro-1-octanesulfonamide (PFOSA)	754-91-6	INITIAL	1		3.9	ng/l	U	U	N		Yes
	Perfluoro-1-pentane sulfonic acid (PFPeS)	2706-91-4	INITIAL	1		3.9	ng/l	U	U	N		Yes
	Perfluorobutanesulfonic acid (PFBS)	375-73-5	INITIAL	1		3.9	ng/l	U	U	N		Yes
	Perfluorobutanoic Acid (PFBA)	375-22-4	INITIAL	1		3.9	ng/l	U	U	N		Yes
	Perfluorodecanesulfonic acid (PFDS)	335-77-3	INITIAL	1		3.9	ng/l	U	U	N		Yes
	Perfluorodecanoic acid (PFDA)	335-76-2	INITIAL	1		3.9	ng/l	U	U	N		Yes
	Perfluorododecanoic acid (PFDoA)	307-55-1	INITIAL	1		3.9	ng/l	U	U	N		Yes
	Perfluoroheptanesulfonic acid (PFHPS)	375-92-8	INITIAL	1		3.9	ng/l	U	U	N		Yes
	Perfluoroheptanoic acid (PFHpA)	375-85-9	INITIAL	1		3.9	ng/l	U	U	N		Yes
	Perfluorohexanesulfonic acid (PFHxS)	355-46-4	INITIAL	1		3.9	ng/l	U	U	N		Yes
	Perfluorohexanoic acid (PFHxA)	307-24-4	INITIAL	1		3.9	ng/l	U	U	N		Yes
	Perfluorononanoic acid (PFNA)	375-95-1	INITIAL	1		3.9	ng/l	U	U	N		Yes
	Perfluorooctanesulfonic acid (PFOS)	1763-23-1	INITIAL	1		3.9	ng/l	U	U	N		Yes
	Perfluorooctanoic acid (PFOA)	335-67-1	INITIAL	1		3.9	ng/l	U	U	N		Yes
	Perfluoropentanoic Acid (PFPeA)	2706-90-3	INITIAL	1		3.9	ng/l	U	U	N		Yes

Lab Sample ID	YI01015-004
Sample Name	WV-MW-15A
Sample Type	N
Sample Date	8/31/2023 12:25:00 PM
Sample Matrix	WG
Validated?	Y
Validation Level	Level 4

ANALYTIC METHOD	Chemical Name	CAS	Test Type	DF	Validation Result	Validation LOQ	UNIT	Lab Qualifiers	Validation Qualifiers	Validation Detect Flag	Validation Reason Code	Reportable?
QSM-PFASbyLC/MS/MS	Perfluorotetradecanoic acid (PFTA)	376-06-7	INITIAL	1		3.9	ng/l	U	U	N		Yes
	Perfluorotridecanoic Acid (PFTriA)	72629-94-8	INITIAL	1		3.9	ng/l	U	U	N		Yes
	Perfluoroundecanoic Acid (PFUnA)	2058-94-8	INITIAL	1		3.9	ng/l	U	U	N		Yes

Lab Sample ID	YI01015-005
Sample Name	HS-PMW-RI-105A
Sample Type	N
Sample Date	8/31/2023 4:50:00 PM
Sample Matrix	WG
Validated?	Y
Validation Level	Level 4

ANALYTIC METHOD	Chemical Name	CAS	Test Type	DF	Validation Result	Validation LOQ	UNIT	Lab Qualifiers	Validation Qualifiers	Validation Detect Flag	Validation Reason Code	Reportable?
QSM-PFASbyLC/MS/MS	11-chloroeicosafluoro-3-oxaundecane-1-sulfonic acid (11Cl-PF	763051-92-9	INITIAL	1		6.9	ng/l	U	U	N		Yes
	1H, 1H, 2H, 2H-perfluohexane sulfonic acid (4:2 FTS)	757124-72-4	INITIAL	1		6.9	ng/l	U	U	N		Yes
	1H, 1H, 2H, 2H-perfluorodecane sulfonic acid (8:2 FTS)	39108-34-4	INITIAL	1		6.9	ng/l	U	U	N		Yes
	1H, 1H, 2H, 2H-perfluorooctane sulfonic acid (6:2 FTS)	27619-97-2	INITIAL	1		6.9	ng/l	U	U	N		Yes
	4,8-dioxa-3H-perfluorononanoic acid (ADONA)	919005-14-4	INITIAL	1		6.9	ng/l	U	U	N		Yes
	9-chlorohexadecafluoro-3-oxanone-1-sulfonic acid (9Cl-PF3ONS	756426-58-1	INITIAL	1		6.9	ng/l	U	U	N		Yes
	Hexafluoropropylene oxide dimer acid (GenX)	13252-13-6	INITIAL	1		6.9	ng/l	U	U	N		Yes
	N-ethylperfluoro-1-octanesulfonamidoacetic acid (EtFOSAA)	2991-50-6	INITIAL	1		6.9	ng/l	U	U	N		Yes
	N-methylperfluoro-1-octanesulfonamidoacetic acid (MeFOSAA)	2355-31-9	INITIAL	1		6.9	ng/l	U	U	N		Yes
	Perfluoro-1-nonane sulfonic acid (PFNS)	68259-12-1	INITIAL	1		3.4	ng/l	U	U	N		Yes
	Perfluoro-1-octanesulfonamide (PFOSA)	754-91-6	INITIAL	1		3.4	ng/l	U	U	N		Yes
	Perfluoro-1-pentane sulfonic acid (PFPeS)	2706-91-4	INITIAL	1		3.4	ng/l	U	U	N		Yes
	Perfluorobutanesulfonic acid (PFBS)	375-73-5	INITIAL	1	4.6	3.4	ng/l			Y		Yes
	Perfluorobutanoic Acid (PFBA)	375-22-4	INITIAL	1		3.4	ng/l	U	U	N		Yes
	Perfluorodecanesulfonic acid (PFDS)	335-77-3	INITIAL	1		3.4	ng/l	U	U	N		Yes
	Perfluorodecanoic acid (PFDA)	335-76-2	INITIAL	1		3.4	ng/l	U	U	N		Yes
	Perfluorododecanoic acid (PFDoA)	307-55-1	INITIAL	1		3.4	ng/l	U	U	N		Yes
	Perfluoroheptanesulfonic acid (PFHPS)	375-92-8	INITIAL	1		3.4	ng/l	U	U	N		Yes
	Perfluoroheptanoic acid (PFHpA)	375-85-9	INITIAL	1		3.4	ng/l	U	U	N		Yes
	Perfluorohexanesulfonic acid (PFHxS)	355-46-4	INITIAL	1		3.4	ng/l	U	U	N		Yes
	Perfluorohexanoic acid (PFHxA)	307-24-4	INITIAL	1		3.4	ng/l	U	U	N		Yes
	Perfluorononanoic acid (PFNA)	375-95-1	INITIAL	1		3.4	ng/l	U	U	N		Yes
	Perfluorooctanesulfonic acid (PFOS)	1763-23-1	INITIAL	1		3.4	ng/l	U	U	N		Yes
	Perfluorooctanoic acid (PFOA)	335-67-1	INITIAL	1	5.1	3.4	ng/l			Y		Yes
	Perfluoropentanoic Acid (PFPeA)	2706-90-3	INITIAL	1		3.4	ng/l	U	U	N		Yes

Lab Sample ID	YI01015-005
Sample Name	HS-PMW-RI-105A
Sample Type	N
Sample Date	8/31/2023 4:50:00 PM
Sample Matrix	WG
Validated?	Y
Validation Level	Level 4

ANALYTIC METHOD	Chemical Name	CAS	Test Type	DF	Validation Result	Validation LOQ	UNIT	Lab Qualifiers	Validation Qualifiers	Validation Detect Flag	Validation Reason Code	Reportable?
QSM-PFASbyLC/MS/MS	Perfluorotetradecanoic acid (PFTA)	376-06-7	INITIAL	1		3.4	ng/l	U	U	N		Yes
	Perfluorotridecanoic Acid (PFTriA)	72629-94-8	INITIAL	1		3.4	ng/l	U	U	N		Yes
	Perfluoroundecanoic Acid (PFUnA)	2058-94-8	INITIAL	1		3.4	ng/l	U	U	N		Yes

Lab Sample ID	YI01015-006
Sample Name	HS-PMW-RI-105B
Sample Type	N
Sample Date	8/31/2023 5:40:00 PM
Sample Matrix	WG
Validated?	Y
Validation Level	Level 4

ANALYTIC METHOD	Chemical Name	CAS	Test Type	DF	Validation Result	Validation LOQ	UNIT	Lab Qualifiers	Validation Qualifiers	Validation Detect Flag	Validation Reason Code	Reportable?
QSM-PFASbyLC/MS/MS	11-chloroeicosafluoro-3-oxaundecane-1-sulfonic acid (11Cl-PF	763051-92-9	INITIAL	1		8.0	ng/l	U	U	N		Yes
	1H, 1H, 2H, 2H-perfluohexane sulfonic acid (4:2 FTS)	757124-72-4	INITIAL	1		8.0	ng/l	U	U	N		Yes
	1H, 1H, 2H, 2H-perfluorodecane sulfonic acid (8:2 FTS)	39108-34-4	INITIAL	1		8.0	ng/l	U	U	N		Yes
	1H, 1H, 2H, 2H-perfluorooctane sulfonic acid (6:2 FTS)	27619-97-2	INITIAL	1		8.0	ng/l	U	U	N		Yes
	4,8-dioxa-3H-perfluorononanoic acid (ADONA)	919005-14-4	INITIAL	1		8.0	ng/l	U	U	N		Yes
	9-chlorohexadecafluoro-3-oxanone-1-sulfonic acid (9Cl-PF3ONS	756426-58-1	INITIAL	1		8.0	ng/l	U	U	N		Yes
	Hexafluoropropylene oxide dimer acid (GenX)	13252-13-6	INITIAL	1		8.0	ng/l	U	U	N		Yes
	N-ethylperfluoro-1-octanesulfonamidoacetic acid (EtFOSAA)	2991-50-6	INITIAL	1		8.0	ng/l	U	U	N		Yes
	N-methylperfluoro-1-octanesulfonamidoacetic acid (MeFOSAA)	2355-31-9	INITIAL	1		8.0	ng/l	U	U	N		Yes
	Perfluoro-1-nonane sulfonic acid (PFNS)	68259-12-1	INITIAL	1		4.0	ng/l	U	U	N		Yes
	Perfluoro-1-octanesulfonamide (PFOSA)	754-91-6	INITIAL	1		4.0	ng/l	U	U	N		Yes
	Perfluoro-1-pentane sulfonic acid (PFPeS)	2706-91-4	INITIAL	1		4.0	ng/l	U	U	N		Yes
	Perfluorobutanesulfonic acid (PFBS)	375-73-5	INITIAL	1		4.0	ng/l	U	U	N		Yes
	Perfluorobutanoic Acid (PFBA)	375-22-4	INITIAL	1		4.0	ng/l	U	U	N		Yes
	Perfluorodecanesulfonic acid (PFDS)	335-77-3	INITIAL	1		4.0	ng/l	U	U	N		Yes
	Perfluorodecanoic acid (PFDA)	335-76-2	INITIAL	1		4.0	ng/l	U	U	N		Yes
	Perfluorododecanoic acid (PFDoA)	307-55-1	INITIAL	1		4.0	ng/l	U	U	N		Yes
	Perfluoroheptanesulfonic acid (PFHPS)	375-92-8	INITIAL	1		4.0	ng/l	U	U	N		Yes
	Perfluoroheptanoic acid (PFHpA)	375-85-9	INITIAL	1		4.0	ng/l	U	U	N		Yes
	Perfluorohexanesulfonic acid (PFHxS)	355-46-4	INITIAL	1		4.0	ng/l	U	U	N		Yes
	Perfluorohexanoic acid (PFHxA)	307-24-4	INITIAL	1		4.0	ng/l	U	U	N		Yes
	Perfluorononanoic acid (PFNA)	375-95-1	INITIAL	1		4.0	ng/l	U	U	N		Yes
	Perfluorooctanesulfonic acid (PFOS)	1763-23-1	INITIAL	1		4.0	ng/l	U	U	N		Yes
	Perfluorooctanoic acid (PFOA)	335-67-1	INITIAL	1		4.0	ng/l	U	U	N		Yes
	Perfluoropentanoic Acid (PFPeA)	2706-90-3	INITIAL	1		4.0	ng/l	U	U	N		Yes

Lab Sample ID	YI01015-006
Sample Name	HS-PMW-RI-105B
Sample Type	N
Sample Date	8/31/2023 5:40:00 PM
Sample Matrix	WG
Validated?	Y
Validation Level	Level 4

ANALYTIC METHOD	Chemical Name	CAS	Test Type	DF	Validation Result	Validation LOQ	UNIT	Lab Qualifiers	Validation Qualifiers	Validation Detect Flag	Validation Reason Code	Reportable?
QSM-PFASbyLC/MS/MS	Perfluorotetradecanoic acid (PFTA)	376-06-7	INITIAL	1		4.0	ng/l	U	U	N		Yes
	Perfluorotridecanoic Acid (PFTriA)	72629-94-8	INITIAL	1		4.0	ng/l	U	U	N		Yes
	Perfluoroundecanoic Acid (PFUnA)	2058-94-8	INITIAL	1		4.0	ng/l	U	U	N		Yes

Lab Sample ID	YI01015-007
Sample Name	WV-PMW-RI-105B
Sample Type	N
Sample Date	8/31/2023 5:40:00 PM
Sample Matrix	WG
Validated?	Y
Validation Level	Level 4

ANALYTIC METHOD	Chemical Name	CAS	Test Type	DF	Validation Result	Validation LOQ	UNIT	Lab Qualifiers	Validation Qualifiers	Validation Detect Flag	Validation Reason Code	Reportable?
QSM-PFASbyLC/MS/MS	11-chloroeicosafluoro-3-oxaundecane-1-sulfonic acid (11Cl-PF	763051-92-9	INITIAL	1		7.2	ng/l	U	U	N		Yes
	1H, 1H, 2H, 2H-perfluohexane sulfonic acid (4:2 FTS)	757124-72-4	INITIAL	1		7.2	ng/l	U	U	N		Yes
	1H, 1H, 2H, 2H-perfluorodecane sulfonic acid (8:2 FTS)	39108-34-4	INITIAL	1		7.2	ng/l	U	U	N		Yes
	1H, 1H, 2H, 2H-perfluorooctane sulfonic acid (6:2 FTS)	27619-97-2	INITIAL	1		7.2	ng/l	U	U	N		Yes
	4,8-dioxa-3H-perfluorononanoic acid (ADONA)	919005-14-4	INITIAL	1		7.2	ng/l	U	U	N		Yes
	9-chlorohexadecafluoro-3-oxanone-1-sulfonic acid (9Cl-PF3ONS	756426-58-1	INITIAL	1		7.2	ng/l	U	U	N		Yes
	Hexafluoropropylene oxide dimer acid (GenX)	13252-13-6	INITIAL	1		7.2	ng/l	U	U	N		Yes
	N-ethylperfluoro-1-octanesulfonamidoacetic acid (EtFOSAA)	2991-50-6	INITIAL	1		7.2	ng/l	U	U	N		Yes
	N-methylperfluoro-1-octanesulfonamidoacetic acid (MeFOSAA)	2355-31-9	INITIAL	1		7.2	ng/l	U	U	N		Yes
	Perfluoro-1-nonane sulfonic acid (PFNS)	68259-12-1	INITIAL	1		3.6	ng/l	U	U	N		Yes
	Perfluoro-1-octanesulfonamide (PFOSA)	754-91-6	INITIAL	1		3.6	ng/l	U	U	N		Yes
	Perfluoro-1-pentane sulfonic acid (PFPeS)	2706-91-4	INITIAL	1		3.6	ng/l	U	U	N		Yes
	Perfluorobutanesulfonic acid (PFBS)	375-73-5	INITIAL	1		3.6	ng/l	U	U	N		Yes
	Perfluorobutanoic Acid (PFBA)	375-22-4	INITIAL	1		3.6	ng/l	U	U	N		Yes
	Perfluorodecanesulfonic acid (PFDS)	335-77-3	INITIAL	1		3.6	ng/l	U	U	N		Yes
	Perfluorodecanoic acid (PFDA)	335-76-2	INITIAL	1		3.6	ng/l	U	U	N		Yes
	Perfluorododecanoic acid (PFDoA)	307-55-1	INITIAL	1		3.6	ng/l	U	U	N		Yes
	Perfluoroheptanesulfonic acid (PFHPS)	375-92-8	INITIAL	1		3.6	ng/l	U	U	N		Yes
	Perfluoroheptanoic acid (PFHpA)	375-85-9	INITIAL	1		3.6	ng/l	U	U	N		Yes
	Perfluorohexanesulfonic acid (PFHxS)	355-46-4	INITIAL	1		3.6	ng/l	U	U	N		Yes
	Perfluorohexanoic acid (PFHxA)	307-24-4	INITIAL	1		3.6	ng/l	U	U	N		Yes
	Perfluorononanoic acid (PFNA)	375-95-1	INITIAL	1		3.6	ng/l	U	U	N		Yes
	Perfluorooctanesulfonic acid (PFOS)	1763-23-1	INITIAL	1		3.6	ng/l	U	U	N		Yes
	Perfluorooctanoic acid (PFOA)	335-67-1	INITIAL	1		3.6	ng/l	U	U	N		Yes
	Perfluoropentanoic Acid (PFPeA)	2706-90-3	INITIAL	1		3.6	ng/l	U	U	N		Yes

Lab Sample ID	YI01015-007
Sample Name	WV-PMW-RI-105B
Sample Type	N
Sample Date	8/31/2023 5:40:00 PM
Sample Matrix	WG
Validated?	Y
Validation Level	Level 4

ANALYTIC METHOD	Chemical Name	CAS	Test Type	DF	Validation Result	Validation LOQ	UNIT	Lab Qualifiers	Validation Qualifiers	Validation Detect Flag	Validation Reason Code	Reportable?
QSM-PFASbyLC/MS/MS	Perfluorotetradecanoic acid (PFTA)	376-06-7	INITIAL	1		3.6	ng/l	U	U	N		Yes
	Perfluorotridecanoic Acid (PFTriA)	72629-94-8	INITIAL	1		3.6	ng/l	U	U	N		Yes
	Perfluoroundecanoic Acid (PFUnA)	2058-94-8	INITIAL	1		3.6	ng/l	U	U	N		Yes

Lab Sample ID	YI01015-008
Sample Name	WV-PMW-RI-105A
Sample Type	N
Sample Date	8/31/2023 4:10:00 PM
Sample Matrix	WG
Validated?	Y
Validation Level	Level 4

ANALYTIC METHOD	Chemical Name	CAS	Test Type	DF	Validation Result	Validation LOQ	UNIT	Lab Qualifiers	Validation Qualifiers	Validation Detect Flag	Validation Reason Code	Reportable?
QSM-PFASbyLC/MS/MS	11-chloroeicosafluoro-3-oxaundecane-1-sulfonic acid (11Cl-PF	763051-92-9	INITIAL	1		7.1	ng/l	U	U	N		Yes
	1H, 1H, 2H, 2H-perfluohexane sulfonic acid (4:2 FTS)	757124-72-4	INITIAL	1		7.1	ng/l	U	U	N		Yes
	1H, 1H, 2H, 2H-perfluorodecane sulfonic acid (8:2 FTS)	39108-34-4	INITIAL	1		7.1	ng/l	U	U	N		Yes
	1H, 1H, 2H, 2H-perfluorooctane sulfonic acid (6:2 FTS)	27619-97-2	INITIAL	1		7.1	ng/l	U	U	N		Yes
	4,8-dioxa-3H-perfluorononanoic acid (ADONA)	919005-14-4	INITIAL	1		7.1	ng/l	U	U	N		Yes
	9-chlorohexadecafluoro-3-oxanone-1-sulfonic acid (9Cl-PF3ONS	756426-58-1	INITIAL	1		7.1	ng/l	U	U	N		Yes
	Hexafluoropropylene oxide dimer acid (GenX)	13252-13-6	INITIAL	1		7.1	ng/l	U	U	N		Yes
	N-ethylperfluoro-1-octanesulfonamidoacetic acid (EtFOSAA)	2991-50-6	INITIAL	1		7.1	ng/l	U	U	N		Yes
	N-methylperfluoro-1-octanesulfonamidoacetic acid (MeFOSAA)	2355-31-9	INITIAL	1		7.1	ng/l	U	U	N		Yes
	Perfluoro-1-nonane sulfonic acid (PFNS)	68259-12-1	INITIAL	1		3.6	ng/l	U	U	N		Yes
	Perfluoro-1-octanesulfonamide (PFOSA)	754-91-6	INITIAL	1		3.6	ng/l	U	U	N		Yes
	Perfluoro-1-pentane sulfonic acid (PFPeS)	2706-91-4	INITIAL	1		3.6	ng/l	U	U	N		Yes
	Perfluorobutanesulfonic acid (PFBS)	375-73-5	INITIAL	1	5.9	3.6	ng/l			Y		Yes
	Perfluorobutanoic Acid (PFBA)	375-22-4	INITIAL	1		3.6	ng/l	U	U	N		Yes
	Perfluorodecanesulfonic acid (PFDS)	335-77-3	INITIAL	1		3.6	ng/l	U	U	N		Yes
	Perfluorodecanoic acid (PFDA)	335-76-2	INITIAL	1		3.6	ng/l	U	U	N		Yes
	Perfluorododecanoic acid (PFDoA)	307-55-1	INITIAL	1		3.6	ng/l	U	U	N		Yes
	Perfluoroheptanesulfonic acid (PFHPS)	375-92-8	INITIAL	1		3.6	ng/l	U	U	N		Yes
	Perfluoroheptanoic acid (PFHpA)	375-85-9	INITIAL	1		3.6	ng/l	U	U	N		Yes
	Perfluorohexanesulfonic acid (PFHxS)	355-46-4	INITIAL	1		3.6	ng/l	U	U	N		Yes
	Perfluorohexanoic acid (PFHxA)	307-24-4	INITIAL	1		3.6	ng/l	U	U	N		Yes
	Perfluorononanoic acid (PFNA)	375-95-1	INITIAL	1		3.6	ng/l	U	U	N		Yes
	Perfluorooctanesulfonic acid (PFOS)	1763-23-1	INITIAL	1		3.6	ng/l	U	U	N		Yes
	Perfluorooctanoic acid (PFOA)	335-67-1	INITIAL	1		3.6	ng/l	U	U	N		Yes
	Perfluoropentanoic Acid (PFPeA)	2706-90-3	INITIAL	1		3.6	ng/l	U	U	N		Yes

Lab Sample ID	YI01015-008
Sample Name	WV-PMW-RI-105A
Sample Type	N
Sample Date	8/31/2023 4:10:00 PM
Sample Matrix	WG
Validated?	Y
Validation Level	Level 4

ANALYTIC METHOD	Chemical Name	CAS	Test Type	DF	Validation Result	Validation LOQ	UNIT	Lab Qualifiers	Validation Qualifiers	Validation Detect Flag	Validation Reason Code	Reportable?
QSM-PFASbyLC/MS/MS	Perfluorotetradecanoic acid (PFTA)	376-06-7	INITIAL	1		3.6	ng/l	U	U	N		Yes
	Perfluorotridecanoic Acid (PFTriA)	72629-94-8	INITIAL	1		3.6	ng/l	U	U	N		Yes
	Perfluoroundecanoic Acid (PFUnA)	2058-94-8	INITIAL	1		3.6	ng/l	U	U	N		Yes

Lab Sample ID	YI01015-009
Sample Name	FB/8/31-MKM
Sample Type	FB
Sample Date	8/31/2023 1:00:00 PM
Sample Matrix	WG
Validated?	Y
Validation Level	Level 4

ANALYTIC METHOD	Chemical Name	CAS	Test Type	DF	Validation Result	Validation LOQ	UNIT	Lab Qualifiers	Validation Qualifiers	Validation Detect Flag	Validation Reason Code	Reportable?
QSM-PFASbyLC/MS/MS	11-chloroeicosafluoro-3-oxaundecane-1-sulfonic acid (11Cl-PF	763051-92-9	INITIAL	1		7.1	ng/l	U	U	N		Yes
	1H, 1H, 2H, 2H-perfluohexane sulfonic acid (4:2 FTS)	757124-72-4	INITIAL	1		7.1	ng/l	U	U	N		Yes
	1H, 1H, 2H, 2H-perfluorodecane sulfonic acid (8:2 FTS)	39108-34-4	INITIAL	1		7.1	ng/l	U	U	N		Yes
	1H, 1H, 2H, 2H-perfluorooctane sulfonic acid (6:2 FTS)	27619-97-2	INITIAL	1		7.1	ng/l	U	U	N		Yes
	4,8-dioxa-3H-perfluorononanoic acid (ADONA)	919005-14-4	INITIAL	1		7.1	ng/l	U	U	N		Yes
	9-chlorohexadecafluoro-3-oxanone-1-sulfonic acid (9Cl-PF3ONS	756426-58-1	INITIAL	1		7.1	ng/l	U	U	N		Yes
	Hexafluoropropylene oxide dimer acid (GenX)	13252-13-6	INITIAL	1		7.1	ng/l	U	U	N		Yes
	N-ethylperfluoro-1-octanesulfonamidoacetic acid (EtFOSAA)	2991-50-6	INITIAL	1		7.1	ng/l	U	U	N		Yes
	N-methylperfluoro-1-octanesulfonamidoacetic acid (MeFOSAA)	2355-31-9	INITIAL	1		7.1	ng/l	U	U	N		Yes
	Perfluoro-1-nonane sulfonic acid (PFNS)	68259-12-1	INITIAL	1		3.5	ng/l	U	U	N		Yes
	Perfluoro-1-octanesulfonamide (PFOSA)	754-91-6	INITIAL	1		3.5	ng/l	U	U	N		Yes
	Perfluoro-1-pentane sulfonic acid (PFPeS)	2706-91-4	INITIAL	1		3.5	ng/l	U	U	N		Yes
	Perfluorobutanesulfonic acid (PFBS)	375-73-5	INITIAL	1		3.5	ng/l	U	U	N		Yes
	Perfluorobutanoic Acid (PFBA)	375-22-4	INITIAL	1		3.5	ng/l	U	U	N		Yes
	Perfluorodecanesulfonic acid (PFDS)	335-77-3	INITIAL	1		3.5	ng/l	U	U	N		Yes
	Perfluorodecanoic acid (PFDA)	335-76-2	INITIAL	1		3.5	ng/l	U	U	N		Yes
	Perfluorododecanoic acid (PFDoA)	307-55-1	INITIAL	1		3.5	ng/l	U	U	N		Yes
	Perfluoroheptanesulfonic acid (PFHPS)	375-92-8	INITIAL	1		3.5	ng/l	U	U	N		Yes
	Perfluoroheptanoic acid (PFHpA)	375-85-9	INITIAL	1		3.5	ng/l	U	U	N		Yes
	Perfluorohexanesulfonic acid (PFHxS)	355-46-4	INITIAL	1		3.5	ng/l	U	U	N		Yes
	Perfluorohexanoic acid (PFHxA)	307-24-4	INITIAL	1		3.5	ng/l	U	U	N		Yes
	Perfluorononanoic acid (PFNA)	375-95-1	INITIAL	1		3.5	ng/l	U	U	N		Yes
	Perfluorooctanesulfonic acid (PFOS)	1763-23-1	INITIAL	1		3.5	ng/l	U	U	N		Yes
	Perfluorooctanoic acid (PFOA)	335-67-1	INITIAL	1		3.5	ng/l	U	U	N		Yes
	Perfluoropentanoic Acid (PFPeA)	2706-90-3	INITIAL	1		3.5	ng/l	U	U	N		Yes

Lab Sample ID	YI01015-009
Sample Name	FB/8/31-MKM
Sample Type	FB
Sample Date	8/31/2023 1:00:00 PM
Sample Matrix	WG
Validated?	Y
Validation Level	Level 4

ANALYTIC METHOD	Chemical Name	CAS	Test Type	DF	Validation Result	Validation LOQ	UNIT	Lab Qualifiers	Validation Qualifiers	Validation Detect Flag	Validation Reason Code	Reportable?
QSM-PFASbyLC/MS/MS	Perfluorotetradecanoic acid (PFTA)	376-06-7	INITIAL	1		3.5	ng/l	U	U	N		Yes
	Perfluorotridecanoic Acid (PFTriA)	72629-94-8	INITIAL	1		3.5	ng/l	U	U	N		Yes
	Perfluoroundecanoic Acid (PFUnA)	2058-94-8	INITIAL	1		3.5	ng/l	U	U	N		Yes

Lab Sample ID	YI01015-010
Sample Name	FB/8/31-JMS
Sample Type	FB
Sample Date	8/31/2023 1:15:00 PM
Sample Matrix	WG
Validated?	Y
Validation Level	Level 4

ANALYTIC METHOD	Chemical Name	CAS	Test Type	DF	Validation Result	Validation LOQ	UNIT	Lab Qualifiers	Validation Qualifiers	Validation Detect Flag	Validation Reason Code	Reportable?
QSM-PFASbyLC/MS/MS	11-chloroeicosafluoro-3-oxaundecane-1-sulfonic acid (11Cl-PF	763051-92-9	INITIAL	1		7.0	ng/l	U	U	N		Yes
	1H, 1H, 2H, 2H-perfluohexane sulfonic acid (4:2 FTS)	757124-72-4	INITIAL	1		7.0	ng/l	U	U	N		Yes
	1H, 1H, 2H, 2H-perfluorodecane sulfonic acid (8:2 FTS)	39108-34-4	INITIAL	1		7.0	ng/l	U	U	N		Yes
	1H, 1H, 2H, 2H-perfluorooctane sulfonic acid (6:2 FTS)	27619-97-2	INITIAL	1		7.0	ng/l	U	U	N		Yes
	4,8-dioxa-3H-perfluorononanoic acid (ADONA)	919005-14-4	INITIAL	1		7.0	ng/l	U	U	N		Yes
	9-chlorohexadecafluoro-3-oxanone-1-sulfonic acid (9Cl-PF3ONS	756426-58-1	INITIAL	1		7.0	ng/l	U	U	N		Yes
	Hexafluoropropylene oxide dimer acid (GenX)	13252-13-6	INITIAL	1		7.0	ng/l	U	U	N		Yes
	N-ethylperfluoro-1-octanesulfonamidoacetic acid (EtFOSAA)	2991-50-6	INITIAL	1		7.0	ng/l	U	U	N		Yes
	N-methylperfluoro-1-octanesulfonamidoacetic acid (MeFOSAA)	2355-31-9	INITIAL	1		7.0	ng/l	U	U	N		Yes
	Perfluoro-1-nonane sulfonic acid (PFNS)	68259-12-1	INITIAL	1		3.5	ng/l	U	U	N		Yes
	Perfluoro-1-octanesulfonamide (PFOSA)	754-91-6	INITIAL	1		3.5	ng/l	U	U	N		Yes
	Perfluoro-1-pentane sulfonic acid (PFPeS)	2706-91-4	INITIAL	1		3.5	ng/l	U	U	N		Yes
	Perfluorobutanesulfonic acid (PFBS)	375-73-5	INITIAL	1		3.5	ng/l	U	U	N		Yes
	Perfluorobutanoic Acid (PFBA)	375-22-4	INITIAL	1		3.5	ng/l	U	U	N		Yes
	Perfluorodecanesulfonic acid (PFDS)	335-77-3	INITIAL	1		3.5	ng/l	U	U	N		Yes
	Perfluorodecanoic acid (PFDA)	335-76-2	INITIAL	1		3.5	ng/l	U	U	N		Yes
	Perfluorododecanoic acid (PFDoA)	307-55-1	INITIAL	1		3.5	ng/l	U	U	N		Yes
	Perfluoroheptanesulfonic acid (PFHPS)	375-92-8	INITIAL	1		3.5	ng/l	U	U	N		Yes
	Perfluoroheptanoic acid (PFHpA)	375-85-9	INITIAL	1		3.5	ng/l	U	U	N		Yes
	Perfluorohexanesulfonic acid (PFHxS)	355-46-4	INITIAL	1		3.5	ng/l	U	U	N		Yes
	Perfluorohexanoic acid (PFHxA)	307-24-4	INITIAL	1		3.5	ng/l	U	U	N		Yes
	Perfluorononanoic acid (PFNA)	375-95-1	INITIAL	1		3.5	ng/l	U	U	N		Yes
	Perfluorooctanesulfonic acid (PFOS)	1763-23-1	INITIAL	1		3.5	ng/l	U	U	N		Yes
	Perfluorooctanoic acid (PFOA)	335-67-1	INITIAL	1		3.5	ng/l	U	U	N		Yes
	Perfluoropentanoic Acid (PFPeA)	2706-90-3	INITIAL	1		3.5	ng/l	U	U	N		Yes

Lab Sample ID	YI01015-010
Sample Name	FB/8/31-JMS
Sample Type	FB
Sample Date	8/31/2023 1:15:00 PM
Sample Matrix	WG
Validated?	Y
Validation Level	Level 4

ANALYTIC METHOD	Chemical Name	CAS	Test Type	DF	Validation Result	Validation LOQ	UNIT	Lab Qualifiers	Validation Qualifiers	Validation Detect Flag	Validation Reason Code	Reportable?
QSM-PFASbyLC/MS/MS	Perfluorotetradecanoic acid (PFTA)	376-06-7	INITIAL	1		3.5	ng/l	U	U	N		Yes
	Perfluorotridecanoic Acid (PFTriA)	72629-94-8	INITIAL	1		3.5	ng/l	U	U	N		Yes
	Perfluoroundecanoic Acid (PFUnA)	2058-94-8	INITIAL	1		3.5	ng/l	U	U	N		Yes

Lab Sample ID	YI01015-011
Sample Name	FB/8/31-BPT
Sample Type	FB
Sample Date	8/31/2023 1:30:00 PM
Sample Matrix	WG
Validated?	Y
Validation Level	Level 4

ANALYTIC METHOD	Chemical Name	CAS	Test Type	DF	Validation Result	Validation LOQ	UNIT	Lab Qualifiers	Validation Qualifiers	Validation Detect Flag	Validation Reason Code	Reportable?
QSM-PFASbyLC/MS/MS	11-chloroeicosafluoro-3-oxaundecane-1-sulfonic acid (11Cl-PF	763051-92-9	INITIAL	1		6.9	ng/l	U	U	N		Yes
	1H, 1H, 2H, 2H-perfluohexane sulfonic acid (4:2 FTS)	757124-72-4	INITIAL	1		6.9	ng/l	U	U	N		Yes
	1H, 1H, 2H, 2H-perfluorodecane sulfonic acid (8:2 FTS)	39108-34-4	INITIAL	1		6.9	ng/l	U	U	N		Yes
	1H, 1H, 2H, 2H-perfluorooctane sulfonic acid (6:2 FTS)	27619-97-2	INITIAL	1		6.9	ng/l	U	U	N		Yes
	4,8-dioxa-3H-perfluorononanoic acid (ADONA)	919005-14-4	INITIAL	1		6.9	ng/l	U	U	N		Yes
	9-chlorohexadecafluoro-3-oxanone-1-sulfonic acid (9Cl-PF3ONS	756426-58-1	INITIAL	1		6.9	ng/l	U	U	N		Yes
	Hexafluoropropylene oxide dimer acid (GenX)	13252-13-6	INITIAL	1		6.9	ng/l	U	U	N		Yes
	N-ethylperfluoro-1-octanesulfonamidoacetic acid (EtFOSAA)	2991-50-6	INITIAL	1		6.9	ng/l	U	U	N		Yes
	N-methylperfluoro-1-octanesulfonamidoacetic acid (MeFOSAA)	2355-31-9	INITIAL	1		6.9	ng/l	U	U	N		Yes
	Perfluoro-1-nonane sulfonic acid (PFNS)	68259-12-1	INITIAL	1		3.5	ng/l	U	U	N		Yes
	Perfluoro-1-octanesulfonamide (PFOSA)	754-91-6	INITIAL	1		3.5	ng/l	U	U	N		Yes
	Perfluoro-1-pentane sulfonic acid (PFPeS)	2706-91-4	INITIAL	1		3.5	ng/l	U	U	N		Yes
	Perfluorobutanesulfonic acid (PFBS)	375-73-5	INITIAL	1		3.5	ng/l	U	U	N		Yes
	Perfluorobutanoic Acid (PFBA)	375-22-4	INITIAL	1		3.5	ng/l	U	U	N		Yes
	Perfluorodecanesulfonic acid (PFDS)	335-77-3	INITIAL	1		3.5	ng/l	U	U	N		Yes
	Perfluorodecanoic acid (PFDA)	335-76-2	INITIAL	1		3.5	ng/l	U	U	N		Yes
	Perfluorododecanoic acid (PFDoA)	307-55-1	INITIAL	1		3.5	ng/l	U	U	N		Yes
	Perfluoroheptanesulfonic acid (PFHPS)	375-92-8	INITIAL	1		3.5	ng/l	U	U	N		Yes
	Perfluoroheptanoic acid (PFHpA)	375-85-9	INITIAL	1		3.5	ng/l	U	U	N		Yes
	Perfluorohexanesulfonic acid (PFHxS)	355-46-4	INITIAL	1		3.5	ng/l	U	U	N		Yes
	Perfluorohexanoic acid (PFHxA)	307-24-4	INITIAL	1		3.5	ng/l	U	U	N		Yes
	Perfluorononanoic acid (PFNA)	375-95-1	INITIAL	1		3.5	ng/l	U	U	N		Yes
	Perfluorooctanesulfonic acid (PFOS)	1763-23-1	INITIAL	1		3.5	ng/l	U	U	N		Yes
	Perfluorooctanoic acid (PFOA)	335-67-1	INITIAL	1		3.5	ng/l	U	U	N		Yes
	Perfluoropentanoic Acid (PFPeA)	2706-90-3	INITIAL	1		3.5	ng/l	U	U	N		Yes

Lab Sample ID	YI01015-011
Sample Name	FB/8/31-BPT
Sample Type	FB
Sample Date	8/31/2023 1:30:00 PM
Sample Matrix	WG
Validated?	Y
Validation Level	Level 4

ANALYTIC METHOD	Chemical Name	CAS	Test Type	DF	Validation Result	Validation LOQ	UNIT	Lab Qualifiers	Validation Qualifiers	Validation Detect Flag	Validation Reason Code	Reportable?
QSM-PFASbyLC/MS/MS	Perfluorotetradecanoic acid (PFTA)	376-06-7	INITIAL	1		3.5	ng/l	U	U	N		Yes
	Perfluorotridecanoic Acid (PFTriA)	72629-94-8	INITIAL	1		3.5	ng/l	U	U	N		Yes
	Perfluoroundecanoic Acid (PFUnA)	2058-94-8	INITIAL	1		3.5	ng/l	U	U	N		Yes

Lab Sample ID	YI01015-012
Sample Name	FB/8/31-JET
Sample Type	FB
Sample Date	8/31/2023 4:00:00 PM
Sample Matrix	WG
Validated?	Y
Validation Level	Level 4

ANALYTIC METHOD	Chemical Name	CAS	Test Type	DF	Validation Result	Validation LOQ	UNIT	Lab Qualifiers	Validation Qualifiers	Validation Detect Flag	Validation Reason Code	Reportable?
QSM-PFASbyLC/MS/MS	11-chloroeicosafluoro-3-oxaundecane-1-sulfonic acid (11Cl-PF	763051-92-9	INITIAL	1		7.1	ng/l	U	U	N		Yes
	1H, 1H, 2H, 2H-perfluohexane sulfonic acid (4:2 FTS)	757124-72-4	INITIAL	1		7.1	ng/l	U	U	N		Yes
	1H, 1H, 2H, 2H-perfluorodecane sulfonic acid (8:2 FTS)	39108-34-4	INITIAL	1		7.1	ng/l	U	U	N		Yes
	1H, 1H, 2H, 2H-perfluorooctane sulfonic acid (6:2 FTS)	27619-97-2	INITIAL	1		7.1	ng/l	U	U	N		Yes
	4,8-dioxa-3H-perfluorononanoic acid (ADONA)	919005-14-4	INITIAL	1		7.1	ng/l	U	U	N		Yes
	9-chlorohexadecafluoro-3-oxanone-1-sulfonic acid (9Cl-PF3ONS	756426-58-1	INITIAL	1		7.1	ng/l	U	U	N		Yes
	Hexafluoropropylene oxide dimer acid (GenX)	13252-13-6	INITIAL	1		7.1	ng/l	U	U	N		Yes
	N-ethylperfluoro-1-octanesulfonamidoacetic acid (EtFOSAA)	2991-50-6	INITIAL	1		7.1	ng/l	U	U	N		Yes
	N-methylperfluoro-1-octanesulfonamidoacetic acid (MeFOSAA)	2355-31-9	INITIAL	1		7.1	ng/l	U	U	N		Yes
	Perfluoro-1-nonane sulfonic acid (PFNS)	68259-12-1	INITIAL	1		3.5	ng/l	U	U	N		Yes
	Perfluoro-1-octanesulfonamide (PFOSA)	754-91-6	INITIAL	1		3.5	ng/l	U	U	N		Yes
	Perfluoro-1-pentane sulfonic acid (PFPeS)	2706-91-4	INITIAL	1		3.5	ng/l	U	U	N		Yes
	Perfluorobutanesulfonic acid (PFBS)	375-73-5	INITIAL	1		3.5	ng/l	U	U	N		Yes
	Perfluorobutanoic Acid (PFBA)	375-22-4	INITIAL	1		3.5	ng/l	U	U	N		Yes
	Perfluorodecanesulfonic acid (PFDS)	335-77-3	INITIAL	1		3.5	ng/l	U	U	N		Yes
	Perfluorodecanoic acid (PFDA)	335-76-2	INITIAL	1		3.5	ng/l	U	U	N		Yes
	Perfluorododecanoic acid (PFDoA)	307-55-1	INITIAL	1		3.5	ng/l	U	U	N		Yes
	Perfluoroheptanesulfonic acid (PFHPS)	375-92-8	INITIAL	1		3.5	ng/l	U	U	N		Yes
	Perfluoroheptanoic acid (PFHpA)	375-85-9	INITIAL	1		3.5	ng/l	U	U	N		Yes
	Perfluorohexanesulfonic acid (PFHxS)	355-46-4	INITIAL	1		3.5	ng/l	U	U	N		Yes
	Perfluorohexanoic acid (PFHxA)	307-24-4	INITIAL	1		3.5	ng/l	U	U	N		Yes
	Perfluorononanoic acid (PFNA)	375-95-1	INITIAL	1		3.5	ng/l	U	U	N		Yes
	Perfluorooctanesulfonic acid (PFOS)	1763-23-1	INITIAL	1		3.5	ng/l	U	U	N		Yes
	Perfluorooctanoic acid (PFOA)	335-67-1	INITIAL	1		3.5	ng/l	U	U	N		Yes
	Perfluoropentanoic Acid (PFPeA)	2706-90-3	INITIAL	1		3.5	ng/l	U	U	N		Yes

Lab Sample ID	YI01015-012
Sample Name	FB/8/31-JET
Sample Type	FB
Sample Date	8/31/2023 4:00:00 PM
Sample Matrix	WG
Validated?	Y
Validation Level	Level 4

ANALYTIC METHOD	Chemical Name	CAS	Test Type	DF	Validation Result	Validation LOQ	UNIT	Lab Qualifiers	Validation Qualifiers	Validation Detect Flag	Validation Reason Code	Reportable?
QSM-PFASbyLC/MS/MS	Perfluorotetradecanoic acid (PFTA)	376-06-7	INITIAL	1		3.5	ng/l	U	U	N		Yes
	Perfluorotridecanoic Acid (PFTriA)	72629-94-8	INITIAL	1		3.5	ng/l	U	U	N		Yes
	Perfluoroundecanoic Acid (PFUnA)	2058-94-8	INITIAL	1		3.5	ng/l	U	U	N		Yes

Lab Sample ID	YI01015-013
Sample Name	EQB-WLM
Sample Type	EB
Sample Date	8/31/2023 1:05:00 PM
Sample Matrix	WG
Validated?	Y
Validation Level	Level 4

ANALYTIC METHOD	Chemical Name	CAS	Test Type	DF	Validation Result	Validation LOQ	UNIT	Lab Qualifiers	Validation Qualifiers	Validation Detect Flag	Validation Reason Code	Reportable?
QSM-PFASbyLC/MS/MS	11-chloroeicosafluoro-3-oxaundecane-1-sulfonic acid (11Cl-PF	763051-92-9	INITIAL	1		7.9	ng/l	U	U	N		Yes
	1H, 1H, 2H, 2H-perfluohexane sulfonic acid (4:2 FTS)	757124-72-4	INITIAL	1		7.9	ng/l	U	U	N		Yes
	1H, 1H, 2H, 2H-perfluorodecane sulfonic acid (8:2 FTS)	39108-34-4	INITIAL	1		7.9	ng/l	U	U	N		Yes
	1H, 1H, 2H, 2H-perfluorooctane sulfonic acid (6:2 FTS)	27619-97-2	INITIAL	1		7.9	ng/l	U	U	N		Yes
	4,8-dioxa-3H-perfluorononanoic acid (ADONA)	919005-14-4	INITIAL	1		7.9	ng/l	U	U	N		Yes
	9-chlorohexadecafluoro-3-oxanone-1-sulfonic acid (9Cl-PF3ONS	756426-58-1	INITIAL	1		7.9	ng/l	U	U	N		Yes
	Hexafluoropropylene oxide dimer acid (GenX)	13252-13-6	INITIAL	1		7.9	ng/l	U	U	N		Yes
	N-ethylperfluoro-1-octanesulfonamidoacetic acid (EtFOSAA)	2991-50-6	INITIAL	1		7.9	ng/l	U	U	N		Yes
	N-methylperfluoro-1-octanesulfonamidoacetic acid (MeFOSAA)	2355-31-9	INITIAL	1		7.9	ng/l	U	U	N		Yes
	Perfluoro-1-nonane sulfonic acid (PFNS)	68259-12-1	INITIAL	1		3.9	ng/l	U	U	N		Yes
	Perfluoro-1-octanesulfonamide (PFOSA)	754-91-6	INITIAL	1		3.9	ng/l	U	U	N		Yes
	Perfluoro-1-pentane sulfonic acid (PFPeS)	2706-91-4	INITIAL	1		3.9	ng/l	U	U	N		Yes
	Perfluorobutanesulfonic acid (PFBS)	375-73-5	INITIAL	1		3.9	ng/l	U	U	N		Yes
	Perfluorobutanoic Acid (PFBA)	375-22-4	INITIAL	1		3.9	ng/l	U	U	N		Yes
	Perfluorodecanesulfonic acid (PFDS)	335-77-3	INITIAL	1		3.9	ng/l	U	U	N		Yes
	Perfluorodecanoic acid (PFDA)	335-76-2	INITIAL	1		3.9	ng/l	U	U	N		Yes
	Perfluorododecanoic acid (PFDoA)	307-55-1	INITIAL	1		3.9	ng/l	U	U	N		Yes
	Perfluoroheptanesulfonic acid (PFHPS)	375-92-8	INITIAL	1		3.9	ng/l	U	U	N		Yes
	Perfluoroheptanoic acid (PFHpA)	375-85-9	INITIAL	1		3.9	ng/l	U	U	N		Yes
	Perfluorohexanesulfonic acid (PFHxS)	355-46-4	INITIAL	1		3.9	ng/l	U	U	N		Yes
	Perfluorohexanoic acid (PFHxA)	307-24-4	INITIAL	1		3.9	ng/l	U	U	N		Yes
	Perfluorononanoic acid (PFNA)	375-95-1	INITIAL	1		3.9	ng/l	U	U	N		Yes
	Perfluorooctanesulfonic acid (PFOS)	1763-23-1	INITIAL	1		3.9	ng/l	U	U	N		Yes
	Perfluorooctanoic acid (PFOA)	335-67-1	INITIAL	1		3.9	ng/l	U	U	N		Yes
	Perfluoropentanoic Acid (PFPeA)	2706-90-3	INITIAL	1		3.9	ng/l	U	U	N		Yes

Lab Sample ID	YI01015-013
Sample Name	EQB-WLM
Sample Type	EB
Sample Date	8/31/2023 1:05:00 PM
Sample Matrix	WG
Validated?	Y
Validation Level	Level 4

ANALYTIC METHOD	Chemical Name	CAS	Test Type	DF	Validation Result	Validation LOQ	UNIT	Lab Qualifiers	Validation Qualifiers	Validation Detect Flag	Validation Reason Code	Reportable?
QSM-PFASbyLC/MS/MS	Perfluorotetradecanoic acid (PFTA)	376-06-7	INITIAL	1		3.9	ng/l	U	U	N		Yes
	Perfluorotridecanoic Acid (PFTriA)	72629-94-8	INITIAL	1		3.9	ng/l	U	U	N		Yes
	Perfluoroundecanoic Acid (PFUnA)	2058-94-8	INITIAL	1		3.9	ng/l	U	U	N		Yes

Lab Sample ID	YI01015-014
Sample Name	EB-MM
Sample Type	N
Sample Date	8/31/2023 6:50:00 PM
Sample Matrix	WG
Validated?	Y
Validation Level	Level 4

ANALYTIC METHOD	Chemical Name	CAS	Test Type	DF	Validation Result	Validation LOQ	UNIT	Lab Qualifiers	Validation Qualifiers	Validation Detect Flag	Validation Reason Code	Reportable?
QSM-PFASbyLC/MS/MS	11-chloroeicosafluoro-3-oxaundecane-1-sulfonic acid (11Cl-PF	763051-92-9	INITIAL	1		7.3	ng/l	U	U	N		Yes
	1H, 1H, 2H, 2H-perfluohexane sulfonic acid (4:2 FTS)	757124-72-4	INITIAL	1		7.3	ng/l	U	U	N		Yes
	1H, 1H, 2H, 2H-perfluorodecane sulfonic acid (8:2 FTS)	39108-34-4	INITIAL	1		7.3	ng/l	U	U	N		Yes
	1H, 1H, 2H, 2H-perfluorooctane sulfonic acid (6:2 FTS)	27619-97-2	INITIAL	1		7.3	ng/l	U	U	N		Yes
	4,8-dioxa-3H-perfluorononanoic acid (ADONA)	919005-14-4	INITIAL	1		7.3	ng/l	U	U	N		Yes
	9-chlorohexadecafluoro-3-oxanone-1-sulfonic acid (9Cl-PF3ONS	756426-58-1	INITIAL	1		7.3	ng/l	U	U	N		Yes
	Hexafluoropropylene oxide dimer acid (GenX)	13252-13-6	INITIAL	1		7.3	ng/l	U	U	N		Yes
	N-ethylperfluoro-1-octanesulfonamidoacetic acid (EtFOSAA)	2991-50-6	INITIAL	1		7.3	ng/l	U	U	N		Yes
	N-methylperfluoro-1-octanesulfonamidoacetic acid (MeFOSAA)	2355-31-9	INITIAL	1		7.3	ng/l	U	U	N		Yes
	Perfluoro-1-nonane sulfonic acid (PFNS)	68259-12-1	INITIAL	1		3.6	ng/l	U	U	N		Yes
	Perfluoro-1-octanesulfonamide (PFOSA)	754-91-6	INITIAL	1		3.6	ng/l	U	U	N		Yes
	Perfluoro-1-pentane sulfonic acid (PFPeS)	2706-91-4	INITIAL	1		3.6	ng/l	U	U	N		Yes
	Perfluorobutanesulfonic acid (PFBS)	375-73-5	INITIAL	1		3.6	ng/l	U	U	N		Yes
	Perfluorobutanoic Acid (PFBA)	375-22-4	INITIAL	1		3.6	ng/l	U	U	N		Yes
	Perfluorodecanesulfonic acid (PFDS)	335-77-3	INITIAL	1		3.6	ng/l	U	U	N		Yes
	Perfluorodecanoic acid (PFDA)	335-76-2	INITIAL	1		3.6	ng/l	U	U	N		Yes
	Perfluorododecanoic acid (PFDoA)	307-55-1	INITIAL	1		3.6	ng/l	U	U	N		Yes
	Perfluoroheptanesulfonic acid (PFHPS)	375-92-8	INITIAL	1		3.6	ng/l	U	U	N		Yes
	Perfluoroheptanoic acid (PFHpA)	375-85-9	INITIAL	1		3.6	ng/l	U	U	N		Yes
	Perfluorohexanesulfonic acid (PFHxS)	355-46-4	INITIAL	1		3.6	ng/l	U	U	N		Yes
	Perfluorohexanoic acid (PFHxA)	307-24-4	INITIAL	1		3.6	ng/l	U	U	N		Yes
	Perfluorononanoic acid (PFNA)	375-95-1	INITIAL	1		3.6	ng/l	U	U	N		Yes
	Perfluorooctanesulfonic acid (PFOS)	1763-23-1	INITIAL	1		3.6	ng/l	U	U	N		Yes
	Perfluorooctanoic acid (PFOA)	335-67-1	INITIAL	1		3.6	ng/l	U	U	N		Yes
	Perfluoropentanoic Acid (PFPeA)	2706-90-3	INITIAL	1		3.6	ng/l	U	U	N		Yes

Lab Sample ID	YI01015-014
Sample Name	EB-MM
Sample Type	N
Sample Date	8/31/2023 6:50:00 PM
Sample Matrix	WG
Validated?	Y
Validation Level	Level 4

ANALYTIC METHOD	Chemical Name	CAS	Test Type	DF	Validation Result	Validation LOQ	UNIT	Lab Qualifiers	Validation Qualifiers	Validation Detect Flag	Validation Reason Code	Reportable?
QSM-PFASbyLC/MS/MS	Perfluorotetradecanoic acid (PFTA)	376-06-7	INITIAL	1		3.6	ng/l	U	U	N		Yes
	Perfluorotridecanoic Acid (PFTriA)	72629-94-8	INITIAL	1		3.6	ng/l	U	U	N		Yes
	Perfluoroundecanoic Acid (PFUnA)	2058-94-8	INITIAL	1		3.6	ng/l	U	U	N		Yes

Lab Sample ID	YI01015-015
Sample Name	EB-BP
Sample Type	EB
Sample Date	8/31/2023 6:55:00 PM
Sample Matrix	WG
Validated?	Y
Validation Level	Level 4

ANALYTIC METHOD	Chemical Name	CAS	Test Type	DF	Validation Result	Validation LOQ	UNIT	Lab Qualifiers	Validation Qualifiers	Validation Detect Flag	Validation Reason Code	Reportable?
QSM-PFASbyLC/MS/MS	11-chloroeicosafluoro-3-oxaundecane-1-sulfonic acid (11Cl-PF	763051-92-9	INITIAL	1		7.2	ng/l	U	U	N		Yes
	1H, 1H, 2H, 2H-perfluohexane sulfonic acid (4:2 FTS)	757124-72-4	INITIAL	1		7.2	ng/l	U	U	N		Yes
	1H, 1H, 2H, 2H-perfluorodecane sulfonic acid (8:2 FTS)	39108-34-4	INITIAL	1		7.2	ng/l	U	U	N		Yes
	1H, 1H, 2H, 2H-perfluorooctane sulfonic acid (6:2 FTS)	27619-97-2	INITIAL	1		7.2	ng/l	U	U	N		Yes
	4,8-dioxa-3H-perfluorononanoic acid (ADONA)	919005-14-4	INITIAL	1		7.2	ng/l	U	U	N		Yes
	9-chlorohexadecafluoro-3-oxanone-1-sulfonic acid (9Cl-PF3ONS	756426-58-1	INITIAL	1		7.2	ng/l	U	U	N		Yes
	Hexafluoropropylene oxide dimer acid (GenX)	13252-13-6	INITIAL	1		7.2	ng/l	U	U	N		Yes
	N-ethylperfluoro-1-octanesulfonamidoacetic acid (EtFOSAA)	2991-50-6	INITIAL	1		7.2	ng/l	U	U	N		Yes
	N-methylperfluoro-1-octanesulfonamidoacetic acid (MeFOSAA)	2355-31-9	INITIAL	1		7.2	ng/l	U	U	N		Yes
	Perfluoro-1-nonane sulfonic acid (PFNS)	68259-12-1	INITIAL	1		3.6	ng/l	U	U	N		Yes
	Perfluoro-1-octanesulfonamide (PFOSA)	754-91-6	INITIAL	1		3.6	ng/l	U	U	N		Yes
	Perfluoro-1-pentane sulfonic acid (PFPeS)	2706-91-4	INITIAL	1		3.6	ng/l	U	U	N		Yes
	Perfluorobutanesulfonic acid (PFBS)	375-73-5	INITIAL	1		3.6	ng/l	U	U	N		Yes
	Perfluorobutanoic Acid (PFBA)	375-22-4	INITIAL	1		3.6	ng/l	U	U	N		Yes
	Perfluorodecanesulfonic acid (PFDS)	335-77-3	INITIAL	1		3.6	ng/l	U	U	N		Yes
	Perfluorodecanoic acid (PFDA)	335-76-2	INITIAL	1		3.6	ng/l	U	U	N		Yes
	Perfluorododecanoic acid (PFDoA)	307-55-1	INITIAL	1		3.6	ng/l	U	U	N		Yes
	Perfluoroheptanesulfonic acid (PFHPS)	375-92-8	INITIAL	1		3.6	ng/l	U	U	N		Yes
	Perfluoroheptanoic acid (PFHpA)	375-85-9	INITIAL	1		3.6	ng/l	U	U	N		Yes
	Perfluorohexanesulfonic acid (PFHxS)	355-46-4	INITIAL	1		3.6	ng/l	U	U	N		Yes
	Perfluorohexanoic acid (PFHxA)	307-24-4	INITIAL	1		3.6	ng/l	U	U	N		Yes
	Perfluorononanoic acid (PFNA)	375-95-1	INITIAL	1		3.6	ng/l	U	U	N		Yes
	Perfluorooctanesulfonic acid (PFOS)	1763-23-1	INITIAL	1		3.6	ng/l	U	U	N		Yes
	Perfluorooctanoic acid (PFOA)	335-67-1	INITIAL	1		3.6	ng/l	U	U	N		Yes
	Perfluoropentanoic Acid (PFPeA)	2706-90-3	INITIAL	1		3.6	ng/l	U	U	N		Yes

Lab Sample ID	YI01015-015
Sample Name	EB-BP
Sample Type	EB
Sample Date	8/31/2023 6:55:00 PM
Sample Matrix	WG
Validated?	Y
Validation Level	Level 4

ANALYTIC METHOD	Chemical Name	CAS	Test Type	DF	Validation Result	Validation LOQ	UNIT	Lab Qualifiers	Validation Qualifiers	Validation Detect Flag	Validation Reason Code	Reportable?
QSM-PFASbyLC/MS/MS	Perfluorotetradecanoic acid (PFTA)	376-06-7	INITIAL	1		3.6	ng/l	U	U	N		Yes
	Perfluorotridecanoic Acid (PFTriA)	72629-94-8	INITIAL	1		3.6	ng/l	U	U	N		Yes
	Perfluoroundecanoic Acid (PFUnA)	2058-94-8	INITIAL	1		3.6	ng/l	U	U	N		Yes

Lab Sample ID	YI01015-016
Sample Name	WV-PMW-RI-107
Sample Type	N
Sample Date	8/30/2023 4:55:00 PM
Sample Matrix	WG
Validated?	Y
Validation Level	Level 4

ANALYTIC METHOD	Chemical Name	CAS	Test Type	DF	Validation Result	Validation LOQ	UNIT	Lab Qualifiers	Validation Qualifiers	Validation Detect Flag	Validation Reason Code	Reportable?
QSM-PFASbyLC/MS/MS	11-chloroeicosafluoro-3-oxaundecane-1-sulfonic acid (11Cl-PF	763051-92-9	INITIAL	1		7.4	ng/l	U	U	N		Yes
	1H, 1H, 2H, 2H-perfluohexane sulfonic acid (4:2 FTS)	757124-72-4	INITIAL	1		7.4	ng/l	U	U	N		Yes
	1H, 1H, 2H, 2H-perfluorodecane sulfonic acid (8:2 FTS)	39108-34-4	INITIAL	1		7.4	ng/l	U	U	N		Yes
	1H, 1H, 2H, 2H-perfluorooctane sulfonic acid (6:2 FTS)	27619-97-2	INITIAL	1		7.4	ng/l	U	U	N		Yes
	4,8-dioxa-3H-perfluorononanoic acid (ADONA)	919005-14-4	INITIAL	1		7.4	ng/l	U	U	N		Yes
	9-chlorohexadecafluoro-3-oxanone-1-sulfonic acid (9Cl-PF3ONS	756426-58-1	INITIAL	1		7.4	ng/l	U	U	N		Yes
	Hexafluoropropylene oxide dimer acid (GenX)	13252-13-6	INITIAL	1		7.4	ng/l	U	U	N		Yes
	N-ethylperfluoro-1-octanesulfonamidoacetic acid (EtFOSAA)	2991-50-6	INITIAL	1		7.4	ng/l	U	U	N		Yes
	N-methylperfluoro-1-octanesulfonamidoacetic acid (MeFOSAA)	2355-31-9	INITIAL	1		7.4	ng/l	U	U	N		Yes
	Perfluoro-1-nonane sulfonic acid (PFNS)	68259-12-1	INITIAL	1		3.7	ng/l	U	U	N		Yes
	Perfluoro-1-octanesulfonamide (PFOSA)	754-91-6	INITIAL	1		3.7	ng/l	U	U	N		Yes
	Perfluoro-1-pentane sulfonic acid (PFPeS)	2706-91-4	INITIAL	1		3.7	ng/l	U	U	N		Yes
	Perfluorobutanesulfonic acid (PFBS)	375-73-5	INITIAL	1		3.7	ng/l	U	U	N		Yes
	Perfluorobutanoic Acid (PFBA)	375-22-4	INITIAL	1		3.7	ng/l	U	U	N		Yes
	Perfluorodecanesulfonic acid (PFDS)	335-77-3	INITIAL	1		3.7	ng/l	U	U	N		Yes
	Perfluorodecanoic acid (PFDA)	335-76-2	INITIAL	1		3.7	ng/l	U	U	N		Yes
	Perfluorododecanoic acid (PFDoA)	307-55-1	INITIAL	1		3.7	ng/l	U	U	N		Yes
	Perfluoroheptanesulfonic acid (PFHPS)	375-92-8	INITIAL	1		3.7	ng/l	U	U	N		Yes
	Perfluoroheptanoic acid (PFHpA)	375-85-9	INITIAL	1		3.7	ng/l	U	U	N		Yes
	Perfluorohexanesulfonic acid (PFHxS)	355-46-4	INITIAL	1		3.7	ng/l	U	U	N		Yes
	Perfluorohexanoic acid (PFHxA)	307-24-4	INITIAL	1		3.7	ng/l	U	U	N		Yes
	Perfluorononanoic acid (PFNA)	375-95-1	INITIAL	1		3.7	ng/l	U	U	N		Yes
	Perfluorooctanesulfonic acid (PFOS)	1763-23-1	INITIAL	1		3.7	ng/l	U	U	N		Yes
	Perfluorooctanoic acid (PFOA)	335-67-1	INITIAL	1		3.7	ng/l	U	U	N		Yes
	Perfluoropentanoic Acid (PFPeA)	2706-90-3	INITIAL	1		3.7	ng/l	U	U	N		Yes

Lab Sample ID	YI01015-016
Sample Name	WV-PMW-RI-107
Sample Type	N
Sample Date	8/30/2023 4:55:00 PM
Sample Matrix	WG
Validated?	Y
Validation Level	Level 4

ANALYTIC METHOD	Chemical Name	CAS	Test Type	DF	Validation Result	Validation LOQ	UNIT	Lab Qualifiers	Validation Qualifiers	Validation Detect Flag	Validation Reason Code	Reportable?
QSM-PFASbyLC/MS/MS	Perfluorotetradecanoic acid (PFTA)	376-06-7	INITIAL	1		3.7	ng/l	U	U	N		Yes
	Perfluorotridecanoic Acid (PFTriA)	72629-94-8	INITIAL	1		3.7	ng/l	U	U	N		Yes
	Perfluoroundecanoic Acid (PFUnA)	2058-94-8	INITIAL	1		3.7	ng/l	U	U	N		Yes

SECTION 3

DATA SUPPORT DOCUMENTATION

HI-RES AND PFAS ORGANIC ANALYSIS SUPPORT DOCUMENTATION

Client Name:	Warner Norcross & Judd LLP	EnvStd Project Manager:	Jared Acker
Site/Project Name:	2021 PFAS DV Wolverine World Wide (20219475.A000)	Reviewed by:	Dwight M. Hoster
Job Number/Task:	Professional Services > Perimeter Plan : PFAS Data Validation	Approved by:	JKA
Laboratory/Location:	Pace Shealy	Completion Date:	10/2024
SDG:	YI01015	Validation Level:	4
Sample Collection Dates:	8/30/23 - 8/31/23		

The following table indicates criteria that were examined, the identified problems, and support documentation attachments.

	Criteria Examined in Detail **Note:** All items examined have been included in the Support Document unless otherwise noted.							Problems Identified						
	Check (√) if Yes or Footnote Letter for Comments Below													
Parameter/ Method	PFAS 537 Mod							PFAS 537 Mod						
Condition Upon Receipt	√													
Sample Preservation	√													
Holding Times	√													
Blank Analysis Results	√													
Laboratory Control Sample/Laboratory Fortified Blank/ On-going Precision and Recovery Standard	√													
Surrogates														
PFAS Pre-Extraction Internal Standards	√													
Laboratory Duplicate														
Field Duplicate														
Matrix Spike/Matrix Spike Duplicate	√													
Sample Preparation	√													
Mass Tuning	√													
Initial Calibration	√													
Second-Source Calibration Verification	√													
PFAS Signal Suppression Check														
Peak Asymmetry														
Continuing Calibrations	√													
Resolution Check Standards	√													
Detection Limit/Sensitivity	√													
Post-Extraction Internal Standards														
Quantitation of Results	√													
Linear/Branched Identification/Quantitation	√													
Qualitative Identification	√													
2,3,7,8-TCDD – 2nd column confirmation														
PFAS Ion Transition Ratio/Hi-Res Ion Ratio	√													
Hi-Res Lock Mass Monitoring														
Dioxin/Furan Chlorodiphenyl Ethers Monitoring														
Analytical Sequence	√													
Percent Solids														
Deliverable was Complete	√													
Other: Dilution	√													

Comments: Qualitative Identification, Quantitation of Results, and Manual Integrations are not included in the Support Documentation unless a problem was identified.

ENVIRONMENTAL® STANDARDS
Montrose Environmental Group

BLANK ANALYSIS RESULTS

Fraction[1]	Matrix[2]	Blank Type[3]	Blank Sample Number	Contaminant	Concentration	Units[4]	Qualification limit (5×)	Qualification limit (10×)
				None				

1 - M = Metal; G = General Chemistry; V = Volatile; S = Semivolatile; P = Pesticide/PCB; O = Other:
2 - Aq = Aqueous; S = Solid
3 - MB = Method Blank; TB = Trip Blank; EB = Equipment Blank; FB = Field Blank;
IB = Instrument Blank; CCB = Continuing Calibration Blank; ICB = Initial Calibration Blank
4 - µg/L, mg/L, µg/kg, mg/kg

Notes: _____

WWW Data Package Deliverable Checklist
Shealy EPA 537 MOD ID

Reviewer: DMH	Laboratory:			Project: Perimeter Plan
Date of Review: 9/2024	Pace SC			SDG#: YI01015
Items	**YES**	**NO**	**N/A**	**Comments**
1. Laboratory Case Narrative	X			
2. Chain-of-Custody	X			
3. Sample Receipt Checklist	X			
4. Sample Results Summary (Form 1)	X			
A. Sample Raw Data	X			
B. Correct Reporting Limits?	X			
C. All analytes requested are reported?	X			
5. Surrogate (Pre-Extraction Internal Standard) Summary (Form 2)	X			
A. Correct Recovery Limits?	X			
6. MS/MSD Summary (Form 3A)			X	MS/MSD pairs analyzed on non-SDG samples.
A. MS/MSD Raw Data			X	
B. Correct MS/MSD Recovery and RPD Limits?			X	
4. LCS/LCSD Summary (Form 3B)	X			No LCSD was included in this data set.
A. LCS/LCSD Raw Data	X			
B. Correct LCS/LCSD Recovery and RPD Limits?	X			
5. Blank Summary and Association (Form 4)	X			
A. Blank Raw Data	X			
6. Internal Standard Summary (Form 8)			X	
A. Correct Internal Standard Limits?			X	
7. Initial Calibration Summary - Target Analytes	X			
A. Initial Calibration Summary - Surrogates	X			
B. Initial Calibration Raw Data	X			
C. Qualitative Linear/Branched PFOA Standard Raw Data	X			
8. Initial Calibration Verification Summary	X			
A. Initial Calibration Verification Raw Data	X			
9. Continuing Calibration Verification Summary	X			
A. Daily Instrument Sensitivity Check	X			
B. Continuing Calibration Verification Raw Data	X			
10. Tune Data	X			
11. Instrument Blank Raw Data	X			
12. Analytical Sequence Logs	X			
13. Extraction Logs	X			
14. Percent Solids Raw Data			X	
15. Standard Preparation Sheets	X			
16. Certificates of Analysis	X			

PFAS by LC/MS/MS

Client: GZA GeoEnvironmental, Inc.
Laboratory ID: YI01015-001
Description: WV-MW-15C
Matrix: Aqueous
Date Sampled: 08/31/2023 1255
Date Received: 09/01/2023

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	SOP SPE	PFAS by ID SOP	1	09/07/2023 2122	MMM	09/03/2023 1816	83966

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	Units	Run
9-chlorohexadecafluoro-3-oxanone-1-sulfonic acid (9Cl-PF3ONS)	756426-58-1	PFAS by ID SOP	ND		7.2	ng/L	1
11-chloroeicosafluoro-3-oxaundecane-1-sulfonic acid (11Cl-PF3...)	763051-92-9	PFAS by ID SOP	ND		7.2	ng/L	1
1H, 1H, 2H, 2H-perfluorodecane sulfonic acid (8:2 FTS)	39108-34-4	PFAS by ID SOP	ND		7.2	ng/L	1
1H, 1H, 2H, 2H-perfluorooctane sulfonic acid (6:2 FTS)	27619-97-2	PFAS by ID SOP	ND		7.2	ng/L	1
1H,1H,2H,2H-perfluorohexane sulfonic acid (4:2 FTS)	757124-72-4	PFAS by ID SOP	ND		7.2	ng/L	1
Hexafluoropropylene oxide dimer acid (GenX)	13252-13-6	PFAS by ID SOP	ND		7.2	ng/L	1
4,8-dioxa-3H-perfluorononanoic acid (ADONA)	919005-14-4	PFAS by ID SOP	ND		7.2	ng/L	1
N-ethylperfluoro-1-octanesulfonamidoacetic acid (EtFOSAA)	2991-50-6	PFAS by ID SOP	ND		7.2	ng/L	1
N-methylperfluoro-1-octanesulfonamidoacetic acid (MeFOSAA)	2355-31-9	PFAS by ID SOP	ND		7.2	ng/L	1
Perfluoro-1-butanesulfonic acid (PFBS)	375-73-5	PFAS by ID SOP	ND		3.6	ng/L	1
Perfluoro-1-decanesulfonic acid (PFDS)	335-77-3	PFAS by ID SOP	ND		3.6	ng/L	1
Perfluoro-1-heptanesulfonic acid (PFHpS)	375-92-8	PFAS by ID SOP	ND		3.6	ng/L	1
Perfluoro-1-nonanesulfonic acid (PFNS)	68259-12-1	PFAS by ID SOP	ND		3.6	ng/L	1
Perfluoro-1-octanesulfonamide (PFOSA)	754-91-6	PFAS by ID SOP	ND		3.6	ng/L	1
Perfluoro-1-pentanesulfonic acid (PFPeS)	2706-91-4	PFAS by ID SOP	ND		3.6	ng/L	1
Perfluorohexanesulfonic acid (PFHxS)	355-46-4	PFAS by ID SOP	ND		3.6	ng/L	1
Perfluoro-n-butanoic acid (PFBA)	375-22-4	PFAS by ID SOP	ND		3.6	ng/L	1
Perfluoro-n-decanoic acid (PFDA)	335-76-2	PFAS by ID SOP	ND		3.6	ng/L	1
Perfluoro-n-dodecanoic acid (PFDoA)	307-55-1	PFAS by ID SOP	ND		3.6	ng/L	1
Perfluoro-n-heptanoic acid (PFHpA)	375-85-9	PFAS by ID SOP	ND		3.6	ng/L	1
Perfluoro-n-hexanoic acid (PFHxA)	307-24-4	PFAS by ID SOP	ND		3.6	ng/L	1
Perfluoro-n-nonanoic acid (PFNA)	375-95-1	PFAS by ID SOP	ND		3.6	ng/L	1
Perfluoro-n-octanoic acid (PFOA)	335-67-1	PFAS by ID SOP	ND		3.6	ng/L	1
Perfluoro-n-pentanoic acid (PFPeA)	2706-90-3	PFAS by ID SOP	ND		3.6	ng/L	1
Perfluoro-n-tetradecanoic acid (PFTeDA)	376-06-7	PFAS by ID SOP	ND		3.6	ng/L	1
Perfluoro-n-tridecanoic acid (PFTrDA)	72629-94-8	PFAS by ID SOP	ND		3.6	ng/L	1
Perfluoro-n-undecanoic acid (PFUdA)	2058-94-8	PFAS by ID SOP	ND		3.6	ng/L	1
Perfluorooctanesulfonic acid (PFOS)	1763-23-1	PFAS by ID SOP	ND		3.6	ng/L	1

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
13C2_4:2FTS		138	50-150
13C2_6:2FTS		120	50-150
13C2_8:2FTS		102	50-150
13C2_PFDoA		107	50-150
13C2_PFTeDA		102	50-150
13C3_PFBS		111	50-150
13C3_PFHxS		99	50-150
13C3-HFPO-DA		111	50-150
13C4_PFBA		92	50-150
13C4_PFHpA		107	50-150
13C5_PFHxA		107	50-150
13C5_PFPeA		104	50-150
13C6_PFDA		98	50-150
13C7_PFUdA		109	50-150

evaluated using method, lab SOP, and QAPP limits/criteria as applicable

Throughout IR the following abbreviations may be used:
TA- target analyte
NTA- non-target analyte
NR- not reported
NB- not bracketing
NE- not evaluated
ND- not detected

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

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

PFAS by LC/MS/MS

Client: GZA GeoEnvironmental, Inc.
Laboratory ID: YI01015-001
Description: WV-MW-15C
Matrix: Aqueous
Date Sampled: 08/31/2023 1255
Date Received: 09/01/2023

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
13C8_PFOA		113	50-150
13C8_PFOS		100	50-150
13C8_PFOSA		112	50-150
13C9_PFNA		113	50-150
d5-EtFOSAA		108	50-150
d3-MeFOSAA		101	50-150



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

PFAS by LC/MS/MS

Client: GZA GeoEnvironmental, Inc.
Laboratory ID: YI01015-002
Description: WV-MW-15D
Matrix: Aqueous
Date Sampled: 08/31/2023 1325
Date Received: 09/01/2023

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	SOP SPE	PFAS by ID SOP	1	09/07/2023 2133	MMM	09/03/2023 1816	83966

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

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
13C2_4:2FTS		123	50-150
13C2_6:2FTS		113	50-150
13C2_8:2FTS		99	50-150
13C2_PFDoA		95	50-150
13C2_PFTeDA		96	50-150
13C3_PFBS		103	50-150
13C3_PFHxS		94	50-150
13C3-HFPO-DA		104	50-150
13C4_PFBA		95	50-150
13C4_PFHpA		104	50-150
13C5_PFHxA		105	50-150
13C5_PFPeA		106	50-150
13C6_PFDA		93	50-150
13C7_PFUdA		103	50-150

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

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PFAS by LC/MS/MS

Client: GZA GeoEnvironmental, Inc.
Laboratory ID: YI01015-002
Description: WV-MW-15D
Matrix: Aqueous
Date Sampled: 08/31/2023 1325
Date Received: 09/01/2023

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
13C8_PFOA		104	50-150
13C8_PFOS		97	50-150
13C8_PFOSA		104	50-150
13C9_PFNA		110	50-150
d5-EtFOSAA		101	50-150
d3-MeFOSAA		99	50-150



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

PFAS by LC/MS/MS

Client: GZA GeoEnvironmental, Inc.
Laboratory ID: YI01015-003
Description: WV-MW-15B
Matrix: Aqueous
Date Sampled: 08/31/2023 1245
Date Received: 09/01/2023

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	SOP SPE	PFAS by ID SOP	1	09/07/2023 2143	MMM	09/03/2023 1816	83966

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	Units	Run
9-chlorohexadecafluoro-3-oxanone-1-sulfonic acid (9Cl-PF3ONS)	756426-58-1	PFAS by ID SOP	ND		7.3	ng/L	1
11-chloroeicosafluoro-3-oxaundecane-1-sulfonic acid (11Cl-PF3...)	763051-92-9	PFAS by ID SOP	ND		7.3	ng/L	1
1H, 1H, 2H, 2H-perfluorodecane sulfonic acid (8:2 FTS)	39108-34-4	PFAS by ID SOP	ND		7.3	ng/L	1
1H, 1H, 2H, 2H-perfluorooctane sulfonic acid (6:2 FTS)	27619-97-2	PFAS by ID SOP	ND		7.3	ng/L	1
1H,1H,2H,2H-perfluorohexane sulfonic acid (4:2 FTS)	757124-72-4	PFAS by ID SOP	ND		7.3	ng/L	1
Hexafluoropropylene oxide dimer acid (GenX)	13252-13-6	PFAS by ID SOP	ND		7.3	ng/L	1
4,8-dioxa-3H-perfluorononanoic acid (ADONA)	919005-14-4	PFAS by ID SOP	ND		7.3	ng/L	1
N-ethylperfluoro-1-octanesulfonamidoacetic acid (EtFOSAA)	2991-50-6	PFAS by ID SOP	ND		7.3	ng/L	1
N-methylperfluoro-1-octanesulfonamidoacetic acid (MeFOSAA)	2355-31-9	PFAS by ID SOP	ND		7.3	ng/L	1
Perfluoro-1-butanesulfonic acid (PFBS)	375-73-5	PFAS by ID SOP	ND		3.7	ng/L	1
Perfluoro-1-decanesulfonic acid (PFDS)	335-77-3	PFAS by ID SOP	ND		3.7	ng/L	1
Perfluoro-1-heptanesulfonic acid (PFHpS)	375-92-8	PFAS by ID SOP	ND		3.7	ng/L	1
Perfluoro-1-nonanesulfonic acid (PFNS)	68259-12-1	PFAS by ID SOP	ND		3.7	ng/L	1
Perfluoro-1-octanesulfonamide (PFOSA)	754-91-6	PFAS by ID SOP	ND		3.7	ng/L	1
Perfluoro-1-pentanesulfonic acid (PFPeS)	2706-91-4	PFAS by ID SOP	ND		3.7	ng/L	1
Perfluorohexanesulfonic acid (PFHxS)	355-46-4	PFAS by ID SOP	ND		3.7	ng/L	1
Perfluoro-n-butanoic acid (PFBA)	375-22-4	PFAS by ID SOP	ND		3.7	ng/L	1
Perfluoro-n-decanoic acid (PFDA)	335-76-2	PFAS by ID SOP	ND		3.7	ng/L	1
Perfluoro-n-dodecanoic acid (PFDoA)	307-55-1	PFAS by ID SOP	ND		3.7	ng/L	1
Perfluoro-n-heptanoic acid (PFHpA)	375-85-9	PFAS by ID SOP	ND		3.7	ng/L	1
Perfluoro-n-hexanoic acid (PFHxA)	307-24-4	PFAS by ID SOP	ND		3.7	ng/L	1
Perfluoro-n-nonanoic acid (PFNA)	375-95-1	PFAS by ID SOP	ND		3.7	ng/L	1
Perfluoro-n-octanoic acid (PFOA)	335-67-1	PFAS by ID SOP	ND		3.7	ng/L	1
Perfluoro-n-pentanoic acid (PFPeA)	2706-90-3	PFAS by ID SOP	ND		3.7	ng/L	1
Perfluoro-n-tetradecanoic acid (PFTeDA)	376-06-7	PFAS by ID SOP	ND		3.7	ng/L	1
Perfluoro-n-tridecanoic acid (PFTrDA)	72629-94-8	PFAS by ID SOP	ND		3.7	ng/L	1
Perfluoro-n-undecanoic acid (PFUdA)	2058-94-8	PFAS by ID SOP	ND		3.7	ng/L	1
Perfluorooctanesulfonic acid (PFOS)	1763-23-1	PFAS by ID SOP	ND		3.7	ng/L	1

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
13C2_4:2FTS		130	50-150
13C2_6:2FTS		120	50-150
13C2_8:2FTS		99	50-150
13C2_PFDoA		92	50-150
13C2_PFTeDA		100	50-150
13C3_PFBS		106	50-150
13C3_PFHxS		97	50-150
13C3-HFPO-DA		108	50-150
13C4_PFBA		86	50-150
13C4_PFHpA		102	50-150
13C5_PFHxA		111	50-150
13C5_PFPeA		97	50-150
13C6_PFDA		97	50-150
13C7_PFUdA		106	50-150

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

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PFAS by LC/MS/MS

Client: GZA GeoEnvironmental, Inc.
Laboratory ID: YI01015-003
Description: WV-MW-15B
Matrix: Aqueous
Date Sampled: 08/31/2023 1245
Date Received: 09/01/2023

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
13C8_PFOA		110	50-150
13C8_PFOS		96	50-150
13C8_PFOSA		105	50-150
13C9_PFNA		109	50-150
d5-EtFOSAA		105	50-150
d3-MeFOSAA		98	50-150



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

PFAS by LC/MS/MS

Client: GZA GeoEnvironmental, Inc.
Laboratory ID: YI01015-004
Description: WV-MW-15A
Matrix: Aqueous
Date Sampled: 08/31/2023 1225
Date Received: 09/01/2023

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	SOP SPE	PFAS by ID SOP	1	09/07/2023 2154	MMM	09/03/2023 1816	83966

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	Units	Run
9-chlorohexadecafluoro-3-oxanone-1-sulfonic acid (9Cl-PF3ONS)	756426-58-1	PFAS by ID SOP	ND		7.7	ng/L	1
11-chloroeicosafluoro-3-oxaundecane-1-sulfonic acid (11Cl-PF3...)	763051-92-9	PFAS by ID SOP	ND		7.7	ng/L	1
1H, 1H, 2H, 2H-perfluorodecane sulfonic acid (8:2 FTS)	39108-34-4	PFAS by ID SOP	ND		7.7	ng/L	1
1H, 1H, 2H, 2H-perfluorooctane sulfonic acid (6:2 FTS)	27619-97-2	PFAS by ID SOP	ND		7.7	ng/L	1
1H,1H,2H,2H-perfluorohexane sulfonic acid (4:2 FTS)	757124-72-4	PFAS by ID SOP	ND		7.7	ng/L	1
Hexafluoropropylene oxide dimer acid (GenX)	13252-13-6	PFAS by ID SOP	ND		7.7	ng/L	1
4,8-dioxa-3H-perfluorononanoic acid (ADONA)	919005-14-4	PFAS by ID SOP	ND		7.7	ng/L	1
N-ethylperfluoro-1-octanesulfonamidoacetic acid (EtFOSAA)	2991-50-6	PFAS by ID SOP	ND		7.7	ng/L	1
N-methylperfluoro-1-octanesulfonamidoacetic acid (MeFOSAA)	2355-31-9	PFAS by ID SOP	ND		7.7	ng/L	1
Perfluoro-1-butanesulfonic acid (PFBS)	375-73-5	PFAS by ID SOP	ND		3.9	ng/L	1
Perfluoro-1-decanesulfonic acid (PFDS)	335-77-3	PFAS by ID SOP	ND		3.9	ng/L	1
Perfluoro-1-heptanesulfonic acid (PFHpS)	375-92-8	PFAS by ID SOP	ND		3.9	ng/L	1
Perfluoro-1-nonanesulfonic acid (PFNS)	68259-12-1	PFAS by ID SOP	ND		3.9	ng/L	1
Perfluoro-1-octanesulfonamide (PFOSA)	754-91-6	PFAS by ID SOP	ND		3.9	ng/L	1
Perfluoro-1-pentanesulfonic acid (PFPeS)	2706-91-4	PFAS by ID SOP	ND		3.9	ng/L	1
Perfluorohexanesulfonic acid (PFHxS)	355-46-4	PFAS by ID SOP	ND		3.9	ng/L	1
Perfluoro-n-butanoic acid (PFBA)	375-22-4	PFAS by ID SOP	ND		3.9	ng/L	1
Perfluoro-n-decanoic acid (PFDA)	335-76-2	PFAS by ID SOP	ND		3.9	ng/L	1
Perfluoro-n-dodecanoic acid (PFDoA)	307-55-1	PFAS by ID SOP	ND		3.9	ng/L	1
Perfluoro-n-heptanoic acid (PFHpA)	375-85-9	PFAS by ID SOP	ND		3.9	ng/L	1
Perfluoro-n-hexanoic acid (PFHxA)	307-24-4	PFAS by ID SOP	ND		3.9	ng/L	1
Perfluoro-n-nonanoic acid (PFNA)	375-95-1	PFAS by ID SOP	ND		3.9	ng/L	1
Perfluoro-n-octanoic acid (PFOA)	335-67-1	PFAS by ID SOP	ND		3.9	ng/L	1
Perfluoro-n-pentanoic acid (PFPeA)	2706-90-3	PFAS by ID SOP	ND		3.9	ng/L	1
Perfluoro-n-tetradecanoic acid (PFTeDA)	376-06-7	PFAS by ID SOP	ND		3.9	ng/L	1
Perfluoro-n-tridecanoic acid (PFTrDA)	72629-94-8	PFAS by ID SOP	ND		3.9	ng/L	1
Perfluoro-n-undecanoic acid (PFUdA)	2058-94-8	PFAS by ID SOP	ND		3.9	ng/L	1
Perfluorooctanesulfonic acid (PFOS)	1763-23-1	PFAS by ID SOP	ND		3.9	ng/L	1

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
13C2_4:2FTS		144	50-150
13C2_6:2FTS		122	50-150
13C2_8:2FTS		102	50-150
13C2_PFDoA		101	50-150
13C2_PFTeDA		96	50-150
13C3_PFBS		105	50-150
13C3_PFHxS		100	50-150
13C3-HFPO-DA		108	50-150
13C4_PFBA		84	50-150
13C4_PFHpA		110	50-150
13C5_PFHxA		112	50-150
13C5_PFPeA		107	50-150
13C6_PFDA		106	50-150
13C7_PFUdA		102	50-150

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

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PFAS by LC/MS/MS

Client: GZA GeoEnvironmental, Inc.
Laboratory ID: YI01015-004
Description: WV-MW-15A
Matrix: Aqueous
Date Sampled: 08/31/2023 1225
Date Received: 09/01/2023

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
13C8_PFOA		110	50-150
13C8_PFOS		100	50-150
13C8_PFOSA		109	50-150
13C9_PFNA		113	50-150
d5-EtFOSAA		100	50-150
d3-MeFOSAA		96	50-150



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

PFAS by LC/MS/MS

Client: GZA GeoEnvironmental, Inc.
Laboratory ID: YI01015-005
Description: HS-PMW-RI-105A
Matrix: Aqueous
Date Sampled: 08/31/2023 1650
Date Received: 09/01/2023

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	SOP SPE	PFAS by ID SOP	1	09/07/2023 2205	MMM	09/03/2023 1816	83966

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	Units	Run
9-chlorohexadecafluoro-3-oxanone-1-sulfonic acid (9Cl-PF3ONS)	756426-58-1	PFAS by ID SOP	ND		6.9	ng/L	1
11-chloroeicosafluoro-3-oxaundecane-1-sulfonic acid (11Cl-PF3...)	763051-92-9	PFAS by ID SOP	ND		6.9	ng/L	1
1H, 1H, 2H, 2H-perfluorodecane sulfonic acid (8:2 FTS)	39108-34-4	PFAS by ID SOP	ND		6.9	ng/L	1
1H, 1H, 2H, 2H-perfluorooctane sulfonic acid (6:2 FTS)	27619-97-2	PFAS by ID SOP	ND		6.9	ng/L	1
1H,1H,2H,2H-perfluorohexane sulfonic acid (4:2 FTS)	757124-72-4	PFAS by ID SOP	ND		6.9	ng/L	1
Hexafluoropropylene oxide dimer acid (GenX)	13252-13-6	PFAS by ID SOP	ND		6.9	ng/L	1
4,8-dioxa-3H-perfluorononanoic acid (ADONA)	919005-14-4	PFAS by ID SOP	ND		6.9	ng/L	1
N-ethylperfluoro-1-octanesulfonamidoacetic acid (EtFOSAA)	2991-50-6	PFAS by ID SOP	ND		6.9	ng/L	1
N-methylperfluoro-1-octanesulfonamidoacetic acid (MeFOSAA)	2355-31-9	PFAS by ID SOP	ND		6.9	ng/L	1
Perfluoro-1-butanesulfonic acid (PFBS)	375-73-5	PFAS by ID SOP	4.6	✓	3.4	ng/L	1
Perfluoro-1-decanesulfonic acid (PFDS)	335-77-3	PFAS by ID SOP	ND		3.4	ng/L	1
Perfluoro-1-heptanesulfonic acid (PFHpS)	375-92-8	PFAS by ID SOP	ND		3.4	ng/L	1
Perfluoro-1-nonanesulfonic acid (PFNS)	68259-12-1	PFAS by ID SOP	ND		3.4	ng/L	1
Perfluoro-1-octanesulfonamide (PFOSA)	754-91-6	PFAS by ID SOP	ND		3.4	ng/L	1
Perfluoro-1-pentanesulfonic acid (PFPeS)	2706-91-4	PFAS by ID SOP	ND		3.4	ng/L	1
Perfluorohexanesulfonic acid (PFHxS)	355-46-4	PFAS by ID SOP	ND		3.4	ng/L	1
Perfluoro-n-butanoic acid (PFBA)	375-22-4	PFAS by ID SOP	ND		3.4	ng/L	1
Perfluoro-n-decanoic acid (PFDA)	335-76-2	PFAS by ID SOP	ND		3.4	ng/L	1
Perfluoro-n-dodecanoic acid (PFDoA)	307-55-1	PFAS by ID SOP	ND		3.4	ng/L	1
Perfluoro-n-heptanoic acid (PFHpA)	375-85-9	PFAS by ID SOP	ND		3.4	ng/L	1
Perfluoro-n-hexanoic acid (PFHxA)	307-24-4	PFAS by ID SOP	ND		3.4	ng/L	1
Perfluoro-n-nonanoic acid (PFNA)	375-95-1	PFAS by ID SOP	ND		3.4	ng/L	1
Perfluoro-n-octanoic acid (PFOA)	335-67-1	PFAS by ID SOP	5.1	✓	3.4	ng/L	1
Perfluoro-n-pentanoic acid (PFPeA)	2706-90-3	PFAS by ID SOP	ND		3.4	ng/L	1
Perfluoro-n-tetradecanoic acid (PFTeDA)	376-06-7	PFAS by ID SOP	ND		3.4	ng/L	1
Perfluoro-n-tridecanoic acid (PFTrDA)	72629-94-8	PFAS by ID SOP	ND		3.4	ng/L	1
Perfluoro-n-undecanoic acid (PFUdA)	2058-94-8	PFAS by ID SOP	ND		3.4	ng/L	1
Perfluorooctanesulfonic acid (PFOS)	1763-23-1	PFAS by ID SOP	ND		3.4	ng/L	1

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
13C2_4:2FTS		121	50-150
13C2_6:2FTS		100	50-150
13C2_8:2FTS		96	50-150
13C2_PFDoA		100	50-150
13C2_PFTeDA		98	50-150
13C3_PFBS		101	50-150
13C3_PFHxS		93	50-150
13C3-HFPO-DA		110	50-150
13C4_PFBA		87	50-150
13C4_PFHpA		99	50-150
13C5_PFHxA		104	50-150
13C5_PFPeA		101	50-150
13C6_PFDA		94	50-150
13C7_PFUdA		96	50-150

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

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PFAS by LC/MS/MS

Client: GZA GeoEnvironmental, Inc.
Laboratory ID: YI01015-005
Description: HS-PMW-RI-105A
Matrix: Aqueous
Date Sampled: 08/31/2023 1650
Date Received: 09/01/2023

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
13C8_PFOA		100	50-150
13C8_PFOS		88	50-150
13C8_PFOSA		101	50-150
13C9_PFNA		102	50-150
d5-EtFOSAA		106	50-150
d3-MeFOSAA		103	50-150

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

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Pace Environmental Services, LLC
Analyte Quantitation Report

Data File: \\Organics\LL\LCMSMS01.i\090723B-nonDOD+ICAL.b\090723B041.d
Injection Date: 07-Sep-2023 22:05:08 Injection Vol: 10.0 uL
Sample Type: Client Auto Sampler: 27
Lab Sample ID: YI01015-005 Lab Prep. Batch: 83966
Client ID: HS-PMW-RI-105A Sample Group: YI01015
Sample Info: YI01015-005 Misc. Info:
Inst. ID: LCMSMS01.i Operator: eqi.svoa

Method: LCMSMS01_PFAS-ID2 Version: V16 30-Jun-2022 10:54:24
Calib Method: PFAS-ID2 Lock State: Unlocked
Quant Method: IsoDil Integrator: picker

Matrix: Aqueous
Final Conc.: Amt * DF * CF
Concentration Formula: CF = (VF/1000) * 1/VI = 0.0171709

Name	Value	Units	Description
DF	1		Dilution Factor
VF	5000	ul	Final Volume
VI	291.19	ml	Initial Sample Volume

IsoDil Stds %Recovery = ((Area * DF)/Ical Mid Area) * 100

Reagent: Surrogates Conc. Level: Smp Vol. Added: 0.1000 ml

Signal	Quant Std	RT (Min)	Exp RT (Min)	c RT (Min)	Response	Peak Pts	S/N	Ion Ratio	Isomer Ratio	OnCol Conc ng/L	Final Conc ng/L	%Rec	Flags
D 46 13C4_PFBA CAS: SESI-0111													
217 > 172		1.645	1.645	0.000	2119296	15	>100:1			2000.00	1819.29	87	
8 Perfluoro-n-butanoic acid (PFBA) CAS: 375-22-4													J
212.9 > 168.9	46	1.645	1.645	0.000	90956	13	53:1			82.787	1.4215		M
D 50 13C5_PFPeA CAS: SESI-0112													
267.9 > 223		1.958	1.950	0.000	2263920	17	>100:1			2000.00	2089.15	101	
21 Perfluoro-n-pentanoic acid (PFPeA) CAS: 2706-90-3													J
262.9 > 218.9	50	1.958	1.950	0.000	125421	17	65:1			101.63	1.7451		
D 44 13C3_PFBS CAS: SESI-0116													
302 > 80		2.005	1.997	0.000	826588	16	>100:1			2000.00	2036.90	101	
7 Perfluoro-1-butanesulfonate (PFBS) CAS: 375-73-5													
298.9 > 80	44	2.005	1.997	0.000	143345	17	>100:1	Target = 3.72		266.94	4.5837		
298.9 > 99	44	2.005	1.997		38514	17	>100:1	3.72 (1.86-5.58)					
22 Perfluoro-1-pentanesulfonic acid (PFPeS) CAS: 2706-91-4													U
349 > 80	44		2.309		ND								
D 63 13C2_4:2 FTS_2 CAS: SESI-0104													
329 >81		2.253	2.243	0.000	572024	18	>100:1			10000	11283	121	
1 Fluorotelomer sulfonate 4:2 [1H,1H,2H,2H-perfluorohexane sulfonate] (4:2 FTS) CAS: 757124-72-4													U
327 > 307	63		2.243		ND								
D 49 13C5_PFHxA CAS: SESI-0113													
318 > 273		2.290	2.281	0.000	2053865	16	>100:1			2000.00	2100.52	104	
15 Perfluoro-n-hexanoic acid (PFHxA) CAS: 307-24-4													J
313 > 269	49	2.290	2.281	0.000	97180	16	67:1	Target = 16.37		98.301	1.6879		
313 > 119	49	2.290	2.281		7558	16	25:1	12.85 (8.18-24.55)					
D 66 13C3_GenX CAS: SESI-0121													
287 > 185		2.402	2.393	0.000	1411631	16	>100:1			10000	10884	110	
28 Hexafluoropropylene oxide dimer acid (GenX) CAS: 13252-13-6													U
285 > 119	66		2.393		ND								
D 47 13C4_PFHpA CAS: SESI-0114													
367 > 322		2.669	2.652	0.000	2457751	19	>100:1			2000.00	2044.44	99	

Signal	Quant Std	RT (Min)	Exp RT (Min)	c RT (Min)	Response	Peak Pts	S/N	Ion Ratio	Isomer Ratio	OnCol Conc ng/L	Final Conc ng/L	%Rec	Flags
13 Perfluoro-n-heptanoic acid (PFHpA) CAS: 375-85-9													J
363 > 319	47	2.669	2.652	0.000	115818	19	75:1	Target = 2.96		104.77	1.7989		
363 > 169	47	2.678	2.652		36445	15	54:1	3.17 (1.48-4.44)					
D 45 13C3_PFHxS CAS: SESI-0096													
402 > 80		2.686	2.669	0.000	781230	19	>100:1			2000.00	1996.55	93	
14 Perfluorohexanesulfonate (PFHxS) CAS: 355-46-4													J
399 > 80	45	2.686	2.669	0.000	40094	24	69:1	Target = 3.54	6.08	89.574	1.5381		
399 > 99	45	2.678	2.669		10391	43	28:1	3.85 (1.77-5.32)	4.37				
29 4,8-dioxa-3H-perfluorononanoic acid (ADONA) CAS: 919005-14-4													U
377 > 251	45		2.694		ND								
12 Perfluoro-1-heptanesulfonic acid (PFHpS) CAS: 375-92-8													U
449 > 80	45		3.092		ND								
D 64 13C2_6:2 FTS_2 CAS: SESI-0105													
429 > 81		3.066	3.048	0.000	567018	24	>100:1			10000	10051	100	
2 Fluorotelomer sulfonate 6:2 [1H,1H,2H,2H-perfluorooctane sulfonate] (6:2 FTS) CAS: 27619-97-2													U
427 > 407	64		3.057		ND								
D 53 13C8_PFOA CAS: SESI-0097													
421 > 376		3.110	3.083	0.000	2284412	22	>100:1			2000.00	2084.12	100	
20 Perfluoro-n-octanoic acid (PFOA) CAS: 335-67-1													
413 > 369	53	3.101	3.083	0.000	322421	28	93:1	Target = 2.66	36.78	296.92	5.0984		M
413 > 169	53	3.110	3.083		123177	40	>100:1	2.61 (1.33-3.99)	16.26				
D 56 13C9_PFNA CAS: SESI-0099													
472 > 427		3.588	3.564	0.000	2120888	24	>100:1			2000.00	1946.99	102	
17 Perfluoro-n-nonanoic acid (PFNA) CAS: 375-95-1													U
463 > 419	56		3.564		ND								
D 54 13C8_PFOS CAS: SESI-0098													
507 > 80		3.596	3.564	0.000	619107	24	>100:1			2000.00	1779.25	88	
18 Perfluorooctanesulfonate (PFOS) CAS: 1763-23-1													U
499 > 80	54		3.564		ND								
30 9-chlorohexadecafluoro-3-oxanone-1-sulfonic acid (9Cl-PF3ONS) CAS: 756426-58-1													U
531 > 351	54		3.852		ND								
16 Perfluoro-1-nonanesulfonic acid (PFNS) CAS: 68259-12-1													U
549 > 80	54		4.044		ND								
9 Perfluoro-1-decanesulfonic acid (PFDS) CAS: 335-77-3													U
599 > 80	54		4.486		ND								
31 11-chloroeicosafluoro-3-oxaundecane-1-sulfonic acid (11Cl-PF3OUdS) CAS: 763051-92-9													U
631 > 451	54		4.724		ND								
D 55 13C8_PFOSA CAS: SESI-0107													
506 > 78		4.036	4.019	0.000	1165192	23	>100:1			2000.00	1862.72	101	
19 Perfluoro-1-octanesulfonamide (PFOSA) CAS: 754-91-6													U
498 > 78	55		4.010		ND								
D 65 13C2_8:2 FTS_2 CAS: SESI-0106													
529 > 81		4.060	4.036	0.000	481540	26	>100:1			10000	9707.01	96	
3 Fluorotelomer sulfonate 8:2 [1H,1H,2H,2H-perfluorodecane sulfonate] (8:2 FTS) CAS: 39108-34-4													U
527 > 507	65		4.027		ND								
D 51 13C6_PFDA CAS: SESI-0115													
519 > 474		4.075	4.052	0.000	1973618	26	>100:1			2000.00	1963.26	94	
10 Perfluoro-n-decanoic acid (PFDA) CAS: 335-76-2													U
513 > 469	51		4.052		ND								
D 58 d3-MeFOSAA CAS: SESI-0102													
573 > 419		4.290	4.265	0.000	2316117	25	>100:1			10000	9949.83	103	
6 N-methylperfluoro-1-octanesulfonamidoacetic acid (N-MeFOSAA) CAS: 2355-31-9													U
570 > 419	58		4.273		ND								
D 60 d5-EtFOSAA CAS: SESI-0110													
589 > 419		4.528	4.494	0.000	2050163	25	>100:1			10000	10297	106	
5 N-ethylperfluoro-1-octanesulfonamidoacetic acid (N-EtFOSAA) CAS: 2991-50-6													U
584 > 419	60		4.503		ND								
D 52 13C7_PFUdA CAS: SESI-0117													
570 > 525		4.536	4.503	0.000	1706047	26	>100:1			2000.00	1934.79	96	

PFAS by LC/MS/MS

Client: GZA GeoEnvironmental, Inc.
Laboratory ID: YI01015-006
Description: HS-PMW-RI-105B
Matrix: Aqueous
Date Sampled: 08/31/2023 1740
Date Received: 09/01/2023

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	SOP SPE	PFAS by ID SOP	1	09/13/2023 1835	ARC2	09/10/2023 2003	84416

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	Units	Run
9-chlorohexadecafluoro-3-oxanone-1-sulfonic acid (9Cl-PF3ONS)	756426-58-1	PFAS by ID SOP	ND		8.0	ng/L	1
11-chloroeicosafluoro-3-oxaundecane-1-sulfonic acid (11Cl-PF3...)	763051-92-9	PFAS by ID SOP	ND		8.0	ng/L	1
1H, 1H, 2H, 2H-perfluorodecane sulfonic acid (8:2 FTS)	39108-34-4	PFAS by ID SOP	ND		8.0	ng/L	1
1H, 1H, 2H, 2H-perfluorooctane sulfonic acid (6:2 FTS)	27619-97-2	PFAS by ID SOP	ND		8.0	ng/L	1
1H,1H,2H,2H-perfluorohexane sulfonic acid (4:2 FTS)	757124-72-4	PFAS by ID SOP	ND		8.0	ng/L	1
Hexafluoropropylene oxide dimer acid (GenX)	13252-13-6	PFAS by ID SOP	ND		8.0	ng/L	1
4,8-dioxa-3H-perfluorononanoic acid (ADONA)	919005-14-4	PFAS by ID SOP	ND		8.0	ng/L	1
N-ethylperfluoro-1-octanesulfonamidoacetic acid (EtFOSAA)	2991-50-6	PFAS by ID SOP	ND		8.0	ng/L	1
N-methylperfluoro-1-octanesulfonamidoacetic acid (MeFOSAA)	2355-31-9	PFAS by ID SOP	ND		8.0	ng/L	1
Perfluoro-1-butanesulfonic acid (PFBS)	375-73-5	PFAS by ID SOP	ND		4.0	ng/L	1
Perfluoro-1-decanesulfonic acid (PFDS)	335-77-3	PFAS by ID SOP	ND		4.0	ng/L	1
Perfluoro-1-heptanesulfonic acid (PFHpS)	375-92-8	PFAS by ID SOP	ND		4.0	ng/L	1
Perfluoro-1-nonanesulfonic acid (PFNS)	68259-12-1	PFAS by ID SOP	ND		4.0	ng/L	1
Perfluoro-1-octanesulfonamide (PFOSA)	754-91-6	PFAS by ID SOP	ND		4.0	ng/L	1
Perfluoro-1-pentanesulfonic acid (PFPeS)	2706-91-4	PFAS by ID SOP	ND		4.0	ng/L	1
Perfluorohexanesulfonic acid (PFHxS)	355-46-4	PFAS by ID SOP	ND		4.0	ng/L	1
Perfluoro-n-butanoic acid (PFBA)	375-22-4	PFAS by ID SOP	ND		4.0	ng/L	1
Perfluoro-n-decanoic acid (PFDA)	335-76-2	PFAS by ID SOP	ND		4.0	ng/L	1
Perfluoro-n-dodecanoic acid (PFDoA)	307-55-1	PFAS by ID SOP	ND		4.0	ng/L	1
Perfluoro-n-heptanoic acid (PFHpA)	375-85-9	PFAS by ID SOP	ND		4.0	ng/L	1
Perfluoro-n-hexanoic acid (PFHxA)	307-24-4	PFAS by ID SOP	ND		4.0	ng/L	1
Perfluoro-n-nonanoic acid (PFNA)	375-95-1	PFAS by ID SOP	ND		4.0	ng/L	1
Perfluoro-n-octanoic acid (PFOA)	335-67-1	PFAS by ID SOP	ND		4.0	ng/L	1
Perfluoro-n-pentanoic acid (PFPeA)	2706-90-3	PFAS by ID SOP	ND		4.0	ng/L	1
Perfluoro-n-tetradecanoic acid (PFTeDA)	376-06-7	PFAS by ID SOP	ND		4.0	ng/L	1
Perfluoro-n-tridecanoic acid (PFTrDA)	72629-94-8	PFAS by ID SOP	ND		4.0	ng/L	1
Perfluoro-n-undecanoic acid (PFUdA)	2058-94-8	PFAS by ID SOP	ND		4.0	ng/L	1
Perfluorooctanesulfonic acid (PFOS)	1763-23-1	PFAS by ID SOP	ND		4.0	ng/L	1

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
13C2_4:2FTS		133	50-150
13C2_6:2FTS		95	50-150
13C2_8:2FTS		112	50-150
13C2_PFDoA		87	50-150
13C2_PFTeDA		85	50-150
13C3_PFBS		104	50-150
13C3_PFHxS		102	50-150
13C3-HFPO-DA		95	50-150
13C4_PFBA		92	50-150
13C4_PFHpA		100	50-150
13C5_PFHxA		107	50-150
13C5_PFPeA		109	50-150
13C6_PFDA		97	50-150
13C7_PFUdA		93	50-150

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

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PFAS by LC/MS/MS

Client: GZA GeoEnvironmental, Inc.
Laboratory ID: YI01015-006
Description: HS-PMW-RI-105B
Matrix: Aqueous
Date Sampled: 08/31/2023 1740
Date Received: 09/01/2023

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
13C8_PFOA		103	50-150
13C8_PFOS		119	50-150
13C8_PFOSA		99	50-150
13C9_PFNA		106	50-150
d5-EtFOSAA		99	50-150
d3-MeFOSAA		100	50-150



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

PFAS by LC/MS/MS

Client: GZA GeoEnvironmental, Inc.
Laboratory ID: YI01015-007
Description: WV-PMW-RI-105B
Matrix: Aqueous
Date Sampled: 08/31/2023 1740
Date Received: 09/01/2023

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	SOP SPE	PFAS by ID SOP	1	09/13/2023 1846	ARC2	09/10/2023 2003	84416

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	Units	Run
9-chlorohexadecafluoro-3-oxanone-1-sulfonic acid (9Cl-PF3ONS)	756426-58-1	PFAS by ID SOP	ND		7.2	ng/L	1
11-chloroeicosafluoro-3-oxaundecane-1-sulfonic acid (11Cl-PF3...)	763051-92-9	PFAS by ID SOP	ND		7.2	ng/L	1
1H, 1H, 2H, 2H-perfluorodecane sulfonic acid (8:2 FTS)	39108-34-4	PFAS by ID SOP	ND		7.2	ng/L	1
1H, 1H, 2H, 2H-perfluorooctane sulfonic acid (6:2 FTS)	27619-97-2	PFAS by ID SOP	ND		7.2	ng/L	1
1H,1H,2H,2H-perfluorohexane sulfonic acid (4:2 FTS)	757124-72-4	PFAS by ID SOP	ND		7.2	ng/L	1
Hexafluoropropylene oxide dimer acid (GenX)	13252-13-6	PFAS by ID SOP	ND		7.2	ng/L	1
4,8-dioxa-3H-perfluorononanoic acid (ADONA)	919005-14-4	PFAS by ID SOP	ND		7.2	ng/L	1
N-ethylperfluoro-1-octanesulfonamidoacetic acid (EtFOSAA)	2991-50-6	PFAS by ID SOP	ND		7.2	ng/L	1
N-methylperfluoro-1-octanesulfonamidoacetic acid (MeFOSAA)	2355-31-9	PFAS by ID SOP	ND		7.2	ng/L	1
Perfluoro-1-butanesulfonic acid (PFBS)	375-73-5	PFAS by ID SOP	ND		3.6	ng/L	1
Perfluoro-1-decanesulfonic acid (PFDS)	335-77-3	PFAS by ID SOP	ND		3.6	ng/L	1
Perfluoro-1-heptanesulfonic acid (PFHpS)	375-92-8	PFAS by ID SOP	ND		3.6	ng/L	1
Perfluoro-1-nonanesulfonic acid (PFNS)	68259-12-1	PFAS by ID SOP	ND		3.6	ng/L	1
Perfluoro-1-octanesulfonamide (PFOSA)	754-91-6	PFAS by ID SOP	ND		3.6	ng/L	1
Perfluoro-1-pentanesulfonic acid (PFPeS)	2706-91-4	PFAS by ID SOP	ND		3.6	ng/L	1
Perfluorohexanesulfonic acid (PFHxS)	355-46-4	PFAS by ID SOP	ND		3.6	ng/L	1
Perfluoro-n-butanoic acid (PFBA)	375-22-4	PFAS by ID SOP	ND		3.6	ng/L	1
Perfluoro-n-decanoic acid (PFDA)	335-76-2	PFAS by ID SOP	ND		3.6	ng/L	1
Perfluoro-n-dodecanoic acid (PFDoA)	307-55-1	PFAS by ID SOP	ND		3.6	ng/L	1
Perfluoro-n-heptanoic acid (PFHpA)	375-85-9	PFAS by ID SOP	ND		3.6	ng/L	1
Perfluoro-n-hexanoic acid (PFHxA)	307-24-4	PFAS by ID SOP	ND		3.6	ng/L	1
Perfluoro-n-nonanoic acid (PFNA)	375-95-1	PFAS by ID SOP	ND		3.6	ng/L	1
Perfluoro-n-octanoic acid (PFOA)	335-67-1	PFAS by ID SOP	ND		3.6	ng/L	1
Perfluoro-n-pentanoic acid (PFPeA)	2706-90-3	PFAS by ID SOP	ND		3.6	ng/L	1
Perfluoro-n-tetradecanoic acid (PFTeDA)	376-06-7	PFAS by ID SOP	ND		3.6	ng/L	1
Perfluoro-n-tridecanoic acid (PFTrDA)	72629-94-8	PFAS by ID SOP	ND		3.6	ng/L	1
Perfluoro-n-undecanoic acid (PFUdA)	2058-94-8	PFAS by ID SOP	ND		3.6	ng/L	1
Perfluorooctanesulfonic acid (PFOS)	1763-23-1	PFAS by ID SOP	ND		3.6	ng/L	1

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
13C2_4:2FTS		108	50-150
13C2_6:2FTS		101	50-150
13C2_8:2FTS		101	50-150
13C2_PFDoA		88	50-150
13C2_PFTeDA		91	50-150
13C3_PFBS		98	50-150
13C3_PFHxS		96	50-150
13C3-HFPO-DA		90	50-150
13C4_PFBA		101	50-150
13C4_PFHpA		89	50-150
13C5_PFHxA		99	50-150
13C5_PFPeA		98	50-150
13C6_PFDA		91	50-150
13C7_PFUdA		93	50-150

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

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PFAS by LC/MS/MS

Client: GZA GeoEnvironmental, Inc.
Laboratory ID: YI01015-007
Description: WV-PMW-RI-105B
Matrix: Aqueous
Date Sampled: 08/31/2023 1740
Date Received: 09/01/2023

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
13C8_PFOA		91	50-150
13C8_PFOS		106	50-150
13C8_PFOSA		95	50-150
13C9_PFNA		94	50-150
d5-EtFOSAA		92	50-150
d3-MeFOSAA		96	50-150



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

PFAS by LC/MS/MS

Client: GZA GeoEnvironmental, Inc.
Laboratory ID: YI01015-008
Description: WV-PMW-RI-105A
Matrix: Aqueous
Date Sampled: 08/31/2023 1610
Date Received: 09/01/2023

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	SOP SPE	PFAS by ID SOP	1	09/13/2023 1930	ARC2	09/10/2023 2003	84416

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	Units	Run
9-chlorohexadecafluoro-3-oxanone-1-sulfonic acid (9Cl-PF3ONS)	756426-58-1	PFAS by ID SOP	ND		7.1	ng/L	1
11-chloroeicosafluoro-3-oxaundecane-1-sulfonic acid (11Cl-PF3...)	763051-92-9	PFAS by ID SOP	ND		7.1	ng/L	1
1H, 1H, 2H, 2H-perfluorodecane sulfonic acid (8:2 FTS)	39108-34-4	PFAS by ID SOP	ND		7.1	ng/L	1
1H, 1H, 2H, 2H-perfluorooctane sulfonic acid (6:2 FTS)	27619-97-2	PFAS by ID SOP	ND		7.1	ng/L	1
1H,1H,2H,2H-perfluorohexane sulfonic acid (4:2 FTS)	757124-72-4	PFAS by ID SOP	ND		7.1	ng/L	1
Hexafluoropropylene oxide dimer acid (GenX)	13252-13-6	PFAS by ID SOP	ND		7.1	ng/L	1
4,8-dioxa-3H-perfluorononanoic acid (ADONA)	919005-14-4	PFAS by ID SOP	ND		7.1	ng/L	1
N-ethylperfluoro-1-octanesulfonamidoacetic acid (EtFOSAA)	2991-50-6	PFAS by ID SOP	ND		7.1	ng/L	1
N-methylperfluoro-1-octanesulfonamidoacetic acid (MeFOSAA)	2355-31-9	PFAS by ID SOP	ND		7.1	ng/L	1
Perfluoro-1-butanesulfonic acid (PFBS)	375-73-5	PFAS by ID SOP	5.9	✓	3.6	ng/L	1
Perfluoro-1-decanesulfonic acid (PFDS)	335-77-3	PFAS by ID SOP	ND		3.6	ng/L	1
Perfluoro-1-heptanesulfonic acid (PFHpS)	375-92-8	PFAS by ID SOP	ND		3.6	ng/L	1
Perfluoro-1-nonanesulfonic acid (PFNS)	68259-12-1	PFAS by ID SOP	ND		3.6	ng/L	1
Perfluoro-1-octanesulfonamide (PFOSA)	754-91-6	PFAS by ID SOP	ND		3.6	ng/L	1
Perfluoro-1-pentanesulfonic acid (PFPeS)	2706-91-4	PFAS by ID SOP	ND		3.6	ng/L	1
Perfluorohexanesulfonic acid (PFHxS)	355-46-4	PFAS by ID SOP	ND		3.6	ng/L	1
Perfluoro-n-butanoic acid (PFBA)	375-22-4	PFAS by ID SOP	ND		3.6	ng/L	1
Perfluoro-n-decanoic acid (PFDA)	335-76-2	PFAS by ID SOP	ND		3.6	ng/L	1
Perfluoro-n-dodecanoic acid (PFDoA)	307-55-1	PFAS by ID SOP	ND		3.6	ng/L	1
Perfluoro-n-heptanoic acid (PFHpA)	375-85-9	PFAS by ID SOP	ND		3.6	ng/L	1
Perfluoro-n-hexanoic acid (PFHxA)	307-24-4	PFAS by ID SOP	ND		3.6	ng/L	1
Perfluoro-n-nonanoic acid (PFNA)	375-95-1	PFAS by ID SOP	ND		3.6	ng/L	1
Perfluoro-n-octanoic acid (PFOA)	335-67-1	PFAS by ID SOP	ND		3.6	ng/L	1
Perfluoro-n-pentanoic acid (PFPeA)	2706-90-3	PFAS by ID SOP	ND		3.6	ng/L	1
Perfluoro-n-tetradecanoic acid (PFTeDA)	376-06-7	PFAS by ID SOP	ND		3.6	ng/L	1
Perfluoro-n-tridecanoic acid (PFTrDA)	72629-94-8	PFAS by ID SOP	ND		3.6	ng/L	1
Perfluoro-n-undecanoic acid (PFUdA)	2058-94-8	PFAS by ID SOP	ND		3.6	ng/L	1
Perfluorooctanesulfonic acid (PFOS)	1763-23-1	PFAS by ID SOP	ND		3.6	ng/L	1

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
13C2_4:2FTS		100	50-150
13C2_6:2FTS		98	50-150
13C2_8:2FTS		97	50-150
13C2_PFDoA		91	50-150
13C2_PFTeDA		91	50-150
13C3_PFBS		95	50-150
13C3_PFHxS		98	50-150
13C3-HFPO-DA		92	50-150
13C4_PFBA	✓	84	50-150
13C4_PFHpA		89	50-150
13C5_PFHxA		101	50-150
13C5_PFPeA		98	50-150
13C6_PFDA		92	50-150
13C7_PFUdA		93	50-150

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

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PFAS by LC/MS/MS

Client: GZA GeoEnvironmental, Inc.
Laboratory ID: YI01015-008
Description: WV-PMW-RI-105A
Matrix: Aqueous
Date Sampled: 08/31/2023 1610
Date Received: 09/01/2023

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
13C8_PFOA		97	50-150
13C8_PFOS		99	50-150
13C8_PFOSA		95	50-150
13C9_PFNA		91	50-150
d5-EtFOSAA		96	50-150
d3-MeFOSAA		99	50-150



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

Pace Environmental Services, LLC
Analyte Quantitation Report

Data File:	\\Organics\LL\LCMSMS02.i\091323-nonDOD+ICAL.b\091323030.d		
Injection Date:	13-Sep-2023 19:30:25	Injection Vol:	10.0 uL
Sample Type:	Client	Auto Sampler:	9
Lab Sample ID:	YI01015-008	Lab Prep. Batch:	84416
Client ID:	WV-PMW-RI-105A	Sample Group:	YI01015
Sample Info:	YI01015-008	Misc. Info:	
Inst. ID:	LCMSMS02.i	Operator:	eqi.svoa
Method:	LCMSMS02_PFAS-ID2	Version: V16	30-Jun-2022 10:54:24
Calib Method:	PFAS-ID2	Lock State:	Unlocked
Quant Method:	IsoDil	Integrator:	picker

Matrix: Aqueous
Final Conc.: Amt * DF * CF
Concentration Formula: CF = (VF/1000) * 1/VI = 0.0177873

Name	Value	Units	Description
DF	1		Dilution Factor
VF	5000	ul	Final Volume
VI	281.1	ml	Initial Sample Volume

IsoDil Stds %Recovery = ((Area * DF)/Ical Mid Area) * 100

Reagent: Surrogates Conc. Level: Smp Vol. Added: 0.1000 ml

Signal	Quant Std	RT (Min)	Exp RT (Min)	c RT (Min)	Response	Peak Pts	S/N	Ion Ratio	Isomer Ratio	OnCol Conc ng/L	Final Conc ng/L	%Rec	Flags
D 46 13C4_PFBA CAS: SESI-0111													
217 > 172		1.646	1.642	0.000	1547410	19	>100:1			2000.00	1807.91	84	
8 Perfluoro-n-butanoic acid (PFBA) CAS: 375-22-4													U
212.9 > 168.9	46		1.642		ND								
D 50 13C5_PFPeA CAS: SESI-0112													
267.9 > 223		1.977	1.974	0.000	1882554	20	>100:1			2000.00	2058.76	98	
21 Perfluoro-n-pentanoic acid (PFPeA) CAS: 2706-90-3													U
262.9 > 218.9	50		1.974		ND								
D 44 13C3_PFBS CAS: SESI-0116													
302 > 80		2.019	2.023	0.000	646876	18	>100:1			2000.00	1996.90	95	
7 Perfluoro-1-butanesulfonate (PFBS) CAS: 375-73-5													
298.9 > 80	44	2.019	2.023	0.000	125772	26	>100:1	Target = 3.40		334.23	5.9450		
298.9 > 99	44	2.019	2.023		38847	19	>100:1	3.23 (1.70-5.10)					
22 Perfluoro-1-pentanesulfonic acid (PFPeS) CAS: 2706-91-4													J
349 > 80	44	2.333	2.338	0.000	8384	11	30:1	Target = 2.94		33.535	0.59650		M
349 > 99	44	2.343	2.338		2401	14	17:1	3.49 (1.47-4.42)					
D 63 13C2_4:2 FTS_2 CAS: SESI-0104													
329 >81		2.273	2.268	0.000	324361	16	>100:1			10000	10384	100	
1 Fluorotelomer sulfonate 4:2 [1H,1H,2H,2H-perfluorohexane sulfonate] (4:2 FTS) CAS: 757124-72-4													U
327 > 307	63		2.278		ND								
D 49 13C5_PFHxA CAS: SESI-0113													
318 > 273		2.313	2.308	0.000	2119578	17	>100:1			2000.00	2105.53	101	
15 Perfluoro-n-hexanoic acid (PFHxA) CAS: 307-24-4													U
313 > 269	49		2.318		ND								
D 66 13C3_GenX CAS: SESI-0121													
287 > 185		2.423	2.428	0.000	2943356	18	>100:1			10000	9813.24	92	
28 Hexafluoropropylene oxide dimer acid (GenX) CAS: 13252-13-6													U
285 > 119	66		2.428		ND								
D 47 13C4_PFHpA CAS: SESI-0114													
367 > 322		2.693	2.696	0.000	2050972	19	>100:1			2000.00	2027.01	89	

PFAS by LC/MS/MS

Client: GZA GeoEnvironmental, Inc.
Laboratory ID: YI01015-009
Description: FB/8/31-MKM
Matrix: Aqueous
Date Sampled: 08/31/2023 1300
Date Received: 09/01/2023

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	SOP SPE	PFAS by ID SOP	1	09/13/2023 1941	ARC2	09/10/2023 2003	84416

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

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
13C2_4:2FTS		91	50-150
13C2_6:2FTS		95	50-150
13C2_8:2FTS		96	50-150
13C2_PFDoA		94	50-150
13C2_PFTeDA		84	50-150
13C3_PFBS		94	50-150
13C3_PFHxS		92	50-150
13C3-HFPO-DA		86	50-150
13C4_PFBA		90	50-150
13C4_PFHpA		89	50-150
13C5_PFHxA		88	50-150
13C5_PFPeA		96	50-150
13C6_PFDA		91	50-150
13C7_PFUdA		95	50-150

LOQ = Limit of Quantitation
ND = Not detected at or above the LOQ
H = Out of holding time
B = Detected in the method blank
N = Recovery is out of criteria
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E = Quantitation of compound exceeded the calibration range
P = The RPD between two GC columns exceeds 40%
Q = Surrogate failure
L = LCS/LCSD failure
S = MS/MSD failure

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PFAS by LC/MS/MS

Client: GZA GeoEnvironmental, Inc.
Laboratory ID: YI01015-009
Description: FB/8/31-MKM
Matrix: Aqueous
Date Sampled: 08/31/2023 1300
Date Received: 09/01/2023

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
13C8_PFOA		92	50-150
13C8_PFOS		96	50-150
13C8_PFOSA		95	50-150
13C9_PFNA		98	50-150
d5-EtFOSAA		93	50-150
d3-MeFOSAA		100	50-150



LOQ = Limit of Quantitation
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P = The RPD between two GC columns exceeds 40%
Q = Surrogate failure
L = LCS/LCSD failure
S = MS/MSD failure

PFAS by LC/MS/MS

Client: GZA GeoEnvironmental, Inc.
Laboratory ID: YI01015-010
Description: FB/8/31-JMS
Matrix: Aqueous
Date Sampled: 08/31/2023 1315
Date Received: 09/01/2023

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	SOP SPE	PFAS by ID SOP	1	09/13/2023 2014	ARC2	09/10/2023 2003	84416

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

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
13C2_4:2FTS		84	50-150
13C2_6:2FTS		73	50-150
13C2_8:2FTS		85	50-150
13C2_PFDoA		80	50-150
13C2_PFTeDA		75	50-150
13C3_PFBS		87	50-150
13C3_PFHxS		87	50-150
13C3-HFPO-DA		78	50-150
13C4_PFBA		83	50-150
13C4_PFHpA		79	50-150
13C5_PFHxA		84	50-150
13C5_PFPeA		86	50-150
13C6_PFDA		82	50-150
13C7_PFUdA		84	50-150

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

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PFAS by LC/MS/MS

Client: GZA GeoEnvironmental, Inc.
Laboratory ID: YI01015-010
Description: FB/8/31-JMS
Matrix: Aqueous
Date Sampled: 08/31/2023 1315
Date Received: 09/01/2023

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
13C8_PFOA		84	50-150
13C8_PFOS		88	50-150
13C8_PFOSA		83	50-150
13C9_PFNA		85	50-150
d5-EtFOSAA		85	50-150
d3-MeFOSAA		85	50-150



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

PFAS by LC/MS/MS

Client: GZA GeoEnvironmental, Inc.
Laboratory ID: YI01015-011
Description: FB/8/31-BPT
Matrix: Aqueous
Date Sampled: 08/31/2023 1330
Date Received: 09/01/2023

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	SOP SPE	PFAS by ID SOP	1	09/13/2023 2025	ARC2	09/10/2023 2003	84416

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

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
13C2_4:2FTS		79	50-150
13C2_6:2FTS		73	50-150
13C2_8:2FTS		74	50-150
13C2_PFDoA		70	50-150
13C2_PFTeDA		67	50-150
13C3_PFBS		75	50-150
13C3_PFHxS		77	50-150
13C3-HFPO-DA		73	50-150
13C4_PFBA		74	50-150
13C4_PFHpA		71	50-150
13C5_PFHxA		79	50-150
13C5_PFPeA		78	50-150
13C6_PFDA		73	50-150
13C7_PFUdA		72	50-150

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

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PFAS by LC/MS/MS

Client: GZA GeoEnvironmental, Inc.
Laboratory ID: YI01015-011
Description: FB/8/31-BPT
Matrix: Aqueous
Date Sampled: 08/31/2023 1330
Date Received: 09/01/2023

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
13C8_PFOA		80	50-150
13C8_PFOS		71	50-150
13C8_PFOSA		77	50-150
13C9_PFNA		79	50-150
d5-EtFOSAA		72	50-150
d3-MeFOSAA		80	50-150

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

PFAS by LC/MS/MS

Client: GZA GeoEnvironmental, Inc.
Laboratory ID: YI01015-012
Description: FB/8/31-JET
Matrix: Aqueous
Date Sampled: 08/31/2023 1600
Date Received: 09/01/2023

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	SOP SPE	PFAS by ID SOP	1	09/13/2023 2036	ARC2	09/10/2023 2003	84416

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

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
13C2_4:2FTS		87	50-150
13C2_6:2FTS		83	50-150
13C2_8:2FTS		90	50-150
13C2_PFDoA		82	50-150
13C2_PFTeDA		71	50-150
13C3_PFBS		89	50-150
13C3_PFHxS		87	50-150
13C3-HFPO-DA		80	50-150
13C4_PFBA		88	50-150
13C4_PFHpA		84	50-150
13C5_PFHxA		86	50-150
13C5_PFPeA		88	50-150
13C6_PFDA		84	50-150
13C7_PFUdA		83	50-150

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

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PFAS by LC/MS/MS

Client: GZA GeoEnvironmental, Inc.
Laboratory ID: YI01015-012
Description: FB/8/31-JET
Matrix: Aqueous
Date Sampled: 08/31/2023 1600
Date Received: 09/01/2023

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
13C8_PFOA		84	50-150
13C8_PFOS		88	50-150
13C8_PFOSA		92	50-150
13C9_PFNA		90	50-150
d5-EtFOSAA		87	50-150
d3-MeFOSAA		88	50-150

LOQ = Limit of Quantitation
ND = Not detected at or above the LOQ
H = Out of holding time
B = Detected in the method blank
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PFAS by LC/MS/MS

Client: GZA GeoEnvironmental, Inc.
Laboratory ID: YI01015-013
Description: EQB-WLM
Matrix: Aqueous
Date Sampled: 08/31/2023 1305
Date Received: 09/01/2023

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	SOP SPE	PFAS by ID SOP	1	09/13/2023 2047	ARC2	09/10/2023 2003	84416

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

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
13C2_4:2FTS		93	50-150
13C2_6:2FTS		101	50-150
13C2_8:2FTS		102	50-150
13C2_PFDoA		99	50-150
13C2_PFTeDA		95	50-150
13C3_PFBS		95	50-150
13C3_PFHxS		99	50-150
13C3-HFPO-DA		86	50-150
13C4_PFBA		94	50-150
13C4_PFHpA		88	50-150
13C5_PFHxA		95	50-150
13C5_PFPeA		95	50-150
13C6_PFDA		88	50-150
13C7_PFUdA		94	50-150

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

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PFAS by LC/MS/MS

Client: GZA GeoEnvironmental, Inc.
Laboratory ID: YI01015-013
Description: EQB-WLM
Matrix: Aqueous
Date Sampled: 08/31/2023 1305
Date Received: 09/01/2023

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
13C8_PFOA		97	50-150
13C8_PFOS		97	50-150
13C8_PFOSA		97	50-150
13C9_PFNA		99	50-150
d5-EtFOSAA		99	50-150
d3-MeFOSAA		117	50-150



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

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PFAS by LC/MS/MS

Client: GZA GeoEnvironmental, Inc.
Laboratory ID: YI01015-014
Description: EB-MM
Matrix: Aqueous
Date Sampled: 08/31/2023 1850
Date Received: 09/01/2023

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	SOP SPE	PFAS by ID SOP	1	09/13/2023 2058	ARC2	09/10/2023 2003	84416

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

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
13C2_4:2FTS		79	50-150
13C2_6:2FTS		57	50-150
13C2_8:2FTS		81	50-150
13C2_PFDoA		75	50-150
13C2_PFTeDA		67	50-150
13C3_PFBS		80	50-150
13C3_PFHxS		81	50-150
13C3-HFPO-DA		74	50-150
13C4_PFBA		80	50-150
13C4_PFHpA		80	50-150
13C5_PFHxA		78	50-150
13C5_PFPeA		79	50-150
13C6_PFDA		76	50-150
13C7_PFUdA		77	50-150

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

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PFAS by LC/MS/MS

Client: GZA GeoEnvironmental, Inc.
Laboratory ID: YI01015-014
Description: EB-MM
Matrix: Aqueous
Date Sampled: 08/31/2023 1850
Date Received: 09/01/2023

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
13C8_PFOA		82	50-150
13C8_PFOS		84	50-150
13C8_PFOSA		80	50-150
13C9_PFNA		79	50-150
d5-EtFOSAA		82	50-150
d3-MeFOSAA		84	50-150



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

PFAS by LC/MS/MS

Client: GZA GeoEnvironmental, Inc.
Laboratory ID: YI01015-015
Description: EB-BP
Matrix: Aqueous
Date Sampled: 08/31/2023 1855
Date Received: 09/01/2023

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	SOP SPE	PFAS by ID SOP	1	09/13/2023 2109	ARC2	09/10/2023 2003	84416

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	Units	Run
9-chlorohexadecafluoro-3-oxanone-1-sulfonic acid (9Cl-PF3ONS)	756426-58-1	PFAS by ID SOP	ND		7.2	ng/L	1
11-chloroeicosafluoro-3-oxaundecane-1-sulfonic acid (11Cl-PF3...)	763051-92-9	PFAS by ID SOP	ND		7.2	ng/L	1
1H, 1H, 2H, 2H-perfluorodecane sulfonic acid (8:2 FTS)	39108-34-4	PFAS by ID SOP	ND		7.2	ng/L	1
1H, 1H, 2H, 2H-perfluorooctane sulfonic acid (6:2 FTS)	27619-97-2	PFAS by ID SOP	ND		7.2	ng/L	1
1H,1H,2H,2H-perfluorohexane sulfonic acid (4:2 FTS)	757124-72-4	PFAS by ID SOP	ND		7.2	ng/L	1
Hexafluoropropylene oxide dimer acid (GenX)	13252-13-6	PFAS by ID SOP	ND		7.2	ng/L	1
4,8-dioxa-3H-perfluorononanoic acid (ADONA)	919005-14-4	PFAS by ID SOP	ND		7.2	ng/L	1
N-ethylperfluoro-1-octanesulfonamidoacetic acid (EtFOSAA)	2991-50-6	PFAS by ID SOP	ND		7.2	ng/L	1
N-methylperfluoro-1-octanesulfonamidoacetic acid (MeFOSAA)	2355-31-9	PFAS by ID SOP	ND		7.2	ng/L	1
Perfluoro-1-butanesulfonic acid (PFBS)	375-73-5	PFAS by ID SOP	ND		3.6	ng/L	1
Perfluoro-1-decanesulfonic acid (PFDS)	335-77-3	PFAS by ID SOP	ND		3.6	ng/L	1
Perfluoro-1-heptanesulfonic acid (PFHpS)	375-92-8	PFAS by ID SOP	ND		3.6	ng/L	1
Perfluoro-1-nonanesulfonic acid (PFNS)	68259-12-1	PFAS by ID SOP	ND		3.6	ng/L	1
Perfluoro-1-octanesulfonamide (PFOSA)	754-91-6	PFAS by ID SOP	ND		3.6	ng/L	1
Perfluoro-1-pentanesulfonic acid (PFPeS)	2706-91-4	PFAS by ID SOP	ND		3.6	ng/L	1
Perfluorohexanesulfonic acid (PFHxS)	355-46-4	PFAS by ID SOP	ND		3.6	ng/L	1
Perfluoro-n-butanoic acid (PFBA)	375-22-4	PFAS by ID SOP	ND		3.6	ng/L	1
Perfluoro-n-decanoic acid (PFDA)	335-76-2	PFAS by ID SOP	ND		3.6	ng/L	1
Perfluoro-n-dodecanoic acid (PFDoA)	307-55-1	PFAS by ID SOP	ND		3.6	ng/L	1
Perfluoro-n-heptanoic acid (PFHpA)	375-85-9	PFAS by ID SOP	ND		3.6	ng/L	1
Perfluoro-n-hexanoic acid (PFHxA)	307-24-4	PFAS by ID SOP	ND		3.6	ng/L	1
Perfluoro-n-nonanoic acid (PFNA)	375-95-1	PFAS by ID SOP	ND		3.6	ng/L	1
Perfluoro-n-octanoic acid (PFOA)	335-67-1	PFAS by ID SOP	ND		3.6	ng/L	1
Perfluoro-n-pentanoic acid (PFPeA)	2706-90-3	PFAS by ID SOP	ND		3.6	ng/L	1
Perfluoro-n-tetradecanoic acid (PFTeDA)	376-06-7	PFAS by ID SOP	ND		3.6	ng/L	1
Perfluoro-n-tridecanoic acid (PFTrDA)	72629-94-8	PFAS by ID SOP	ND		3.6	ng/L	1
Perfluoro-n-undecanoic acid (PFUdA)	2058-94-8	PFAS by ID SOP	ND		3.6	ng/L	1
Perfluorooctanesulfonic acid (PFOS)	1763-23-1	PFAS by ID SOP	ND		3.6	ng/L	1

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
13C2_4:2FTS		94	50-150
13C2_6:2FTS		100	50-150
13C2_8:2FTS		97	50-150
13C2_PFDoA		90	50-150
13C2_PFTeDA		91	50-150
13C3_PFBS		91	50-150
13C3_PFHxS		93	50-150
13C3-HFPO-DA		82	50-150
13C4_PFBA		90	50-150
13C4_PFHpA		84	50-150
13C5_PFHxA		90	50-150
13C5_PFPeA		90	50-150
13C6_PFDA		89	50-150
13C7_PFUdA		91	50-150

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

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PFAS by LC/MS/MS

Client: GZA GeoEnvironmental, Inc.
Laboratory ID: YI01015-015
Description: EB-BP
Matrix: Aqueous
Date Sampled: 08/31/2023 1855
Date Received: 09/01/2023

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
13C8_PFOA		87	50-150
13C8_PFOS		93	50-150
13C8_PFOSA		95	50-150
13C9_PFNA		95	50-150
d5-EtFOSAA		89	50-150
d3-MeFOSAA		93	50-150



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

PFAS by LC/MS/MS

Client: GZA GeoEnvironmental, Inc.
Laboratory ID: YI01015-016
Description: WV-PMW-RI-107
Matrix: Aqueous
Date Sampled: 08/30/2023 1655
Date Received: 09/01/2023

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	SOP SPE	PFAS by ID SOP	1	09/13/2023 2120	ARC2	09/10/2023 2003	84416

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	Units	Run
9-chlorohexadecafluoro-3-oxanone-1-sulfonic acid (9Cl-PF3ONS)	756426-58-1	PFAS by ID SOP	ND		7.4	ng/L	1
11-chloroeicosafluoro-3-oxaundecane-1-sulfonic acid (11Cl-PF3...)	763051-92-9	PFAS by ID SOP	ND		7.4	ng/L	1
1H, 1H, 2H, 2H-perfluorodecane sulfonic acid (8:2 FTS)	39108-34-4	PFAS by ID SOP	ND		7.4	ng/L	1
1H, 1H, 2H, 2H-perfluorooctane sulfonic acid (6:2 FTS)	27619-97-2	PFAS by ID SOP	ND		7.4	ng/L	1
1H,1H,2H,2H-perfluorohexane sulfonic acid (4:2 FTS)	757124-72-4	PFAS by ID SOP	ND		7.4	ng/L	1
Hexafluoropropylene oxide dimer acid (GenX)	13252-13-6	PFAS by ID SOP	ND		7.4	ng/L	1
4,8-dioxa-3H-perfluorononanoic acid (ADONA)	919005-14-4	PFAS by ID SOP	ND		7.4	ng/L	1
N-ethylperfluoro-1-octanesulfonamidoacetic acid (EtFOSAA)	2991-50-6	PFAS by ID SOP	ND		7.4	ng/L	1
N-methylperfluoro-1-octanesulfonamidoacetic acid (MeFOSAA)	2355-31-9	PFAS by ID SOP	ND		7.4	ng/L	1
Perfluoro-1-butanesulfonic acid (PFBS)	375-73-5	PFAS by ID SOP	ND		3.7	ng/L	1
Perfluoro-1-decanesulfonic acid (PFDS)	335-77-3	PFAS by ID SOP	ND		3.7	ng/L	1
Perfluoro-1-heptanesulfonic acid (PFHpS)	375-92-8	PFAS by ID SOP	ND		3.7	ng/L	1
Perfluoro-1-nonanesulfonic acid (PFNS)	68259-12-1	PFAS by ID SOP	ND		3.7	ng/L	1
Perfluoro-1-octanesulfonamide (PFOSA)	754-91-6	PFAS by ID SOP	ND		3.7	ng/L	1
Perfluoro-1-pentanesulfonic acid (PFPeS)	2706-91-4	PFAS by ID SOP	ND		3.7	ng/L	1
Perfluorohexanesulfonic acid (PFHxS)	355-46-4	PFAS by ID SOP	ND		3.7	ng/L	1
Perfluoro-n-butanoic acid (PFBA)	375-22-4	PFAS by ID SOP	ND		3.7	ng/L	1
Perfluoro-n-decanoic acid (PFDA)	335-76-2	PFAS by ID SOP	ND		3.7	ng/L	1
Perfluoro-n-dodecanoic acid (PFDoA)	307-55-1	PFAS by ID SOP	ND		3.7	ng/L	1
Perfluoro-n-heptanoic acid (PFHpA)	375-85-9	PFAS by ID SOP	ND		3.7	ng/L	1
Perfluoro-n-hexanoic acid (PFHxA)	307-24-4	PFAS by ID SOP	ND		3.7	ng/L	1
Perfluoro-n-nonanoic acid (PFNA)	375-95-1	PFAS by ID SOP	ND		3.7	ng/L	1
Perfluoro-n-octanoic acid (PFOA)	335-67-1	PFAS by ID SOP	ND		3.7	ng/L	1
Perfluoro-n-pentanoic acid (PFPeA)	2706-90-3	PFAS by ID SOP	ND		3.7	ng/L	1
Perfluoro-n-tetradecanoic acid (PFTeDA)	376-06-7	PFAS by ID SOP	ND		3.7	ng/L	1
Perfluoro-n-tridecanoic acid (PFTrDA)	72629-94-8	PFAS by ID SOP	ND		3.7	ng/L	1
Perfluoro-n-undecanoic acid (PFUdA)	2058-94-8	PFAS by ID SOP	ND		3.7	ng/L	1
Perfluorooctanesulfonic acid (PFOS)	1763-23-1	PFAS by ID SOP	ND		3.7	ng/L	1

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
13C2_4:2FTS		96	50-150
13C2_6:2FTS		97	50-150
13C2_8:2FTS		89	50-150
13C2_PFDoA		95	50-150
13C2_PFTeDA		92	50-150
13C3_PFBS		94	50-150
13C3_PFHxS		100	50-150
13C3-HFPO-DA		89	50-150
13C4_PFBA		95	50-150
13C4_PFHpA		91	50-150
13C5_PFHxA		91	50-150
13C5_PFPeA		96	50-150
13C6_PFDA		95	50-150
13C7_PFUdA		94	50-150

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

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PFAS by LC/MS/MS

Client: GZA GeoEnvironmental, Inc.
Laboratory ID: YI01015-016
Description: WV-PMW-RI-107
Matrix: Aqueous
Date Sampled: 08/30/2023 1655
Date Received: 09/01/2023

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
13C8_PFOA		93	50-150
13C8_PFOS		96	50-150
13C8_PFOSA		89	50-150
13C9_PFNA		94	50-150
d5-EtFOSAA		96	50-150
d3-MeFOSAA		99	50-150



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

FORM 2
ISOTOPE DILUTION STANDARD RECOVERY

Lab Name: Pace Analytical Services, LLC Lot No.: YI01015

Project No.: 16.0062961.9

AnalyticalMethod: PFAS by ID SOP Matrix: Water

CLIENT SAMPLE ID	IDS1	IDS2	IDS3	IDS4	IDS5	IDS6	IDS7	IDS8	IDS9
WV-MW-15C	138	120	102	107	102	111	99	111	92
WV-MW-15D	123	113	99	95	96	103	94	104	95
WV-MW-15B	130	120	99	92	100	106	97	108	86
WV-MW-15A	144	122	102	101	96	105	100	108	84
HS-PMW-RI-105A	121	100	96	100	98	101	93	110	87
HS-PMW-RI-105B	133	95	112	87	85	104	102	95	92
WV-PMW-RI-105B	108	101	101	88	91	98	96	90	101
WV-PMW-RI-105A	100	98	97	91	91	95	98	92	84
FB/8/31-MKM	91	95	96	94	84	94	92	86	90
FB/8/31-JMS	84	73	85	80	75	87	87	78	83
FB/8/31-BPT	79	73	74	70	67	75	77	73	74
FB/8/31-JET	87	83	90	82	71	89	87	80	88
EQB-WLM	93	101	102	99	95	95	99	86	94
EB-MM	79	57	81	75	67	80	81	74	80
EB-BP	94	100	97	90	91	91	93	82	90
WV-PMW-RI-107	96	97	89	95	92	94	100	89	95
YQ83966-001	112	109	103	100	97	107	100	114	104
YQ83966-002	114	113	110	101	93	114	101	106	107
YQ84416-001	102	113	96	91	85	97	102	103	102
YQ84416-002	101	110	96	93	96	101	95	99	99

IDS1 = 13C2_4:2FTS
IDS2 = 13C2_6:2FTS
IDS3 = 13C2_8:2FTS
IDS4 = 13C2_PFDoA
IDS5 = 13C2_PFTeDA
IDS6 = 13C3_PFBS
IDS7 = 13C3_PFHxS
IDS8 = 13C3-HFPO-DA
IDS9 = 13C4_PFBA

Evalutated on Form Is

QC LIMITS
50-150
50-150
50-150
50-150
50-150
50-150
50-150
50-150
50-150

* Recoveries outside QC limits
D IDS Diluted Out

FORM 2
ISOTOPE DILUTION STANDARD RECOVERY

Lab Name: Pace Analytical Services, LLC Lot No.: YI01015

Project No.: 16.0062961.9

AnalyticalMethod: PFAS by ID SOP Matrix: Water

CLIENT SAMPLE ID	IDS10	IDS11	IDS12	IDS13	IDS14	IDS15	IDS16	IDS17	
WV-MW-15C	107	107	104	98	109	113	100	112	
WV-MW-15D	104	105	106	93	103	104	97	104	
WV-MW-15B	102	111	97	97	106	110	96	105	
WV-MW-15A	110	112	107	106	102	110	100	109	
HS-PMW-RI-105A	99	104	101	94	96	100	88	101	
HS-PMW-RI-105B	100	107	109	97	93	103	119	99	
WV-PMW-RI-105B	89	99	98	91	93	91	106	95	
WV-PMW-RI-105A	89	101	98	92	93	97	99	95	
FB/8/31-MKM	89	88	96	91	95	92	96	95	
FB/8/31-JMS	79	84	86	82	84	84	88	83	
FB/8/31-BPT	71	79	78	73	72	80	71	77	
FB/8/31-JET	84	86	88	84	83	84	88	92	
EQB-WLM	88	95	95	88	94	97	97	97	
EB-MM	80	78	79	76	77	82	84	80	
EB-BP	84	90	90	89	91	87	93	95	
WV-PMW-RI-107	91	91	96	95	94	93	96	89	
YQ83966-001	103	112	110	104	106	107	100	109	
YQ83966-002	109	109	109	104	105	113	109	104	
YQ84416-001	101	98	100	94	100	99	96	97	
YQ84416-002	103	97	96	102	103	102	92	97	

	QC LIMITS
IDS10 = 13C4_PFHpA	50-150
IDS11 = 13C5_PFHxA	50-150
IDS12 = 13C5_PFPeA	50-150
IDS13 = 13C6_PFDA	50-150
IDS14 = 13C7_PFUdA	50-150
IDS15 = 13C8_PFOA	50-150
IDS16 = 13C8_PFOS	50-150
IDS17 = 13C8_PFOSA	50-150

* Recoveries outside QC limits
D IDS Diluted Out

FORM 2
ISOTOPE DILUTION STANDARD RECOVERY

Lab Name: Pace Analytical Services, LLC Lot No.: YI01015

Project No.: 16.0062961.9

AnalyticalMethod: PFAS by ID SOP Matrix: Water

CLIENT SAMPLE ID	IDS18	IDS19	IDS20						TOT OUT
WV-MW-15C	113	108	101						0
WV-MW-15D	110	101	99						0
WV-MW-15B	109	105	98						0
WV-MW-15A	113	100	96						0
HS-PMW-RI-105A	102	106	103						0
HS-PMW-RI-105B	106	99	100						0
WV-PMW-RI-105B	94	92	96						0
WV-PMW-RI-105A	91	96	99						0
FB/8/31-MKM	98	93	100						0
FB/8/31-JMS	85	85	85						0
FB/8/31-BPT	79	72	80						0
FB/8/31-JET	90	87	88						0
EQB-WLM	99	99	117						0
EB-MM	79	82	84						0
EB-BP	95	89	93						0
WV-PMW-RI-107	94	96	99						0
YQ83966-001	115	107	97						0
YQ83966-002	117	106	105						0
YQ84416-001	103	96	96						0
YQ84416-002	100	94	94						0

	QC LIMITS
IDS18 = 13C9_PFNA	50-150
IDS19 = d5-EtFOSAA	50-150
IDS20 = d3-MeFOSAA	50-150

* Recoveries outside QC limits
D IDS Diluted Out

FORM 3
LABORATORY CONTROL/LABORATORY CONTROL DUPLICATE SAMPLE RECOVERY

Lab Name: Pace Analytical Services, LLC Lot No.: YI01015

Project No.: 16.0062961.9

Analytical Method: PFAS by ID SOP Matrix: Water

Client Sample ID: YQ83966-002 Lab Sample ID: YQ83966-002

Instrument ID: _Sciex 4500_LCMSMS1

Concentration Units (ug/L, mg/L, ug/kg): ng/L

ANALYTE	SPIKE ADDED	LCS CONCENTRATION	LCS %REC #	QC LIMITS REC.
11-chloroeicosafluoro-3-oxaundecane-1-sulfonic acid (11Cl-PF3OUdS)	15	13	85	70-150
1H, 1H, 2H, 2H-perfluorodecane sulfonic acid (8:2 FTS)	15	17	109	70-150
1H, 1H, 2H, 2H-perfluorooctane sulfonic acid (6:2 FTS)	15	17	113	70-150
1H,1H,2H,2H-perfluorohexane sulfonic acid (4:2 FTS)	15	16	110	70-150
4,8-dioxa-3H-perfluorononanoic acid (ADONA)	15	15	97	70-150
9-chlorohexadecafluoro-3-oxanone-1-sulfonic acid (9Cl-PF3ONS)	15	14	92	70-150
Hexafluoropropylene oxide dimer acid (GenX)	32	34	107	70-150
N-ethylperfluoro-1-octanesulfonamidoacetic acid (EtFOSAA)	16	16	103	70-150
N-methylperfluoro-1-octanesulfonamidoacetic acid (MeFOSAA)	16	16	100	70-150
Perfluoro-1-butanesulfonic acid (PFBS)	14	13	94	70-150
Perfluoro-1-decanesulfonic acid (PFDS)	15	15	96	70-150
Perfluoro-1-heptanesulfonic acid (PFHpS)	15	14	94	70-150
Perfluoro-1-nonanesulfonic acid (PFNS)	15	14	94	70-150
Perfluoro-1-octanesulfonamide (PFOSA)	16	17	105	70-150
Perfluoro-1-pentanesulfonic acid (PFPeS)	15	14	95	70-150
Perfluoro-n-butanoic acid (PFBA)	16	15	96	70-150
Perfluoro-n-decanoic acid (PFDA)	16	15	94	70-150
Perfluoro-n-dodecanoic acid (PFDoA)	16	16	97	70-150
Perfluoro-n-heptanoic acid (PFHpA)	16	15	92	70-150
Perfluoro-n-hexanoic acid (PFHxA)	16	15	96	70-150
Perfluoro-n-nonanoic acid (PFNA)	16	15	96	70-150
Perfluoro-n-octanoic acid (PFOA)	16	15	93	70-150
Perfluoro-n-pentanoic acid (PFPeA)	16	15	94	70-150
Perfluoro-n-tetradecanoic acid (PFTeDA)	16	15	93	70-150
Perfluoro-n-tridecanoic acid (PFTrDA)	16	14	90	70-150
Perfluoro-n-undecanoic acid (PFUdA)	16	16	99	70-150
Perfluorohexanesulfonic acid (PFHxS)	15	14	93	70-150
Perfluorooctanesulfonic acid (PFOS)	15	13	89	70-150

* Values outside of QC Limits

FORM 3
LABORATORY CONTROL/LABORATORY CONTROL DUPLICATE SAMPLE RECOVERY

Lab Name: Pace Analytical Services, LLC Lot No.: YI01015

Project No.: 16.0062961.9

Analytical Method: PFAS by ID SOP Matrix: Water

Client Sample ID: YQ84416-002 Lab Sample ID: YQ84416-002

Instrument ID: _Sciex 4500_LCMSMS1

Concentration Units (ug/L, mg/L, ug/kg): ng/L

ANALYTE	SPIKE ADDED	LCS CONCENTRATION	LCS %REC #	QC LIMITS REC.
11-chloroeicosafluoro-3-oxaundecane-1-sulfonic acid (11Cl-PF3OUdS)	15	15	102	70-150
1H, 1H, 2H, 2H-perfluorodecane sulfonic acid (8:2 FTS)	15	17	111	70-150
1H, 1H, 2H, 2H-perfluorooctane sulfonic acid (6:2 FTS)	15	17	111	70-150
1H,1H,2H,2H-perfluorohexane sulfonic acid (4:2 FTS)	15	16	105	70-150
4,8-dioxa-3H-perfluorononanoic acid (ADONA)	15	18	120	70-150
9-chlorohexadecafluoro-3-oxanone-1-sulfonic acid (9Cl-PF3ONS)	15	16	108	70-150
Hexafluoropropylene oxide dimer acid (GenX)	32	33	105	70-150
N-ethylperfluoro-1-octanesulfonamidoacetic acid (EtFOSAA)	16	19	120	70-150
N-methylperfluoro-1-octanesulfonamidoacetic acid (MeFOSAA)	16	18	115	70-150
Perfluoro-1-butanesulfonic acid (PFBS)	14	16	111	70-150
Perfluoro-1-decanesulfonic acid (PFDS)	15	17	113	70-150
Perfluoro-1-heptanesulfonic acid (PFHpS)	15	17	110	70-150
Perfluoro-1-nonanesulfonic acid (PFNS)	15	17	114	70-150
Perfluoro-1-octanesulfonamide (PFOSA)	16	17	103	70-150
Perfluoro-1-pentanesulfonic acid (PFPeS)	15	15	100	70-150
Perfluoro-n-butanoic acid (PFBA)	16	17	107	70-150
Perfluoro-n-decanoic acid (PFDA)	16	17	108	70-150
Perfluoro-n-dodecanoic acid (PFDoA)	16	17	104	70-150
Perfluoro-n-heptanoic acid (PFHpA)	16	16	102	70-150
Perfluoro-n-hexanoic acid (PFHxA)	16	17	105	70-150
Perfluoro-n-nonanoic acid (PFNA)	16	17	109	70-150
Perfluoro-n-octanoic acid (PFOA)	16	18	111	70-150
Perfluoro-n-pentanoic acid (PFPeA)	16	17	106	70-150
Perfluoro-n-tetradecanoic acid (PFTeDA)	16	16	102	70-150
Perfluoro-n-tridecanoic acid (PFTrDA)	16	16	103	70-150
Perfluoro-n-undecanoic acid (PFUdA)	16	16	98	70-150
Perfluorohexanesulfonic acid (PFHxS)	15	16	110	70-150
Perfluorooctanesulfonic acid (PFOS)	15	16	105	70-150

* Values outside of QC Limits

CLIENT SAMPLE ID

YQ83966-001

FORM 4
METHOD BLANK SUMMARY

Lab Name: Pace Analytical Services, LLC

Project No.: 16.0062961.9

Analytical Method: PFAS by ID SOP

Instrument ID: Sciex 4500_LCMSMS1

Extraction Type: SOP SPE

LC Column: Gemini C18 ID: 2.00 (mm)

Lot No.: YI01015

Lab Sample ID: YQ83966-001

Matrix: Water

Lab File ID: YQ83966-001.txt

Date Extracted: 09/03/2023

Date Analyzed: 09/07/2023

Time Analyzed: 17:50

CLIENT SAMPLE ID	LAB SAMPLE ID	LAB FILE ID	DATE/TIME ANALYZED
WV-MW-15C	YI01015-001	YI01015-001.txt	21:22
WV-MW-15D	YI01015-002	YI01015-002.txt	21:33
WV-MW-15B	YI01015-003	YI01015-003.txt	21:43
WV-MW-15A	YI01015-004	YI01015-004.txt	21:54
HS-PMW-RI-105A	YI01015-005	YI01015-005.txt	22:05
YQ83966-002	YQ83966-002	YQ83966-002.txt	18:01

CLIENT SAMPLE ID

YQ84416-001

FORM 4
METHOD BLANK SUMMARY

Lab Name: Pace Analytical Services, LLC

Project No.: 16.0062961.9

Analytical Method: PFAS by ID SOP

Instrument ID: Sciex 4500_LCMSMS1

Extraction Type: SOP SPE

LC Column: Gemini C18 ID: 2.00 (mm)

Lot No.: YI01015

Lab Sample ID: YQ84416-001

Matrix: Water

Lab File ID: YQ84416-001.txt

Date Extracted: 09/10/2023

Date Analyzed: 09/12/2023

Time Analyzed: 21:45

CLIENT SAMPLE ID	LAB SAMPLE ID	LAB FILE ID	DATE/TIME ANALYZED
HS-PMW-RI-105B	YI01015-006	YI01015-006.txt	18:35
WV-PMW-RI-105B	YI01015-007	YI01015-007.txt	18:46
WV-PMW-RI-105A	YI01015-008	YI01015-008.txt	19:30
FB/8/31-MKM	YI01015-009	YI01015-009.txt	19:41
FB/8/31-JMS	YI01015-010	YI01015-010.txt	20:14
FB/8/31-BPT	YI01015-011	YI01015-011.txt	20:25
FB/8/31-JET	YI01015-012	YI01015-012.txt	20:36
EQB-WLM	YI01015-013	YI01015-013.txt	20:47
EB-MM	YI01015-014	YI01015-014.txt	20:58
EB-BP	YI01015-015	YI01015-015.txt	21:09
WV-PMW-RI-107	YI01015-016	YI01015-016.txt	21:20
YQ84416-002	YQ84416-002	YQ84416-002.txt	21:56

Report Date: 11-Sep-2023 13:18:51 AIM Revision: 2.0.2023.0816

Pace Environmental Services, LLC

Initial Calibration Signal Ratios Report

Batch: \\Organics\LL\LCMSMS01.i\090723B-nonDOD+ICAL.b

Method: LCMSMS01_PFAS-ID2.M Version: V16 30-Jun-2022 10:54:24

Instrument: LCMSMS01.i Integrator: picker

Cal Start Date: 07-Sep-2023 15:01:35 Cal End Date: 07-Sep-2023 16:26:20

Method Lock: Unknown Lock Date:

Calib Method: PFAS-ID2 No.Compounds: 66

Calibration Concentration Units: ng/L

Initial Calibration Samples: Primary Reagent: Analytes

Batch: \\organics\LL\LCMSMS01.i\090723B-nonDOD+ICAL.b

Level	Cal File	Cal Sample ID	Cal Date
2	090723B001.d	ID ICAL L2_SVLC-2954	07-Sep-2023 15:01:35
3	090723B002.d	ID ICAL L3_SVLC-2955	07-Sep-2023 15:12:04
4	090723B003.d	ID ICAL L4_SVLC-2956	07-Sep-2023 15:22:34
5	090723B004.d	ID ICAL L5_SVLC-3024	07-Sep-2023 15:33:06
6	090723B005.d	ID ICAL L6_SVLC-2958	07-Sep-2023 15:43:43
7	090723B006.d	ID ICAL L7_SVLC-2959	07-Sep-2023 15:54:22
8	090723B007.d	ID ICAL L8_SVLC-2960	07-Sep-2023 16:05:00
9	090723B008.d	ID ICAL L9_SVLC-2961	07-Sep-2023 16:15:41
10	090723B009.d	ID ICAL L10_SVLC-2962	07-Sep-2023 16:26:20

Column: 1 Detector: LCMS-Q3

Compound	Ratio Level 2	Ratio Level 3	Ratio Level 4	Ratio Level 5	Ratio Level 6	Ratio Level 7	Ratio Level 8	Ratio Level 9	Ratio Level 10	Average Ratio	Avg. +/-3 SD Ratio Limits	StdD Limit	50% Limit
7 PFBS	3.749	3.902	3.711	3.713	3.630	3.759	3.778	3.760	3.500	3.722	3.408-4.036	0.10454	1.861
1 4:2 FTS	0.442	1.029	1.047	1.305	1.480	1.437	1.568	1.746	1.559	1.290	0.127-2.452	0.38747	0.645
15 PFHxA	15.219	16.299	16.569	19.307	15.609	17.115	16.154	14.788	16.303	16.373	12.605-20.142	1.25619	8.186
22 PFPeS	3.338	3.677	3.202	3.586	3.638	3.422	3.574	3.612	3.450	3.499	3.046-3.952	0.15103	1.749
28 GenX	0.669	0.808	0.855	0.757	0.727	0.846	0.846	0.841	0.797	0.794	0.589-0.998	0.06832	0.397
13 PFHpA	3.152	2.979	2.860	2.913	3.020	3.020	3.033	2.812	2.858	2.960	2.606-3.314	0.11799	1.480
14 PFHxS	3.175	3.909	3.394	3.329	3.368	3.660	3.681	3.689	3.743	3.549	2.778-4.321	0.25714	1.774
29 ADONA	2.280	2.243	2.098	2.292	2.405	2.228	2.212	2.112	2.057	2.214	1.895-2.532	0.10607	1.107
2 6:2 FTS	0.949	1.242	1.177	1.245	1.546	1.338	1.308	1.366	1.263	1.270	0.802-1.738	0.15592	0.635
20 PFOA	2.825	2.651	2.751	2.693	2.684	2.714	2.632	2.602	2.441	2.665	2.316-3.014	0.11631	1.332
12 PFHpS	3.425	3.915	3.647	3.650	3.618	3.392	3.457	3.543	3.587	3.581	3.127-4.035	0.15147	1.790
17 PFNA	4.594	6.165	4.634	5.308	4.552	5.020	4.888	4.764	4.895	4.980	3.493-6.466	0.49555	2.490
18 PFOS	5.650	4.072	3.825	4.728	4.094	4.456	4.118	4.186	4.161	4.365	2.711-6.019	0.55120	2.182
19 PFOSA	44.192	33.819	53.232	45.560	46.397	47.261	49.381	43.040	47.160	45.560	30.094-61.025	5.15519	22.780
3 8:2 FTS	Disabled	1.379	1.272	1.556	1.229	1.360	1.331	1.391	1.311	1.353	0.968-1.738	0.12839	0.676
16 PFNS	2.184	3.951	3.250	3.710	3.299	3.412	3.421	3.547	3.192	3.329	1.921-4.737	0.46937	1.664
10 PFDA	10.272	10.399	9.697	9.336	10.389	9.940	9.863	10.306	9.360	9.951	8.630-11.272	0.44034	4.975
6 N-MeFOSAA	1.556	1.577	1.530	1.444	1.730	1.534	1.570	1.447	1.466	1.539	1.289-1.789	0.08336	0.769
9 PFDS	3.647	2.781	3.010	3.308	3.347	3.191	3.555	3.358	3.430	3.291	2.522-4.061	0.25646	1.645
25 PFUdA	8.900	12.907	10.129	9.243	9.843	9.936	9.506	9.735	9.667	9.985	6.604-13.365	1.12696	4.992
5 N-EtFOSAA	1.499	1.993	1.830	1.639	1.670	1.809	1.865	1.632	1.756	1.743	1.320-2.166	0.14098	0.871
26 MeFOSA	0.966	1.131	0.911	1.074	1.183	1.076	1.109	1.048	1.062	1.062	0.829-1.295	0.07769	0.531
11 PFDoA	7.058	6.899	7.665	7.416	7.259	7.208	7.601	7.572	7.671	7.372	6.432-8.311	0.31317	3.686
4 10:2 FTS	2.123	3.352	2.095	2.266	2.156	2.221	2.142	2.126	2.226	2.300	1.104-3.497	0.39892	1.150
27 EtFOSA	1.110	1.099	1.017	0.999	0.988	1.080	1.084	1.024	1.049	1.050	0.850-1.249	0.06652	0.525
34 PFDOS	3.067	3.202	3.217	3.352	3.227	3.532	3.551	3.353	3.414	3.323	2.855-3.791	0.15602	1.661
24 PFTrDA	3.857	3.073	3.451	3.582	3.335	3.437	3.576	3.751	3.765	3.536	2.839-4.233	0.23241	1.768
23 PFTeDA	7.758	8.751	9.159	8.392	8.123	8.385	8.519	8.335	8.229	8.405	7.267-9.544	0.37947	4.202
35 PFHxDA	11.005	12.683	12.877	12.717	12.155	12.633	12.811	12.471	12.726	12.453	10.622-14.283	0.61013	6.226
36 PFODA	10.842	10.769	10.709	10.568	11.561	11.231	11.057	11.136	11.136	11.001	10.070-11.931	0.31031	5.500

Report Date: 11-Sep-2023 13:18:50 AIM Revision: 2.0.2023.0816

Pace Environmental Services, LLC

Initial Calibration RF Report

Batch: \\Organics\LL\LCMSMS01.i\090723B-nonDOD+ICAL.b

Method: LCMSMS01_PFAS-ID2.M Version: V16 30-Jun-2022 10:54:24

Instrument: LCMSMS01.i Integrator: picker

Cal Start Date: 07-Sep-2023 15:01:35 Cal End Date: 07-Sep-2023 16:26:20

Method Lock: Unknown Lock Date:

Calib Method: PFAS-ID2 No.Compounds: 66

Calibration Concentration Units: ng/L

Initial Calibration Samples: Primary Reagent: Analytes

Batch: \\organics\LL\LCMSMS01.i\090723B-nonDOD+ICAL.b

Level	Cal File	Cal Sample ID	Cal Date
2	090723B001.d	ID ICAL L2_SVLC-2954	07-Sep-2023 15:01:35
3	090723B002.d	ID ICAL L3_SVLC-2955	07-Sep-2023 15:12:04
4	090723B003.d	ID ICAL L4_SVLC-2956	07-Sep-2023 15:22:34
5	090723B004.d	ID ICAL L5_SVLC-3024	07-Sep-2023 15:33:06
6	090723B005.d	ID ICAL L6_SVLC-2958	07-Sep-2023 15:43:43
7	090723B006.d	ID ICAL L7_SVLC-2959	07-Sep-2023 15:54:22
8	090723B007.d	ID ICAL L8_SVLC-2960	07-Sep-2023 16:05:00
9	090723B008.d	ID ICAL L9_SVLC-2961	07-Sep-2023 16:15:41
10	090723B009.d	ID ICAL L10_SVLC-2962	07-Sep-2023 16:26:20

Curve Legend: Ex. Avg:H Wt:C2 Org:F Dep:R

Curve Type: Avg, Ln, Qd Response Type: H-Height, A-Area

Wt: Curve Weighting, C-1/Conc, C2-1/Conc^2, R-1/Rsp, R2-1/Rsp^2, N-None

Org: Origin, F-Force, I-Include, N-Neither

Dep: Dependent Variable, C-Concentration, R-Response

%Rec = (Measured Amount / True Amount) * 100

RSD ≤ 20%
r2 ≥ 0.99
%R ± 30%

Column: 1 Detector: LCMS-Q3

Compound	Level 2 / %Rec	Level 3 / %Rec	Level 4 / %Rec	Level 5 / %Rec	Level 6 / %Rec	Level 7 / %Rec	Level 8 / %Rec	Level 9 / %Rec	Level 10 / %Rec	Curve	M1	B	Curve Errors	Flags
D 46 13C4_PFBA	1163	1225	1230	1216	1205	1113	1145	1112	1075	Avg:A Wt:C2	1165		RSD=4.9	
	99	105	105	104	103	95	98	95	92	Org:N Dep:R				
8 PFBA	1.148070	1.082259	1.049784	0.963597	1.017078	1.113903	0.981122	0.991883	0.983779	Avg:A Wt:C2	1.036831		RSD=6.3	
	110	104	101	92	98	107	94	95	94	Org:N Dep:R				
D 50 13C5_PFPeA	1118	1157	1122	1120	1132	1073	1018	1005	1008	Avg:A Wt:C2	1084		RSD=5.5	
	103	106	103	103	104	99	93	92	92	Org:N Dep:R				
21 PFPeA	1.104824	1.129484	1.078626	1.062094	1.131703	1.140216	1.065145	1.060447	1.039323	Avg:A Wt:C2	1.090207		RSD=3.4	
	101	103	98	97	103	104	97	97	95	Org:N Dep:R				
D 44 13C3_PFBS	408	418	431	411	416	406	398	384	379	Avg:A Wt:C2	406	✓	RSD=4.1 ✓	
	100	103	106	101	102	100	98	94	93	Org:N Dep:R				
7 PFBS	1.319243	1.416496	1.192602	1.287204	1.306501	1.309015	1.302989	1.301099	1.258396	Avg:A Wt:C2	1.299283	✓	RSD=4.5 ✓	
	101	109	91	99	100	100	100	100	96	Org:N Dep:R				

Compound	Level 2 / %Rec	Level 3 / %Rec	Level 4 / %Rec	Level 5 / %Rec	Level 6 / %Rec	Level 7 / %Rec	Level 8 / %Rec	Level 9 / %Rec	Level 10 / %Rec	Curve	M1	B	Curve Errors	Flags
1 4:2 FTS	1.552259	2.088990	1.545435	1.798203	1.852638	1.827468	1.568712	1.685116	1.712715	Avg:A Wt:C2	1.736837		RSD=10.2	
	89	120	88	103	106	105	90	97	98	Org:N Dep:R				
D 63 13C2_4:2 FTS_2	51.7654	52.4597	55.0949	47.2075	52.1844	47.9736	53.6357	48.4216	47.5523	Avg:A Wt:C2	50.6995		RSD=5.8	
	102	103	108	93	102	94	105	95	93	Org:N Dep:R				
D 49 13C5_PFHxA	974	1085	1032	991	1035	972	935	898	878	Avg:A Wt:C2	978		RSD=6.9	
	99	110	105	101	105	99	95	91	89	Org:N Dep:R				
15 PFHxA	0.992735	0.958166	0.906070	0.999479	0.937560	0.979562	1.005112	0.928549	0.956750	Avg:A Wt:C2	0.962665		RSD=3.6	
	103	99	94	103	97	101	104	96	99	Org:N Dep:R				
22 PFPeS	1.148153	1.159517	1.043622	1.048876	1.126464	1.077449	1.082783	1.072007	1.060599	Avg:A Wt:C2	1.091052		RSD=3.9	
	105	106	95	96	103	98	99	98	97	Org:N Dep:R				
28 GenX	0.842306	0.880088	0.865652	0.802801	0.770866	0.931636	0.779550	0.855385	0.827350	Avg:A Wt:C2	0.839515		RSD=6.1	
	100	104	103	95	91	110	92	101	98	Org:N Dep:R				
D 66 13C3_GenX	137	127	138	128	143	118	133	124	119	Avg:A Wt:C2	130		RSD=6.7	
	105	98	106	98	110	90	102	95	91	Org:N Dep:R				
13 PFHpA	1.019606	0.929977	0.871171	0.859482	0.895063	0.896265	0.862275	0.916201	0.846249	Avg:A Wt:C2	0.899588		RSD=5.9	
	113	103	96	95	99	99	95	101	94	Org:N Dep:R				
D 47 13C4_PFHpA	1171	1267	1295	1238	1262	1241	1158	1066	1122	Avg:A Wt:C2	1202		RSD=6.4	
	97	105	107	103	104	103	96	88	93	Org:N Dep:R				
D 45 13C3_PFHxS	402	392	385	418	429	380	374	372	369	Avg:A Wt:C2	391		RSD=5.4	
	102	100	98	106	109	97	95	94	94	Org:N Dep:R				
14 PFHxS	1.248564	1.215518	1.146741	0.959127	1.026386	1.181987	1.160368	1.173226	1.201264	Avg:A Wt:C2	1.145909		RSD=8.2	
	108	106	100	83	89	103	101	102	104	Org:N Dep:R				
29 ADONA	4.462351	4.739356	4.611926	4.251665	4.341024	4.856283	4.468364	4.198628	4.047088	Avg:A Wt:C2	4.441854		RSD=5.9	
	100	106	103	95	97	109	100	94	91	Org:N Dep:R				
D 64 13C2_6:2 FTS_2	59.7467	53.4329	60.3720	56.8266	64.2043	53.5004	55.3298	50.1456	54.1618	Avg:A Wt:C2	56.4133		RSD=7.7	
	105	94	107	100	113	94	98	88	96	Org:N Dep:R				
2 6:2 FTS	1.714870	1.975150	1.473599	1.989916	1.747701	1.623179	1.532374	1.635147	1.475494	Avg:A Wt:C2	1.685270		RSD=11.5	
	101	117	87	118	103	96	90	97	87	Org:N Dep:R				
D 53 13C8_PFOA	1173	1133	1170	1144	1172	1051	1036	981	1006	Avg:A Wt:C2	1096	✓	RSD=7.1	✓
	107	103	106	104	106	95	94	89	91 ✓	Org:N Dep:R				
20 PFOA	0.931491	1.067375	0.942681	0.894806	0.935029	1.002629	0.940810	0.949561	0.891793	Avg:A Wt:C2	0.950686	✓	RSD=5.7	✓
	97	112	99	94	98	105	98	99	93 ✓	Org:N Dep:R				
12 PFHpS	0.936450	1.020291	1.030500	0.865875	0.897276	0.937068	0.903619	0.925125	0.894671	Avg:A Wt:C2	0.934541		RSD=6.0	
	100	109	110	92	96	100	96	98	95	Org:N Dep:R				
D 54 13C8_PFOS	349	356	356	353	379	342	347	323	325	Avg:A Wt:C2	348		RSD=4.9	
	100	102	102	101	108	98	99	92	93	Org:N Dep:R				
D 56 13C9_PFNA	1116	1104	1158	1035	1169	1104	1088	1047	983	Avg:A Wt:C2	1089		RSD=5.5	
	102	101	106	95	107	101	99	96	90	Org:N Dep:R				
17 PFNA	0.953860	1.053314	0.869027	0.955154	0.840633	0.895786	0.823850	0.848154	0.901106	Avg:A Wt:C2	0.904543		RSD=8.0	
	105	116	96	105	92	99	91	93	99	Org:N Dep:R				
18 PFOS	1.252512	1.355044	1.116580	1.093337	1.104023	1.229353	1.117761	1.210170	1.154081	Avg:A Wt:C2	1.181429		RSD=7.4	
	106	114	94	92	93	104	94	102	97	Org:N Dep:R				

Compound	Level 2 / %Rec	Level 3 / %Rec	Level 4 / %Rec	Level 5 / %Rec	Level 6 / %Rec	Level 7 / %Rec	Level 8 / %Rec	Level 9 / %Rec	Level 10 / %Rec	Curve	M1	B	Curve Errors	Flags
30 9Cl-PF3ONS	2.557004	2.699134	2.502357	2.414955	2.288516	2.519314	2.402407	2.695225	2.501321	Avg:A Wt:C2	2.508915		RSD=5.3	
	101	107	99	96	91	100	95	107	99	Org:N Dep:R				
19 PFOSA	0.912782	0.996864	0.948308	1.059299	0.930011	1.049843	0.901722	0.928820	0.982110	Avg:A Wt:C2	0.967751		RSD=6.0	
	94	103	97	109	96	108	93	95	101	Org:N Dep:R				
D 55 13C8_PFOSA	652	635	705	579	673	572	622	613	579	Avg:A Wt:C2	626		RSD=7.3	
	104	101	112	92	107	91	99	97	92	Org:N Dep:R				
3 8:2 FTS Dropped point < RL no impact	Disabled	1.445099	1.402583	1.487940	1.242170	1.571165	1.217530	1.269642	1.280009	Avg:A Wt:C2	1.364517		RSD=9.5	
	Disabled	105	102	109	91	115	89	93	93	Org:N Dep:R				
D 65 13C2_8:2 FTS_2	53.6300	52.8747	55.6087	50.0510	51.2904	43.9271	46.9855	47.1706	44.9291	Avg:A Wt:C2	49.6075		RSD=8.2	
	108	106	112	100	103	88	94	95	90	Org:N Dep:R				
16 PFNS	0.724630	1.016814	0.920233	0.929877	0.891694	0.965243	0.888993	0.921650	0.833707	Avg:A Wt:C2	0.899204		RSD=9.2	
	80	113	102	103	99	107	98	102	92	Org:N Dep:R				
10 PFDA	0.945938	0.912591	1.050848	0.897292	0.897112	0.897086	0.870060	0.948082	0.851863	Avg:A Wt:C2	0.918986		RSD=6.4	
	102	99	114	97	97	97	94	103	92	Org:N Dep:R				
D 51 13C6_PFDA	1010	1095	959	1055	1109	1032	995	889	905	Avg:A Wt:C2	1005		RSD=7.7	
	100	108	95	104	110	102	98	88	90	Org:N Dep:R				
D 58 d3-MeFOSAA	238	219	245	226	240	218	234	246	230	Avg:A Wt:C2	233		RSD=4.5	
	102	93	105	97	103	93	100	105	98	Org:N Dep:R				
6 N-MeFOSAA	0.810180	0.969227	0.782763	0.721338	0.782147	0.828914	0.723757	0.676277	0.752363	Avg:A Wt:C2	0.782996		RSD=10.8	
	103	123	99	92	99	105	92	86	96	Org:N Dep:R				
9 PFDS	0.907700	0.801375	0.759677	0.803401	0.803633	0.864471	0.797216	0.848319	0.878078	Avg:A Wt:C2	0.829319		RSD=5.7	
	109	96	91	96	96	104	96	102	105	Org:N Dep:R				
D 60 d5-EtFOSAA	212	200	224	194	217	181	200	182	182	Avg:A Wt:C2	199		RSD=8.0	
	106	100	112	97	108	90	100	91	91	Org:N Dep:R				
D 52 13C7_PFUdA	886	930	949	886	925	908	870	790	793	Avg:A Wt:C2	882		RSD=6.5	
	100	105	107	100	104	102	98	89	89	Org:N Dep:R				
25 PFUdA	0.921199	0.957463	0.894326	0.876130	0.901696	0.931400	0.872117	0.910744	0.891049	Avg:A Wt:C2	0.906236		RSD=3.0	
	101	105	98	96	99	102	96	100	98	Org:N Dep:R				
5 N-EtFOSAA	0.948365	1.191891	0.914473	0.958940	0.870671	1.070569	0.902311	0.937123	0.905006	Avg:A Wt:C2	0.966594		RSD=10.5	
	98	123	94	99	90	110	93	96	93	Org:N Dep:R				
D 61 d7-MeFOSE	202	200	218	190	226	189	208	198	201	Avg:A Wt:C2	204		RSD=6.0	
	99	98	106	93	111	92	102	97	98	Org:N Dep:R				
32 MeFOSE	0.914295	0.953613	0.853855	0.936206	0.842159	0.947532	0.844851	0.871720	0.869068	Avg:A Wt:C2	0.892589		RSD=5.1	
	102	106	95	104	94	106	94	97	97	Org:N Dep:R				
D 57 d3-MeFOSA	84.4295	77.9815	85.3655	71.7510	84.9675	73.5070	75.4645	83.0150	79.6715	Avg:A Wt:C2	79.5726		RSD=6.5	
	106	98	107	90	106	92	94	104	100	Org:N Dep:R				
26 MeFOSA	1.152678	1.056725	1.050331	1.134521	1.086651	1.166803	1.093584	1.007118	1.029401	Avg:A Wt:C2	1.086423		RSD=5.1	
	106	97	96	104	100	107	100	92	94	Org:N Dep:R				
31 11Cl-PF3OUDS	1.806990	1.868340	1.856454	1.708768	1.609656	2.021635	1.770636	1.883386	1.872702	Avg:A Wt:C2	1.822063		RSD=6.4	
	99	102	101	93	88	110	97	103	102	Org:N Dep:R				
11 PFDoA	0.940140	1.011804	0.951143	0.976689	0.978309	0.994458	1.010111	0.967661	1.005314	Avg:A Wt:C2	0.981736		RSD=2.6	
	95	103	96	99	99	101	102	98	102	Org:N Dep:R				

Compound	Level 2 / %Rec	Level 3 / %Rec	Level 4 / %Rec	Level 5 / %Rec	Level 6 / %Rec	Level 7 / %Rec	Level 8 / %Rec	Level 9 / %Rec	Level 10 / %Rec	Curve	M1	B	Curve Errors	Flags
D 38 13C2_PFDoA	881	872	912	868	869	812	807	818	802	Avg:A Wt:C2	849		RSD=4.7	
	103	102	107	102	102	95	95	96	94	Org:N Dep:R				
4 10:2 FTS	1.289959	1.472106	1.259281	1.330386	1.363868	1.502145	1.346487	1.295945	1.470714	Avg:A Wt:C2	1.370099		RSD=6.5	
	94	107	91	97	99	109	98	94	107	Org:N Dep:R				
D 62 d9-EtFOSE	187	186	195	190	210	180	203	186	187	Avg:A Wt:C2	192		RSD=5.0	
	97	97	101	99	109	93	106	96	97	Org:N Dep:R				
33 EtFOSE	1.089808	0.826633	0.923299	0.930896	0.846387	0.936008	0.832876	0.893182	0.925593	Avg:A Wt:C2	0.911631		RSD=8.8	
	119	90	101	102	92	102	91	97	101	Org:N Dep:R				
D 59 d5-EtFOSA	77.9120	71.0415	81.3705	68.8765	82.2625	71.4550	77.7905	74.1565	76.5080	Avg:A Wt:C2	75.7081		RSD=6.2	
	102	93	107	90	108	94	102	97	101	Org:N Dep:R				
27 EtFOSA	1.254749	1.296355	1.105511	1.179778	1.011068	1.214641	1.094243	1.129118	1.135503	Avg:A Wt:C2	1.157885		RSD=7.6	
	108	111	95	101	87	104	94	97	98	Org:N Dep:R				
34 PFDOS	0.772881	0.891198	0.781656	0.796928	0.734033	0.867374	0.777152	0.852009	0.850347	Avg:A Wt:C2	0.813731		RSD=6.5	
	94	109	96	97	90	106	95	104	104	Org:N Dep:R				
24 PFTrDA	0.484486	0.480497	0.473120	0.452603	0.470198	0.496208	0.517378	0.512755	0.527691	Avg:A Wt:C2	0.490549		RSD=5.1	
	98	97	96	92	95	101	105	104	107	Org:N Dep:R				
23 PFTeDA	1.047895	1.039451	0.991047	0.905708	0.962424	0.967403	0.929850	0.934334	0.939743	Avg:A Wt:C2	0.968651		RSD=5.1	
	108	107	102	93	99	99	95	96	97	Org:N Dep:R				
D 42 13C2_PFTeDA	858	924	929	899	916	873	889	850	845	Avg:A Wt:C2	887		RSD=3.6	
	96	104	104	101	103	98	100	95	95	Org:N Dep:R				
35 PFHxDA	1.584504	1.512631	1.364828	1.520655	1.340302	1.495212	1.342286	1.360452	1.306350	Avg:A Wt:C2	1.425247		RSD=7.2	
	111	106	95	106	94	104	94	95	91	Org:N Dep:R				
D 40 13C2_PFHxDA	486	477	535	453	508	475	503	484	500	Avg:A Wt:C2	491		RSD=4.8	
	98	97	108	92	103	96	102	98	101	Org:N Dep:R				
36 PFODA	1.009586	1.065949	0.942564	1.032534	1.007697	1.041544	0.932126	0.981863	0.950277	Avg:A Wt:C2	0.996016		RSD=4.7	
	101	107	94	103	101	104	93	98	95	Org:N Dep:R				

Report Date: 11-Sep-2023 13:18:51 AIM Revision: 2.0.2023.0816

Pace Environmental Services, LLC

Initial Calibration Ion Suppression Report

Batch: \\Organics\LL\LCMSMS01.i\090723B-nonDOD+ICAL.b
Method: LCMSMS01_PFAS-ID2.M Version: V16 30-Jun-2022 10:54:24
Instrument: LCMSMS01.i Integrator: picker
Cal Start Date: 07-Sep-2023 15:01:35 Cal End Date: 07-Sep-2023 16:26:20
Method Lock: Unknown Lock Date:
Calib Method: PFAS-ID2 No.Compounds: 66
Calibration Concentration Units: ng/L

Initial Calibration Samples: Primary Reagent: Analytes
Batch: \\organics\LL\LCMSMS01.i\090723B-nonDOD+ICAL.b

Level	Cal File	Cal Sample ID	Cal Date
2	090723B001.d	ID ICAL L2_SVLC-2954	07-Sep-2023 15:01:35
3	090723B002.d	ID ICAL L3_SVLC-2955	07-Sep-2023 15:12:04
4	090723B003.d	ID ICAL L4_SVLC-2956	07-Sep-2023 15:22:34
5	090723B004.d	ID ICAL L5_SVLC-3024	07-Sep-2023 15:33:06
6	090723B005.d	ID ICAL L6_SVLC-2958	07-Sep-2023 15:43:43
7	090723B006.d	ID ICAL L7_SVLC-2959	07-Sep-2023 15:54:22
8	090723B007.d	ID ICAL L8_SVLC-2960	07-Sep-2023 16:05:00
9	090723B008.d	ID ICAL L9_SVLC-2961	07-Sep-2023 16:15:41
10	090723B009.d	ID ICAL L10_SVLC-2962	07-Sep-2023 16:26:20

Column: 1 Detector: LCMS-Q3

Compound	Response Level 2	Response Level 3	Response Level 4	Response Level 5	Response Level 6	Response Level 7	Response Level 8	Response Level 9	Response Level 10	RPD
* 43 13C3_PFBA	17147	18040	19948	20161	18364	18584	18471	17743	16852	0.43
* 39 13C2_PFHxA	1294	684	2054	2359	1217	3350	6623	10277	11190	39.63
* 41 13C2_PFOA	260		1043	894	2343	1611	10812	14455	20189	48.72
* 48 13C4_PFOS	5183	9420	5639	4823	6272	7138	5266	6412	9669	15.10
* 37 13C2_PFDA			132	1366	750	2561	10392	12392	18292	49.28

13C3_PFBA ((|16852 - 17147| / (16852 + 17147)) / 2) * 100 = 0.43
13C2_PFHxA ((|11190 - 1294| / (11190 + 1294)) / 2) * 100 = 39.63
13C2_PFOA ((|20189 - 260| / (20189 + 260)) / 2) * 100 = 48.73
13C4_PFOS ((|9669 - 5183| / (9669 + 5183)) / 2) * 100 = 15.10
13C2_PFDA ((|18292 - 132| / (18292 + 132)) / 2) * 100 = 49.28

not used, not evaluated

Report Date: 11-Sep-2023 13:18:51 AIM Revision: 2.0.2023.0816

Pace Environmental Services, LLC

Initial Calibration Response Report

Batch: \\Organics\LL\LCMSMS01.i\090723B-nonDOD+ICAL.b
Method: LCMSMS01_PFAS-ID2.M Version: V16 30-Jun-2022 10:54:24
Instrument: LCMSMS01.i Integrator: picker
Cal Start Date: 07-Sep-2023 15:01:35 Cal End Date: 07-Sep-2023 16:26:20
Method Lock: Unknown Lock Date:
Calib Method: PFAS-ID2 No.Compounds: 66
Calibration Concentration Units: ng/L

Initial Calibration Samples: Primary Reagent: Analytes
Batch: \\organics\LL\LCMSMS01.i\090723B-nonDOD+ICAL.b

Level	Cal File	Cal Sample ID	Cal Date
2	090723B001.d	ID ICAL L2_SVLC-2954	07-Sep-2023 15:01:35
3	090723B002.d	ID ICAL L3_SVLC-2955	07-Sep-2023 15:12:04
4	090723B003.d	ID ICAL L4_SVLC-2956	07-Sep-2023 15:22:34
5	090723B004.d	ID ICAL L5_SVLC-3024	07-Sep-2023 15:33:06
6	090723B005.d	ID ICAL L6_SVLC-2958	07-Sep-2023 15:43:43
7	090723B006.d	ID ICAL L7_SVLC-2959	07-Sep-2023 15:54:22
8	090723B007.d	ID ICAL L8_SVLC-2960	07-Sep-2023 16:05:00
9	090723B008.d	ID ICAL L9_SVLC-2961	07-Sep-2023 16:15:41
10	090723B009.d	ID ICAL L10_SVLC-2962	07-Sep-2023 16:26:20

Quantitation Standards (* - Istd) (D - Iso Dil Std)

* 43 13C3_PFBA	* 39 13C2_PFHxA	* 41 13C2_PFOA
* 48 13C4_PFOS	* 37 13C2_PFDA	D 46 13C4_PFBA
D 50 13C5_PFPeA	D 44 13C3_PFBS	D 63 13C2_4:2 FTS_2
D 49 13C5_PFHxA	D 66 13C3_GenX	D 47 13C4_PFHpA
D 45 13C3_PFHxS	D 64 13C2_6:2 FTS_2	D 53 13C8_PFOA
D 56 13C9_PFNA	D 54 13C8_PFOS	D 55 13C8_PFOSA
D 65 13C2_8:2 FTS_2	D 51 13C6_PFDA	D 58 d3-MeFOSAA
D 60 d5-EtFOSAA	D 52 13C7_PFUdA	D 61 d7-MeFOSE
D 57 d3-MeFOSA	D 38 13C2_PFDoA	D 62 d9-EtFOSE
D 59 d5-EtFOSA	D 42 13C2_PFTeDA	D 40 13C2_PFHxDA

Column: 1 Detector: LCMS-Q3

Compound	Level 2 Conc/Rsp	Level 3 Conc/Rsp	Level 4 Conc/Rsp	Level 5 Conc/Rsp	Level 6 Conc/Rsp	Level 7 Conc/Rsp	Level 8 Conc/Rsp	Level 9 Conc/Rsp	Level 10 Conc/Rsp	Std #
* 43 13C3_PFBA	2000.00	2000.00	2000.00	2000.00	2000.00	2000.00	2000.00	2000.00	2000.00	
	17147	18040	19948	20161	18364	18584	18471	17743	16852	
* 39 13C2_PFHxA	2000.00	2000.00	2000.00	2000.00	2000.00	2000.00	2000.00	2000.00	2000.00	
	1294	684	2054	2359	1217	3350	6623	10277	11190	
* 41 13C2_PFOA	2000.00		2000.00	2000.00	2000.00	2000.00	2000.00	2000.00	2000.00	
	260		1043	894	2343	1611	10812	14455	20189	
* 48 13C4_PFOS	2000.00	2000.00	2000.00	2000.00	2000.00	2000.00	2000.00	2000.00	2000.00	
	5183	9420	5639	4823	6272	7138	5266	6412	9669	
* 37 13C2_PFDA			2000.00	2000.00	2000.00	2000.00	2000.00	2000.00	2000.00	
			132	1366	750	2561	10392	12392	18292	
D 46 13C4_PFBA	2000.00	2000.00	2000.00	2000.00	2000.00	2000.00	2000.00	2000.00	2000.00	
	2326896	2449524	2459992	2431491	2410046	2226477	2289162	2224565	2150134	
8 PFBA	100.00	200.00	500.00	1000.00	2000.00	5000.00	10000	15000	20000	#46
	133572	265102	645615	1171489	2451204	6200201	11229738	16548815	21152566	
D 50 13C5_PFPeA	2000.00	2000.00	2000.00	2000.00	2000.00	2000.00	2000.00	2000.00	2000.00	
	2236538	2314109	2243095	2240815	2263183	2146648	2036927	2009247	2015292	
21 PFPeA	100.00	200.00	500.00	1000.00	2000.00	5000.00	10000	15000	20000	#50
	123549	261375	604865	1189978	2561252	6119104	10848116	15980256	20945390	
D 44 13C3_PFBS	2000.00	2000.00	2000.00	2000.00	2000.00	2000.00	2000.00	2000.00	2000.00	
	816199	836923	862455	822330	832368	812113	795708	768538	757894	

Compound	Level 2 Conc/Rsp	Level 3 Conc/Rsp	Level 4 Conc/Rsp	Level 5 Conc/Rsp	Level 6 Conc/Rsp	Level 7 Conc/Rsp	Level 8 Conc/Rsp	Level 9 Conc/Rsp	Level 10 Conc/Rsp	Std #
7 PFBS	88.400	176.80	442.00	884.00	1768.00	4420.00	8840.00	13260	17680	#44
	47593	104798	227313	467860	961341	2349380	4582651	6629631	8430983	
1 4:2 FTS	93.400	186.80	467.00	934.00	1868.00	4670.00	9340.00	14010	18680	#63
	7505	20471	39763	79286	180596	409420	785858	1143160	1521365	
D 63 13C2_4:2 FTS_2	10000	10000	10000	10000	10000	10000	10000	10000	10000	
	517654	524597	550949	472075	521844	479736	536357	484216	475523	
D 49 13C5_PFHxA	2000.00	2000.00	2000.00	2000.00	2000.00	2000.00	2000.00	2000.00	2000.00	
	1947609	2170136	2064740	1981677	2070225	1944899	1869643	1795290	1755980	
15 PFHxA	100.00	200.00	500.00	1000.00	2000.00	5000.00	10000	15000	20000	#49
	96673	207935	467700	990322	1940960	4762872	9396005	12502610	16800345	
22 PFPeS	93.800	187.60	469.00	938.00	1876.00	4690.00	9380.00	14070	18760	#44
	43951	91026	211068	404523	879499	2051900	4040807	5795983	7539847	
28 GenX	200.00	400.00	1000.00	2000.00	4000.00	10000	20000	30000	40000	#66
	23058	44863	119038	205599	441508	1098976	2080995	3169372	3947835	
D 66 13C3_GenX	10000	10000	10000	10000	10000	10000	10000	10000	10000	
	1368742	1274390	1375125	1280510	1431857	1179620	1334741	1235067	1192915	
13 PFHpA	100.00	200.00	500.00	1000.00	2000.00	5000.00	10000	15000	20000	#47
	119370	235599	564097	1064245	2258658	5560978	9984072	14646743	18997506	
D 47 13C4_PFHpA	2000.00	2000.00	2000.00	2000.00	2000.00	2000.00	2000.00	2000.00	2000.00	
	2341493	2533386	2590064	2476480	2523463	2481845	2315751	2131518	2244907	
D 45 13C3_PFHxS	2000.00	2000.00	2000.00	2000.00	2000.00	2000.00	2000.00	2000.00	2000.00	
	804599	784471	769493	836168	857225	760366	748874	743086	738941	
14 PFHxS	91.000	182.00	455.00	910.00	1820.00	4550.00	9100.00	13650	18200	#45
	45709	86772	200748	364906	800658	2044639	3953812	5950088	8077738	
29 ADONA	94.200	188.40	471.00	942.00	1884.00	4710.00	9420.00	14130	18840	#45
	169108	350225	835753	1674455	3505403	8695961	15760799	22042390	28171066	
D 64 13C2_6:2 FTS_2	10000	10000	10000	10000	10000	10000	10000	10000	10000	
	597467	534329	603720	568266	642043	535004	553298	501456	541618	
2 6:2 FTS	94.800	189.60	474.00	948.00	1896.00	4740.00	9480.00	14220	18960	#64
	9713	20010	42169	107200	212750	411625	803771	1165975	1515196	
D 53 13C8_PFOA	2000.00	2000.00	2000.00	2000.00	2000.00	2000.00	2000.00	2000.00	2000.00	
	2346131	2265089	2340040	2287307	2343986	2101138	2072747	1961271	2012141	
20 PFOA	100.00	200.00	500.00	1000.00	2000.00	5000.00	10000	15000	20000	#53
	109270	241770	551478	1023348	2191694	5266656	9750303	13967605	17944126	
12 PFHpS	95.200	190.40	476.00	952.00	1904.00	4760.00	9520.00	14280	19040	#45
	35865	76197	188725	344632	732247	1695785	3221078	4908373	6293757	
D 54 13C8_PFOS	2000.00	2000.00	2000.00	2000.00	2000.00	2000.00	2000.00	2000.00	2000.00	
	697856	712663	712849	706178	757943	684752	694985	646128	649932	
D 56 13C9_PFNA	2000.00	2000.00	2000.00	2000.00	2000.00	2000.00	2000.00	2000.00	2000.00	
	2232277	2207320	2316157	2070435	2337904	2207377	2176161	2094180	1965871	
17 PFNA	100.00	200.00	500.00	1000.00	2000.00	5000.00	10000	15000	20000	#56
	106464	232500	503201	988792	1965319	4943346	8964151	13321406	17714585	
18 PFOS	92.800	185.60	464.00	928.00	1856.00	4640.00	9280.00	13920	18560	#54
	40557	89616	184661	358250	776538	1952981	3604479	5442194	6960689	
30 9Cl-PF3ONS	93.200	186.40	466.00	932.00	1864.00	4660.00	9320.00	13980	18640	#54
	83154	179277	415626	794711	1616614	4019496	7780507	12172809	15151415	
19 PFOSA	100.00	200.00	500.00	1000.00	2000.00	5000.00	10000	15000	20000	#55
	59527	126585	334408	613834	1251933	3000114	5606602	8539563	11366459	
D 55 13C8_PFOSA	2000.00	2000.00	2000.00	2000.00	2000.00	2000.00	2000.00	2000.00	2000.00	
	1304298	1269832	1410546	1158944	1346148	1143072	1243532	1225866	1157351	
3 8:2 FTS	Disabled	191.60	479.00	958.00	1916.00	4790.00	9580.00	14370	19160	#65
	Disabled	14640	37360	71345	122071	330590	548036	860616	1101885	
D 65 13C2_8:2 FTS_2	10000	10000	10000	10000	10000	10000	10000	10000	10000	
	536300	528747	556087	500510	512904	439271	469855	471706	449291	
16 PFNS	96.000	192.00	480.00	960.00	1920.00	4800.00	9600.00	14400	19200	#54
	24273	69566	157437	315196	648819	1586285	2965615	4287627	5201787	

Compound	Level 2 Conc/Rsp	Level 3 Conc/Rsp	Level 4 Conc/Rsp	Level 5 Conc/Rsp	Level 6 Conc/Rsp	Level 7 Conc/Rsp	Level 8 Conc/Rsp	Level 9 Conc/Rsp	Level 10 Conc/Rsp	Std #
10 PFDA	100.00	200.00	500.00	1000.00	2000.00	5000.00	10000	15000	20000	#51
	95496	199824	503944	946271	1989751	4629098	8654938	12638939	15417217	
D 51 13C6_PFDA	2000.00	2000.00	2000.00	2000.00	2000.00	2000.00	2000.00	2000.00	2000.00	
	2019075	2189634	1918238	2109170	2217952	2064061	1989504	1777474	1809823	
D 58 d3-MeFOSAA	10000	10000	10000	10000	10000	10000	10000	10000	10000	
	2378606	2185968	2449120	2259303	2397713	2182110	2344456	2457336	2295556	
6 N-MeFOSAA	100.00	200.00	500.00	1000.00	2000.00	5000.00	10000	15000	20000	#58
	19271	42374	95854	162972	375073	904391	1696816	2492761	3454181	
9 PFDS	96.400	192.80	482.00	964.00	1928.00	4820.00	9640.00	14460	19280	#54
	30532	55055	130510	273460	587180	1426596	2670537	3962925	5501464	
D 60 d5-EtFOSAA	10000	10000	10000	10000	10000	10000	10000	10000	10000	
	2116802	2004294	2243522	1935814	2167173	1810620	1999486	1824699	1816618	
D 52 13C7_PFUdA	2000.00	2000.00	2000.00	2000.00	2000.00	2000.00	2000.00	2000.00	2000.00	
	1771236	1859007	1897920	1772741	1849885	1816293	1740540	1579283	1585058	
25 PFUdA	100.00	200.00	500.00	1000.00	2000.00	5000.00	10000	15000	20000	#52
	81583	177993	424340	776576	1668033	4229236	7589774	10787413	14123651	
5 N-EtFOSAA	100.00	200.00	500.00	1000.00	2000.00	5000.00	10000	15000	20000	#60
	20075	47778	102582	185633	377379	969197	1804159	2564950	3288101	
D 61 d7-MeFOSE	2000.00	2000.00	2000.00	2000.00	2000.00	2000.00	2000.00	2000.00	2000.00	
	404071	400498	435498	379912	452690	377663	416833	395158	401534	
32 MeFOSE	100.00	200.00	500.00	1000.00	2000.00	5000.00	10000	15000	20000	#61
	18472	38192	92963	177838	381237	894619	1760809	2583503	3489604	
D 57 d3-MeFOSA	2000.00	2000.00	2000.00	2000.00	2000.00	2000.00	2000.00	2000.00	2000.00	
	168859	155963	170731	143502	169935	147014	150929	166030	159343	
26 MeFOSA	100.00	200.00	500.00	1000.00	2000.00	5000.00	10000	15000	20000	#57
	9732	16481	44831	81403	184660	428841	825268	1254088	1640278	
31 11Cl-PF3OUDS	94.200	188.40	471.00	942.00	1884.00	4710.00	9420.00	14130	18840	#54
	59394	125427	311654	568353	1149266	3260071	5795962	8597460	11465354	
11 PFDoA	100.00	200.00	500.00	1000.00	2000.00	5000.00	10000	15000	20000	#38
	82793	176377	433824	847463	1699757	4036695	8151901	11866678	16129266	
D 38 13C2_PFDoA	2000.00	2000.00	2000.00	2000.00	2000.00	2000.00	2000.00	2000.00	2000.00	
	1761290	1743194	1824432	1735380	1737444	1623677	1614061	1635101	1604401	
4 10:2 FTS	96.400	192.80	482.00	964.00	1928.00	4820.00	9640.00	14460	19280	#65
	6669	15007	33753	64190	134870	318047	609878	883947	1273981	
D 62 d9-EtFOSE	2000.00	2000.00	2000.00	2000.00	2000.00	2000.00	2000.00	2000.00	2000.00	
	374543	372971	390010	380859	420101	359422	406888	371356	373796	
33 EtFOSE	100.00	200.00	500.00	1000.00	2000.00	5000.00	10000	15000	20000	#62
	20409	30831	90024	177270	355568	841055	1694436	2487665	3459828	
D 59 d5-EtFOSA	2000.00	2000.00	2000.00	2000.00	2000.00	2000.00	2000.00	2000.00	2000.00	
	155824	142083	162741	137753	164525	142910	155581	148313	153016	
27 EtFOSA	100.00	200.00	500.00	1000.00	2000.00	5000.00	10000	15000	20000	#59
	9776	18419	44978	81259	166346	433961	851217	1255972	1737501	
34 PFDOS	96.800	193.60	484.00	968.00	1936.00	4840.00	9680.00	14520	19360	#54
	26105	61480	134843	272382	538552	1437326	2614127	3996678	5349823	
24 PFTrDA	100.00	200.00	500.00	1000.00	2000.00	5000.00	10000	15000	20000	#58
	42666	83760	215794	392719	816943	2014204	4175398	6288049	8466286	
23 PFTeDA	100.00	200.00	500.00	1000.00	2000.00	5000.00	10000	15000	20000	#42
	89955	192132	460458	813823	1763495	4223773	8270324	11911094	15879187	
D 42 13C2_PFTeDA	2000.00	2000.00	2000.00	2000.00	2000.00	2000.00	2000.00	2000.00	2000.00	
	1716870	1848398	1858471	1797097	1832348	1746437	1778852	1699763	1689738	
35 PFHxDA	100.00	200.00	500.00	1000.00	2000.00	5000.00	10000	15000	20000	#40
	76949	144168	365138	688739	1362977	3548673	6752909	9874504	13059298	
D 40 13C2_PFHxDA	2000.00	2000.00	2000.00	2000.00	2000.00	2000.00	2000.00	2000.00	2000.00	
	971269	953094	1070136	905845	1016918	949343	1006180	967767	999678	
36 PFODA	100.00	200.00	500.00	1000.00	2000.00	5000.00	10000	15000	20000	#40
	49029	101595	252168	467658	1024745	2471957	4689435	7126609	9499713	

Pace Environmental Services, LLC
Initial Calibration RT Report

Batch: \\Organics\LL\LCMSMS01.i\090723B-nonDOD+ICAL.b
Method: LCMSMS01_PFAS-ID2.M Version: V16 30-Jun-2022 10:54:24
Instrument: LCMSMS01.i Integrator: picker
Cal Start Date: 07-Sep-2023 15:01:35 Cal End Date: 07-Sep-2023 16:26:20
Method Lock: Unknown Lock Date:
Calib Method: PFAS-ID2 No.Compounds: 66
Calibration Concentration Units: ng/L

Initial Calibration Samples: Primary Reagent: Analytes
Batch: \\organics\LL\LCMSMS01.i\090723B-nonDOD+ICAL.b

Level	Cal File	Cal Sample ID	Cal Date
2	090723B001.d	ID ICAL L2_SVLC-2954	07-Sep-2023 15:01:35
3	090723B002.d	ID ICAL L3_SVLC-2955	07-Sep-2023 15:12:04
4	090723B003.d	ID ICAL L4_SVLC-2956	07-Sep-2023 15:22:34
5	090723B004.d	ID ICAL L5_SVLC-3024	07-Sep-2023 15:33:06
6	090723B005.d	ID ICAL L6_SVLC-2958	07-Sep-2023 15:43:43
7	090723B006.d	ID ICAL L7_SVLC-2959	07-Sep-2023 15:54:22
8	090723B007.d	ID ICAL L8_SVLC-2960	07-Sep-2023 16:05:00
9	090723B008.d	ID ICAL L9_SVLC-2961	07-Sep-2023 16:15:41
10	090723B009.d	ID ICAL L10_SVLC-2962	07-Sep-2023 16:26:20

Column: 1 Detector: LCMS-Q3

Compound	Level 2	Level 3	Level 4	Level 5	Level 6	Level 7	Level 8	Level 9	Level 10	Avg. RT	%Rsd RT
D 46 13C4_PFBA	1.645	1.645	1.645	1.645	1.641	1.645	1.645	1.645	1.642	1.644	0.097
8 PFBA	1.645	1.645	1.645	1.645	1.641	1.645	1.645	1.645	1.642	1.644	0.097
D 50 13C5_PFPeA	1.958	1.950	1.950	1.950	1.953	1.950	1.950	1.950	1.955	1.951	0.165
21 PFPeA	1.958	1.950	1.950	1.950	1.953	1.950	1.950	1.950	1.955	1.951	0.165
D 44 13C3_PFBS	1.997	1.997	1.997	1.997	1.992	1.997	1.997	1.997	1.994	1.995	0.087
7 PFBS	1.997	1.997	1.997	1.997	1.992	1.997	1.997	1.997	1.994	1.995	0.087
1 4:2 FTS	2.244	2.243	2.244	2.243	2.238	2.243	2.243	2.243	2.240	2.242	0.082
D 63 13C2_4:2 FTS_2	2.244	2.243	2.244	2.243	2.238	2.243	2.243	2.243	2.240	2.242	0.082
* 39 13C2_PFHxA	2.281	2.271	2.262	2.271	2.276	2.281	2.271	2.271	2.278	2.273	0.255
D 49 13C5_PFHxA	2.281	2.280	2.281	2.281	2.276	2.281	2.281	2.281	2.278	2.279	0.088
15 PFHxA	2.281	2.280	2.281	2.281	2.276	2.281	2.281	2.281	2.278	2.279	0.088
22 PFPeS	2.309	2.309	2.309	2.309	2.304	2.309	2.309	2.309	2.306	2.307	0.087
28 GenX	2.393	2.393	2.393	2.393	2.388	2.393	2.393	2.393	2.390	2.391	0.084
D 66 13C3_GenX	2.393	2.393	2.393	2.393	2.388	2.393	2.393	2.383	2.390	2.390	0.142
13 PFHpA	2.653	2.652	2.653	2.652	2.655	2.652	2.652	2.652	2.657	2.653	0.053
D 47 13C4_PFHpA	2.653	2.652	2.653	2.652	2.655	2.652	2.652	2.652	2.657	2.653	0.053
D 45 13C3_PFHxS	2.669	2.669	2.669	2.669	2.663	2.669	2.669	2.661	2.665	2.667	0.123
14 PFHxS	2.669	2.669	2.669	2.669	2.663	2.669	2.669	2.669	2.665	2.668	0.080
29 ADONA	2.695	2.694	2.695	2.694	2.697	2.694	2.694	2.694	2.699	2.695	0.056
D 64 13C2_6:2 FTS_2	3.057	3.048	3.048	3.048	3.051	3.048	3.048	3.048	3.053	3.050	0.114
2 6:2 FTS	3.057	3.048	3.057	3.057	3.042	3.048	3.048	3.048	3.053	3.050	0.178
* 41 13C2_PFOA	3.101		3.075	3.074	3.095	3.118	3.092	3.083	3.080	3.089	0.491
D 53 13C8_PFOA	3.083	3.083	3.084	3.083	3.086	3.083	3.083	3.083	3.080	3.083	0.058
20 PFOA	3.083	3.083	3.084	3.083	3.086	3.083	3.083	3.083	3.088	3.084	0.062
12 PFHpS	3.092	3.092	3.092	3.092	3.095	3.092	3.092	3.092	3.097	3.092	0.070
* 48 13C4_PFOS	3.572	3.564	3.557	3.549	3.559	3.564	3.572	3.549	3.582	3.563	0.312
D 54 13C8_PFOS	3.565	3.564	3.565	3.564	3.559	3.564	3.564	3.564	3.567	3.563	0.061
D 56 13C9_PFNA	3.565	3.564	3.565	3.564	3.566	3.557	3.564	3.564	3.567	3.563	0.083
17 PFNA	3.572	3.564	3.565	3.564	3.566	3.564	3.564	3.564	3.567	3.565	0.077
18 PFOS	3.565	3.556	3.565	3.564	3.566	3.564	3.564	3.564	3.567	3.564	0.083
30 9Cl-PF3ONS	3.861	3.852	3.852	3.852	3.846	3.852	3.852	3.852	3.854	3.852	0.100
19 PFOSA	4.011	4.010	4.019	4.010	4.012	4.010	4.010	4.010	4.012	4.011	0.073
D 55 13C8_PFOSA	4.019	4.010	4.019	4.019	4.012	4.010	4.010	4.010	4.012	4.013	0.103

Compound	Level 2	Level 3	Level 4	Level 5	Level 6	Level 7	Level 8	Level 9	Level 10	Avg. RT	%Rsd RT
3 8:2 FTS	Disabled	4.035	4.036	4.027	4.037	4.027	4.036	4.035	4.038	4.034	0.103
D 65 13C2_8:2 FTS_2	4.036	4.035	4.028	4.036	4.037	4.027	4.027	4.027	4.038	4.032	0.119
16 PFNS	4.036	4.035	4.036	4.044	4.037	4.035	4.036	4.035	4.046	4.038	0.105
10 PFDA	4.052	4.052	4.052	4.052	4.046	4.044	4.052	4.052	4.054	4.050	0.085
D 51 13C6_PFDA	4.052	4.044	4.044	4.052	4.046	4.044	4.052	4.044	4.054	4.047	0.108
* 37 13C2_PFDA			4.060	4.060	4.069	4.027	4.052	4.067	4.062	4.056	0.346
D 58 d3-MeFOSAA	4.265	4.264	4.265	4.265	4.266	4.265	4.265	4.265	4.267	4.265	0.021
6 N-MeFOSAA	4.274	4.273	4.265	4.273	4.266	4.265	4.265	4.273	4.275	4.269	0.110
9 PFDS	4.478	4.477	4.477	4.486	4.478	4.477	4.486	4.477	4.479	4.479	0.078
D 60 d5-EtFOSAA	4.495	4.494	4.494	4.494	4.495	4.494	4.494	4.494	4.496	4.494	0.013
D 52 13C7_PFUdA	4.503	4.494	4.503	4.503	4.495	4.494	4.503	4.503	4.504	4.500	0.096
25 PFUdA	4.503	4.502	4.494	4.503	4.504	4.503	4.503	4.503	4.504	4.502	0.065
5 N-EtFOSAA	4.503	4.502	4.503	4.503	4.504	4.503	4.503	4.503	4.504	4.502	0.016
D 61 d7-MeFOSE	4.681	4.680	4.681	4.681	4.682	4.672	4.672	4.672	4.674	4.677	0.090
32 MeFOSE	4.689	4.698	4.698	4.698	4.690	4.689	4.689	4.689	4.691	4.692	0.082
D 57 d3-MeFOSA	4.706	4.706	4.707	4.706	4.699	4.698	4.698	4.698	4.699	4.701	0.095
26 MeFOSA	4.715	4.698	4.707	4.706	4.707	4.706	4.706	4.706	4.708	4.706	0.091
31 11Cl-PF3OUDS	4.732	4.723	4.724	4.724	4.724	4.732	4.732	4.723	4.725	4.726	0.089
11 PFDoA	4.918	4.910	4.910	4.910	4.911	4.910	4.910	4.910	4.911	4.911	0.051
D 38 13C2_PFDoA	4.910	4.910	4.910	4.910	4.911	4.910	4.910	4.910	4.911	4.910	0.014
4 10:2 FTS	4.902	4.918	4.918	4.918	4.919	4.918	4.918	4.910	4.919	4.915	0.124
D 62 d9-EtFOSE	4.934	4.934	4.934	4.934	4.935	4.934	4.934	4.934	4.935	4.934	0.014
33 EtFOSE	4.950	4.950	4.950	4.950	4.951	4.950	4.950	4.950	4.951	4.950	0.013
D 59 d5-EtFOSA	4.966	4.966	4.966	4.966	4.967	4.966	4.958	4.958	4.959	4.963	0.078
27 EtFOSA	4.966	4.974	4.974	4.974	4.975	4.974	4.974	4.974	4.975	4.973	0.061
34 PFDOS	5.250	5.240	5.249	5.250	5.250	5.250	5.241	5.250	5.251	5.247	0.078
24 PFTrDA	5.286	5.277	5.286	5.277	5.277	5.286	5.277	5.277	5.278	5.280	0.084
23 PFTeDA	5.610	5.609	5.610	5.610	5.610	5.610	5.610	5.610	5.610	5.609	0.006
D 42 13C2_PFTeDA	5.610	5.609	5.610	5.610	5.610	5.610	5.610	5.610	5.610	5.609	0.006
35 PFHxDA	6.181	6.181	6.181	6.182	6.181	6.182	6.190	6.182	6.182	6.182	0.043
D 40 13C2_PFHxDA	6.181	6.181	6.181	6.182	6.181	6.182	6.182	6.182	6.182	6.181	0.000
36 PFODA	6.679	6.679	6.680	6.680	6.679	6.680	6.686	6.680	6.680	6.680	0.030

Pace Environmental Services, LLC
Analyte Quantitation Report

Data File: \\Organics\LL\LCMSMS01.i\090723B-nonDOD+ICAL.b\090723B010.d
Injection Date: 07-Sep-2023 16:36:59 Injection Vol: 10.0 uL
Sample Type: INSTBLK Auto Sampler: 80
Lab Sample ID: ID IBLK B1 Lab Prep. Batch:
Sample Info: ID IBLK B1 Misc. Info:
Inst. ID: LCMSMS01.i Operator: eqi.svoa

Method: LCMSMS01_PFAS-ID2 Version: V16 30-Jun-2022 10:54:24
Calib Method: PFAS-ID2 Lock State: Unlocked
Quant Method: IsoDil Integrator: picker

Matrix: Aqueous
Final Conc.: Amt * DF * CF
Concentration Formula: CF = (VF/1000) * 1/VI = 0.0040000

Name	Value	Units	Description
DF	1		Dilution Factor
VF	1000	ul	Final Volume
VI	250	ml	Initial Sample Volume

IsoDil Stds %Recovery = ((Area * DF)/Ical Mid Area) * 100

Reagent: Surrogates Conc. Level: Smp Vol. Added: 0.0200 ml

Signal	Quant Std	RT (Min)	Exp RT (Min)	c RT (Min)	Response	Peak Pts	S/N	Ion Ratio	Isomer Ratio	OnCol Conc ng/L	Final Conc ng/L	%Rec	Flags
D 46 13C4_PFBA CAS: SESI-0111													
217 > 172		1.645	1.645	0.000	2828366	16	>100:1			2000.00	2427.98	116	
8 Perfluoro-n-butanoic acid (PFBA) CAS: 375-22-4													U
212.9 > 168.9	46		1.645		ND								
D 50 13C5_PFPeA CAS: SESI-0112													
267.9 > 223		1.950	1.950	0.000	2653355	17	>100:1			2000.00	2448.52	118	
21 Perfluoro-n-pentanoic acid (PFPeA) CAS: 2706-90-3													U
262.9 > 218.9	50		1.950		ND								
D 44 13C3_PFBS CAS: SESI-0116													
302 > 80		1.997	1.997	0.000	953186	17	>100:1			2000.00	2348.86	116	
7 Perfluoro-1-butanesulfonate (PFBS) CAS: 375-73-5													U
298.9 > 80	44		1.997		ND								
22 Perfluoro-1-pentanesulfonic acid (PFPeS) CAS: 2706-91-4													U
349 > 80	44		2.309		ND								
D 63 13C2_4:2 FTS_2 CAS: SESI-0104													
329 >81		2.244	2.243	0.000	551263	17	>100:1			10000	10873	117	
1 Fluorotelomer sulfonate 4:2 [1H,1H,2H,2H-perfluorohexane sulfonate] (4:2 FTS) CAS: 757124-72-4													U
327 > 307	63		2.243		ND								
D 49 13C5_PFHxA CAS: SESI-0113													
318 > 273		2.281	2.281	0.000	2272771	16	>100:1			2000.00	2324.40	115	
15 Perfluoro-n-hexanoic acid (PFHxA) CAS: 307-24-4													U
313 > 269	49		2.281		ND								
D 66 13C3_GenX CAS: SESI-0121													
287 > 185		2.393	2.393	0.000	1604391	17	>100:1			10000	12370	125	
28 Hexafluoropropylene oxide dimer acid (GenX) CAS: 13252-13-6													U
285 > 119	66		2.393		ND								
D 47 13C4_PFHpA CAS: SESI-0114													
367 > 322		2.653	2.652	0.000	2933723	19	>100:1			2000.00	2440.37	118	
13 Perfluoro-n-heptanoic acid (PFHpA) CAS: 375-85-9													U
363 > 319	47		2.652		ND								
D 45 13C3_PFHxS CAS: SESI-0096													
402 > 80		2.670	2.669	0.000	939579	20	>100:1			2000.00	2401.23	112	

Signal	Quant Std	RT (Min)	Exp RT (Min)	c RT (Min)	Response	Peak Pts	S/N	Ion Ratio	Isomer Ratio	OnCol Conc ng/L	Final Conc ng/L	%Rec	Flags
14 Perfluorohexanesulfonate (PFHxS) CAS: 355-46-4													U
399 > 80	45		2.669		ND								
29 4,8-dioxa-3H-perfluorononanoic acid (ADONA) CAS: 919005-14-4													U
377 > 251	45		2.694		ND								
12 Perfluoro-1-heptanesulfonic acid (PFHpS) CAS: 375-92-8													U
449 > 80	45		3.092		ND								
D 64 13C2_6:2 FTS_2 CAS: SESI-0105													
429 > 81		3.058	3.048	0.000	641307	29	>100:1			10000	11368	113	
2 Fluorotelomer sulfonate 6:2 [1H,1H,2H,2H-perfluorooctane sulfonate] (6:2 FTS) CAS: 27619-97-2													U
427 > 407	64		3.057		ND								
D 53 13C8_PFOA CAS: SESI-0097													
421 > 376		3.084	3.083	0.000	2710585	20	>100:1			2000.00	2472.93	119	
20 Perfluoro-n-octanoic acid (PFOA) CAS: 335-67-1													U
413 > 369	53		3.083		ND								
D 56 13C9_PFNA CAS: SESI-0099													
472 > 427		3.565	3.564	0.000	2511711	23	>100:1			2000.00	2305.77	121	
17 Perfluoro-n-nonanoic acid (PFNA) CAS: 375-95-1													U
463 > 419	56		3.564		ND								
D 54 13C8_PFOS CAS: SESI-0098													
507 > 80		3.565	3.564	0.000	834145	27	>100:1			2000.00	2397.24	118	
18 Perfluorooctanesulfonate (PFOS) CAS: 1763-23-1													U
499 > 80	54		3.564		ND								
30 9-chlorohexadecafluoro-3-oxanone-1-sulfonic acid (9Cl-PF3ONS) CAS: 756426-58-1													U
531 > 351	54		3.852		ND								
16 Perfluoro-1-nonanesulfonic acid (PFNS) CAS: 68259-12-1													U
549 > 80	54		4.044		ND								
9 Perfluoro-1-decanesulfonic acid (PFDS) CAS: 335-77-3													U
599 > 80	54		4.486		ND								
31 11-chloroeicosafluoro-3-oxaundecane-1-sulfonic acid (11Cl-PF3OUdS) CAS: 763051-92-9													U
631 > 451	54		4.724		ND								
34 Perfluorododecanesulfonic acid (PFDOS) CAS: 79780-39-5													U
699 > 80	54		5.250		ND								
D 55 13C8_PFOSA CAS: SESI-0107													
506 > 78		4.011	4.019	0.000	1431379	23	>100:1			2000.00	2288.26	124	
19 Perfluoro-1-octanesulfonamide (PFOSA) CAS: 754-91-6													U
498 > 78	55		4.010		ND								
D 65 13C2_8:2 FTS_2 CAS: SESI-0106													
529 > 81		4.028	4.036	0.000	562374	21	>100:1			10000	11336	112	
3 Fluorotelomer sulfonate 8:2 [1H,1H,2H,2H-perfluorodecane sulfonate] (8:2 FTS) CAS: 39108-34-4													U
527 > 507	65		4.027		ND								
4 1H,1H,2H,2H-perfluorododecane sulfonate (10:2FTS) CAS: 120226-60-0													U
627 > 607	65		4.918		ND								
D 51 13C6_PFDA CAS: SESI-0115													
519 > 474		4.052	4.052	0.000	2359273	22	>100:1			2000.00	2346.90	112	
10 Perfluoro-n-decanoic acid (PFDA) CAS: 335-76-2													U
513 > 469	51		4.052		ND								
D 58 d3-MeFOSAA CAS: SESI-0102													
573 > 419		4.265	4.265	0.000	2482689	24	>100:1			10000	10665	110	
6 N-methylperfluoro-1-octanesulfonamidoacetic acid (N-MeFOSAA) CAS: 2355-31-9													U
570 > 419	58		4.273		ND								
D 60 d5-EtFOSAA CAS: SESI-0110													
589 > 419		4.495	4.494	0.000	2260146	21	>100:1			10000	11352	117	
5 N-ethylperfluoro-1-octanesulfonamidoacetic acid (N-EtFOSAA) CAS: 2991-50-6													U
584 > 419	60		4.503		ND								
D 52 13C7_PFUdA CAS: SESI-0117													
570 > 525		4.503	4.503	0.000	2094100	22	>100:1			2000.00	2374.87	118	
25 Perfluoro-n-undecanoic acid (PFUdA) CAS: 2058-94-8													U
563 > 519	52		4.503		ND								

Signal	Quant Std	RT (Min)	Exp RT (Min)	c RT (Min)	Response	Peak Pts	S/N	Ion Ratio	Isomer Ratio	OnCol Conc ng/L	Final Conc ng/L	%Rec	Flags
D 61 d7-MeFOSE CAS: SESI-0129													
623 > 59		4.672	4.681	0.000	449012	21	>100:1			2000.00	2205.93	118	
32 2-N-methylperfluoro-1-octanesulfonamido-ethanol (MeFOSE) CAS: 24448-09-7													U
616 > 59	61		4.698		ND								
D 57 d3-MeFOSA CAS: SESI-0109													
515 > 169		4.698	4.706	0.000	180151	20	>100:1			2000.00	2263.98	126	
26 N-methylperfluoro-1-octanesulfonamide (MeFOSA) CAS: 31506-32-8													U
512 > 169	57		4.706		ND								
D 38 13C2_PFDoA CAS: SESI-0118													
615 > 570		4.910	4.910	0.000	2073788	23	>100:1			2000.00	2443.11	120	
11 Perfluoro-n-dodecanoic acid (PFDoA) CAS: 307-55-1													U
613 > 569	38		4.910		ND								
24 Perfluoro-n-tridecanoic acid (PFTrDA) CAS: 72629-94-8													U
663 > 619	38		5.277		ND								
D 62 d9-EtFOSE CAS: SESI-0130													
639 > 59		4.934	4.934	0.000	406082	23	>100:1			2000.00	2118.72	107	
33 2-N-ethylperfluoro-1-octanesulfonamido-ethanol (EtFOSE) CAS: 1691-99-2													U
630 > 59	62		4.950		ND								
D 59 d5-EtFOSA CAS: SESI-0108													
531 > 169		4.958	4.966	0.000	170183	22	>100:1			2000.00	2247.88	124	
27 N-ethylperfluoro-1-octanesulfonamide (EtFOSA) CAS: 4151-50-2													U
526 > 169	59		4.974		ND								
D 42 13C2_PFTeDA CAS: SESI-0119													
715 > 670		5.610	5.610	0.000	2025530	23	>100:1			2000.00	2283.29	113	
23 Perfluoro-n-tetradecanoic acid (PFTeDA) CAS: 376-06-7													
713 > 669	42	5.617	5.610	0.000	4439	14	8.5:1	Target = 8.40		4.5249	0.01810	< LOQ	
713 > 169	42	5.603	5.610		758	15	4.9:1	5.85 (4.20-12.60)					
D 40 13C2_PFHxDA CAS: SESI-0103													
815 > 770		6.182	6.182	0.000	1102934	23	>100:1			2000.00	2245.73	122	
35 Perfluoro-n-hexadecanoic acid (PFHxDA) CAS: 67905-19-5													
813 > 769	40	6.182	6.182	0.000	3748	16	5.2:1	Target = 12.45		4.7686	0.01907	< LOQ	
813 > 269	40	6.182	6.182		565	13	10.0:1	6.63 (6.22-18.67)					
36 Perfluoro-n-octadecanoic acid (PFODA) CAS: 16517-11-6													U
913 > 869	40		6.680		ND								
*** 37 13C2_PFDA**													U
515 > 470			4.060		ND								
*** 39 13C2_PFHxA CAS: SESI-0120**													
315 > 270		2.272	2.271	0.000	1143	19	9.0:1			0			
*** 41 13C2_PFOA CAS: 864071-08-9**													
415 > 370		3.145	3.074	0.000	130	13	>100:1			0			
*** 43 13C3_PFBA**													
216 > 172		1.645	1.645	0.000	22234	16	75:1			0			
*** 48 13C4_PFOS CAS: 2795-39-3**													
503 > 80		3.565	3.549	0.000	9960	22	47:1			0			

Compound Type Legend

D - Isotopic Dilution Std.
* - ISTD

QC Flag Legend

U - Result Less Than Method Detection Limit

Pace Environmental Services, LLC
Initial Calibration Verification Report

Data File: \\Organics\LL\LCMSMS01.i\090723B-nonDOD+ICAL.b\090723B011.d
Injection Date: 07-Sep-2023 16:47:41 Injection Vol: 10.0 uL
Sample Type: ICV Auto Sampler: 81
Sample Info: ICV 1000_SVLC-3027 Misc. Info:
Inst. ID: LCMSMS01.i Operator: eqi.svoa

Method: LCMSMS01_PFAS-ID2 Version: V16 30-Jun-2022 10:54:24
Calib Method: PFAS-ID2 Lock State: Unlocked
Quant Method: IsoDil Integrator: picker

Reagent: Analytes Conc. Level: ICV-43 Vol. Added: 2.00 ml

Compound	Std Area	CCV Area	Exp. Conc ng/L	Conc ng/L	%Rec	%Rec Limits
8 PFBA			2000.00	1776.50	89	70 - 130
D 46 13C4_PFBA	2431491	4759995			196	50 - 150
21 PFPeA			2000.00	1843.89	92	70 - 130
D 50 13C5_PFPeA	2240815	4401203			196	50 - 150
D 44 13C3_PFBS	822330	1637107			199	50 - 150
7 PFBS			2000.00	1854.15	93	70 - 130
D 63 13C2_4:2 FTS_2	472075	921447			195	50 - 150
1 4:2 FTS			2000.00	1764.69	88	70 - 130
15 PFHxA			2000.00	1824.66	91	70 - 130
D 49 13C5_PFHxA	1981677	3932715			198	50 - 150
22 PFPeS			2000.00	1831.73	92	70 - 130
28 GenX			2000.00	1903.36	95	70 - 130
D 66 13C3_GenX	1280510	2486740			194	50 - 150
13 PFHpA			2000.00	1610.92	81	70 - 130
D 47 13C4_PFHpA	2476480	4929620			199	50 - 150
D 45 13C3_PFHxS	836168	1553357			186	50 - 150
14 PFHxS			2000.00	1776.85	89	70 - 130
29 ADONA			2000.00	1853.13	93	70 - 130
D 64 13C2_6:2 FTS_2	568266	992710			175	50 - 150
2 6:2 FTS			2000.00	1666.96	83	70 - 130
D 53 13C8_PFOA	2287307	4559205			199	50 - 150
20 PFOA			2000.00	1493.17	75	70 - 130
12 PFHpS			2000.00	1709.88	85	70 - 130
17 PFNA			2000.00	1906.53	95	70 - 130
D 54 13C8_PFOS	706178	1355095			192	50 - 150
18 PFOS			2000.00	1597.80	80	70 - 130
D 56 13C9_PFNA	2070435	4166819			201	50 - 150
30 9Cl-PF3ONS			2000.00	1702.98	85	70 - 130
19 PFOSA			2000.00	1641.81	82	70 - 130
D 55 13C8_PFOSA	1158944	2367722			204	50 - 150
3 8:2 FTS			2000.00	1705.56	85	70 - 130
D 65 13C2_8:2 FTS_2	500510	921924			184	50 - 150
16 PFNS			2000.00	1850.12	93	70 - 130
D 51 13C6_PFDA	2109170	4070077			193	50 - 150
10 PFDA			2000.00	1822.66	91	70 - 130
D 58 d3-MeFOSAA	2259303	4342382			192	50 - 150

Report Date: 11-Sep-2023 13:18:09 AIM Revision: 2.0.2023.0816
Data File: \\organics\LL\LCMSMS01.i\090723B-nonDOD+ICAL.b\090723B011.d

Compound	Std Area	CCV Area	Exp. Conc ng/L	Conc ng/L	%Rec	%Rec Limits
6 N-MeFOSAA			2000.00	1857.12	93	70 - 130
9 PFDS			2000.00	1795.20	90	70 - 130
D 60 d5-EtFOSAA	1935814	3857644			199	50 - 150
5 N-EtFOSAA			2000.00	1749.37	87	70 - 130
25 PFUdA			2000.00	1648.73	82	70 - 130
D 52 13C7_PFUdA	1772741	3503627			198	50 - 150
D 61 d7-MeFOSE	379912	748433			197	50 - 150
32 MeFOSE			2000.00	1892.00	95	70 - 130
D 57 d3-MeFOSA	143502	289102			201	50 - 150
26 MeFOSA			2000.00	1818.60	91	70 - 130
31 11Cl-PF3OUDS			2000.00	1633.51	82	70 - 130
D 38 13C2_PFDoA	1735380	3469877			200	50 - 150
11 PFDoA			2000.00	1569.74	78	70 - 130
4 10:2 FTS			1936.00	2057.34	106	70 - 130
D 62 d9-EtFOSE	380859	732476			192	50 - 150
33 EtFOSE			2000.00	1604.81	80	70 - 130
D 59 d5-EtFOSA	137753	290474			211	50 - 150
27 EtFOSA			2000.00	1928.30	96	70 - 130
34 PFDOS			2000.00	1735.01	87	70 - 130
24 PFTrDA			2000.00	1587.18	79	70 - 130
23 PFTeDA			2000.00	1804.06	90	70 - 130
D 42 13C2_PFTeDA	1797097	3570704			199	50 - 150
35 PFHxDA			2000.00	1737.39	87	70 - 130
D 40 13C2_PFHxDA	905845	1798536			199	50 - 150
36 PFODA			2000.00	1791.47	90	70 - 130

EIS %R > UCL; however, according to the raw data the ICV appears to have been double spiked with EIS.
As all the TA %R meet criteria, qualification of data was not warranted

Pace Environmental Services, LLC
Analyte Quantitation Report

Data File: \\Organics\LL\LCMSMS01.i\090723B-nonDOD+ICAL.b\090723B011.d
Injection Date: 07-Sep-2023 16:47:41 Injection Vol: 10.0 uL
Sample Type: ICV Auto Sampler: 81
Sample Info: ICV 1000_SVLC-3027 Misc. Info:
Inst. ID: LCMSMS01.i Operator: eqi.svoa

Method: LCMSMS01_PFAS-ID2 Version: V16 30-Jun-2022 10:54:24
Calib Method: PFAS-ID2 Lock State: Unlocked
Quant Method: IsoDil Integrator: picker

%Rec incorrect here no impact

Reagent: Analytes Conc. Level: ICV-43 Vol. Added: 2.00 ml

Signal	Quant Std	RT (Min)	Exp RT (Min)	S RT (Min)	Response	Peak Pts	S/N	Ion Ratio	Isomer Ratio	Cal Conc ng/L	OnCol Conc ng/L	%Rec	Flags
D 46 13C4_PFBA CAS: SESI-0111													
217 > 172		1.641	1.645	0.000	4759995	17	>100:1			4000.00	4086.17	196*	
8 Perfluoro-n-butanoic acid (PFBA) CAS: 375-22-4													
212.9 > 168.9	46	1.641	1.645	0.000	2191894	17	>100:1			2000.00	1776.50		
D 50 13C5_PFPeA CAS: SESI-0112													
267.9 > 223		1.954	1.950	0.000	4401203	17	>100:1			4000.00	4061.43	196*	
21 Perfluoro-n-pentanoic acid (PFPeA) CAS: 2706-90-3													
262.9 > 218.9	50	1.954	1.950	0.000	2211847	17	>100:1			2000.00	1843.89		
D 44 13C3_PFBS CAS: SESI-0116													
302 > 80		1.993	1.997	0.000	1637107	16	>100:1			4000.00	4034.20	199*	
7 Perfluoro-1-butanesulfonate (PFBS) CAS: 375-73-5													
298.9 > 80	44	1.993	1.997	0.000	985972	16	>100:1	Target = 3.72		2000.00	1854.15		
298.9 > 99	44	1.993	1.997		266100	17	>100:1	3.70 (1.86-5.58)					
22 Perfluoro-1-pentanesulfonic acid (PFPeS) CAS: 2706-91-4													
349 > 80	44	2.304	2.309	0.000	817946	17	>100:1	Target = 3.49		2000.00	1831.73		
349 > 99	44	2.304	2.309		237461	17	>100:1	3.44 (1.74-5.24)					
D 63 13C2_4:2 FTS_2 CAS: SESI-0104													
329 >81		2.239	2.243	0.000	921447	15	>100:1			20000	18175	195*	
1 Fluorotelomer sulfonate 4:2 [1H,1H,2H,2H-perfluorohexane sulfonate] (4:2 FTS) CAS: 757124-72-4													
327 > 307	63	2.248	2.243	0.000	141211	20	>100:1	Target = 1.29		2000.00	1764.69		M
327 > 81	63	2.248	2.243		118215	20	>100:1	1.19 (0.64-1.93)					
D 49 13C5_PFHxA CAS: SESI-0113													
318 > 273		2.276	2.281	0.000	3932715	16	>100:1			4000.00	4022.05	198*	
15 Perfluoro-n-hexanoic acid (PFHxA) CAS: 307-24-4													
313 > 269	49	2.276	2.281	0.000	1726988	16	>100:1	Target = 16.37		2000.00	1824.66		
313 > 119	49	2.276	2.281		101663	16	>100:1	16.98 (8.18-24.55)					
D 66 13C3_GenX CAS: SESI-0121													
287 > 185		2.388	2.393	0.000	2486740	16	>100:1			20000	19173	194*	
28 Hexafluoropropylene oxide dimer acid (GenX) CAS: 13252-13-6													
285 > 119	66	2.388	2.393	0.000	198678	16	>100:1	Target = 0.79		2000.00	1903.36		
285 > 185	66	2.388	2.393		233428	17	>100:1	0.85 (0.39-1.19)					
D 47 13C4_PFHpA CAS: SESI-0114													
367 > 322		2.655	2.652	0.000	4929620	18	>100:1			4000.00	4100.63	199*	
13 Perfluoro-n-heptanoic acid (PFHpA) CAS: 375-85-9													
363 > 319	47	2.655	2.652	0.000	1785961	18	>100:1	Target = 2.96		2000.00	1610.92		
363 > 169	47	2.655	2.652		570157	18	>100:1	3.13 (1.48-4.44)					
D 45 13C3_PFHxS CAS: SESI-0096													
402 > 80		2.672	2.669	0.000	1553357	18	>100:1			4000.00	3969.83	186*	
14 Perfluorohexanesulfonate (PFHxS) CAS: 355-46-4													
399 > 80	45	2.672	2.669	0.000	790701	28	>100:1	Target = 3.54	6.07	2000.00	1776.85		
399 > 99	45	2.672	2.669		213198	24	>100:1	3.70 (1.77-5.32)	7.94				

Signal	Quant Std	RT (Min)	Exp RT (Min)	S RT (Min)	Response	Peak Pts	S/N	Ion Ratio	Isomer Ratio	Cal Conc ng/L	OnCol Conc ng/L	%Rec	Flags
29 4,8-dioxa-3H-perfluorononanoic acid (ADONA) CAS: 919005-14-4													
377 > 251	45	2.697	2.694	0.000	3196553	19	>100:1	Target = 2.21		2000.00	1853.13		
377 > 85	45	2.697	2.694		1412741	20	>100:1	2.26 (1.10-3.32)					
12 Perfluoro-1-heptanesulfonic acid (PFHpS) CAS: 375-92-8													
449 > 80	45	3.095	3.092	0.000	620547	18	>100:1	Target = 3.58		2000.00	1709.88		
449 > 99	45	3.095	3.092		169573	17	>100:1	3.65 (1.79-5.37)					
D 64 13C2_6:2 FTS_2 CAS: SESI-0105													
429 > 81		3.051	3.048	0.000	992710	21	>100:1			20000	17597	175*	
2 Fluorotelomer sulfonate 6:2 [1H,1H,2H,2H-perfluorooctane sulfonate] (6:2 FTS) CAS: 27619-97-2													
427 > 407	64	3.051	3.057	0.000	139440	19	>100:1	Target = 1.27		2000.00	1666.96		
427 > 81	64	3.051	3.057		121905	22	>100:1	1.14 (0.63-1.90)					
D 53 13C8_PFOA CAS: SESI-0097													
421 > 376		3.086	3.083	0.000	4559205	20	>100:1			4000.00	4159.47	199*	
20 Perfluoro-n-octanoic acid (PFOA) CAS: 335-67-1													
413 > 369	53	3.086	3.083	0.000	1617992	19	>100:1	Target = 2.66		2000.00	1493.17		
413 > 169	53	3.086	3.083		648276	19	>100:1	2.49 (1.33-3.99)					
D 56 13C9_PFNA CAS: SESI-0099													
472 > 427		3.567	3.564	0.000	4166819	23	>100:1			4000.00	3825.17	201*	
17 Perfluoro-n-nonanoic acid (PFNA) CAS: 375-95-1													
463 > 419	56	3.567	3.564	0.000	1796460	23	>100:1	Target = 4.98		2000.00	1906.53		
463 > 169	56	3.567	3.564		375063	28	>100:1	4.78 (2.49-7.46)					
D 54 13C8_PFOS CAS: SESI-0098													
507 > 80		3.567	3.564	0.000	1355095	23	>100:1			4000.00	3894.40	192*	
18 Perfluorooctanesulfonate (PFOS) CAS: 1763-23-1													
499 > 80	54	3.567	3.564	0.000	639499	65	>100:1	Target = 4.36	2.23	2000.00	1597.80		
499 > 99	54	3.567	3.564		147746	47	>100:1	4.32 (2.18-6.54)	5.55				
30 9-chlorohexadecafluoro-3-oxanone-1-sulfonic acid (9Cl-PF3ONS) CAS: 756426-58-1													
531 > 351	54	3.854	3.852	0.000	1447456	23	>100:1			2000.00	1702.98		
16 Perfluoro-1-nonanesulfonic acid (PFNS) CAS: 68259-12-1													
549 > 80	54	4.046	4.044	0.000	563596	23	>100:1	Target = 3.32		2000.00	1850.12		
549 > 99	54	4.046	4.044		165730	22	>100:1	3.40 (1.66-4.99)					
9 Perfluoro-1-decanesulfonic acid (PFDS) CAS: 335-77-3													
599 > 80	54	4.487	4.486	0.000	504365	20	>100:1	Target = 3.29		2000.00	1795.20		
599 > 99	54	4.487	4.486		155637	23	>100:1	3.24 (1.64-4.93)					
31 11-chloroeicosafluoro-3-oxaundecane-1-sulfonic acid (11Cl-PF3OUdS) CAS: 763051-92-9													
631 > 451	54	4.733	4.724	0.000	1008315	21	>100:1			2000.00	1633.51		
34 Perfluorododecanesulfonic acid (PFDOS) CAS: 79780-39-5													
699 > 80	54	5.250	5.250	0.000	478292	20	>100:1	Target = 3.32		2000.00	1735.01		
699 > 99	54	5.250	5.250		139511	21	>100:1	3.42 (1.66-4.98)					
D 55 13C8_PFOSA CAS: SESI-0107													
506 > 78		4.012	4.019	0.000	2367722	22	>100:1			4000.00	3785.13	204*	
19 Perfluoro-1-octanesulfonamide (PFOSA) CAS: 754-91-6													
498 > 78	55	4.012	4.010	0.000	940494	23	>100:1	Target = 45.56		2000.00	1641.81		
498>478	55	4.003	4.010		19943	20	56:1	47.15 (22.78-68.33)					
D 65 13C2_8:2 FTS_2 CAS: SESI-0106													
529 > 81		4.037	4.036	0.000	921924	22	>100:1			20000	18584	184*	
3 Fluorotelomer sulfonate 8:2 [1H,1H,2H,2H-perfluorodecane sulfonate] (8:2 FTS) CAS: 39108-34-4													
527 > 507	65	4.029	4.027	0.000	107278	21	>100:1	Target = 1.35		2000.00	1705.56		
527 > 81	65	4.037	4.027		98778	28	>100:1	1.08 (0.67-2.03)					
4 1H,1H,2H,2H-perfluorododecane sulfonate (10:2FTS) CAS: 120226-60-0													
627 > 607	65	4.919	4.918	0.000	129934	43	>100:1	Target = 2.30		1936.00	2057.34		
627 > 80	65	4.911	4.918		53810	18	>100:1	2.41 (1.15-3.45)					
D 51 13C6_PFDA CAS: SESI-0115													
519 > 474		4.046	4.052	0.000	4070077	22	>100:1			4000.00	4048.72	193*	
10 Perfluoro-n-decanoic acid (PFDA) CAS: 335-76-2													
513 > 469	51	4.046	4.052	0.000	1704342	22	>100:1	Target = 9.95		2000.00	1822.66		
513 > 169	51	4.046	4.052		163297	20	>100:1	10.43 (4.97-14.92)					
D 58 d3-MeFOSAA CAS: SESI-0102													
573 > 419		4.266	4.265	0.000	4342382	24	>100:1			20000	18654	192*	

Signal	Quant Std	RT (Min)	Exp RT (Min)	S RT (Min)	Response	Peak Pts	S/N	Ion Ratio	Isomer Ratio	Cal Conc ng/L	OnCol Conc ng/L	%Rec	Flags
6 N-methylperfluoro-1-octanesulfonamidoacetic acid (N-MeFOSAA) CAS: 2355-31-9													
570 > 419	58	4.275	4.273	0.000	315716	50	>100:1	Target = 1.53	6.69	2000.00	1857.12		M
570 > 483	58	4.266	4.273		206694	48	>100:1	1.52 (0.76-2.30)	3.14				
D 60 d5-EtFOSAA CAS: SESI-0110													
589 > 419		4.496	4.494	0.000	3857644	23	>100:1			20000	19375	199*	
5 N-ethylperfluoro-1-octanesulfonamidoacetic acid (N-EtFOSAA) CAS: 2991-50-6													
584 > 419	60	4.504	4.503	0.000	326150	45	>100:1	Target = 1.74	7.76	2000.00	1749.37		
584 > 526	60	4.513	4.503		185962	46	>100:1	1.75 (0.87-2.61)	4.46				
D 52 13C7_PFUdA CAS: SESI-0117													
570 > 525		4.504	4.503	0.000	3503627	23	>100:1			4000.00	3973.38	198*	
25 Perfluoro-n-undecanoic acid (PFUdA) CAS: 2058-94-8													
563 > 519	52	4.504	4.503	0.000	1308725	28	>100:1	Target = 9.98		2000.00	1648.73		
563 > 169	52	4.504	4.503		135571	22	>100:1	9.65 (4.99-14.97)					
D 61 d7-MeFOSE CAS: SESI-0129													
623 > 59		4.673	4.681	0.000	748433	22	>100:1			4000.00	3676.94	197*	
32 2-N-methylperfluoro-1-octanesulfonamido-ethanol (MeFOSE) CAS: 24448-09-7													
616 > 59	61	4.690	4.698	0.000	315985	19	>100:1			2000.00	1892.00		
D 57 d3-MeFOSA CAS: SESI-0109													
515 > 169		4.699	4.706	0.000	289102	18	>100:1			4000.00	3633.19	201*	
26 N-methylperfluoro-1-octanesulfonamide (MeFOSA) CAS: 31506-32-8													
512 > 169	57	4.707	4.706	0.000	142800	20	>100:1	Target = 1.06		2000.00	1818.60		
512 > 219	57	4.707	4.706		134410	27	>100:1	1.06 (0.53-1.59)					
D 38 13C2_PFDoA CAS: SESI-0118													
615 > 570		4.911	4.910	0.000	3469877	22	>100:1			4000.00	4087.82	200*	
11 Perfluoro-n-dodecanoic acid (PFDoA) CAS: 307-55-1													
613 > 569	38	4.919	4.910	0.000	1336834	21	>100:1	Target = 7.37		2000.00	1569.74		
613 > 169	38	4.911	4.910		170550	22	>100:1	7.83 (3.68-11.05)					
24 Perfluoro-n-tridecanoic acid (PFTrDA) CAS: 72629-94-8													
663 > 619	38	5.287	5.277	0.000	675403	22	>100:1	Target = 3.53		2000.00	1587.18		
663 > 169	38	5.287	5.277		195745	22	>100:1	3.45 (1.76-5.30)					
D 62 d9-EtFOSE CAS: SESI-0130													
639 > 59		4.935	4.934	0.000	732476	23	>100:1			4000.00	3821.67	192*	
33 2-N-ethylperfluoro-1-octanesulfonamido-ethanol (EtFOSE) CAS: 1691-99-2													
630 > 59	62	4.951	4.950	0.000	267902	24	>100:1			2000.00	1604.81		
D 59 d5-EtFOSA CAS: SESI-0108													
531 > 169		4.967	4.966	0.000	290474	21	>100:1			4000.00	3836.76	211*	
27 N-ethylperfluoro-1-octanesulfonamide (EtFOSA) CAS: 4151-50-2													
526 > 169	59	4.975	4.974	0.000	162139	25	>100:1	Target = 1.05		2000.00	1928.30		
526 > 219	59	4.975	4.974		133732	20	>100:1	1.21 (0.52-1.57)					
D 42 13C2_PFTeDA CAS: SESI-0119													
715 > 670		5.610	5.610	0.000	3570704	23	>100:1			4000.00	4025.10	199*	
23 Perfluoro-n-tetradecanoic acid (PFTeDA) CAS: 376-06-7													
713 > 669	42	5.610	5.610	0.000	1559951	23	>100:1	Target = 8.40		2000.00	1804.06		
713 > 169	42	5.610	5.610		191245	22	>100:1	8.15 (4.20-12.60)					
D 40 13C2_PFHxDA CAS: SESI-0103													
815 > 770		6.182	6.182	0.000	1798536	22	>100:1			4000.00	3662.08	199*	
35 Perfluoro-n-hexadecanoic acid (PFHxDA) CAS: 67905-19-5													
813 > 769	40	6.190	6.182	0.000	1113387	23	>100:1	Target = 12.45		2000.00	1737.39		
813 > 269	40	6.190	6.182		91567	22	>100:1	12.15 (6.22-18.67)					
36 Perfluoro-n-octadecanoic acid (PFODA) CAS: 16517-11-6													
913 > 869	40	6.686	6.680	0.000	802296	28	>100:1	Target = 11.00		2000.00	1791.47		
913 > 319	40	6.686	6.680		71252	27	>100:1	11.25 (5.50-16.50)					
*** 37 13C2_PFDA**													
515 > 470		4.061	4.060	0.000	2581	20	13:1			4000.00			
*** 39 13C2_PFHxA CAS: SESI-0120**													
315 > 270		2.276	2.271	0.000	2283	17	21:1			4000.00			
*** 41 13C2_PFOA CAS: 864071-08-9**													
415 > 370		3.104	3.074	0.000	814	14	6.8:1			4000.00			

Signal	Quant Std	RT (Min)	Exp RT (Min)	S RT (Min)	Response	Peak Pts	S/N	Ion Ratio	Isomer Ratio	Cal Conc ng/L	OnCol Conc ng/L	%Rec	Flags
*** 43 13C3_PFBA**													
216 > 172		1.641	1.645	0.000	34506	21	>100:1			4000.00			
*** 48 13C4_PFOS CAS: 2795-39-3**													
503 > 80		3.567	3.549	0.000	16504	26	48:1			4000.00			

Compound Type Legend

D - Isotopic Dilution Std.
* - ISTD

QC Flag Legend

M - Compound Hit/Peak Manually Integrated

Pace Environmental Services, LLC
Analyte Quantitation Report

Data File: \\Organics\LL\LCMSMS01.i\090723B-nonDOD+ICAL.b\090723B012.d
Injection Date: 07-Sep-2023 16:58:09 Injection Vol: 10.0 uL
Sample Type: CHECKSTD Auto Sampler: 82
Sample Info: ISOMER CHECK_SVLC-2964 Misc. Info:
Inst. ID: LCMSMS01.i Operator: eqi.svoa

Method: LCMSMS01_PFAS-ID2 Version: V16 30-Jun-2022 10:54:24
Calib Method: PFAS-ID2 Lock State: Unlocked
Quant Method: IsoDil Integrator: picker

Reagent: IsomerCheck Conc. Level: Smp Vol. Added: 1.00 ml

Signal	Quant Std	RT (Min)	Exp RT (Min)	S RT (Min)	Response	Peak Pts	S/N	Ion Ratio	Isomer Ratio	Cal Conc ng/L	OnCol Conc ng/L	%Rec	Flags
20 Perfluoro-n-octanoic acid (PFOA) CAS: 335-67-1													
413 > 369	53	3.083	3.083	0.000	9454826	33	>100:1	Target = 2.66	5.70	10000	7952.24		
413 > 169	53	3.083	3.083		3853335	32	>100:1	2.45 (1.33-3.99)	4.21				
6 N-methylperfluoro-1-octanesulfonamidoacetic acid (N-MeFOSAA) CAS: 2355-31-9													
570 > 419	58	4.273	4.273	0.000	3708464	53	>100:1	Target = 1.53	7.32	10000	10426		M
570 > 483	58	4.273	4.273		2177391	44	>100:1	1.70 (0.76-2.30)	4.05				
5 N-ethylperfluoro-1-octanesulfonamidoacetic acid (N-EtFOSAA) CAS: 2991-50-6													
584 > 419	60	4.503	4.503	0.000	4479605	50	>100:1	Target = 1.74	7.37	10000	9535.33		M
584 > 526	60	4.503	4.503		2578294	44	>100:1	1.73 (0.87-2.61)	3.81				
*** 43 13C3_PFBA**													
216 > 172		1.645	1.645	0.000	19546	21	76:1			2000.00			
*** 39 13C2_PFHxA CAS: SESI-0120**													
315 > 270		2.271	2.271	0.000	838	14	4.4:1			2000.00			
*** 41 13C2_PFOA CAS: 864071-08-9**													
415 > 370		3.092	3.074	0.000	5893	17	>100:1			2000.00			
*** 48 13C4_PFOS CAS: 2795-39-3**													
503 > 80		3.564	3.549	0.000	8111	30	22:1			2000.00			
*** 37 13C2_PFDA**													U
515 > 470			4.060		ND								
D 46 13C4_PFBA CAS: SESI-0111													
217 > 172		1.645	1.645	0.000	2546500	17	>100:1			2000.00	2186.02	105	
D 50 13C5_PFPeA CAS: SESI-0112													
267.9 > 223		1.950	1.950	0.000	2446981	16	>100:1			2000.00	2258.07	109	
D 44 13C3_PFBS CAS: SESI-0116													
302 > 80		1.997	1.997	0.000	907138	17	>100:1			2000.00	2235.39	110	
D 63 13C2_4:2 FTS_2 CAS: SESI-0104													
329 >81		2.243	2.243	0.000	618345	17	>100:1			10000	12196	131	
D 49 13C5_PFHxA CAS: SESI-0113													
318 > 273		2.281	2.281	0.000	2216668	16	>100:1			2000.00	2267.02	112	
D 66 13C3_GenX CAS: SESI-0121													
287 > 185		2.393	2.393	0.000	1565235	17	>100:1			10000	12068	122	
D 47 13C4_PFHpA CAS: SESI-0114													
367 > 322		2.652	2.652	0.000	2688209	18	>100:1			2000.00	2236.15	109	
D 45 13C3_PFHxS CAS: SESI-0096													
402 > 80		2.669	2.669	0.000	893797	19	>100:1			2000.00	2284.23	107	
D 64 13C2_6:2 FTS_2 CAS: SESI-0105													
429 > 81		3.048	3.048	0.000	666348	19	>100:1			10000	11812	117	
D 53 13C8_PFOA CAS: SESI-0097													
421 > 376		3.083	3.083	0.000	2501250	19	>100:1			2000.00	2281.95	109	
D 56 13C9_PFNA CAS: SESI-0099													
472 > 427		3.564	3.564	0.000	2806148	22	>100:1			2000.00	2576.07	136	

Signal	Quant Std	RT (Min)	Exp RT (Min)	S RT (Min)	Response	Peak Pts	S/N	Ion Ratio	Isomer Ratio	Cal Conc ng/L	OnCol Conc ng/L	%Rec	Flags
D 54 13C8_PFOS CAS: SESI-0098													
507 > 80		3.564	3.564	0.000	781942	24	>100:1			2000.00	2247.22	111	
D 55 13C8_PFOSA CAS: SESI-0107													
506 > 78		4.010	4.019	0.000	1583688	20	>100:1			2000.00	2531.74	137	
D 65 13C2_8:2 FTS_2 CAS: SESI-0106													
529 > 81		4.027	4.036	0.000	1300602	23	>100:1			10000	26218	260*	
D 51 13C6_PFDA CAS: SESI-0115													
519 > 474		4.044	4.052	0.000	2706725	23	>100:1			2000.00	2692.52	128	
D 58 d3-MeFOSAA CAS: SESI-0102													
573 > 419		4.257	4.265	0.000	4542594	23	>100:1			10000	19515	201*	
D 60 d5-EtFOSAA CAS: SESI-0110													
589 > 419		4.494	4.494	0.000	4860261	23	>100:1			10000	24411	251*	
D 52 13C7_PFUdA CAS: SESI-0117													
570 > 525		4.494	4.503	0.000	2507986	22	>100:1			2000.00	2844.24	141	
D 61 d7-MeFOSE CAS: SESI-0129													
623 > 59		4.672	4.681	0.000	532181	22	>100:1			2000.00	2614.53	140	
D 57 d3-MeFOSA CAS: SESI-0109													
515 > 169		4.698	4.706	0.000	189866	23	>100:1			2000.00	2386.07	132	
D 38 13C2_PFDoA CAS: SESI-0118													
615 > 570		4.910	4.910	0.000	2510133	21	>100:1			2000.00	2957.16	145	
D 62 d9-EtFOSE CAS: SESI-0130													
639 > 59		4.934	4.934	0.000	620379	22	>100:1			2000.00	3236.81	163*	
D 59 d5-EtFOSA CAS: SESI-0108													
531 > 169		4.966	4.966	0.000	203916	22	>100:1			2000.00	2693.45	148	
D 42 13C2_PFTeDA CAS: SESI-0119													
715 > 670		5.610	5.610	0.000	2413892	22	>100:1			2000.00	2721.08	134	
D 40 13C2_PFHxDA CAS: SESI-0103													
815 > 770		6.173	6.182	0.000	939026	23	>100:1			2000.00	1911.99	104	

Compound Type Legend

* - ISTD
D - Isotopic Dilution Std.

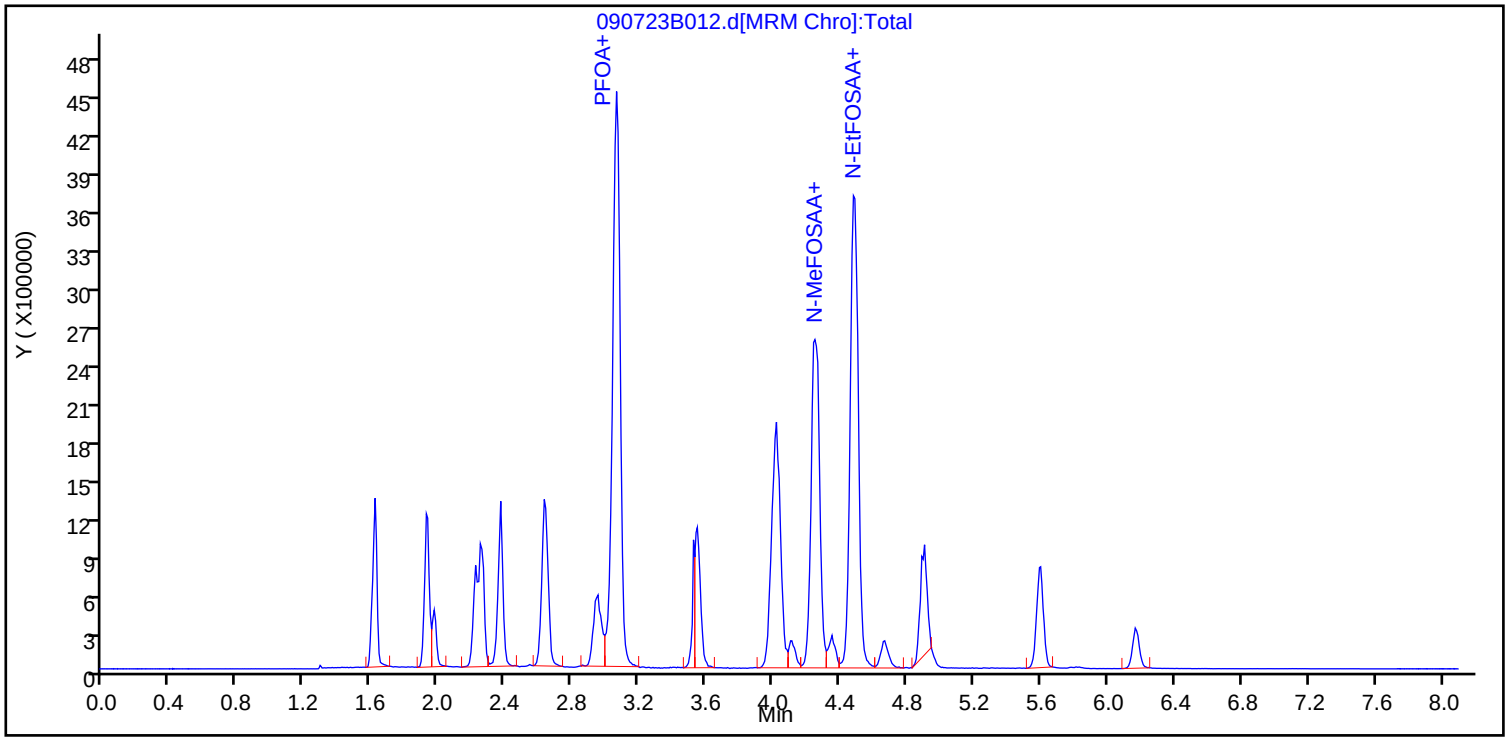
QC Flag Legend

U - Result Less Than Method Detection Limit
M - Compound Hit/Peak Manually Integrated

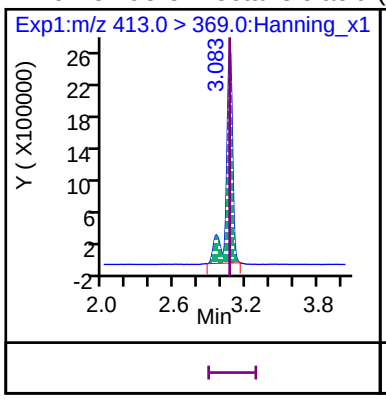
Report Date: 11-Sep-2023 13:18:10 AIM Revision: 2.0.2023.0816

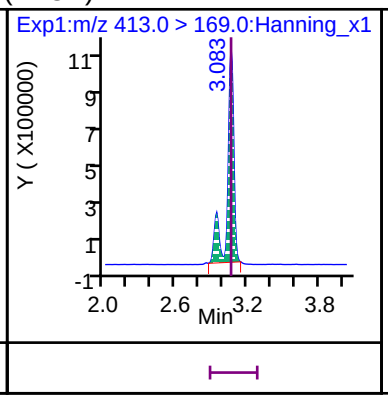
Pace Environmental Services, LLC

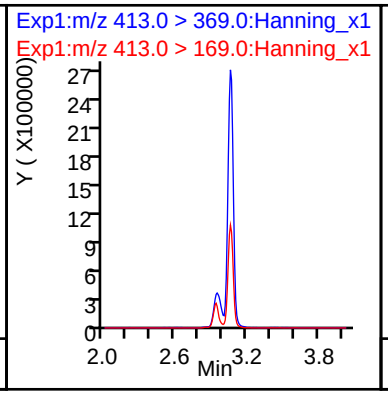
Data File:	\\Organics\LL\LCMSMS01.i\090723B-nonDOD+ICAL.b\090723B012.d		
Injection Date:	07-Sep-2023 16:58:09	Inst. ID:	LCMSMS01.i
Client ID:		Lab ID:	ISOMER CHECK_SVLC-2964
Sample Info:	ISOMER CHECK_SVLC-2964		
Dil. Factor:	1	Operator:	eqi.svoa



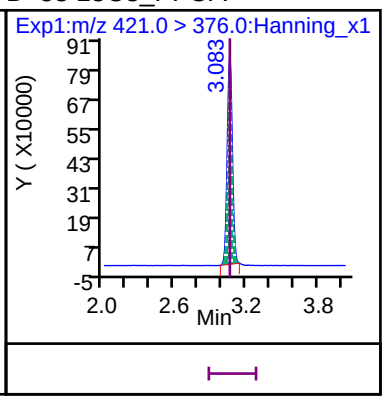
20 Perfluoro-n-octanoic acid (PFOA)



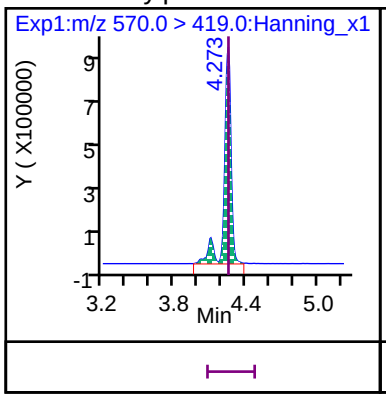


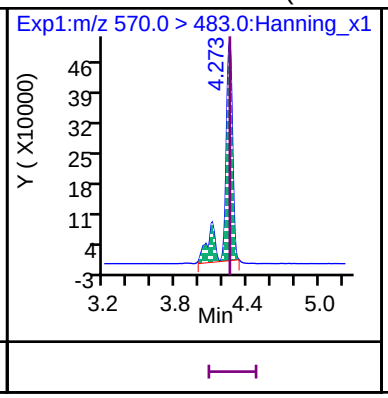


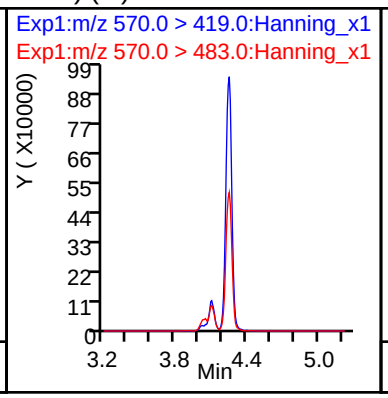
D 53 13C8_PFOA



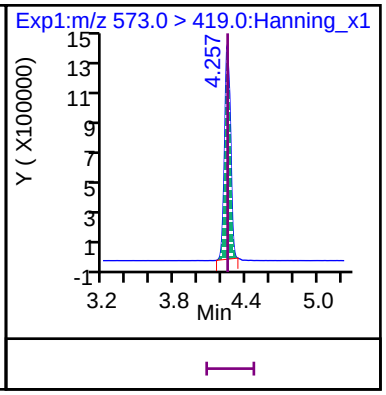
6 N-methylperfluoro-1-octanesulfonamidoacetic acid (N-MeFOSAA) (M)



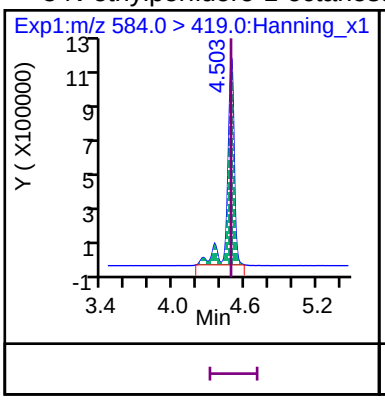


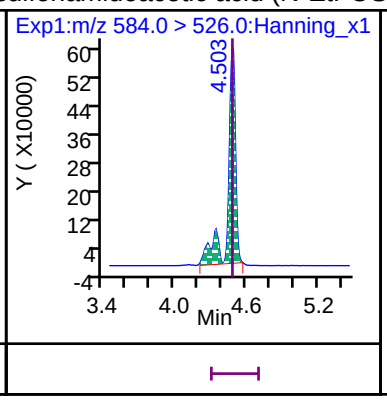


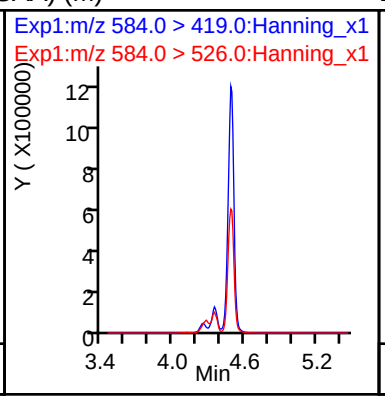
D 58 d3-MeFOSAA



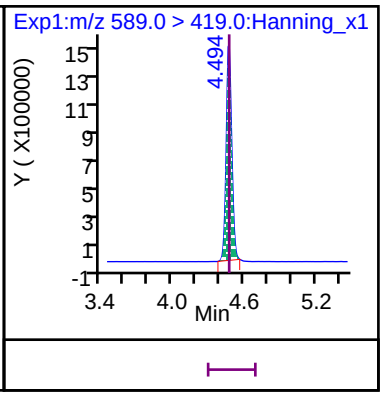
5 N-ethylperfluoro-1-octanesulfonamidoacetic acid (N-EtFOSAA) (M)



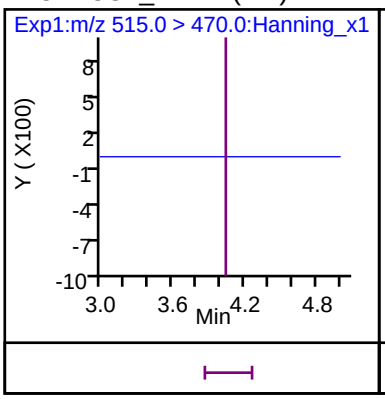




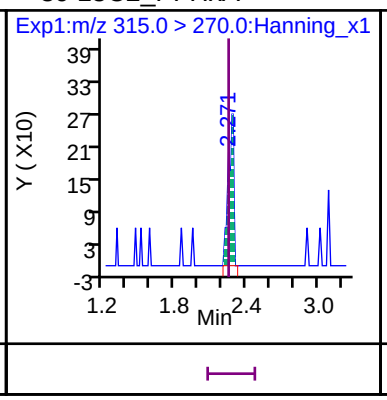
D 60 d5-EtFOSAA



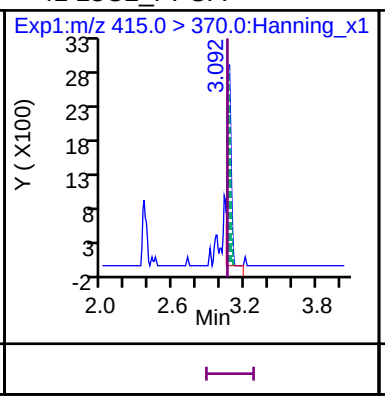
* 37 13C2_PFDA (ND)



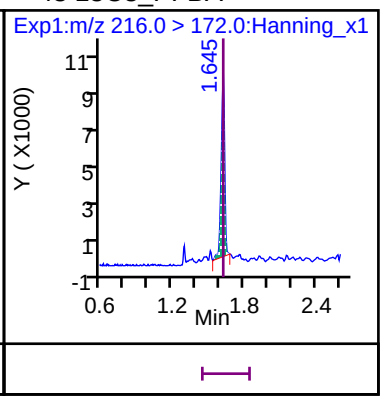
* 39 13C2_PFHxA



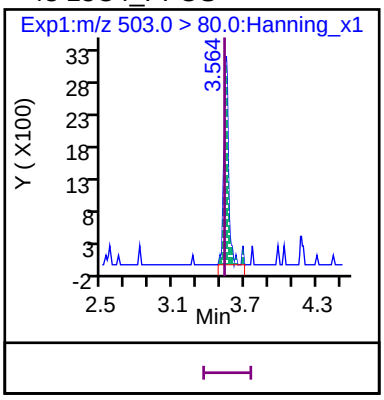
* 41 13C2_PFOA



* 43 13C3_PFBA



* 48 13C4_PFOS



Report Date: 11-Sep-2023 13:42:49 AIM Revision: 2.0.2023.0816

Pace Environmental Services, LLC

Initial Calibration Signal Ratios Report

Batch: \\Organics\LL\LCMSMS01.i\090923-nonDOD+ICAL.b

Method: LCMSMS01_PFAS-ID2.M Version: V16 30-Jun-2022 10:54:24

Instrument: LCMSMS01.i Integrator: picker

Cal Start Date: 09-Sep-2023 14:10:05 Cal End Date: 09-Sep-2023 15:34:42

Method Lock: Unknown Lock Date:

Calib Method: PFAS-ID2 No.Compounds: 66

Calibration Concentration Units: ng/L

Initial Calibration Samples: Primary Reagent: Analytes

Batch: \\Organics\LL\LCMSMS01.i\090923-nonDOD+ICAL.b

Level	Cal File	Cal Sample ID	Cal Date
2	090923011.d	ID ICAL L2_SVLC-2954	09-Sep-2023 14:10:05
3	090923012.d	ID ICAL L3_SVLC-2955	09-Sep-2023 14:20:38
4	090923013.d	ID ICAL L4_SVLC-2956	09-Sep-2023 14:31:10
5	090923014.d	ID ICAL L5_SVLC-3024	09-Sep-2023 14:41:44
6	090923015.d	ID ICAL L6_SVLC-2958	09-Sep-2023 14:52:17
7	090923016.d	ID ICAL L7_SVLC-2959	09-Sep-2023 15:02:52
8	090923017.d	ID ICAL L8_SVLC-2960	09-Sep-2023 15:13:27
9	090923018.d	ID ICAL L9_SVLC-2961	09-Sep-2023 15:24:05
10	090923019.d	ID ICAL L10_SVLC-2962	09-Sep-2023 15:34:42

Associated with analysis of PB 84416 MB and LCS only,
not recalculating just confirming ICAL criteria met

Column: 1 Detector: LCMS-Q3

Compound	Ratio Level 2	Ratio Level 3	Ratio Level 4	Ratio Level 5	Ratio Level 6	Ratio Level 7	Ratio Level 8	Ratio Level 9	Ratio Level 10	Average Ratio	Avg. +/-3 SD Ratio Limits	StdD Limit	50% Limit
7 PFBS	3.359	3.728	3.664	3.752	3.880	3.691	3.750	3.623	3.622	3.674	3.270-4.078	0.13471	1.837
1 4:2 FTS	0.499	0.867	1.133	1.379	1.336	1.598	1.490	1.584	1.331	1.246	0.178-2.314	0.35601	0.623
15 PFHxA	16.225	16.863	14.470	17.712	16.199	15.932	15.508	16.525	15.211	16.071	12.918-19.224	1.05110	8.035
22 PFPeS	3.150	3.623	3.456	3.422	3.625	3.512	3.318	3.455	3.468	3.447	3.026-3.869	0.14053	1.723
28 GenX	0.802	0.742	0.817	0.769	0.783	0.831	0.759	0.830	0.784	0.790	0.697-0.884	0.03110	0.395
13 PFHpA	3.073	2.934	3.102	3.027	2.934	2.995	2.953	2.915	2.973	2.989	2.762-3.216	0.07562	1.494
14 PFHxS	4.155	3.441	3.559	3.339	3.658	3.338	3.476	3.603	3.502	3.563	2.857-4.269	0.23539	1.781
29 ADONA	2.075	2.217	2.258	2.536	2.308	2.276	2.219	2.237	2.038	2.240	1.835-2.645	0.13490	1.120
2 6:2 FTS	1.038	1.031	1.747	1.443	1.448	1.492	1.367	1.347	1.287	1.355	0.723-1.987	0.21058	0.677
20 PFOA	3.073	2.580	2.646	2.418	2.818	2.702	2.644	2.617	2.690	2.687	2.119-3.255	0.18934	1.343
12 PFHpS	4.727	4.309	3.295	3.351	3.787	3.391	3.664	3.567	3.450	3.726	2.305-5.147	0.47374	1.863
17 PFNA	5.939	5.085	4.482	4.901	5.336	4.715	4.807	4.870	4.683	4.979	3.710-6.248	0.42305	2.489
18 PFOS	4.559	3.115	4.629	4.720	3.999	4.325	4.026	4.093	4.177	4.182	2.780-5.584	0.46729	2.091
19 PFOSA	51.491	56.348	39.359	44.660	47.399	41.308	42.742	46.349	40.965	45.624	23.658-67.591	7.32218	22.812
3 8:2 FTS	1.488	1.881	1.249	1.361	1.313	1.369	1.328	1.417	1.509	1.435	0.888-1.981	0.18213	0.717
16 PFNS	4.209	3.406	3.361	3.114	3.658	3.249	3.353	3.512	3.577	3.493	2.517-4.468	0.32508	1.746
10 PFDA	9.460	10.076	8.179	10.453	10.439	9.895	9.562	10.378	12.859	10.144	6.298-13.990	1.28210	5.072
6 N-MeFOSAA	2.157	1.428	1.739	1.654	1.698	1.587	1.592	1.391	1.570	1.646	1.001-2.291	0.21495	0.823
9 PFDS	4.223	3.210	3.466	3.175	3.228	3.312	3.377	3.339	3.460	3.421	2.500-4.341	0.30695	1.710
25 PFUdA	15.592	11.286	11.719	11.958	9.660	9.629	10.184	10.105	9.436	11.063	4.880-17.245	2.06092	5.531
5 N-EtFOSAA	1.227	1.917	1.809	1.610	1.754	1.895	1.939	1.689	1.638	1.719	1.091-2.347	0.20935	0.859
26 MeFOSA	0.945	1.105	1.197	1.055	1.104	1.127	1.111	1.054	1.078	1.086	0.891-1.281	0.06500	0.543
11 PFDoA	7.433	7.513	7.524	7.976	7.285	7.474	8.085	7.578	7.593	7.606	6.377-8.836	0.40987	3.803
4 10:2 FTS	3.087	1.464	1.983	2.339	2.100	2.165	2.284	2.305	2.217	2.216	1.020-3.411	0.39849	1.108
27 EtFOSA	1.479	1.068	1.085	1.015	1.114	1.029	1.047	1.047	1.071	1.106	0.686-1.525	0.13974	0.553
34 PFDOS	3.118	3.314	3.100	3.423	3.248	3.384	3.317	3.421	3.187	3.279	2.903-3.655	0.12530	1.639
24 PFTrDA	3.073	3.661	3.541	3.100	3.266	3.646	3.379	3.677	3.561	3.433	2.746-4.121	0.22919	1.716
23 PFTeDA	7.137	8.782	8.735	8.557	7.855	8.501	8.225	8.149	8.436	8.264	6.784-9.744	0.49333	4.132
35 PFHxDA	12.065	12.383	11.733	12.313	12.580	12.266	12.613	12.157	11.867	12.219	11.109-13.330	0.37018	6.109
36 PFODA	11.044	10.971	10.483	10.877	11.133	11.001	10.883	11.172	10.896	10.940	10.327-11.552	0.20416	5.470



Report Date: 11-Sep-2023 13:42:48 AIM Revision: 2.0.2023.0816

Pace Environmental Services, LLC

Initial Calibration RF Report

Batch: \\Organics\LL\LCMSMS01.i\090923-nonDOD+ICAL.b

Method: LCMSMS01_PFAS-ID2.M Version: V16 30-Jun-2022 10:54:24

Instrument: LCMSMS01.i Integrator: picker

Cal Start Date: 09-Sep-2023 14:10:05 Cal End Date: 09-Sep-2023 15:34:42

Method Lock: Unknown Lock Date:

Calib Method: PFAS-ID2 No.Compounds: 66

Calibration Concentration Units: ng/L

Initial Calibration Samples: Primary Reagent: Analytes

Batch: \\Organics\LL\LCMSMS01.i\090923-nonDOD+ICAL.b

Level	Cal File	Cal Sample ID	Cal Date
2	090923011.d	ID ICAL L2_SVLC-2954	09-Sep-2023 14:10:05
3	090923012.d	ID ICAL L3_SVLC-2955	09-Sep-2023 14:20:38
4	090923013.d	ID ICAL L4_SVLC-2956	09-Sep-2023 14:31:10
5	090923014.d	ID ICAL L5_SVLC-3024	09-Sep-2023 14:41:44
6	090923015.d	ID ICAL L6_SVLC-2958	09-Sep-2023 14:52:17
7	090923016.d	ID ICAL L7_SVLC-2959	09-Sep-2023 15:02:52
8	090923017.d	ID ICAL L8_SVLC-2960	09-Sep-2023 15:13:27
9	090923018.d	ID ICAL L9_SVLC-2961	09-Sep-2023 15:24:05
10	090923019.d	ID ICAL L10_SVLC-2962	09-Sep-2023 15:34:42

Curve Legend: Ex. Avg:H Wt:C2 Org:F Dep:R

Curve Type: Avg, Ln, Qd Response Type: H-Height, A-Area

Wt: Curve Weighting, C-1/Conc, C2-1/Conc^2, R-1/Rsp, R2-1/Rsp^2, N-None

Org: Origin, F-Force, I-Include, N-Neither

Dep: Dependent Variable, C-Concentration, R-Response

%Rec = (Measured Amount / True Amount) * 100

Column: 1 Detector: LCMS-Q3

Compound	Level 2 / %Rec	Level 3 / %Rec	Level 4 / %Rec	Level 5 / %Rec	Level 6 / %Rec	Level 7 / %Rec	Level 8 / %Rec	Level 9 / %Rec	Level 10 / %Rec	Curve	M1	B	Curve Errors	Flags
D 46 13C4_PFBA	1093	1063	1115	1053	1009	1001	976	927	944	Avg:A Wt:C2	1020		RSD=6.4	
	107	104	109	103	98	98	95	90	92	Org:N Dep:R				
8 PFBA	1.045316	1.100737	1.029894	1.004934	1.041712	1.055260	1.013170	1.025085	0.946858	Avg:A Wt:C2	1.029219		RSD=4.0	
	101	106	100	97	101	102	98	99	91	Org:N Dep:R				
D 50 13C5_PFPeA	1034	1056	1019	1002	989	942	925	895	882	Avg:A Wt:C2	972		RSD=6.5	
	106	108	104	103	101	96	95	92	90	Org:N Dep:R				
21 PFPeA	1.090578	1.084741	1.085609	1.088869	1.126035	1.157583	1.099082	1.069240	1.064395	Avg:A Wt:C2	1.096237		RSD=2.6	
	99	98	99	99	102	105	100	97	97	Org:N Dep:R				
D 44 13C3_PFBS	388	378	376	383	377	359	357	350	341	Avg:A Wt:C2	368		RSD=4.5	
	105	102	102	104	102	97	97	95	92	Org:N Dep:R				
7 PFBS	1.221612	1.328192	1.330257	1.205519	1.316283	1.267005	1.288818	1.270812	1.282517	Avg:A Wt:C2	1.279002		RSD=3.4	
	95	103	104	94	102	99	100	99	100	Org:N Dep:R				

Compound	Level 2 / %Rec	Level 3 / %Rec	Level 4 / %Rec	Level 5 / %Rec	Level 6 / %Rec	Level 7 / %Rec	Level 8 / %Rec	Level 9 / %Rec	Level 10 / %Rec	Curve	M1	B	Curve Errors	Flags
1 4:2 FTS	1.850624	2.120321	1.899512	1.970824	1.546416	1.824119	1.530336	1.613323	1.547005	Avg:A Wt:C2	1.766942		RSD=12.2	
	104	119	107	111	87	103	86	91	87	Org:N Dep:R				
D 63 13C2_4:2 FTS_2	49.5637	48.6649	50.2090	46.8923	49.9961	49.0184	51.3216	46.6202	47.3398	Avg:A Wt:C2	48.8473		RSD=3.3	
	101	99	102	95	102	100	105	95	96	Org:N Dep:R				
D 49 13C5_PFHxA	904	910	935	890	936	908	857	801	788	Avg:A Wt:C2	881		RSD=6.2	
	102	103	106	101	106	103	97	90	89	Org:N Dep:R				
15 PFHxA	1.000906	1.044954	0.916225	0.964543	0.955435	0.958422	0.900223	0.961204	1.000686	Avg:A Wt:C2	0.966955		RSD=4.6	
	103	108	94	99	98	99	93	99	103	Org:N Dep:R				
22 PFPeS	1.079371	1.131171	1.096174	1.089723	1.058496	1.138414	1.040385	1.036787	1.099279	Avg:A Wt:C2	1.085533		RSD=3.3	
	99	104	100	100	97	104	95	95	101	Org:N Dep:R				
28 GenX	0.833301	0.882695	0.807647	0.883031	0.751074	0.895023	0.698829	0.799035	0.801719	Avg:A Wt:C2	0.816928		RSD=8.0	
	102	108	98	108	91	109	85	97	98	Org:N Dep:R				
D 66 13C3_GenX	129	121	137	122	135	114	123	111	114	Avg:A Wt:C2	123		RSD=7.6	
	104	98	111	99	109	92	100	90	92	Org:N Dep:R				
13 PFHpA	0.929108	0.941664	0.914879	0.887611	0.871290	0.920417	0.825615	0.889181	0.883619	Avg:A Wt:C2	0.895932		RSD=3.9	
	103	105	102	99	97	102	92	99	98	Org:N Dep:R				
D 47 13C4_PFHpA	1168	1113	1181	1123	1171	1085	1078	972	979	Avg:A Wt:C2	1097		RSD=7.1	
	106	101	107	102	106	98	98	88	89	Org:N Dep:R				
14 PFHxS	1.198743	1.199696	1.095218	1.087037	1.084325	1.063738	1.048097	1.146444	1.113816	Avg:A Wt:C2	1.115235		RSD=5.0	
	107	107	98	97	97	95	93	102	99	Org:N Dep:R				
D 45 13C3_PFHxS	378	370	372	359	363	351	348	320	336	Avg:A Wt:C2	355		RSD=5.3	
	106	104	104	101	102	98	97	90	94	Org:N Dep:R				
29 ADONA	4.658984	4.388952	4.602440	4.566610	4.541770	4.515875	4.166001	4.434890	3.999776	Avg:A Wt:C2	4.430589		RSD=4.9	
	105	99	103	103	102	101	94	100	90	Org:N Dep:R				
D 64 13C2_6:2 FTS_2	61.7299	52.0252	57.4197	50.1766	54.9444	51.9716	50.0746	49.5006	47.5538	Avg:A Wt:C2	52.8218		RSD=8.5	
	116	98	108	94	104	98	94	93	90	Org:N Dep:R				
2 6:2 FTS	1.638587	1.873078	1.837606	2.172622	1.726938	1.715336	1.538588	1.569749	1.677823	Avg:A Wt:C2	1.750036		RSD=11.0	
	93	107	105	124	98	98	87	89	95	Org:N Dep:R				
D 53 13C8_PFOA	1051	1080	1025	971	977	1073	939	909	866	Avg:A Wt:C2	988		RSD=7.6	
	106	109	103	98	98	108	94	91	87	Org:N Dep:R				
20 PFOA	1.062617	0.951424	0.960088	0.918382	0.964140	0.847376	0.885088	0.929219	0.929878	Avg:A Wt:C2	0.938690		RSD=6.3	
	113	101	102	97	102	90	94	98	99	Org:N Dep:R				
12 PFHpS	0.945809	0.987908	0.878861	0.880376	0.901289	0.919878	0.892601	0.957803	0.899248	Avg:A Wt:C2	0.918197		RSD=4.1	
	103	107	95	95	98	100	97	104	97	Org:N Dep:R				
D 54 13C8_PFOS	374	319	313	313	303	297	301	267	281	Avg:A Wt:C2	308		RSD=9.7	
	121	103	101	101	98	96	97	86	91	Org:N Dep:R				
D 56 13C9_PFNA	1053	1003	1036	998	949	955	882	827	869	Avg:A Wt:C2	953		RSD=8.3	
	110	105	108	104	99	100	92	86	91	Org:N Dep:R				
17 PFNA	0.956667	0.945920	0.869165	0.837474	0.904492	0.881799	0.898142	0.925443	0.904702	Avg:A Wt:C2	0.902645		RSD=4.1	
	105	104	96	92	100	97	99	102	100	Org:N Dep:R				
18 PFOS	1.101833	1.090263	1.245890	1.162355	1.114803	1.186671	1.059530	1.230001	1.196493	Avg:A Wt:C2	1.154204		RSD=5.7	
	95	94	107	100	96	102	91	106	103	Org:N Dep:R				

Compound	Level 2 / %Rec	Level 3 / %Rec	Level 4 / %Rec	Level 5 / %Rec	Level 6 / %Rec	Level 7 / %Rec	Level 8 / %Rec	Level 9 / %Rec	Level 10 / %Rec	Curve	M1	B	Curve Errors	Flags
30 9Cl-PF3ONS	2.357672	2.558325	2.549060	2.363923	2.487996	2.588372	2.461565	2.617549	2.609639	Avg:A Wt:C2	2.510456		RSD=4.0	
	93	101	101	94	99	103	98	104	103	Org:N Dep:R				
19 PFOSA	0.944764	1.106893	0.947770	0.971424	0.970509	1.064903	0.963498	0.981182	0.898617	Avg:A Wt:C2	0.983285		RSD=6.5	
	96	112	96	98	98	108	97	99	91	Org:N Dep:R				
D 55 13C8_PFOSA	577	513	599	543	533	501	516	503	557	Avg:A Wt:C2	538		RSD=6.3	
	107	95	111	100	99	93	95	93	103	Org:N Dep:R				
3 8:2 FTS	1.309738	1.821286	1.335806	1.475909	1.307761	1.419590	1.259068	1.350901	1.452787	Avg:A Wt:C2	1.414761		RSD=11.9	
	92	128	94	104	92	100	88	95	102	Org:N Dep:R				
D 65 13C2_8:2 FTS_2	51.1983	45.8536	48.6113	41.9585	43.0807	41.4110	42.0643	40.1615	38.2961	Avg:A Wt:C2	43.6261		RSD=9.5	
	117	105	111	96	98	94	96	92	87	Org:N Dep:R				
16 PFNS	0.817038	0.947489	1.009220	0.896184	0.939031	0.908724	0.847112	0.945739	0.966333	Avg:A Wt:C2	0.919652		RSD=6.5	
	88	103	109	97	102	98	92	102	105	Org:N Dep:R				
10 PFDA	0.998933	0.962294	0.869942	0.932870	0.911377	0.986311	0.856032	0.998699	0.889333	Avg:A Wt:C2	0.933977		RSD=5.9	
	106	103	93	99	97	105	91	106	95	Org:N Dep:R				
D 51 13C6_PFDA	969	911	983	922	952	807	896	772	802	Avg:A Wt:C2	890		RSD=8.8	
	108	102	110	103	106	90	100	86	90	Org:N Dep:R				
D 58 d3-MeFOSAA	240	202	225	213	229	207	209	210	206	Avg:A Wt:C2	216		RSD=5.8	
	111	93	104	98	106	96	96	97	95	Org:N Dep:R				
6 N-MeFOSAA	0.806493	0.851093	0.876674	0.803917	0.763653	0.825787	0.759451	0.720106	0.793695	Avg:A Wt:C2	0.800096		RSD=6.0	
	100	106	109	100	95	103	94	90	99	Org:N Dep:R				
9 PFDS	0.764996	0.823415	0.956004	0.792945	0.872073	0.910570	0.845371	0.938452	0.893726	Avg:A Wt:C2	0.866395		RSD=7.5	
	88	95	110	91	100	105	97	108	103	Org:N Dep:R				
25 PFUdA	0.977073	0.897648	0.935490	0.847783	0.888387	0.867380	0.917099	0.918174	0.868969	Avg:A Wt:C2	0.902000		RSD=4.4	
	108	99	103	93	98	96	101	101	96	Org:N Dep:R				
D 60 d5-EtFOSAA	201	179	211	181	205	170	178	170	166	Avg:A Wt:C2	185		RSD=9.0	
	108	97	114	97	111	92	96	92	89	Org:N Dep:R				
D 52 13C7_PFUdA	841	849	860	848	803	817	752	712	735	Avg:A Wt:C2	802		RSD=6.9	
	104	105	107	105	100	101	93	88	91	Org:N Dep:R				
5 N-EtFOSAA	0.978397	1.140852	0.916930	1.037856	0.897577	1.091839	0.989915	0.926860	0.944959	Avg:A Wt:C2	0.991687		RSD=8.4	
	98	115	92	104	90	110	99	93	95	Org:N Dep:R				
D 61 d7-MeFOSE	184	161	185	158	169	157	177	161	172	Avg:A Wt:C2	169		RSD=6.5	
	108	94	109	93	99	92	104	95	101	Org:N Dep:R				
32 MeFOSE	1.071140	0.945899	0.918472	0.955525	0.894406	0.951962	0.836759	0.950160	0.921192	Avg:A Wt:C2	0.938391		RSD=6.7	
	114	100	97	101	95	101	89	101	98	Org:N Dep:R				
D 57 d3-MeFOSA	77.0245	63.0055	75.6780	65.3095	71.0245	64.3295	71.5445	69.7950	71.8390	Avg:A Wt:C2	69.9500		RSD=7.0	
	110	90	108	93	101	91	102	99	102	Org:N Dep:R				
26 MeFOSA	1.221170	1.300521	1.280081	1.221966	1.065470	1.213919	1.003297	1.048045	1.060441	Avg:A Wt:C2	1.157212		RSD=9.7	
	105	112	110	105	92	104	86	90	91	Org:N Dep:R				
31 11Cl-PF3OUDS	1.565610	1.831181	1.950934	1.811689	1.838201	1.880107	1.794760	2.062362	1.966618	Avg:A Wt:C2	1.855718		RSD=7.5	
	84	98	105	97	99	101	96	111	105	Org:N Dep:R				
11 PFDoA	1.011038	1.063205	0.982852	0.976326	0.998082	1.025632	0.994953	1.034217	0.996265	Avg:A Wt:C2	1.009174		RSD=2.7	
	100	105	97	96	98	101	98	102	98	Org:N Dep:R				

Compound	Level 2 / %Rec	Level 3 / %Rec	Level 4 / %Rec	Level 5 / %Rec	Level 6 / %Rec	Level 7 / %Rec	Level 8 / %Rec	Level 9 / %Rec	Level 10 / %Rec	Curve	M1	B	Curve Errors	Flags
D 38 13C2_PFDoA	832	803	824	801	768	767	738	691	712	Avg:A Wt:C2	771		RSD=6.4	
	107	104	106	103	99	99	95	89	92	Org:N Dep:R				
4 10:2 FTS	1.157123	1.434409	1.254724	1.391491	1.365140	1.394286	1.344156	1.405403	1.391067	Avg:A Wt:C2	1.348644		RSD=6.5	
	85	106	93	103	101	103	99	104	103	Org:N Dep:R				
D 62 d9-EtFOSE	176	153	178	159	167	156	158	152	156	Avg:A Wt:C2	162		RSD=6.0	
	108	94	110	98	103	96	97	94	96	Org:N Dep:R				
33 EtFOSE	0.896095	1.073094	0.904617	0.837198	0.868567	0.920481	0.845023	0.913775	0.911522	Avg:A Wt:C2	0.907819		RSD=7.6	
	98	118	99	92	95	101	93	100	100	Org:N Dep:R				
D 59 d5-EtFOSA	71.3950	63.3020	73.9675	64.7735	67.2325	62.0990	66.9565	65.1170	67.4150	Avg:A Wt:C2	66.9176		RSD=5.6	
	106	94	110	96	100	92	100	97	100	Org:N Dep:R				
27 EtFOSA	1.147279	1.306752	1.101024	1.105112	1.146811	1.265959	1.093255	1.083716	1.096467	Avg:A Wt:C2	1.149597		RSD=7.1	
	99	113	95	96	99	110	95	94	95	Org:N Dep:R				
34 PFDOS	0.724114	0.847263	0.804572	0.812218	0.826934	0.865238	0.802198	0.892047	0.847340	Avg:A Wt:C2	0.824658		RSD=5.8	
	87	102	97	98	100	104	97	108	102	Org:N Dep:R				
24 PFTrDA	0.469071	0.477382	0.457389	0.459268	0.451667	0.513580	0.474289	0.498211	0.499992	Avg:A Wt:C2	0.477872		RSD=4.5	
	98	99	95	96	94	107	99	104	104	Org:N Dep:R				
23 PFTeDA	1.007442	1.041502	1.043987	0.989311	0.963661	0.989272	0.918865	0.968853	0.906959	Avg:A Wt:C2	0.981095		RSD=4.9	
	102	106	106	100	98	100	93	98	92	Org:N Dep:R				
D 42 13C2_PFTeDA	869	806	846	814	787	784	757	736	786	Avg:A Wt:C2	798		RSD=5.2	
	108	101	105	101	98	98	94	92	98	Org:N Dep:R				
35 PFHxDA	1.436884	1.539325	1.354662	1.431337	1.331192	1.496397	1.295542	1.313817	1.310999	Avg:A Wt:C2	1.390017		RSD=6.4	
	103	110	97	102	95	107	93	94	94	Org:N Dep:R				
D 40 13C2_PFHxDA	530	450	507	457	486	447	461	454	457	Avg:A Wt:C2	472		RSD=6.2	
	112	95	107	96	102	94	97	96	96	Org:N Dep:R				
36 PFODA	0.921558	1.090804	0.953100	1.001301	0.969434	1.041330	0.950505	0.993496	1.005331	Avg:A Wt:C2	0.991873		RSD=5.2	
	92	109	96	100	97	104	95	100	101	Org:N Dep:R				

Report Date: 11-Sep-2023 13:42:49 AIM Revision: 2.0.2023.0816

Pace Environmental Services, LLC

Initial Calibration Ion Suppression Report

Batch: \\Organics\LL\LCMSMS01.i\090923-nonDOD+ICAL.b

Method: LCMSMS01_PFAS-ID2.M Version: V16 30-Jun-2022 10:54:24

Instrument: LCMSMS01.i Integrator: picker

Cal Start Date: 09-Sep-2023 14:10:05 Cal End Date: 09-Sep-2023 15:34:42

Method Lock: Unknown Lock Date:

Calib Method: PFAS-ID2 No.Compounds: 66

Calibration Concentration Units: ng/L

Initial Calibration Samples: Primary Reagent: Analytes

Batch: \\Organics\LL\LCMSMS01.i\090923-nonDOD+ICAL.b

Level	Cal File	Cal Sample ID	Cal Date
2	090923011.d	ID ICAL L2_SVLC-2954	09-Sep-2023 14:10:05
3	090923012.d	ID ICAL L3_SVLC-2955	09-Sep-2023 14:20:38
4	090923013.d	ID ICAL L4_SVLC-2956	09-Sep-2023 14:31:10
5	090923014.d	ID ICAL L5_SVLC-3024	09-Sep-2023 14:41:44
6	090923015.d	ID ICAL L6_SVLC-2958	09-Sep-2023 14:52:17
7	090923016.d	ID ICAL L7_SVLC-2959	09-Sep-2023 15:02:52
8	090923017.d	ID ICAL L8_SVLC-2960	09-Sep-2023 15:13:27
9	090923018.d	ID ICAL L9_SVLC-2961	09-Sep-2023 15:24:05
10	090923019.d	ID ICAL L10_SVLC-2962	09-Sep-2023 15:34:42

Column: 1 Detector: LCMS-Q3

Compound	Response Level 2	Response Level 3	Response Level 4	Response Level 5	Response Level 6	Response Level 7	Response Level 8	Response Level 9	Response Level 10	RPD
* 43 13C3_PFBA	18418	17488	19891	19210	16375	17490	17382	17790	16864	2.20
* 39 13C2_PFHxA	1521	751	1446	884	2511	4578	6775	8526	11115	37.96
* 41 13C2_PFOA	260	130	260	521	1173	2282	7163	11917	13930	48.16
* 48 13C4_PFOS	5272	5918	7959	6811	4898	4547		6870	4312	5.00
* 37 13C2_PFDA	259	259	388	275	1555	4339	7689	11572	12208	47.92

13C3_PFBA ((|16864 - 18418| / (16864 + 18418)) / 2) * 100 = 2.20

13C2_PFHxA ((|11115 - 1521| / (11115 + 1521)) / 2) * 100 = 37.96

13C2_PFOA ((|13930 - 260| / (13930 + 260)) / 2) * 100 = 48.17

13C4_PFOS ((|4312 - 5272| / (4312 + 5272)) / 2) * 100 = 5.01

13C2_PFDA ((|12208 - 259| / (12208 + 259)) / 2) * 100 = 47.92

not used, not evaluated

Report Date: 11-Sep-2023 13:42:48 AIM Revision: 2.0.2023.0816

Pace Environmental Services, LLC

Initial Calibration Response Report

Batch: \\Organics\LL\LCMSMS01.i\090923-nonDOD+ICAL.b
Method: LCMSMS01_PFAS-ID2.M Version: V16 30-Jun-2022 10:54:24
Instrument: LCMSMS01.i Integrator: picker
Cal Start Date: 09-Sep-2023 14:10:05 Cal End Date: 09-Sep-2023 15:34:42
Method Lock: Unknown Lock Date:
Calib Method: PFAS-ID2 No.Compounds: 66
Calibration Concentration Units: ng/L

Initial Calibration Samples: Primary Reagent: Analytes
Batch: \\Organics\LL\LCMSMS01.i\090923-nonDOD+ICAL.b

Level	Cal File	Cal Sample ID	Cal Date
2	090923011.d	ID ICAL L2_SVLC-2954	09-Sep-2023 14:10:05
3	090923012.d	ID ICAL L3_SVLC-2955	09-Sep-2023 14:20:38
4	090923013.d	ID ICAL L4_SVLC-2956	09-Sep-2023 14:31:10
5	090923014.d	ID ICAL L5_SVLC-3024	09-Sep-2023 14:41:44
6	090923015.d	ID ICAL L6_SVLC-2958	09-Sep-2023 14:52:17
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9	090923018.d	ID ICAL L9_SVLC-2961	09-Sep-2023 15:24:05
10	090923019.d	ID ICAL L10_SVLC-2962	09-Sep-2023 15:34:42

Quantitation Standards (* - Istd) (D - Iso Dil Std)

* 43 13C3_PFBA	* 39 13C2_PFHxA	* 41 13C2_PFOA
* 48 13C4_PFOS	* 37 13C2_PFDA	D 46 13C4_PFBA
D 50 13C5_PFPeA	D 44 13C3_PFBS	D 63 13C2_4:2 FTS_2
D 49 13C5_PFHxA	D 66 13C3_GenX	D 47 13C4_PFHpA
D 45 13C3_PFHxS	D 64 13C2_6:2 FTS_2	D 53 13C8_PFOA
D 56 13C9_PFNA	D 54 13C8_PFOS	D 55 13C8_PFOSA
D 65 13C2_8:2 FTS_2	D 51 13C6_PFDA	D 58 d3-MeFOSAA
D 60 d5-EtFOSAA	D 52 13C7_PFUdA	D 61 d7-MeFOSE
D 57 d3-MeFOSA	D 62 d9-EtFOSE	D 38 13C2_PFDoA
D 59 d5-EtFOSA	D 42 13C2_PFTeDA	D 40 13C2_PFHxDA

Column: 1 Detector: LCMS-Q3

Compound	Level 2 Conc/Rsp	Level 3 Conc/Rsp	Level 4 Conc/Rsp	Level 5 Conc/Rsp	Level 6 Conc/Rsp	Level 7 Conc/Rsp	Level 8 Conc/Rsp	Level 9 Conc/Rsp	Level 10 Conc/Rsp	Std #
* 43 13C3_PFBA	2000.00	2000.00	2000.00	2000.00	2000.00	2000.00	2000.00	2000.00	2000.00	
	18418	17488	19891	19210	16375	17490	17382	17790	16864	
* 39 13C2_PFHxA	2000.00	2000.00	2000.00	2000.00	2000.00	2000.00	2000.00	2000.00	2000.00	
	1521	751	1446	884	2511	4578	6775	8526	11115	
* 41 13C2_PFOA	2000.00	2000.00	2000.00	2000.00	2000.00	2000.00	2000.00	2000.00	2000.00	
	260	130	260	521	1173	2282	7163	11917	13930	
* 48 13C4_PFOS	2000.00	2000.00	2000.00	2000.00	2000.00	2000.00		2000.00	2000.00	
	5272	5918	7959	6811	4898	4547		6870	4312	
* 37 13C2_PFDA	2000.00	2000.00	2000.00	2000.00	2000.00	2000.00	2000.00	2000.00	2000.00	
	259	259	388	275	1555	4339	7689	11572	12208	
D 46 13C4_PFBA	2000.00	2000.00	2000.00	2000.00	2000.00	2000.00	2000.00	2000.00	2000.00	
	2185425	2126239	2230704	2106190	2017876	2002481	1952334	1854756	1888277	
8 PFBA	100.00	200.00	500.00	1000.00	2000.00	5000.00	10000	15000	20000	#46
	114223	234043	574347	1058291	2102046	5282844	9890235	14259621	17879305	
D 50 13C5_PFPeA	2000.00	2000.00	2000.00	2000.00	2000.00	2000.00	2000.00	2000.00	2000.00	
	2068334	2111297	2038384	2004669	1978601	1884661	1850012	1789001	1764410	
21 PFPeA	100.00	200.00	500.00	1000.00	2000.00	5000.00	10000	15000	20000	#50
	112784	229021	553222	1091411	2227973	5454128	10166578	14346530	18780291	
D 44 13C3_PFBS	2000.00	2000.00	2000.00	2000.00	2000.00	2000.00	2000.00	2000.00	2000.00	
	776809	755816	751289	766931	753060	718569	714804	699853	681384	

Compound	Level 2 Conc/Rsp	Level 3 Conc/Rsp	Level 4 Conc/Rsp	Level 5 Conc/Rsp	Level 6 Conc/Rsp	Level 7 Conc/Rsp	Level 8 Conc/Rsp	Level 9 Conc/Rsp	Level 10 Conc/Rsp	Std #
7 PFBS	88.400	176.80	442.00	884.00	1768.00	4420.00	8840.00	13260	17680	#44
	41944	88742	220869	408651	876256	2012051	4071936	5896601	7725157	
1 4:2 FTS	93.400	186.80	467.00	934.00	1868.00	4670.00	9340.00	14010	18680	#63
	8567	19275	44539	86317	144424	417570	733557	1053740	1368028	
D 63 13C2_4:2 FTS_2	10000	10000	10000	10000	10000	10000	10000	10000	10000	
	495637	486649	502090	468923	499961	490184	513216	466202	473398	
D 49 13C5_PFHxA	2000.00	2000.00	2000.00	2000.00	2000.00	2000.00	2000.00	2000.00	2000.00	
	1807482	1819679	1870956	1780605	1872032	1816714	1714459	1601316	1576476	
15 PFHxA	100.00	200.00	500.00	1000.00	2000.00	5000.00	10000	15000	20000	#49
	90456	190148	428554	858735	1788604	4352945	7716973	11543938	15775574	
22 PFPeS	93.800	187.60	469.00	938.00	1876.00	4690.00	9380.00	14070	18760	#44
	39324	80195	193121	391963	747690	1918278	3487820	5104587	7025913	
28 GenX	200.00	400.00	1000.00	2000.00	4000.00	10000	20000	30000	40000	#66
	21505	42562	110937	215410	405747	1021491	1724166	2661985	3663781	
D 66 13C3_GenX	10000	10000	10000	10000	10000	10000	10000	10000	10000	
	1290350	1205456	1373583	1219720	1350556	1141302	1233611	1110500	1142476	
13 PFHpA	100.00	200.00	500.00	1000.00	2000.00	5000.00	10000	15000	20000	#47
	108497	209663	540363	996619	2040579	4991198	8899275	12970821	17294024	
D 47 13C4_PFHpA	2000.00	2000.00	2000.00	2000.00	2000.00	2000.00	2000.00	2000.00	2000.00	
	2335508	2226515	2362555	2245621	2342020	2169103	2155793	1944983	1957180	
14 PFHxS	91.000	182.00	455.00	910.00	1820.00	4550.00	9100.00	13650	18200	#45
	41241	80792	185128	355511	716085	1697376	3319290	5004547	6808134	
D 45 13C3_PFHxS	2000.00	2000.00	2000.00	2000.00	2000.00	2000.00	2000.00	2000.00	2000.00	
	756122	740041	743002	718782	725711	701394	696037	639601	671697	
29 ADONA	94.200	188.40	471.00	942.00	1884.00	4710.00	9420.00	14130	18840	#45
	165922	305962	805321	1546009	3104844	7459245	13657545	20040296	25308128	
D 64 13C2_6:2 FTS_2	10000	10000	10000	10000	10000	10000	10000	10000	10000	
	617299	520252	574197	501766	549444	519716	500746	495006	475538	
2 6:2 FTS	94.800	189.60	474.00	948.00	1896.00	4740.00	9480.00	14220	18960	#64
	9589	18476	50014	103346	179903	422565	730379	1104944	1512759	
D 53 13C8_PFOA	2000.00	2000.00	2000.00	2000.00	2000.00	2000.00	2000.00	2000.00	2000.00	
	2102657	2160289	2050025	1942649	1954649	2146071	1877057	1817398	1732433	
20 PFOA	100.00	200.00	500.00	1000.00	2000.00	5000.00	10000	15000	20000	#53
	111716	205535	492051	892047	1884555	4546323	8306802	12665709	16109518	
12 PFHpS	95.200	190.40	476.00	952.00	1904.00	4760.00	9520.00	14280	19040	#45
	34041	69600	155413	301212	622680	1535569	2957310	4374048	5750294	
D 54 13C8_PFOS	2000.00	2000.00	2000.00	2000.00	2000.00	2000.00	2000.00	2000.00	2000.00	
	747109	637639	625768	626806	606222	593810	601944	534268	562439	
D 56 13C9_PFNA	2000.00	2000.00	2000.00	2000.00	2000.00	2000.00	2000.00	2000.00	2000.00	
	2106939	2006238	2071837	1996040	1898773	1910787	1763471	1653480	1738628	
17 PFNA	100.00	200.00	500.00	1000.00	2000.00	5000.00	10000	15000	20000	#56
	100782	189774	450192	835816	1717425	4212324	7919239	11476517	15729405	
18 PFOS	92.800	185.60	464.00	928.00	1856.00	4640.00	9280.00	13920	18560	#54
	38196	64514	180876	338057	627159	1634805	2959290	4573765	6245014	
30 9Cl-PF3ONS	93.200	186.40	466.00	932.00	1864.00	4660.00	9320.00	13980	18640	#54
	82083	152036	371663	690482	1405715	3581213	6904834	9775325	13679551	
19 PFOSA	100.00	200.00	500.00	1000.00	2000.00	5000.00	10000	15000	20000	#55
	54530	113655	283943	527748	1034552	2669089	4971604	7408710	10018416	
D 55 13C8_PFOSA	2000.00	2000.00	2000.00	2000.00	2000.00	2000.00	2000.00	2000.00	2000.00	
	1154362	1026793	1198363	1086545	1065989	1002566	1031990	1006773	1114870	
3 8:2 FTS	95.800	191.60	479.00	958.00	1916.00	4790.00	9580.00	14370	19160	#65
	6424	16001	31104	59326	107946	281588	507374	779633	1065987	
D 65 13C2_8:2 FTS_2	10000	10000	10000	10000	10000	10000	10000	10000	10000	
	511983	458536	486113	419585	430807	414110	420643	401615	382961	
16 PFNS	96.000	192.00	480.00	960.00	1920.00	4800.00	9600.00	14400	19200	#54
	29300	57999	151569	269632	546491	1295062	2447586	3638002	5217631	

Compound	Level 2 Conc/Rsp	Level 3 Conc/Rsp	Level 4 Conc/Rsp	Level 5 Conc/Rsp	Level 6 Conc/Rsp	Level 7 Conc/Rsp	Level 8 Conc/Rsp	Level 9 Conc/Rsp	Level 10 Conc/Rsp	Std #
10 PFDA	100.00	200.00	500.00	1000.00	2000.00	5000.00	10000	15000	20000	#51
	96805	175267	427401	860564	1735887	3977626	7672069	11571064	14259987	
D 51 13C6_PFDA	2000.00	2000.00	2000.00	2000.00	2000.00	2000.00	2000.00	2000.00	2000.00	
	1938168	1821345	1965194	1844982	1904686	1613132	1792473	1544818	1603448	
D 58 d3-MeFOSAA	10000	10000	10000	10000	10000	10000	10000	10000	10000	
	2397168	2024631	2249046	2133530	2289143	2072768	2091518	2097821	2061801	
6 N-MeFOSAA	100.00	200.00	500.00	1000.00	2000.00	5000.00	10000	15000	20000	#58
	19333	34463	98584	171518	349622	855832	1588406	2265979	3272882	
9 PFDS	96.400	192.80	482.00	964.00	1928.00	4820.00	9640.00	14460	19280	#54
	27548	50614	144175	239565	509638	1303101	2452735	3625013	4845703	
25 PFUdA	100.00	200.00	500.00	1000.00	2000.00	5000.00	10000	15000	20000	#52
	82174	152509	402044	719037	1427090	3542769	6896535	9808210	12777594	
D 60 d5-EtFOSAA	10000	10000	10000	10000	10000	10000	10000	10000	10000	
	2010432	1794448	2105613	1805665	2051004	1701086	1783864	1698949	1658861	
D 52 13C7_PFUdA	2000.00	2000.00	2000.00	2000.00	2000.00	2000.00	2000.00	2000.00	2000.00	
	1682044	1698985	1719074	1696277	1606383	1633780	1503989	1424306	1470431	
5 N-EtFOSAA	100.00	200.00	500.00	1000.00	2000.00	5000.00	10000	15000	20000	#60
	19670	40944	96535	187402	368187	928656	1765873	2362033	3135110	
D 61 d7-MeFOSE	2000.00	2000.00	2000.00	2000.00	2000.00	2000.00	2000.00	2000.00	2000.00	
	368131	321493	370733	315774	337983	313554	353288	321734	344193	
32 MeFOSE	100.00	200.00	500.00	1000.00	2000.00	5000.00	10000	15000	20000	#61
	19716	30410	85127	150865	302294	746229	1478085	2292742	3170680	
D 57 d3-MeFOSA	2000.00	2000.00	2000.00	2000.00	2000.00	2000.00	2000.00	2000.00	2000.00	
	154049	126011	151356	130619	142049	128659	143089	139590	143678	
26 MeFOSA	100.00	200.00	500.00	1000.00	2000.00	5000.00	10000	15000	20000	#57
	9406	16388	48437	79806	151349	390454	717804	1097224	1523621	
31 11Cl-PF3OUDS	94.200	188.40	471.00	942.00	1884.00	4710.00	9420.00	14130	18840	#54
	55092	109991	287506	534857	1049725	2629184	5088426	7784600	10419485	
11 PFDoA	100.00	200.00	500.00	1000.00	2000.00	5000.00	10000	15000	20000	#38
	84160	170854	405115	782092	1533138	3932002	7342643	10718797	14188347	
D 38 13C2_PFDoA	2000.00	2000.00	2000.00	2000.00	2000.00	2000.00	2000.00	2000.00	2000.00	
	1664823	1606972	1648733	1602112	1536084	1533495	1475978	1381889	1424154	
4 10:2 FTS	96.400	192.80	482.00	964.00	1928.00	4820.00	9640.00	14460	19280	#65
	5711	12681	29399	56283	113388	278301	545055	816167	1027093	
D 62 d9-EtFOSE	2000.00	2000.00	2000.00	2000.00	2000.00	2000.00	2000.00	2000.00	2000.00	
	351302	305593	356447	318319	334475	311860	315271	304512	312566	
33 EtFOSE	100.00	200.00	500.00	1000.00	2000.00	5000.00	10000	15000	20000	#62
	15740	32793	80612	133248	290514	717653	1332057	2086915	2849108	
D 59 d5-EtFOSA	2000.00	2000.00	2000.00	2000.00	2000.00	2000.00	2000.00	2000.00	2000.00	
	142790	126604	147935	129547	134465	124198	133913	130234	134830	
27 EtFOSA	100.00	200.00	500.00	1000.00	2000.00	5000.00	10000	15000	20000	#59
	8191	16544	40720	71582	154206	393074	732005	1058525	1478367	
34 PFDOS	96.800	193.60	484.00	968.00	1936.00	4840.00	9680.00	14520	19360	#54
	26184	52296	121841	246406	485264	1243364	2337132	3460061	4613268	
24 PFTrDA	100.00	200.00	500.00	1000.00	2000.00	5000.00	10000	15000	20000	#38
	39046	76714	188528	367899	693799	1968931	3500198	5163544	7120662	
23 PFTeDA	100.00	200.00	500.00	1000.00	2000.00	5000.00	10000	15000	20000	#42
	87575	167976	441353	805015	1515993	3877548	6952331	10695725	14258101	
D 42 13C2_PFTeDA	2000.00	2000.00	2000.00	2000.00	2000.00	2000.00	2000.00	2000.00	2000.00	
	1738562	1612825	1691029	1627426	1573160	1567839	1513244	1471943	1572078	
35 PFHxDA	100.00	200.00	500.00	1000.00	2000.00	5000.00	10000	15000	20000	#40
	76182	138526	343478	653567	1294173	3341263	5967972	8944480	11989493	
D 40 13C2_PFHxDA	2000.00	2000.00	2000.00	2000.00	2000.00	2000.00	2000.00	2000.00	2000.00	
	1060378	899914	1014210	913226	972191	893149	921309	907735	914531	
36 PFODA	100.00	200.00	500.00	1000.00	2000.00	5000.00	10000	15000	20000	#40
	48860	98163	241661	457207	942475	2325157	4378546	6763730	9194066	

Report Date: 11-Sep-2023 13:42:48 AIM Revision: 2.0.2023.0816

Pace Environmental Services, LLC

Initial Calibration RT Report

Batch: \\Organics\LL\LCMSMS01.i\090923-nonDOD+ICAL.b

Method: LCMSMS01_PFAS-ID2.M Version: V16 30-Jun-2022 10:54:24

Instrument: LCMSMS01.i Integrator: picker

Cal Start Date: 09-Sep-2023 14:10:05 Cal End Date: 09-Sep-2023 15:34:42

Method Lock: Unknown Lock Date:

Calib Method: PFAS-ID2 No.Compounds: 66

Calibration Concentration Units: ng/L

Initial Calibration Samples: Primary Reagent: Analytes

Batch: \\Organics\LL\LCMSMS01.i\090923-nonDOD+ICAL.b

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Column: 1 Detector: LCMS-Q3

Compound	Level 2	Level 3	Level 4	Level 5	Level 6	Level 7	Level 8	Level 9	Level 10	Avg. RT	%Rsd RT
D 46 13C4_PFBA	1.646	1.649	1.653	1.652	1.648	1.653	1.653	1.652	1.653	1.650	0.146
8 PFBA	1.654	1.649	1.653	1.652	1.648	1.653	1.653	1.652	1.653	1.651	0.112
D 50 13C5_PFPeA	1.967	1.969	1.966	1.965	1.969	1.966	1.966	1.965	1.974	1.967	0.145
21 PFPeA	1.967	1.969	1.966	1.965	1.969	1.966	1.966	1.965	1.974	1.967	0.145
D 44 13C3_PFBS	2.015	2.009	2.013	2.013	2.008	2.014	2.014	2.013	2.013	2.012	0.114
7 PFBS	2.015	2.009	2.013	2.013	2.017	2.014	2.014	2.013	2.013	2.013	0.104
1 4:2 FTS	2.263	2.267	2.262	2.262	2.267	2.263	2.262	2.262	2.272	2.264	0.146
D 63 13C2_4:2 FTS_2	2.263	2.267	2.262	2.262	2.267	2.263	2.262	2.262	2.262	2.263	0.085
D 49 13C5_PFHxA	2.301	2.304	2.300	2.299	2.304	2.300	2.300	2.299	2.300	2.300	0.085
15 PFHxA	2.301	2.304	2.300	2.299	2.304	2.300	2.300	2.309	2.309	2.302	0.175
* 39 13C2_PFHxA	2.310	2.304	2.300	2.309	2.295	2.291	2.300	2.299	2.300	2.300	0.275
22 PFPeS	2.329	2.332	2.328	2.327	2.332	2.328	2.328	2.337	2.337	2.330	0.173
28 GenX	2.413	2.416	2.412	2.411	2.416	2.412	2.412	2.421	2.421	2.414	0.168
D 66 13C3_GenX	2.413	2.416	2.412	2.411	2.416	2.412	2.421	2.421	2.421	2.415	0.182
13 PFHpA	2.687	2.680	2.686	2.686	2.688	2.686	2.686	2.686	2.686	2.685	0.083
D 47 13C4_PFHpA	2.687	2.680	2.686	2.686	2.688	2.686	2.686	2.686	2.686	2.685	0.083
14 PFHxS	2.696	2.705	2.703	2.694	2.697	2.703	2.703	2.702	2.703	2.700	0.150
D 45 13C3_PFHxS	2.696	2.697	2.703	2.702	2.705	2.703	2.703	2.702	2.703	2.701	0.123
29 ADONA	2.729	2.730	2.728	2.728	2.730	2.728	2.728	2.736	2.736	2.730	0.121
D 64 13C2_6:2 FTS_2	3.094	3.095	3.092	3.092	3.104	3.101	3.101	3.101	3.101	3.097	0.150
2 6:2 FTS	3.120	3.095	3.101	3.092	3.095	3.092	3.101	3.101	3.101	3.099	0.278
D 53 13C8_PFOA	3.129	3.130	3.127	3.127	3.130	3.136	3.136	3.136	3.136	3.132	0.134
20 PFOA	3.129	3.130	3.127	3.127	3.139	3.127	3.127	3.127	3.127	3.128	0.121
* 41 13C2_PFOA	3.138	3.113	3.083	3.127	3.130	3.119	3.136	3.127	3.136	3.123	0.548
12 PFHpS	3.147	3.139	3.136	3.136	3.139	3.136	3.145	3.144	3.145	3.140	0.136
D 54 13C8_PFOS	3.631	3.615	3.613	3.621	3.623	3.621	3.621	3.628	3.621	3.621	0.159
* 48 13C4_PFOS	3.623	3.615	3.613	3.621	3.615	3.629		3.628	3.629	3.621	0.193
D 56 13C9_PFNA	3.623	3.623	3.621	3.621	3.623	3.621	3.621	3.628	3.621	3.622	0.068
17 PFNA	3.631	3.623	3.613	3.621	3.623	3.621	3.629	3.628	3.629	3.624	0.155
18 PFOS	3.623	3.623	3.621	3.628	3.623	3.621	3.621	3.628	3.629	3.624	0.091
30 9Cl-PF3ONS	3.904	3.913	3.903	3.911	3.913	3.921	3.912	3.919	3.912	3.911	0.156
19 PFOSA	4.069	4.069	4.067	4.067	4.069	4.075	4.068	4.075	4.067	4.069	0.078
D 55 13C8_PFOSA	4.069	4.069	4.067	4.067	4.069	4.068	4.075	4.067	4.067	4.068	0.064

Compound	Level 2	Level 3	Level 4	Level 5	Level 6	Level 7	Level 8	Level 9	Level 10	Avg. RT	%Rsd RT
3 8:2 FTS	4.106	4.091	4.097	4.090	4.099	4.098	4.098	4.097	4.090	4.096	0.131
D 65 13C2_8:2 FTS_2	4.091	4.099	4.090	4.097	4.091	4.098	4.090	4.090	4.090	4.092	0.094
16 PFNS	4.099	4.099	4.097	4.097	4.106	4.098	4.098	4.105	4.105	4.100	0.091
10 PFDA	4.121	4.106	4.112	4.112	4.114	4.113	4.113	4.112	4.112	4.112	0.093
D 51 13C6_PFDA	4.106	4.114	4.105	4.112	4.114	4.113	4.113	4.120	4.112	4.111	0.105
* 37 13C2_PFDA	4.121	4.106	4.127	4.135	4.114	4.113	4.120	4.112	4.120	4.118	0.209
D 58 d3-MeFOSAA	4.325	4.326	4.324	4.324	4.326	4.333	4.333	4.332	4.333	4.328	0.094
6 N-MeFOSAA	4.334	4.326	4.324	4.333	4.334	4.333	4.333	4.341	4.333	4.332	0.110
9 PFDS	4.544	4.537	4.536	4.544	4.537	4.544	4.544	4.551	4.544	4.542	0.103
25 PFUdA	4.567	4.567	4.566	4.559	4.567	4.566	4.566	4.566	4.566	4.565	0.061
D 60 d5-EtFOSAA	4.559	4.552	4.551	4.559	4.560	4.559	4.559	4.566	4.559	4.558	0.095
D 52 13C7_PFUdA	4.559	4.560	4.559	4.566	4.560	4.566	4.559	4.574	4.566	4.563	0.116
5 N-EtFOSAA	4.575	4.567	4.566	4.574	4.567	4.566	4.581	4.574	4.574	4.571	0.110
D 61 d7-MeFOSE	4.724	4.725	4.715	4.723	4.716	4.723	4.723	4.723	4.724	4.721	0.083
32 MeFOSE	4.733	4.742	4.732	4.741	4.733	4.741	4.740	4.740	4.732	4.737	0.089
D 57 d3-MeFOSA	4.750	4.750	4.749	4.749	4.742	4.749	4.740	4.749	4.749	4.747	0.080
26 MeFOSA	4.750	4.750	4.749	4.758	4.750	4.758	4.749	4.757	4.758	4.753	0.087
31 11Cl-PF3OUDS	4.793	4.793	4.783	4.792	4.784	4.792	4.792	4.792	4.792	4.790	0.075
11 PFDoA	4.967	4.975	4.974	4.974	4.975	4.974	4.974	4.982	4.982	4.974	0.095
D 38 13C2_PFDoA	4.975	4.975	4.974	4.982	4.975	4.974	4.974	4.982	4.974	4.975	0.071
4 10:2 FTS	4.983	4.975	4.966	4.982	4.983	4.974	4.982	4.982	4.990	4.979	0.141
D 62 d9-EtFOSE	4.975	4.983	4.974	4.982	4.975	4.982	4.982	4.974	4.974	4.977	0.084
33 EtFOSE	4.998	4.991	4.998	4.998	4.991	4.997	4.997	4.997	4.998	4.995	0.062
D 59 d5-EtFOSA	5.013	5.013	5.005	5.012	5.006	5.012	5.012	5.012	5.012	5.010	0.061
27 EtFOSA	5.026	5.019	5.012	5.012	5.019	5.019	5.019	5.025	5.026	5.019	0.101
34 PFDOS	5.314	5.314	5.305	5.314	5.314	5.313	5.313	5.313	5.314	5.312	0.059
24 PFTrDA	5.341	5.341	5.341	5.350	5.341	5.350	5.350	5.350	5.350	5.345	0.084
23 PFTeDA	5.674	5.674	5.673	5.673	5.674	5.673	5.680	5.680	5.681	5.675	0.062
D 42 13C2_PFTeDA	5.674	5.674	5.673	5.673	5.674	5.673	5.673	5.680	5.681	5.675	0.054
35 PFHxDA	6.252	6.252	6.252	6.252	6.252	6.259	6.252	6.260	6.259	6.254	0.060
D 40 13C2_PFHxDA	6.252	6.245	6.252	6.252	6.245	6.252	6.252	6.252	6.259	6.251	0.073
36 PFODA	6.756	6.750	6.750	6.751	6.751	6.756	6.756	6.757	6.762	6.754	0.063

Pace Environmental Services, LLC
Initial Calibration Verification Report

Data File: \\Organics\LL\LCMSMS01.i\090923-nonDOD+ICAL.b\090923021.d
Injection Date: 09-Sep-2023 15:55:52 Injection Vol: 10.0 uL
Sample Type: ICV Auto Sampler: 10
Sample Info: ICV 1000_SVLC-3035 Misc. Info:
Inst. ID: LCMSMS01.i Operator: eqi.svoa

Method: LCMSMS01_PFAS-ID2 Version: V16 30-Jun-2022 10:54:24
Calib Method: PFAS-ID2 Lock State: Unlocked
Quant Method: IsoDil Integrator: picker

Reagent: Analytes Conc. Level: ICV-43 Vol. Added: 1.00 ml

Compound	Std Area	CCV Area	Exp. Conc ng/L	Conc ng/L	%Rec	%Rec Limits
D 46 13C4_PFBA	2106190	2414270			115	50 - 150
8 PFBA			1000.00	897.32	90	70 - 130
D 50 13C5_PFPeA	2004669	2207679			110	50 - 150
21 PFPeA			1000.00	952.02	95	70 - 130
7 PFBS			1000.00	973.05	97	70 - 130
D 44 13C3_PFBS	766931	829400			108	50 - 150
D 63 13C2_4:2 FTS_2	468923	538090			115	50 - 150
1 4:2 FTS			1000.00	866.85	87	70 - 130
D 49 13C5_PFHxA	1780605	2020809			113	50 - 150
15 PFHxA			1000.00	886.23	89	70 - 130
22 PFPeS			1000.00	949.95	95	70 - 130
D 66 13C3_GenX	1219720	1441134			118	50 - 150
28 GenX			1000.00	897.03	90	70 - 130
D 47 13C4_PFHpA	2245621	2547208			113	50 - 150
13 PFHpA			1000.00	831.10	83	70 - 130
14 PFHxS			1000.00	895.53	90	70 - 130
D 45 13C3_PFHxS	718782	838126			117	50 - 150
29 ADONA			1000.00	898.65	90	70 - 130
2 6:2 FTS			1000.00	886.59	89	70 - 130
D 64 13C2_6:2 FTS_2	501766	560168			112	50 - 150
D 53 13C8_PFOA	1942649	2298188			118	50 - 150
20 PFOA			1000.00	780.28	78	70 - 130
12 PFHpS			1000.00	894.28	89	70 - 130
17 PFNA			1000.00	992.17	99	70 - 130
D 54 13C8_PFOS	626806	694696			111	50 - 150
D 56 13C9_PFNA	1996040	2064180			103	50 - 150
18 PFOS			1000.00	875.88	88	70 - 130
30 9Cl-PF3ONS			1000.00	800.35	80	70 - 130
D 55 13C8_PFOSA	1086545	1156412			106	50 - 150
19 PFOSA			1000.00	853.46	85	70 - 130
3 8:2 FTS			1000.00	1068.69	107	70 - 130
16 PFNS			1000.00	910.09	91	70 - 130
D 65 13C2_8:2 FTS_2	419585	453688			108	50 - 150
D 51 13C6_PFDA	1844982	2078507			113	50 - 150
10 PFDA			1000.00	845.43	85	70 - 130
D 58 d3-MeFOSAA	2133530	2267555			106	50 - 150

Report Date: 11-Sep-2023 13:42:37 AIM Revision: 2.0.2023.0816
Data File: \\Organics\LL\LCMSMS01.i\090923-nonDOD+ICAL.b\090923021.d

Compound	Std Area	CCV Area	Exp. Conc ng/L	Conc ng/L	%Rec	%Rec Limits
6 N-MeFOSAA			1000.00	1010.76	101	70 - 130
9 PFDS			1000.00	913.45	91	70 - 130
25 PFUdA			1000.00	888.94	89	70 - 130
D 60 d5-EtFOSAA	1805665	2087444			116	50 - 150
D 52 13C7_PFUdA	1696277	1781986			105	50 - 150
5 N-EtFOSAA			1000.00	961.46	96	70 - 130
D 61 d7-MeFOSE	315774	378932			120	50 - 150
32 MeFOSE			1000.00	924.87	92	70 - 130
D 57 d3-MeFOSA	130619	158074			121	50 - 150
26 MeFOSA			1000.00	856.48	86	70 - 130
31 11Cl-PF3OUDS			1000.00	891.36	89	70 - 130
11 PFDoA			1000.00	769.15	77	70 - 130
D 62 d9-EtFOSE	318319	354432			111	50 - 150
4 10:2 FTS			968.00	1039.28	107	70 - 130
D 38 13C2_PFDoA	1602112	1812600			113	50 - 150
33 EtFOSE			1000.00	908.31	91	70 - 130
D 59 d5-EtFOSA	129547	151077			117	50 - 150
27 EtFOSA			1000.00	1012.86	101	70 - 130
34 PFDOS			1000.00	925.74	93	70 - 130
24 PFTrDA			1000.00	841.16	84	70 - 130
23 PFTeDA			1000.00	958.09	96	70 - 130
D 42 13C2_PFTeDA	1627426	1876100			115	50 - 150
35 PFHxDA			1000.00	953.27	95	70 - 130
D 40 13C2_PFHxDA	913226	965062			106	50 - 150
36 PFODA			1000.00	946.33	95	70 - 130



Pace Environmental Services, LLC
Analyte Quantitation Report

Data File: \\Organics\LL\LCMSMS01.i\090923-nonDOD+ICAL.b\090923024.d
Injection Date: 09-Sep-2023 16:28:12 Injection Vol: 10.0 uL
Sample Type: INSTBLK Auto Sampler: 94
Lab Sample ID: ID BLK A6 SUR-3048 Lab Prep. Batch:
Sample Info: ID BLK A6 SUR-3048 Misc. Info:
Inst. ID: LCMSMS01.i Operator: eqi.svoa

Method: LCMSMS01_PFAS-ID2 Version: V16 30-Jun-2022 10:54:24
Calib Method: PFAS-ID2 Lock State: Unlocked
Quant Method: IsoDil Integrator: picker

Matrix: Aqueous
Final Conc.: Amt * DF * CF
Concentration Formula: CF = (VF/1000) * 1/VI = 0.0040000

Name	Value	Units	Description
DF	1		Dilution Factor
VF	1000	ul	Final Volume
VI	250	ml	Initial Sample Volume

IsoDil Stds %Recovery = ((Area * DF)/Ical Mid Area) * 100

Reagent: Surrogates Conc. Level: Smp Vol. Added: 0.0200 ml

Signal	Quant Std	RT (Min)	Exp RT (Min)	c RT (Min)	Response	Peak Pts	S/N	Ion Ratio	Isomer Ratio	OnCol Conc ng/L	Final Conc ng/L	%Rec	Flags
D 46 13C4_PFBA CAS: SESI-0111													
217 > 172		1.652	1.652	0.000	2419220	16	>100:1			2000.00	2371.23	115	
8 Perfluoro-n-butanoic acid (PFBA) CAS: 375-22-4													
212.9 > 168.9	46	1.652	1.652	0.000	6818	15	4.0:1			5.4765	0.02191	< LOQ	
D 50 13C5_PFPeA CAS: SESI-0112													
267.9 > 223		1.973	1.965	0.000	2295882	18	>100:1			2000.00	2362.91	115	
21 Perfluoro-n-pentanoic acid (PFPeA) CAS: 2706-90-3													
262.9 > 218.9	50	1.973	1.965	0.000	6522	15	2.2:1			5.1827	0.02073	< LOQ	
D 44 13C3_PFBS CAS: SESI-0116													
302 > 80		2.013	2.013	0.000	877633	17	>100:1			2000.00	2386.85	114	
7 Perfluoro-1-butanesulfonate (PFBS) CAS: 375-73-5													U
298.9 > 80	44		2.013		ND								
22 Perfluoro-1-pentanesulfonic acid (PFPeS) CAS: 2706-91-4													U
349 > 80	44		2.327		ND								
D 63 13C2_4:2 FTS_2 CAS: SESI-0104													
329 >81		2.262	2.262	0.000	571248	16	>100:1			10000	11695	122	
1 Fluorotelomer sulfonate 4:2 [1H,1H,2H,2H-perfluorohexane sulfonate] (4:2 FTS) CAS: 757124-72-4													U
327 > 307	63		2.262		ND								
D 49 13C5_PFHxA CAS: SESI-0113													
318 > 273		2.309	2.299	0.000	2097170	17	>100:1			2000.00	2380.18	118	
15 Perfluoro-n-hexanoic acid (PFHxA) CAS: 307-24-4													U
313 > 269	49		2.299		ND								
D 66 13C3_GenX CAS: SESI-0121													
287 > 185		2.421	2.411	0.000	1427258	17	>100:1			10000	11606	117	
28 Hexafluoropropylene oxide dimer acid (GenX) CAS: 13252-13-6													U
285 > 119	66		2.411		ND								
D 47 13C4_PFHpA CAS: SESI-0114													
367 > 322		2.686	2.686	0.000	2669331	19	>100:1			2000.00	2434.13	119	
13 Perfluoro-n-heptanoic acid (PFHpA) CAS: 375-85-9													U
363 > 319	47		2.686		ND								
D 45 13C3_PFHxS CAS: SESI-0096													
402 > 80		2.703	2.702	0.000	879270	21	>100:1			2000.00	2475.89	122	

Signal	Quant Std	RT (Min)	Exp RT (Min)	c RT (Min)	Response	Peak Pts	S/N	Ion Ratio	Isomer Ratio	OnCol Conc ng/L	Final Conc ng/L	%Rec	Flags
14 Perfluorohexanesulfonate (PFHxS) CAS: 355-46-4													U
399 > 80	45		2.694		ND								
29 4,8-dioxa-3H-perfluorononanoic acid (ADONA) CAS: 919005-14-4													U
377 > 251	45		2.728		ND								
12 Perfluoro-1-heptanesulfonic acid (PFHpS) CAS: 375-92-8													U
449 > 80	45		3.136		ND								
D 64 13C2_6:2 FTS_2 CAS: SESI-0105													
429 > 81		3.101	3.092	0.000	584810	20	>100:1			10000	11071	117	
2 Fluorotelomer sulfonate 6:2 [1H,1H,2H,2H-perfluorooctane sulfonate] (6:2 FTS) CAS: 27619-97-2													U
427 > 407	64		3.092		ND								
D 53 13C8_PFOA CAS: SESI-0097													
421 > 376		3.136	3.127	0.000	2314474	21	>100:1			2000.00	2342.69	119	
20 Perfluoro-n-octanoic acid (PFOA) CAS: 335-67-1													U
413 > 369	53		3.127		ND								
D 54 13C8_PFOS CAS: SESI-0098													
507 > 80		3.629	3.621	0.000	679620	23	>100:1			2000.00	2209.75	108	
18 Perfluorooctanesulfonate (PFOS) CAS: 1763-23-1													U
499 > 80	54		3.628		ND								
30 9-chlorohexadecafluoro-3-oxanone-1-sulfonic acid (9Cl-PF3ONS) CAS: 756426-58-1													U
531 > 351	54		3.911		ND								
16 Perfluoro-1-nonanesulfonic acid (PFNS) CAS: 68259-12-1													U
549 > 80	54		4.097		ND								
9 Perfluoro-1-decanesulfonic acid (PFDS) CAS: 335-77-3													U
599 > 80	54		4.544		ND								
31 11-chloroeicosafluoro-3-oxaundecane-1-sulfonic acid (11Cl-PF3OUdS) CAS: 763051-92-9													U
631 > 451	54		4.792		ND								
34 Perfluorododecanesulfonic acid (PFDOS) CAS: 79780-39-5													U
699 > 80	54		5.314		ND								
D 56 13C9_PFNA CAS: SESI-0099													
472 > 427		3.629	3.621	0.000	2565111	22	>100:1			2000.00	2692.84	129	
17 Perfluoro-n-nonanoic acid (PFNA) CAS: 375-95-1													U
463 > 419	56		3.621		ND								
D 55 13C8_PFOSA CAS: SESI-0107													
506 > 78		4.075	4.067	0.000	1245680	24	>100:1			2000.00	2314.37	115	
19 Perfluoro-1-octanesulfonamide (PFOSA) CAS: 754-91-6													U
498 > 78	55		4.067		ND								
D 65 13C2_8:2 FTS_2 CAS: SESI-0106													
529 > 81		4.098	4.097	0.000	480109	24	>100:1			10000	11005	114	
3 Fluorotelomer sulfonate 8:2 [1H,1H,2H,2H-perfluorodecane sulfonate] (8:2 FTS) CAS: 39108-34-4													U
527 > 507	65		4.090		ND								
4 1H,1H,2H,2H-perfluorododecane sulfonate (10:2FTS) CAS: 120226-60-0													U
627 > 607	65		4.982		ND								
D 51 13C6_PFDA CAS: SESI-0115													
519 > 474		4.120	4.112	0.000	2179549	24	>100:1			2000.00	2447.67	118	
10 Perfluoro-n-decanoic acid (PFDA) CAS: 335-76-2													U
513 > 469	51		4.112		ND								
D 58 d3-MeFOSAA CAS: SESI-0102													
573 > 419		4.333	4.324	0.000	2391572	23	>100:1			10000	11085	112	
6 N-methylperfluoro-1-octanesulfonamidoacetic acid (N-MeFOSAA) CAS: 2355-31-9													U
570 > 419	58		4.333		ND								
D 60 d5-EtFOSAA CAS: SESI-0110													
589 > 419		4.567	4.559	0.000	2124718	24	>100:1			10000	11513	118	
5 N-ethylperfluoro-1-octanesulfonamidoacetic acid (N-EtFOSAA) CAS: 2991-50-6													U
584 > 419	60		4.574		ND								
D 52 13C7_PFUdA CAS: SESI-0117													
570 > 525		4.574	4.566	0.000	1942807	23	>100:1			2000.00	2422.58	115	
25 Perfluoro-n-undecanoic acid (PFUdA) CAS: 2058-94-8													U
563 > 519	52		4.559		ND								

Signal	Quant Std	RT (Min)	Exp RT (Min)	c RT (Min)	Response	Peak Pts	S/N	Ion Ratio	Isomer Ratio	OnCol Conc ng/L	Final Conc ng/L	%Rec	Flags
D 61 d7-MeFOSE CAS: SESI-0129													
623 > 59		4.724	4.723	0.000	363875	21	>100:1			2000.00	2149.66	115	
32 2-N-methylperfluoro-1-octanesulfonamido-ethanol (MeFOSE) CAS: 24448-09-7													U
616 > 59	61		4.741		ND								
D 57 d3-MeFOSA CAS: SESI-0109													
515 > 169		4.749	4.749	0.000	159757	21	>100:1			2000.00	2283.87	122	
26 N-methylperfluoro-1-octanesulfonamide (MeFOSA) CAS: 31506-32-8													U
512 > 169	57		4.758		ND								
D 62 d9-EtFOSE CAS: SESI-0130													
639 > 59		4.982	4.982	0.000	369837	22	>100:1			2000.00	2287.38	116	
33 2-N-ethylperfluoro-1-octanesulfonamido-ethanol (EtFOSE) CAS: 1691-99-2													U
630 > 59	62		4.998		ND								
D 38 13C2_PFDoA CAS: SESI-0118													
615 > 570		4.982	4.982	0.000	1805864	23	>100:1			2000.00	2342.87	113	
11 Perfluoro-n-dodecanoic acid (PFDoA) CAS: 307-55-1													U
613 > 569	38		4.974		ND								
24 Perfluoro-n-tridecanoic acid (PFTrDA) CAS: 72629-94-8													U
663 > 619	38		5.350		ND								
D 59 d5-EtFOSA CAS: SESI-0108													
531 > 169		5.012	5.012	0.000	151011	24	>100:1			2000.00	2256.67	117	
27 N-ethylperfluoro-1-octanesulfonamide (EtFOSA) CAS: 4151-50-2													U
526 > 169	59		5.012		ND								
D 42 13C2_PFTeDA CAS: SESI-0119													
715 > 670		5.680	5.673	0.000	1902433	23	>100:1			2000.00	2383.32	117	
23 Perfluoro-n-tetradecanoic acid (PFTeDA) CAS: 376-06-7													
713 > 669	42	5.673	5.673	0.000	6013	18	3.7:1	Target = 8.26		6.4432	0.02577	< LOQ	
713 > 169	42	5.673	5.673		816	13	7.2:1	7.36 (4.13-12.39)					
D 40 13C2_PFHxDA CAS: SESI-0103													
815 > 770		6.260	6.252	0.000	1036569	22	>100:1			2000.00	2195.95	114	
35 Perfluoro-n-hexadecanoic acid (PFHxDA) CAS: 67905-19-5													
813 > 769	40	6.267	6.252	0.000	2918	14	5.9:1	Target = 12.21		4.0504	0.01620	< LOQ	J
813 > 269	40	6.275	6.252		502	18	8.2:1	5.81 (6.10-18.32)*					J
36 Perfluoro-n-octadecanoic acid (PFODA) CAS: 16517-11-6													U
913 > 869	40		6.751		ND								
*** 37 13C2_PFDA**													U
515 > 470			4.135		ND								
*** 39 13C2_PFHxA CAS: SESI-0120**													
315 > 270		2.299	2.309	0.000	686	16	7.5:1			0			
*** 41 13C2_PFOA CAS: 864071-08-9**													
415 > 370		3.004	3.127	0.000	251	13	3.0:1			0			
*** 43 13C3_PFBA**													
216 > 172		1.652	1.652	0.000	22615	17	90:1			0			
*** 48 13C4_PFOS CAS: 2795-39-3**													
503 > 80		3.629	3.621	0.000	5135	18	28:1			0			

Compound Type Legend

D - Isotopic Dilution Std.
* - ISTD

QC Flag Legend

U - Result Less Than Method Detection Limit
J - Compound Fails Signal Ratio Limit

Pace Environmental Services, LLC
Analyte Quantitation Report

Data File: \\Organics\LL\LCMSMS01.i\090923-nonDOD+ICAL.b\090923025.d
Injection Date: 09-Sep-2023 16:38:44 Injection Vol: 10.0 uL
Sample Type: CHECKSTD Auto Sampler: 11
Sample Info: ISOMER CHECK_SVLC-2964 Misc. Info:
Inst. ID: LCMSMS01.i Operator: eqi.svoa

Method: LCMSMS01_PFAS-ID2 Version: V16 30-Jun-2022 10:54:24
Calib Method: PFAS-ID2 Lock State: Unlocked
Quant Method: IsoDil Integrator: picker

Reagent: IsomerCheck Conc. Level: Smp Vol. Added: 1.00 ml

Signal	Quant Std	RT (Min)	Exp RT (Min)	S RT (Min)	Response	Peak Pts	S/N	Ion Ratio	Isomer Ratio	Cal Conc ng/L	OnCol Conc ng/L	%Rec	Flags
20 Perfluoro-n-octanoic acid (PFOA) CAS: 335-67-1													
413 > 369	53	3.137	3.127	0.000	7919706	31	>100:1	Target = 2.68	6.60	10000	8485.54		
413 > 169	53	3.137	3.127		3236493	33	>100:1	2.44 (1.34-4.03)	4.10				
6 N-methylperfluoro-1-octanesulfonamidoacetic acid (N-MeFOSAA) CAS: 2355-31-9													
570 > 419	58	4.342	4.333	0.000	2029553	51	>100:1	Target = 1.64	7.64	10000	10950		M
570 > 483	58	4.342	4.333		1063610	44	>100:1	1.90 (0.82-2.46)	4.03				
5 N-ethylperfluoro-1-octanesulfonamidoacetic acid (N-EtFOSAA) CAS: 2991-50-6													
584 > 419	60	4.575	4.574	0.000	1978764	53	>100:1	Target = 1.71	7.06	10000	10365		M
584 > 526	60	4.575	4.574		924541	42	>100:1	2.14 (0.85-2.57)	5.06				
*** 43 13C3_PFBA**													
216 > 172		1.653	1.652	0.000	19666	20	65:1			2000.00			
*** 39 13C2_PFHxA CAS: SESI-0120**													
315 > 270		2.300	2.309	0.000	838	16	6.0:1			2000.00			
*** 41 13C2_PFOA CAS: 864071-08-9**													
415 > 370		3.137	3.127	0.000	6540	19	18:1			2000.00			
*** 48 13C4_PFOS CAS: 2795-39-3**													
503 > 80		3.630	3.621	0.000	4677	19	14:1			2000.00			
*** 37 13C2_PFDA**													
515 > 470		4.196	4.135	0.000	258	13	>100:1			2000.00			
D 46 13C4_PFBA CAS: SESI-0111													
217 > 172		1.653	1.652	0.000	2086783	16	>100:1			2000.00	2045.39	99	
D 50 13C5_PFPeA CAS: SESI-0112													
267.9 > 223		1.966	1.965	0.000	2015404	18	>100:1			2000.00	2074.25	101	
D 44 13C3_PFBS CAS: SESI-0116													
302 > 80		2.014	2.013	0.000	798472	24	>100:1			2000.00	2171.56	104	
D 63 13C2_4:2 FTS_2 CAS: SESI-0104													
329 >81		2.263	2.262	0.000	529206	16	>100:1			10000	10834	113	
D 49 13C5_PFHxA CAS: SESI-0113													
318 > 273		2.300	2.299	0.000	1809476	17	>100:1			2000.00	2053.67	102	
D 66 13C3_GenX CAS: SESI-0121													
287 > 185		2.422	2.411	0.000	1291398	19	>100:1			10000	10501	106	
D 47 13C4_PFHpA CAS: SESI-0114													
367 > 322		2.687	2.686	0.000	2328499	19	>100:1			2000.00	2123.33	104	
D 45 13C3_PFHxS CAS: SESI-0096													
402 > 80		2.703	2.702	0.000	732435	20	>100:1			2000.00	2062.43	102	
D 64 13C2_6:2 FTS_2 CAS: SESI-0105													
429 > 81		3.102	3.092	0.000	521295	23	>100:1			10000	9868.93	104	
D 53 13C8_PFOA CAS: SESI-0097													
421 > 376		3.128	3.127	0.000	1988554	20	>100:1			2000.00	2012.79	102	
D 56 13C9_PFNA CAS: SESI-0099													
472 > 427		3.630	3.621	0.000	1976493	24	>100:1			2000.00	2074.91	99	

Signal	Quant Std	RT (Min)	Exp RT (Min)	S RT (Min)	Response	Peak Pts	S/N	Ion Ratio	Isomer Ratio	Cal Conc ng/L	OnCol Conc ng/L	%Rec	Flags
D 54 13C8_PFOS CAS: SESI-0098													
507 > 80		3.630	3.621	0.000	618744	22	>100:1			2000.00	2011.81	99	
D 55 13C8_PFOSA CAS: SESI-0107													
506 > 78		4.076	4.067	0.000	1093770	23	>100:1			2000.00	2032.14	101	
D 65 13C2_8:2 FTS_2 CAS: SESI-0106													
529 > 81		4.099	4.097	0.000	496229	22	>100:1			10000	11375	118	
D 51 13C6_PFDA CAS: SESI-0115													
519 > 474		4.121	4.112	0.000	1889153	25	>100:1			2000.00	2121.55	102	
D 58 d3-MeFOSAA CAS: SESI-0102													
573 > 419		4.334	4.324	0.000	2316534	21	>100:1			10000	10737	109	
D 60 d5-EtFOSAA CAS: SESI-0110													
589 > 419		4.567	4.559	0.000	1925055	24	>100:1			10000	10431	107	
D 52 13C7_PFUdA CAS: SESI-0117													
570 > 525		4.567	4.566	0.000	1706581	22	>100:1			2000.00	2128.01	101	
D 61 d7-MeFOSE CAS: SESI-0129													
623 > 59		4.724	4.723	0.000	345896	21	>100:1			2000.00	2043.44	110	
D 57 d3-MeFOSA CAS: SESI-0109													
515 > 169		4.750	4.749	0.000	139345	23	>100:1			2000.00	1992.07	107	
D 62 d9-EtFOSE CAS: SESI-0130													
639 > 59		4.983	4.982	0.000	313602	22	>100:1			2000.00	1939.58	99	
D 38 13C2_PFDoA CAS: SESI-0118													
615 > 570		4.983	4.982	0.000	1662974	22	>100:1			2000.00	2157.49	104	
D 59 d5-EtFOSA CAS: SESI-0108													
531 > 169		5.013	5.012	0.000	152814	40	>100:1			2000.00	2283.62	118	
D 42 13C2_PFTeDA CAS: SESI-0119													
715 > 670		5.680	5.673	0.000	1724264	24	>100:1			2000.00	2160.11	106	
D 40 13C2_PFHxDA CAS: SESI-0103													
815 > 770		6.259	6.252	0.000	828587	23	>100:1			2000.00	1755.35	91	

Compound Type Legend

* - ISTD

D - Isotopic Dilution Std.

QC Flag Legend

M - Compound Hit/Peak Manually Integrated

Report Date: 11-Sep-2023 13:42:40 AIM Revision: 2.0.2023.0816

Pace Environmental Services, LLC

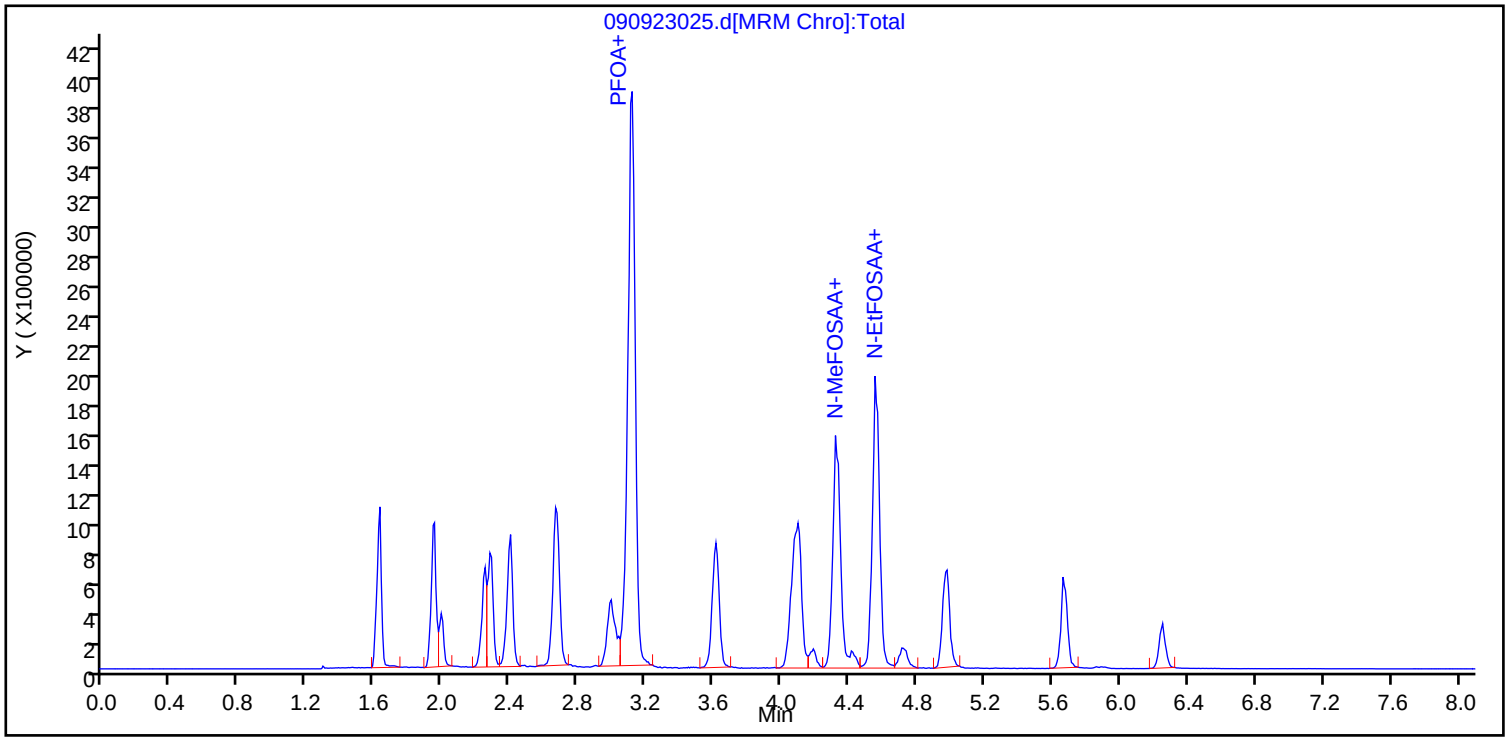
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Injection Date: 09-Sep-2023 16:38:44 Inst. ID: LCMSMS01.i

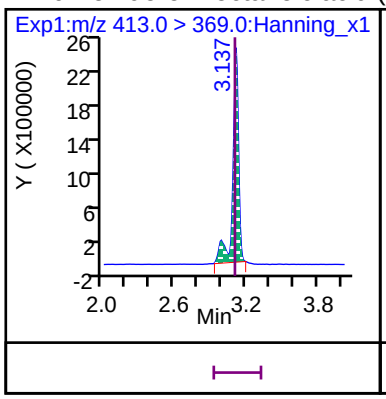
Client ID: Lab ID: ISOMER CHECK_SVLC-2964

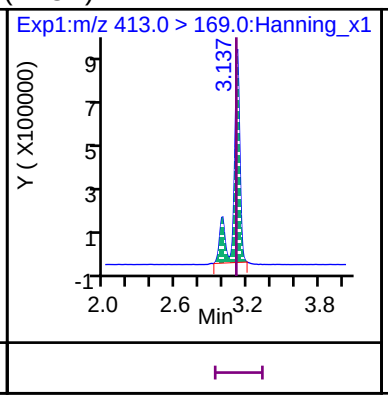
Sample Info: ISOMER CHECK_SVLC-2964

Dil. Factor: 1 Operator: eqi.svoa

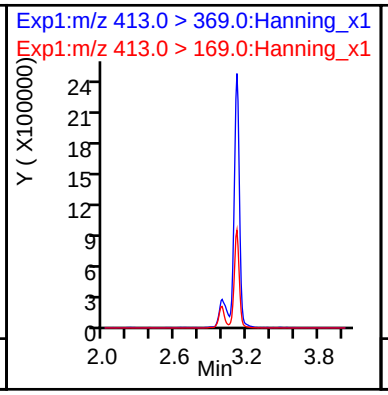


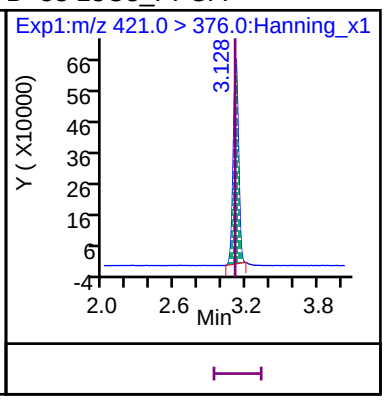
20 Perfluoro-n-octanoic acid (PFOA)



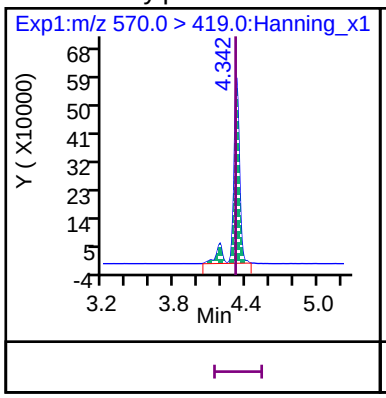


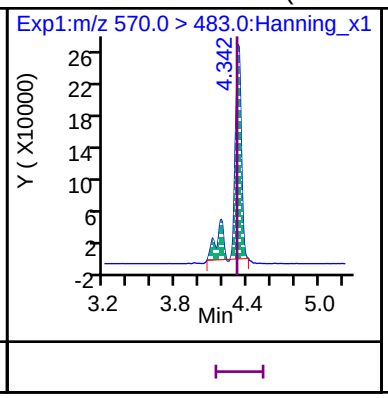
D 53 13C8_PFOA



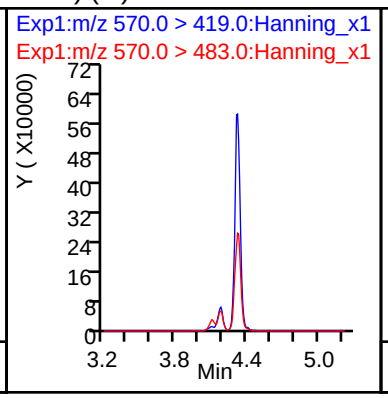


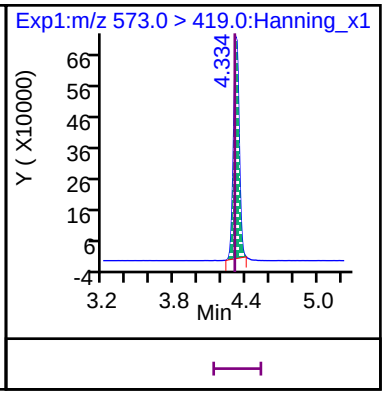
6 N-methylperfluoro-1-octanesulfonamidoacetic acid (N-MeFOSAA) (M)



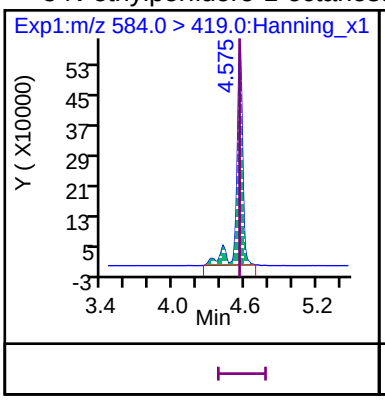


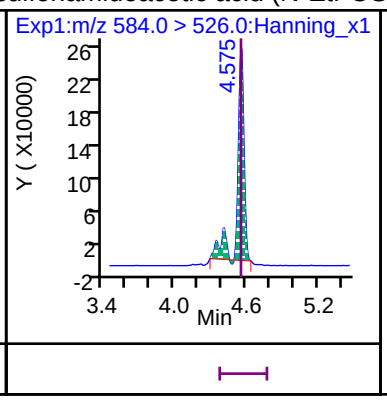
D 58 d3-MeFOSAA

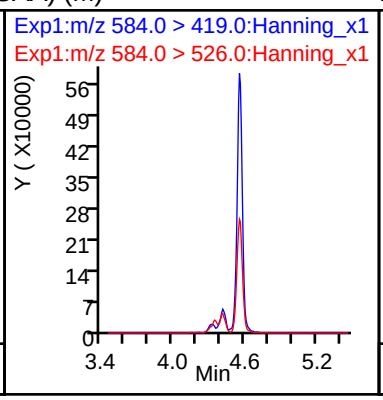




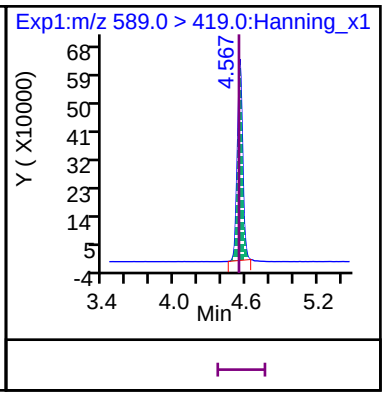
5 N-ethylperfluoro-1-octanesulfonamidoacetic acid (N-EtFOSAA) (M)



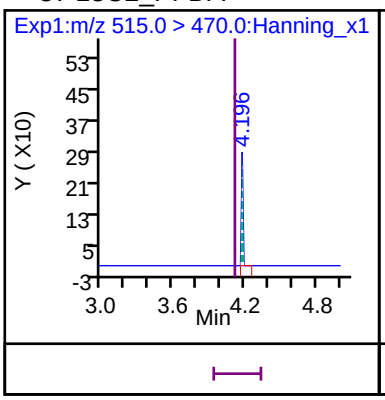




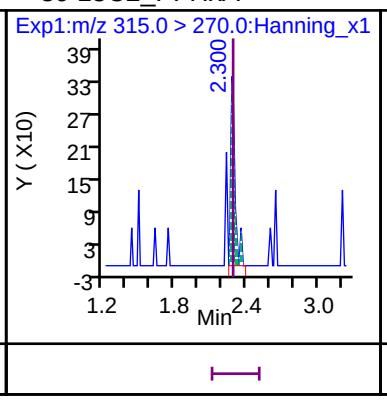
D 60 d5-EtFOSAA



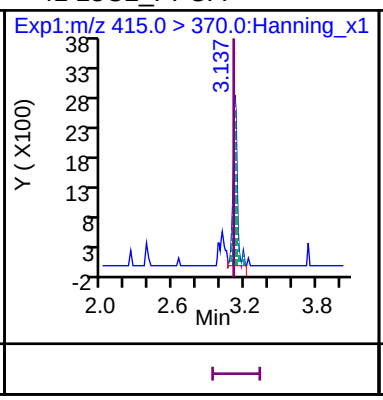
* 37 13C2_PFDA



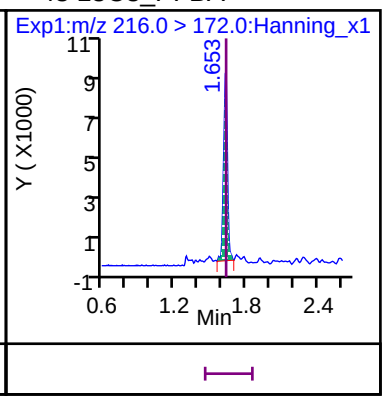
* 39 13C2_PFHxA



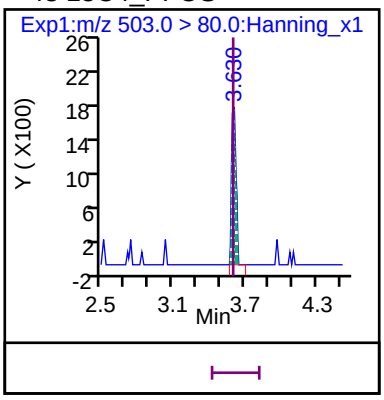
* 41 13C2_PFOA



* 43 13C3_PFBA



* 48 13C4_PFOS



Report Date: 14-Sep-2023 12:06:30 AIM Revision: 2.0.2023.0816

Pace Environmental Services, LLC

Initial Calibration Signal Ratios Report

Batch: \\Organics\LL\LCMSMS02.i\091323-nonDOD+ICAL.b

Method: LCMSMS02_PFAS-ID2.M Version: V16 30-Jun-2022 10:54:24

Instrument: LCMSMS02.i Integrator: picker

Cal Start Date: 13-Sep-2023 15:40:01 Cal End Date: 13-Sep-2023 17:07:56

Method Lock: Unknown Lock Date:

Calib Method: PFAS-ID2 No.Compounds: 66

Calibration Concentration Units: ng/L

Initial Calibration Samples: Primary Reagent: Analytes

Batch: \\Organics\LL\LCMSMS02.i\091323-nonDOD+ICAL.b

Level	Cal File	Cal Sample ID	Cal Date
2	091323009.d	ICAL 100_SVLC-2954	13-Sep-2023 15:40:01
3	091323010.d	ICAL 200_SVLC-2966	13-Sep-2023 15:50:57
4	091323011.d	ICAL 500_SVLC-2956	13-Sep-2023 16:01:48
5	091323012.d	ICAL 1000_SVLC-3024	13-Sep-2023 16:12:41
6	091323013.d	ICAL 2000_SVLC-2958	13-Sep-2023 16:23:46
7	091323014.d	ICAL 5000_SVLC-2967	13-Sep-2023 16:34:48
8	091323015.d	ICAL 10000_SVLC-2960	13-Sep-2023 16:45:52
9	091323016.d	ICAL 15000_SVLC-2961	13-Sep-2023 16:56:54
10	091323017.d	ICAL 20000_SVLC-2962	13-Sep-2023 17:07:56

Column: 1 Detector: LCMS-Q3

Compound	Ratio Level 2	Ratio Level 3	Ratio Level 4	Ratio Level 5	Ratio Level 6	Ratio Level 7	Ratio Level 8	Ratio Level 9	Ratio Level 10	Average Ratio	Avg. +/-3 SD Ratio Limits	StdD Limit	50% Limit
7 PFBS	3.349	3.530	3.452	3.472	3.307	3.345	3.278	3.475	3.417	3.402	3.062-3.742	0.11329	1.701
1 4:2 FTS	0.614	1.185	1.290	1.572	1.601	1.901	1.860	1.752	1.87[illegible]	[illegible].517	0.258-2.775	0.41953	0.758
15 PFHxA	13.106	18.618	18.239	17.186	17.994	18.808	19.166	18.128	18.009	17.694	12.267-23.121	1.80902	8.847
22 PFPeS	2.732	3.086	3.214	2.904	2.768	2.842	2.977	2.906	3.101	2.947	2.470-3.425	0.15908	1.473
28 GenX	0.884	[illegible].747	0.848	0.751	0.779	0.769	0.769	0.814	0.816	0.797	0.664-0.930	0.04431	0.398
13 PFHpA	3.281	3.568	3.408	3.753	3.723	3.528	3.567	3.594	3.558	3.553	3.130-3.975	0.14078	1.776
14 PFHxS	2.842	3.205	2.931	2.498	3.011	2.983	3.130	3.073	2.993	2.962	2.352-3.573	0.20352	1.481
29 ADONA	3.220	3.052	3.022	3.137	2.901	2.961	2.860	2.947	2.823	2.991	2.595-3.387	0.13188	1.495
2 6:2 FTS	Disabled	2.474	1.579	1.775	1.898	1.936	1.751	1.955	2.120	1.936	1.055-2.816	0.29349	0.968
20 PFOA	2.666	3.953	3.193	2.994	2.935	3.066	2.940	2.814	3.104	3.073	2.002-4.145	0.35710	1.536
12 PFHpS	3.681	2.059	3.969	3.029	2.775	2.882	3.096	3.163	2.900	3.061	1.479-4.643	0.52723	1.530
18 PFOS	3.058	3.700	3.800	3.291	3.255	3.763	3.547	3.756	3.524	3.521	2.471-4.572	0.35017	1.760
17 PFNA	6.441	5.577	7.803	5.447	6.215	6.016	5.852	5.802	5.593	6.082	3.932-8.233	0.71681	3.041
19 PFOSA	39.061	70.054	35.970	50.540	31.342	29.492	33.986	32.768	32.866	39.564	-1.592-80.721	13.71892	19.782
16 PFNS	3.183	2.731	2.731	2.513	2.935	2.690	2.756	2.602	2.745	2.765	2.175-3.354	0.19658	1.382
3 8:2 FTS	Disabled	1.698	2.244	1.827	2.328	1.797	1.980	1.631	1.839	1.918	1.153-2.682	0.25494	0.959
10 PFDA	18.140	11.302	13.445	12.355	14.309	13.004	14.314	13.359	13.404	13.736	8.282-19.191	1.81813	6.868
6 N-MeFOSAA	1.227	1.558	1.361	1.446	1.291	1.429	1.335	1.414	1.402	1.384	1.111-1.658	0.09115	0.692
9 PFDS	1.982	2.818	2.611	2.645	2.739	2.733	2.705	2.729	2.617	2.619	1.862-3.376	0.25231	1.309
25 PFUdA	9.750	13.063	14.670	13.236	13.576	14.066	13.575	14.889	13.678	13.389	9.091-17.686	1.43245	6.694
5 N-EtFOSAA	1.558	1.625	1.865	1.774	1.712	1.833	1.570	1.518	1.569	1.669	1.227-2.110	0.14717	0.834
26 MeFOSA	1.026	1.017	1.010	1.002	1.083	0.991	1.040	1.063	1.067	1.033	0.892-1.174	0.04700	0.516
11 PFDoA	9.506	12.672	9.936	10.712	11.250	10.919	10.833	10.651	9.822	10.700	7.939-13.460	0.92005	5.350
4 10:2 FTS	3.196	2.666	2.890	3.000	3.451	3.271	3.148	3.167	3.127	3.101	2.390-3.812	0.23699	1.550
27 EtFOSA	1.032	1.218	1.036	0.987	0.963	1.025	0.937	0.923	0.922	1.004	0.743-1.266	0.08714	0.502
34 PFDOS	2.902	3.130	2.775	3.036	2.961	2.728	2.917	2.804	3.104	2.928	2.520-3.336	0.13612	1.464
24 PFTrDA	7.754	6.206	6.790	6.381	6.344	[illegible].531	6.613	6.727	6.665	6.667	5.309-8.026	0.45274	3.333
23 PFTeDA	12.926	10.43[illegible]	11.367	10.950	11.165	11.682	11.279	10.710	10.454	11.219	8.996-13.441	0.74080	5.609
35 PFHxDA	12.936	11.902	11.251	10.986	11.902	12.176	11.848	11.395	11.181	11.730	9.982-13.478	0.58264	5.865
36 PFODA	11.135	11.205	11.076	11.280	11.220	11.445	11.376	11.230	11.064	11.225	10.863-11.587	0.12059	5.612

Report Date: 14-Sep-2023 12:06:30 AIM Revision: 2.0.2023.0816

Pace Environmental Services, LLC

Initial Calibration RF Report

Batch: \\Organics\LL\LCMSMS02.i\091323-nonDOD+ICAL.b

Method: LCMSMS02_PFAS-ID2.M Version: V16 30-Jun-2022 10:54:24

Instrument: LCMSMS02.i Integrator: picker

Cal Start Date: 13-Sep-2023 15:40:01 Cal End Date: 13-Sep-2023 17:07:56

Method Lock: Unknown Lock Date:

Calib Method: PFAS-ID2 No.Compounds: 66

Calibration Concentration Units: ng/L

Initial Calibration Samples: Primary Reagent: Analytes

Batch: \\Organics\LL\LCMSMS02.i\091323-nonDOD+ICAL.b

Level	Cal File	Cal Sample ID	Cal Date
2	091323009.d	ICAL 100_SVLC-2954	13-Sep-2023 15:40:01
3	091323010.d	ICAL 200_SVLC-2966	13-Sep-2023 15:50:57
4	091323011.d	ICAL 500_SVLC-2956	13-Sep-2023 16:01:48
5	091323012.d	ICAL 1000_SVLC-3024	13-Sep-2023 16:12:41
6	091323013.d	ICAL 2000_SVLC-2958	13-Sep-2023 16:23:46
7	091323014.d	ICAL 5000_SVLC-2967	13-Sep-2023 16:34:48
8	091323015.d	ICAL 10000_SVLC-2960	13-Sep-2023 16:45:52
9	091323016.d	ICAL 15000_SVLC-2961	13-Sep-2023 16:56:54
10	091323017.d	ICAL 20000_SVLC-2962	13-Sep-2023 17:07:56

Curve Legend: Ex. Avg:H Wt:C2 Org:F Dep:R

Curve Type: Avg, Ln, Qd Response Type: H-Height, A-Area

Wt: Curve Weighting, C-1/Conc, C2-1/Conc^2, R-1/Rsp, R2-1/Rsp^2, N-None

Org: Origin, F-Force, I-Include, N-Neither

Dep: Dependent Variable, C-Concentration, R-Response

%Rec = (Measured Amount / True Amount) * 100

Column: 1 Detector: LCMS-Q3

Compound	Level 2 / %Rec	Level 3 / %Rec	Level 4 / %Rec	Level 5 / %Rec	Level 6 / %Rec	Level 7 / %Rec	Level 8 / %Rec	Level 9 / %Rec	Level 10 / %Rec	Curve	M1	B	Curve Errors	Flags
D 46 13C4_PFBA	870	966	889	925	865	888	794	765	742	Avg:A Wt:C2	856		RSD=8.7	
	101	112	103	108	101	103	92	89	86	Org:N Dep:R				
8 PFBA	1.017478	1.001949	0.957097	0.948749	0.945005	0.978741	0.942427	0.958524	0.953709	Avg:A Wt:C2	0.967075		RSD=2.8	
	105	103	98	98	97	101	97	99	98	Org:N Dep:R				
D 50 13C5_PFPeA	942	1022	931	962	931	929	863	820	829	Avg:A Wt:C2	914		RSD=7.2	
	103	111	101	105	101	101	94	89	90	Org:N Dep:R				
21 PFPeA	1.039241	1.115368	0.983471	1.018241	0.988565	1.065994	0.989666	1.034382	1.004616	Avg:A Wt:C2	1.026616		RSD=4.2	
	101	108	95	99	96	103	96	100	97	Org:N Dep:R				
D 44 13C3_PFBS	330	359	336	341	322	326	304	302	296	Avg:A Wt:C2	324	✓	RSD=6.3 ✓	
	101	110	103	105	99	100	93	93	91 ✓	Org:N Dep:R				
7 PFBS	1.202917	1.220847	1.130569	1.130395	1.135216	1.195184	1.126144	1.173282	1.156527	Avg:A Wt:C2	1.163453	✓	RSD=3.1 ✓	
	103	104	97	97	97	102	96	100	99 ✓	Org:N Dep:R				

Compound	Level 2 / %Rec	Level 3 / %Rec	Level 4 / %Rec	Level 5 / %Rec	Level 6 / %Rec	Level 7 / %Rec	Level 8 / %Rec	Level 9 / %Rec	Level 10 / %Rec	Curve	M1	B	Curve Errors	Flags
D 63 13C2_4:2 FTS_2	31.4150	33.8226	32.5600	32.4762	32.0222	29.5042	31.4157	29.8991	28.0019	Avg:A Wt:C2	31.2352		RSD=5.8	
	100	108	104	103	102	94	100	95	89	Org:N Dep:R				
1 4:2 FTS	2.140305	2.533847	1.712602	2.135677	2.002024	2.383118	1.922152	2.086050	2.138831	Avg:A Wt:C2	2.117178		RSD=11.3	
	101	119	80	100	94	112	90	98	101	Org:N Dep:R				
D 49 13C5_PFHxA	981	1149	1048	1050	1017	1020	947	932	918	Avg:A Wt:C2	1007		RSD=7.2	
	97	114	104	104	100	101	94	92	91	Org:N Dep:R				
15 PFHxA	1.090217	1.004698	0.998717	1.002849	1.006900	1.017277	0.956817	0.954703	0.933753	Avg:A Wt:C2	0.996215		RSD=4.6	
	109	100	100	100	101	102	96	95	93	Org:N Dep:R				
22 PFPeS	0.801151	0.792386	0.735170	0.775587	0.747253	0.799568	0.772209	0.742021	0.791329	Avg:A Wt:C2	0.772964		RSD=3.3	
	103	102	95	100	96	103	99	95	102	Org:N Dep:R				
28 GenX	0.798843	0.786169	0.733695	0.703347	0.750136	0.789221	0.674159	0.754772	0.730791	Avg:A Wt:C2	0.746793		RSD=5.5	
	106	105	98	94	100	105	90	101	97	Org:N Dep:R				
D 66 13C3_GenX	317	325	318	319	290	294	292	272	272	Avg:A Wt:C2	300		RSD=6.9	
	105	108	106	106	96	97	97	90	90	Org:N Dep:R				
13 PFHpA	1.103291	1.137541	1.019789	0.957396	1.092316	1.061692	1.000827	1.026022	0.999853	Avg:A Wt:C2	1.044303		RSD=5.6	
	105	108	97	91	104	101	95	98	95	Org:N Dep:R				
D 47 13C4_PFHpA	1006	1112	1071	1157	986	1048	933	896	897	Avg:A Wt:C2	1012		RSD=9.2	
	99	109	105	114	97	103	92	88	88	Org:N Dep:R				
D 45 13C3_PFHxS	219	253	243	230	216	234	210	194	208	Avg:A Wt:C2	223		RSD=8.4	
	98	113	108	103	96	105	93	87	93	Org:N Dep:R				
14 PFHxS	1.179030	1.168104	1.033990	1.036302	1.087055	1.073052	1.091888	1.154494	1.053481	Avg:A Wt:C2	1.097489		RSD=5.1	
	107	106	94	94	99	97	99	105	95	Org:N Dep:R				
29 ADONA	8.242831	7.387015	6.978784	7.504301	7.265142	7.112114	6.935279	7.211239	6.454119	Avg:A Wt:C2	7.232314		RSD=6.7	
	113	102	96	103	100	98	95	99	89	Org:N Dep:R				
2 6:2 FTS Dropped point < RL no impact	Disabled	3.466008	2.444354	2.853372	2.470208	2.337978	2.163796	2.406193	2.380533	Ln:A Wt:C2	2.324717	204	R^2=0.991	
	Disabled	102	86	113	101	98	92	102	101	Org:N Dep:R			RSE=8.6	
D 64 13C2_6:2 FTS_2	35.7552	36.8467	36.2266	34.4444	34.1058	36.2286	32.7035	30.8676	31.6904	Avg:A Wt:C2	34.3188		RSD=6.3	
	104	107	105	100	99	105	95	89	92	Org:N Dep:R				
20 PFOA	0.945526	1.104037	0.978661	0.904687	0.979638	0.998672	0.930591	0.953979	0.961667	Avg:A Wt:C2	0.973051		RSD=5.8	
	97	113	100	92	100	102	95	98	98	Org:N Dep:R				
D 53 13C8_PFOA	1026	1183	1063	1177	1022	1065	950	889	874	Avg:A Wt:C2	1028		RSD=10.8	
	99	115	103	114	99	103	92	86	85	Org:N Dep:R				
12 PFHpS	1.125671	0.996648	1.039639	1.044562	1.046475	1.085627	1.071948	1.132339	1.022288	Avg:A Wt:C2	1.062800		RSD=4.3	
	105	93	97	98	98	102	100	106	96	Org:N Dep:R				
D 56 13C9_PFNA	1064	1093	1106	1081	1028	1098	960	936	942	Avg:A Wt:C2	1034		RSD=6.8	
	102	105	106	104	99	106	92	90	91	Org:N Dep:R				
18 PFOS	1.154749	1.237265	1.115811	1.190154	1.197180	1.081537	1.137618	1.158843	1.088043	Avg:A Wt:C2	1.151244		RSD=4.5	
	100	107	96	103	103	93	98	100	94	Org:N Dep:R				
17 PFNA	1.209402	1.143821	1.093522	0.958128	1.005240	1.007488	1.013171	0.971844	0.909154	Avg:A Wt:C2	1.034641		RSD=9.3	
	116	110	105	92	97	97	97	93	87	Org:N Dep:R				
D 54 13C8_PFOS	234	248	230	214	207	243	203	199	205	Avg:A Wt:C2	220		RSD=8.4	
	106	112	104	97	94	110	92	90	93	Org:N Dep:R				

Compound	Level 2 / %Rec	Level 3 / %Rec	Level 4 / %Rec	Level 5 / %Rec	Level 6 / %Rec	Level 7 / %Rec	Level 8 / %Rec	Level 9 / %Rec	Level 10 / %Rec	Curve	M1	B	Curve Errors	Flags
30 9Cl-PF3ONS	3.432148	3.380706	3.205025	3.643764	3.431615	3.216297	3.251826	3.282270	3.321081	Avg:A Wt:C2	3.351637		RSD=4.1	
	102	100	95	108	102	95	97	97	99	Org:N Dep:R				
19 PFOSA	0.914685	1.121175	0.847821	1.011826	0.969605	1.058122	0.944989	0.975220	0.993322	Avg:A Wt:C2	0.981863		RSD=8.1	
	93	114	86	103	98	107	96	99	101	Org:N Dep:R				
D 55 13C8_PFOSA	428	416	429	405	416	391	388	372	381	Avg:A Wt:C2	403		RSD=5.2	
	106	103	106	100	103	97	96	92	94	Org:N Dep:R				
D 65 13C2_8:2 FTS_2	28.5105	27.8023	28.0251	26.0184	27.2494	24.8934	25.5465	23.6007	24.8129	Avg:A Wt:C2	26.2732		RSD=6.5	
	108	105	106	99	103	94	97	89	94	Org:N Dep:R				
16 PFNS	0.832643	0.850565	0.774915	0.765620	0.853405	0.684393	0.707103	0.743697	0.738060	Avg:A Wt:C2	0.772267		RSD=8.0	
	107	110	100	99	110	88	91	96	95	Org:N Dep:R				
3 8:2 FTS Dropped point < RL no impact	Disabled	2.107597	1.655018	2.109235	2.037700	2.029095	1.786178	1.790335	1.778332	Avg:A Wt:C2	1.911686		RSD=9.3	
	Disabled	110	86	110	106	106	93	93	93	Org:N Dep:R				
D 51 13C6_PFDA	859	1025	935	966	937	930	839	766	759	Avg:A Wt:C2	891		RSD=10.2	
	96	115	104	108	105	104	94	85	85	Org:N Dep:R				
10 PFDA	1.182258	1.076348	1.052512	1.042520	1.024924	1.057138	1.013810	1.107610	1.100949	Avg:A Wt:C2	1.073119		RSD=4.8	
	110	100	98	97	95	98	94	103	102	Org:N Dep:R				
D 58 d3-MeFOSAA	207	201	207	190	199	190	187	184	190	Avg:A Wt:C2	195		RSD=4.3	
	106	103	105	97	101	97	95	94	97	Org:N Dep:R				
6 N-MeFOSAA	0.714558	0.836913	0.708427	0.769352	0.686159	0.793815	0.707853	0.725454	0.721106	Avg:A Wt:C2	0.740404		RSD=6.6	
	96	113	95	103	92	107	95	97	97	Org:N Dep:R				
9 PFDS	0.765175	0.758071	0.768642	0.794236	0.814606	0.687798	0.721606	0.731856	0.699411	Avg:A Wt:C2	0.749044		RSD=5.7	
	102	101	102	106	108	91	96	97	93	Org:N Dep:R				
D 60 d5-EtFOSAA	179	191	199	181	184	168	172	154	158	Avg:A Wt:C2	176		RSD=8.4	
	101	108	113	102	104	95	97	87	89	Org:N Dep:R				
25 PFUdA	0.839925	0.999828	1.007071	0.912161	0.934076	0.901660	0.916669	0.991079	0.906708	Avg:A Wt:C2	0.934353	✓	RSD=5.9	✓
	89	107	107	97	99	96	98	106	97	Org:N Dep:R				
D 52 13C7_PFUdA	915	992	928	947	902	969	824	755	795	Avg:A Wt:C2	892		RSD=9.2	✓
	102	111	104	106	101	108	92	84	89	Org:N Dep:R		✓		
5 N-EtFOSAA	0.945344	1.122309	0.884708	0.933539	0.916140	1.044653	0.844637	0.947035	0.879458	Avg:A Wt:C2	0.946425		RSD=9.2	
	99	118	93	98	96	110	89	100	92	Org:N Dep:R				
D 61 d7-MeFOSE	114	122	125	126	122	114	123	107	112	Avg:A Wt:C2	118		RSD=5.6	
	96	103	105	106	103	96	103	90	94	Org:N Dep:R				
32 MeFOSE	1.252967	1.264807	1.045872	1.035320	0.952835	1.127838	0.964066	1.088208	1.056933	Avg:A Wt:C2	1.087650		RSD=10.2	
	115	116	96	95	87	103	88	100	97	Org:N Dep:R				
26 MeFOSA	1.124833	1.390305	1.210138	1.252772	1.220691	1.328946	1.130158	1.117139	1.143913	Avg:A Wt:C2	1.213211		RSD=8.0	
	92	114	99	103	100	109	93	92	94	Org:N Dep:R				
D 57 d3-MeFOSA	67.1655	61.3175	65.5925	59.8385	59.3070	58.4385	59.8290	60.9255	60.4015	Avg:A Wt:C2	61.4239		RSD=4.8	
	109	99	106	97	96	95	97	99	98	Org:N Dep:R				
31 11Cl-PF3OUDS	2.636306	2.730864	2.651202	2.673064	2.920589	2.506410	2.578189	2.803899	2.752582	Avg:A Wt:C2	2.694790		RSD=4.6	
	97	101	98	99	108	93	95	104	102	Org:N Dep:R				
D 38 13C2_PFDoA	862	982	904	933	892	925	814	779	782	Avg:A Wt:C2	875		RSD=8.1	
	98	112	103	106	101	105	93	89	89	Org:N Dep:R				

Compound	Level 2 / %Rec	Level 3 / %Rec	Level 4 / %Rec	Level 5 / %Rec	Level 6 / %Rec	Level 7 / %Rec	Level 8 / %Rec	Level 9 / %Rec	Level 10 / %Rec	Curve	M1	B	Curve Errors	Flags
11 PFDoA	1.107536	1.174709	1.022615	1.030416	1.017157	1.054778	1.042151	1.054484	1.001172	Avg:A Wt:C2	1.056113		RSD=5.1	
	104	111	96	97	96	99	98	99	94	Org:N Dep:R				
D 62 d9-EtFOSE	119	118	125	121	121	108	112	109	113	Avg:A Wt:C2	116		RSD=5.1	
	102	101	107	104	104	92	96	93	97	Org:N Dep:R				
33 EtFOSE	1.255704	1.404325	0.962725	1.094077	0.992209	1.311828	1.080612	1.115516	1.125189	Avg:A Wt:C2	1.149131		RSD=12.8	
	109	122	83	95	86	114	94	97	97	Org:N Dep:R				
4 10:2 FTS	2.022259	2.192235	1.831938	2.016447	2.064551	2.127445	1.861547	2.061766	1.964388	Avg:A Wt:C2	2.015842		RSD=5.8	
	100	108	90	100	102	105	92	102	97	Org:N Dep:R				
D 59 d5-EtFOSA	59.2090	60.4850	62.5625	60.6400	54.3320	55.9640	55.7325	53.3435	57.1740	Avg:A Wt:C2	57.7158		RSD=5.5	
	102	104	108	105	94	96	96	92	99	Org:N Dep:R				
27 EtFOSA	1.525106	1.612053	1.134737	1.114363	1.231963	1.305139	1.074980	1.098893	1.093091	Avg:A Wt:C2	1.243369		RSD=16.1	
	122	129	91	89	99	104	86	88	87	Org:N Dep:R				
34 PFDOS	0.702512	0.745173	0.659820	0.727284	0.728137	0.648596	0.724540	0.723639	0.732892	Avg:A Wt:C2	0.710288		RSD=4.8	
	98	104	92	102	102	91	102	101	103	Org:N Dep:R				
24 PFTrDA	0.817146	0.755624	0.759066	0.722594	0.697613	0.753477	0.747208	0.780942	0.766474	Avg:A Wt:C2	0.755572		RSD=4.5	
	108	100	100	95	92	99	98	103	101	Org:N Dep:R				
D 42 13C2_PFTeDA	885	1014	924	950	899	917	849	817	860	Avg:A Wt:C2	902		RSD=6.5	
	98	112	102	105	99	101	94	90	95	Org:N Dep:R				
23 PFTeDA	1.089204	0.997088	0.975263	0.953944	0.986673	1.012160	0.924313	0.941901	0.901324	Avg:A Wt:C2	0.975763		RSD=5.7	
	111	102	99	97	101	103	94	96	92	Org:N Dep:R				
35 PFHxDA	0.578251	0.630674	0.551698	0.583703	0.539540	0.615970	0.528079	0.525975	0.516633	Avg:A Wt:C2	0.563391		RSD=7.3	
	102	111	97	103	95	109	93	93	91	Org:N Dep:R				
D 40 13C2_PFHxDA	783	792	816	769	798	749	741	741	742	Avg:A Wt:C2	770		RSD=3.7	
	101	102	105	99	103	97	96	96	96	Org:N Dep:R				
36 PFODA	0.908941	1.008640	0.865189	0.947444	0.867810	0.996787	0.891955	0.870861	0.851603	Avg:A Wt:C2	0.912137		RSD=6.4	
	99	110	94	103	95	109	97	95	93	Org:N Dep:R				

Report Date: 14-Sep-2023 12:06:30 AIM Revision: 2.0.2023.0816

Pace Environmental Services, LLC

Initial Calibration Ion Suppression Report

Batch: \\Organics\LL\LCMSMS02.i\091323-nonDOD+ICAL.b

Method: LCMSMS02_PFAS-ID2.M Version: V16 30-Jun-2022 10:54:24

Instrument: LCMSMS02.i Integrator: picker

Cal Start Date: 13-Sep-2023 15:40:01 Cal End Date: 13-Sep-2023 17:07:56

Method Lock: Unknown Lock Date:

Calib Method: PFAS-ID2 No.Compounds: 66

Calibration Concentration Units: ng/L

Initial Calibration Samples: Primary Reagent: Analytes

Batch: \\Organics\LL\LCMSMS02.i\091323-nonDOD+ICAL.b

Level	Cal File	Cal Sample ID	Cal Date
2	091323009.d	ICAL 100_SVLC-2954	13-Sep-2023 15:40:01
3	091323010.d	ICAL 200_SVLC-2966	13-Sep-2023 15:50:57
4	091323011.d	ICAL 500_SVLC-2956	13-Sep-2023 16:01:48
5	091323012.d	ICAL 1000_SVLC-3024	13-Sep-2023 16:12:41
6	091323013.d	ICAL 2000_SVLC-2958	13-Sep-2023 16:23:46
7	091323014.d	ICAL 5000_SVLC-2967	13-Sep-2023 16:34:48
8	091323015.d	ICAL 10000_SVLC-2960	13-Sep-2023 16:45:52
9	091323016.d	ICAL 15000_SVLC-2961	13-Sep-2023 16:56:54
10	091323017.d	ICAL 20000_SVLC-2962	13-Sep-2023 17:07:56

Column: 1 Detector: LCMS-Q3

Compound	Response Level 2	Response Level 3	Response Level 4	Response Level 5	Response Level 6	Response Level 7	Response Level 8	Response Level 9	Response Level 10	RPD
* 43 13C3_PFBA	10497	9667	9697	9684	11264	8540	7623	6833	7391	8.68
* 39 13C2_PFHxA	1947	665	938	1225	2166	5198	7293	9676	10399	34.22
* 41 13C2_PFOA	110	230	108	207	1384	4937	7046	9702		48.87
* 48 13C4_PFOS	545	3310	4423	4648	3991	4775	2622	5245	3782	37.40
* 37 13C2_PFDA	233	461	115	1450	2309	4973	12741	18746	22104	48.95

13C3_PFBA ((|7391 - 10497| / (7391 + 10497)) / 2) * 100 = 8.68

13C2_PFHxA ((|10399 - 1947| / (10399 + 1947)) / 2) * 100 = 34.23

13C2_PFOA ((|9702 - 110| / (9702 + 110)) / 2) * 100 = 48.88

13C4_PFOS ((|3782 - 545| / (3782 + 545)) / 2) * 100 = 37.40

13C2_PFDA ((|22104 - 233| / (22104 + 233)) / 2) * 100 = 48.96

not used, not evaluated

Report Date: 14-Sep-2023 12:06:30 AIM Revision: 2.0.2023.0816

Pace Environmental Services, LLC

Initial Calibration Response Report

Batch: \\Organics\LL\LCMSMS02.i\091323-nonDOD+ICAL.b
Method: LCMSMS02_PFAS-ID2.M Version: V16 30-Jun-2022 10:54:24
Instrument: LCMSMS02.i Integrator: picker
Cal Start Date: 13-Sep-2023 15:40:01 Cal End Date: 13-Sep-2023 17:07:56
Method Lock: Unknown Lock Date:
Calib Method: PFAS-ID2 No.Compounds: 66
Calibration Concentration Units: ng/L

Initial Calibration Samples: Primary Reagent: Analytes
Batch: \\Organics\LL\LCMSMS02.i\091323-nonDOD+ICAL.b

Level	Cal File	Cal Sample ID	Cal Date
2	091323009.d	ICAL 100_SVLC-2954	13-Sep-2023 15:40:01
3	091323010.d	ICAL 200_SVLC-2966	13-Sep-2023 15:50:57
4	091323011.d	ICAL 500_SVLC-2956	13-Sep-2023 16:01:48
5	091323012.d	ICAL 1000_SVLC-3024	13-Sep-2023 16:12:41
6	091323013.d	ICAL 2000_SVLC-2958	13-Sep-2023 16:23:46
7	091323014.d	ICAL 5000_SVLC-2967	13-Sep-2023 16:34:48
8	091323015.d	ICAL 10000_SVLC-2960	13-Sep-2023 16:45:52
9	091323016.d	ICAL 15000_SVLC-2961	13-Sep-2023 16:56:54
10	091323017.d	ICAL 20000_SVLC-2962	13-Sep-2023 17:07:56

Quantitation Standards (* - Istd) (D - Iso Dil Std)

* 43 13C3_PFBA	* 39 13C2_PFHxA	* 41 13C2_PFOA
* 48 13C4_PFOS	* 37 13C2_PFDA	D 46 13C4_PFBA
D 50 13C5_PFPeA	D 44 13C3_PFBS	D 63 13C2_4:2 FTS_2
D 49 13C5_PFHxA	D 66 13C3_GenX	D 47 13C4_PFHpA
D 45 13C3_PFHxS	D 64 13C2_6:2 FTS_2	D 53 13C8_PFOA
D 56 13C9_PFNA	D 54 13C8_PFOS	D 55 13C8_PFOSA
D 65 13C2_8:2 FTS_2	D 51 13C6_PFDA	D 58 d3-MeFOSAA
D 60 d5-EtFOSAA	D 52 13C7_PFUdA	D 61 d7-MeFOSE
D 57 d3-MeFOSA	D 62 d9-EtFOSE	D 38 13C2_PFDoA
D 59 d5-EtFOSA	D 42 13C2_PFTeDA	D 40 13C2_PFHxDA

Column: 1 Detector: LCMS-Q3

Compound	Level 2 Conc/Rsp	Level 3 Conc/Rsp	Level 4 Conc/Rsp	Level 5 Conc/Rsp	Level 6 Conc/Rsp	Level 7 Conc/Rsp	Level 8 Conc/Rsp	Level 9 Conc/Rsp	Level 10 Conc/Rsp	Std #
* 43 13C3_PFBA	2000.00	2000.00	2000.00	2000.00	2000.00	2000.00	2000.00	2000.00	2000.00	
	10497	9667	9697	9684	11264	8540	7623	6833	7391	
* 39 13C2_PFHxA	2000.00	2000.00	2000.00	2000.00	2000.00	2000.00	2000.00	2000.00	2000.00	
	1947	665	938	1225	2166	5198	7293	9676	10399	
* 41 13C2_PFOA	2000.00	2000.00	2000.00	2000.00	2000.00	2000.00	2000.00	2000.00		
	110	230	108	207	1384	4937	7046	9702		
* 48 13C4_PFOS	2000.00	2000.00	2000.00	2000.00	2000.00	2000.00	2000.00	2000.00	2000.00	
	545	3310	4423	4648	3991	4775	2622	5245	3782	
* 37 13C2_PFDA	2000.00	2000.00	2000.00	2000.00	2000.00	2000.00	2000.00	2000.00	2000.00	
	233	461	115	1450	2309	4973	12741	18746	22104	
D 46 13C4_PFBA	2000.00	2000.00	2000.00	2000.00	2000.00	2000.00	2000.00	2000.00	2000.00	
	1739301	1932484	1777466	1849042	1730387	1775491	1587412	1530697	1484090	
8 PFBA	100.00	200.00	500.00	1000.00	2000.00	5000.00	10000	15000	20000	#46
	88485	193625	425302	877138	1635224	4344364	7480098	11004079	14153900	
D 50 13C5_PFPeA	2000.00	2000.00	2000.00	2000.00	2000.00	2000.00	2000.00	2000.00	2000.00	
	1884838	2043837	1862774	1924608	1862086	1857147	1726810	1639694	1657582	
21 PFPeA	100.00	200.00	500.00	1000.00	2000.00	5000.00	10000	15000	20000	#50
	97940	227963	457996	979857	1840793	4949270	8544830	12720521	16652335	
D 44 13C3_PFBS	2000.00	2000.00	2000.00	2000.00	2000.00	2000.00	2000.00	2000.00	2000.00	
	659765	717355	672272	681588	643528	651684	608837	603913	591983	

Compound	Level 2 Conc/Rsp	Level 3 Conc/Rsp	Level 4 Conc/Rsp	Level 5 Conc/Rsp	Level 6 Conc/Rsp	Level 7 Conc/Rsp	Level 8 Conc/Rsp	Level 9 Conc/Rsp	Level 10 Conc/Rsp	Std #
7 PFBS	88.400	176.80	442.00	884.00	1768.00	4420.00	8840.00	13260	17680	#44
	35079	77419	167971	340545	645800	1721330	3030520	4697755	6052256	
D 63 13C2_4:2 FTS_2	10000	10000	10000	10000	10000	10000	10000	10000	10000	
	314150	338226	325600	324762	320222	295042	314157	298991	280019	
1 4:2 FTS	93.400	186.80	467.00	934.00	1868.00	4670.00	9340.00	14010	18680	#63
	6280	16009	26041	64781	119756	328357	564003	873818	1118770	
D 49 13C5_PFHxA	2000.00	2000.00	2000.00	2000.00	2000.00	2000.00	2000.00	2000.00	2000.00	
	1961811	2297029	2095160	2099693	2033051	2040498	1893112	1863045	1836696	
15 PFHxA	100.00	200.00	500.00	1000.00	2000.00	5000.00	10000	15000	20000	#49
	106940	230782	523118	1052838	2047080	5189381	9056808	13339903	17150208	
22 PFPeS	93.800	187.60	469.00	938.00	1876.00	4690.00	9380.00	14070	18760	#44
	24790	53318	115898	247928	451064	1221899	2205001	3152496	4394093	
28 GenX	200.00	400.00	1000.00	2000.00	4000.00	10000	20000	30000	40000	#66
	50685	102274	233439	448795	869521	2319032	3939463	6167810	7938188	
D 66 13C3_GenX	10000	10000	10000	10000	10000	10000	10000	10000	10000	
	3172399	3252289	3181690	3190425	2897877	2938380	2921763	2723918	2715614	
13 PFHpA	100.00	200.00	500.00	1000.00	2000.00	5000.00	10000	15000	20000	#47
	110969	252933	546114	1108102	2154074	5564532	9341182	13786684	17937697	
D 47 13C4_PFHpA	2000.00	2000.00	2000.00	2000.00	2000.00	2000.00	2000.00	2000.00	2000.00	
	2011599	2223507	2142066	2314826	1972025	2096476	1866693	1791604	1794033	
D 45 13C3_PFHxS	2000.00	2000.00	2000.00	2000.00	2000.00	2000.00	2000.00	2000.00	2000.00	
	437946	506804	486263	460846	432928	468767	419398	388809	416155	
14 PFHxS	91.000	182.00	455.00	910.00	1820.00	4550.00	9100.00	13650	18200	#45
	23494	53872	114385	217297	428261	1144351	2083607	3063591	3989544	
29 ADONA	94.200	188.40	471.00	942.00	1884.00	4710.00	9420.00	14130	18840	#45
	170027	352663	799175	1628872	2962857	7851392	13699705	19808809	25301310	
2 6:2 FTS	Disabled	189.60	474.00	948.00	1896.00	4740.00	9480.00	14220	18960	#64
	Disabled	24214	41973	93172	159735	401486	670840	1056168	1430343	
D 64 13C2_6:2 FTS_2	10000	10000	10000	10000	10000	10000	10000	10000	10000	
	357552	368467	362266	344444	341058	362286	327035	308676	316904	
20 PFOA	100.00	200.00	500.00	1000.00	2000.00	5000.00	10000	15000	20000	#53
	97052	261282	520019	1065047	2001549	5320269	8835990	12717214	16817350	
D 53 13C8_PFOA	2000.00	2000.00	2000.00	2000.00	2000.00	2000.00	2000.00	2000.00	2000.00	
	2052867	2366606	2125431	2354509	2043152	2130938	1899007	1777427	1748771	
12 PFHpS	95.200	190.40	476.00	952.00	1904.00	4760.00	9520.00	14280	19040	#45
	23466	48086	120318	229138	431302	1211196	2139966	3143483	4050095	
D 56 13C9_PFNA	2000.00	2000.00	2000.00	2000.00	2000.00	2000.00	2000.00	2000.00	2000.00	
	2128208	2185901	2211570	2161832	2056273	2195160	1920518	1871344	1883844	
18 PFOS	92.800	185.60	464.00	928.00	1856.00	4640.00	9280.00	13920	18560	#54
	25024	56966	119084	236047	460397	1218170	2143063	3202029	4138724	
17 PFNA	100.00	200.00	500.00	1000.00	2000.00	5000.00	10000	15000	20000	#53
	128693	250028	604600	1035656	2067047	5528994	9729062	13639905	17127046	
D 54 13C8_PFOS	2000.00	2000.00	2000.00	2000.00	2000.00	2000.00	2000.00	2000.00	2000.00	
	467037	496141	460018	427442	414405	485488	405995	397001	409895	
30 9Cl-PF3ONS	93.200	186.40	466.00	932.00	1864.00	4660.00	9320.00	13980	18640	#54
	74697	156325	343528	725794	1325377	3638233	6152249	9108422	12687263	
19 PFOSA	100.00	200.00	500.00	1000.00	2000.00	5000.00	10000	15000	20000	#55
	39140	93312	181760	410036	807394	2070296	3665386	5440654	7571308	
D 55 13C8_PFOSA	2000.00	2000.00	2000.00	2000.00	2000.00	2000.00	2000.00	2000.00	2000.00	
	855814	832270	857539	810487	832704	782630	775752	743853	762221	
D 65 13C2_8:2 FTS_2	10000	10000	10000	10000	10000	10000	10000	10000	10000	
	285105	278023	280251	260184	272494	248934	255465	236007	248129	
16 PFNS	96.000	192.00	480.00	960.00	1920.00	4800.00	9600.00	14400	19200	#54
	18666	40512	85554	157084	339509	797435	1377985	2125789	2904259	
3 8:2 FTS	Disabled	191.60	479.00	958.00	1916.00	4790.00	9580.00	14370	19160	#65
	Disabled	11227	22217	52574	106388	241948	437141	607178	845446	

Compound	Level 2 Conc/Rsp	Level 3 Conc/Rsp	Level 4 Conc/Rsp	Level 5 Conc/Rsp	Level 6 Conc/Rsp	Level 7 Conc/Rsp	Level 8 Conc/Rsp	Level 9 Conc/Rsp	Level 10 Conc/Rsp	Std #
D 51 13C6_PFDA	2000.00	2000.00	2000.00	2000.00	2000.00	2000.00	2000.00	2000.00	2000.00	
	1718864	2050973	1869319	1931518	1873286	1859593	1677816	1531496	1517003	
10 PFDA	100.00	200.00	500.00	1000.00	2000.00	5000.00	10000	15000	20000	#51
	101607	220756	491870	1006823	1919975	4914616	8504932	12722248	16701433	
D 58 d3-MeFOSAA	10000	10000	10000	10000	10000	10000	10000	10000	10000	
	2068551	2009467	2066013	1903926	1987279	1903476	1869028	1844583	1902735	
6 N-MeFOSAA	100.00	200.00	500.00	1000.00	2000.00	5000.00	10000	15000	20000	#58
	14781	33635	73181	146479	272718	755504	1322997	2007241	2744147	
9 PFDS	96.400	192.80	482.00	964.00	1928.00	4820.00	9640.00	14460	19280	#54
	17225	36257	85215	163634	325424	804742	1412107	2100658	2763644	
D 60 d5-EtFOSAA	10000	10000	10000	10000	10000	10000	10000	10000	10000	
	1786440	1914490	1991527	1811012	1836821	1679252	1715187	1542890	1583447	
25 PFUdA	100.00	200.00	500.00	1000.00	2000.00	5000.00	10000	15000	20000	#52
	76815	198277	467481	863916	1684969	4368263	7557121	11222395	14423019	
D 52 13C7_PFUdA	2000.00	2000.00	2000.00	2000.00	2000.00	2000.00	2000.00	2000.00	2000.00	
	1829092	1983111	1856795	1894218	1803889	1937876	1648822	1509788	1590701	
5 N-EtFOSAA	100.00	200.00	500.00	1000.00	2000.00	5000.00	10000	15000	20000	#60
	16888	42973	88096	169065	336557	877118	1448710	2191757	2785151	
D 61 d7-MeFOSE	2000.00	2000.00	2000.00	2000.00	2000.00	2000.00	2000.00	2000.00	2000.00	
	227492	243642	249040	251389	244801	228803	245775	213146	224023	
32 MeFOSE	100.00	200.00	500.00	1000.00	2000.00	5000.00	10000	15000	20000	#61
	14252	30816	65116	130134	233255	645132	1184716	1739604	2367773	
26 MeFOSA	100.00	200.00	500.00	1000.00	2000.00	5000.00	10000	15000	20000	#57
	7555	17050	39688	74964	144791	388308	676162	1020934	1381881	
D 57 d3-MeFOSA	2000.00	2000.00	2000.00	2000.00	2000.00	2000.00	2000.00	2000.00	2000.00	
	134331	122635	131185	119677	118614	116877	119658	121851	120803	
31 11Cl-PF3OUDS	94.200	188.40	471.00	942.00	1884.00	4710.00	9420.00	14130	18840	#54
	57992	127631	287216	538155	1140109	2865639	4930107	7864411	10628299	
D 38 13C2_PFDoA	2000.00	2000.00	2000.00	2000.00	2000.00	2000.00	2000.00	2000.00	2000.00	
	1723339	1964759	1808575	1865990	1783720	1850729	1627584	1557431	1563043	
11 PFDoA	100.00	200.00	500.00	1000.00	2000.00	5000.00	10000	15000	20000	#38
	95433	230802	462369	961373	1814323	4880270	8480942	12317146	15648745	
D 62 d9-EtFOSE	2000.00	2000.00	2000.00	2000.00	2000.00	2000.00	2000.00	2000.00	2000.00	
	237763	236619	249629	242462	241804	215800	223511	218476	226466	
33 EtFOSE	100.00	200.00	500.00	1000.00	2000.00	5000.00	10000	15000	20000	#62
	14928	33229	60081	132636	239920	707731	1207643	1827851	2548170	
4 10:2 FTS	96.400	192.80	482.00	964.00	1928.00	4820.00	9640.00	14460	19280	#65
	5558	11751	24746	50576	108465	255264	458440	703611	939749	
D 59 d5-EtFOSA	2000.00	2000.00	2000.00	2000.00	2000.00	2000.00	2000.00	2000.00	2000.00	
	118418	120970	125125	121280	108664	111928	111465	106687	114348	
27 EtFOSA	100.00	200.00	500.00	1000.00	2000.00	5000.00	10000	15000	20000	#59
	9030	19501	35496	67575	133870	365204	599113	879282	1249928	
34 PFDOS	96.800	193.60	484.00	968.00	1936.00	4840.00	9680.00	14520	19360	#54
	15880	35788	73454	150462	292088	762023	1423733	2085692	2907958	
24 PFTrDA	100.00	200.00	500.00	1000.00	2000.00	5000.00	10000	15000	20000	#38
	70411	148462	343207	674177	1244347	3486206	6080716	9121978	11980313	
D 42 13C2_PFTeDA	2000.00	2000.00	2000.00	2000.00	2000.00	2000.00	2000.00	2000.00	2000.00	
	1769696	2027825	1847953	1899115	1798437	1833641	1698049	1633496	1719390	
23 PFTeDA	100.00	200.00	500.00	1000.00	2000.00	5000.00	10000	15000	20000	#42
	96378	202192	450560	905825	1774470	4639847	7847646	11539431	15497278	
35 PFHxDA	100.00	200.00	500.00	1000.00	2000.00	5000.00	10000	15000	20000	#40
	45277	99894	225115	448645	860790	2306326	3912493	5849289	7667554	
D 40 13C2_PFHxDA	2000.00	2000.00	2000.00	2000.00	2000.00	2000.00	2000.00	2000.00	2000.00	
	1565999	1583925	1632162	1537237	1595415	1497687	1481784	1482781	1484138	
36 PFODA	100.00	200.00	500.00	1000.00	2000.00	5000.00	10000	15000	20000	#40
	71170	159761	353032	728223	1384517	3732189	6608425	9684719	12638963	

Pace Environmental Services, LLC
Initial Calibration RT Report

Batch: \\Organics\LL\LCMSMS02.i\091323-nonDOD+ICAL.b
Method: LCMSMS02_PFAS-ID2.M Version: V16 30-Jun-2022 10:54:24
Instrument: LCMSMS02.i Integrator: picker
Cal Start Date: 13-Sep-2023 15:40:01 Cal End Date: 13-Sep-2023 17:07:56
Method Lock: Unknown Lock Date:
Calib Method: PFAS-ID2 No.Compounds: 66
Calibration Concentration Units: ng/L

Initial Calibration Samples: Primary Reagent: Analytes
Batch: \\Organics\LL\LCMSMS02.i\091323-nonDOD+ICAL.b

Level	Cal File	Cal Sample ID	Cal Date
2	091323009.d	ICAL 100_SVLC-2954	13-Sep-2023 15:40:01
3	091323010.d	ICAL 200_SVLC-2966	13-Sep-2023 15:50:57
4	091323011.d	ICAL 500_SVLC-2956	13-Sep-2023 16:01:48
5	091323012.d	ICAL 1000_SVLC-3024	13-Sep-2023 16:12:41
6	091323013.d	ICAL 2000_SVLC-2958	13-Sep-2023 16:23:46
7	091323014.d	ICAL 5000_SVLC-2967	13-Sep-2023 16:34:48
8	091323015.d	ICAL 10000_SVLC-2960	13-Sep-2023 16:45:52
9	091323016.d	ICAL 15000_SVLC-2961	13-Sep-2023 16:56:54
10	091323017.d	ICAL 20000_SVLC-2962	13-Sep-2023 17:07:56

Column: 1 Detector: LCMS-Q3

Compound	Level 2	Level 3	Level 4	Level 5	Level 6	Level 7	Level 8	Level 9	Level 10	Avg. RT	%Rsd RT
D 46 13C4_PFBA	1.650	1.642	1.638	1.642	1.642	1.642	1.642	1.642	1.645	1.642	0.191
8 PFBA	1.650	1.642	1.646	1.642	1.642	1.642	1.649	1.649	1.645	1.645	0.219
D 50 13C5_PFPeA	1.982	1.973	1.978	1.974	1.972	1.973	1.973	1.973	1.977	1.974	0.160
21 PFPeA	1.982	1.982	1.978	1.974	1.972	1.981	1.973	1.973	1.977	1.976	0.199
D 44 13C3_PFBS	2.023	2.023	2.027	2.023	2.022	2.022	2.022	2.023	2.027	2.023	0.092
7 PFBS	2.023	2.032	2.027	2.023	2.022	2.022	2.022	2.023	2.027	2.024	0.169
D 63 13C2_4:2 FTS_2	2.268	2.278	2.273	2.268	2.277	2.277	2.267	2.267	2.273	2.272	0.195
1 4:2 FTS	2.278	2.278	2.273	2.278	2.277	2.277	2.267	2.267	2.273	2.274	0.198
D 49 13C5_PFHxA	2.308	2.318	2.313	2.308	2.317	2.317	2.307	2.307	2.312	2.312	0.186
* 39 13C2_PFHxA	2.298	2.328	2.303	2.308	2.317	2.317	2.317	2.297	2.322	2.312	0.461
15 PFHxA	2.308	2.318	2.313	2.318	2.317	2.317	2.307	2.307	2.312	2.313	0.196
22 PFPeS	2.338	2.348	2.353	2.338	2.347	2.347	2.337	2.337	2.342	2.343	0.250
28 GenX	2.418	2.428	2.433	2.428	2.427	2.427	2.417	2.417	2.422	2.423	0.238
D 66 13C3_GenX	2.418	2.428	2.433	2.428	2.427	2.427	2.417	2.417	2.422	2.423	0.238
13 PFHpA	2.678	2.705	2.693	2.696	2.695	2.695	2.686	2.677	2.692	2.690	0.329
D 47 13C4_PFHpA	2.678	2.696	2.693	2.696	2.695	2.695	2.686	2.677	2.692	2.689	0.280
D 45 13C3_PFHxS	2.696	2.714	2.711	2.714	2.713	2.713	2.704	2.695	2.710	2.707	0.278
14 PFHxS	2.696	2.714	2.711	2.714	2.713	2.713	2.704	2.695	2.710	2.707	0.278
29 ADONA	2.723	2.741	2.738	2.741	2.740	2.740	2.731	2.722	2.737	2.734	0.279
* 41 13C2_PFOA	2.904	3.158	2.783	2.950	3.129	3.148	3.119	3.138		3.041	4.680
2 6:2 FTS	Disabled	3.110	3.118	3.111	3.110	3.110	3.100	3.091	3.107	3.107	0.262
D 64 13C2_6:2 FTS_2	3.092	3.110	3.118	3.111	3.110	3.110	3.100	3.091	3.107	3.105	0.296
20 PFOA	3.120	3.149	3.146	3.149	3.148	3.148	3.129	3.129	3.145	3.140	0.351
D 53 13C8_PFOA	3.130	3.149	3.146	3.149	3.148	3.148	3.138	3.129	3.145	3.142	0.258
12 PFHpS	3.120	3.168	3.165	3.158	3.157	3.157	3.138	3.138	3.155	3.150	0.486
* 48 13C4_PFOS	3.645	3.660	3.658	3.629	3.644	3.636	3.628	3.620	3.634	3.639	0.378
D 56 13C9_PFNA	3.612	3.652	3.643	3.637	3.636	3.636	3.628	3.620	3.642	3.634	0.340
18 PFOS	3.612	3.645	3.651	3.645	3.644	3.644	3.628	3.620	3.642	3.636	0.365
17 PFNA	3.621	3.645	3.651	3.645	3.644	3.644	3.628	3.620	3.634	3.636	0.319
D 54 13C8_PFOS	3.612	3.645	3.635	3.645	3.644	3.644	3.628	3.620	3.634	3.633	0.329
30 9Cl-PF3ONS	3.914	3.932	3.931	3.942	3.932	3.932	3.922	3.913	3.930	3.927	0.236
19 PFOSA	4.059	4.076	4.075	4.077	4.076	4.076	4.067	4.058	4.074	4.070	0.191
D 55 13C8_PFOSA	4.050	4.076	4.084	4.085	4.076	4.076	4.067	4.049	4.065	4.069	0.330

Compound	Level 2	Level 3	Level 4	Level 5	Level 6	Level 7	Level 8	Level 9	Level 10	Avg. RT	%Rsd RT
D 65 13C2_8:2 FTS_2	4.085	4.110	4.108	4.110	4.109	4.109	4.101	4.084	4.099	4.101	0.250
16 PFNS	4.085	4.118	4.117	4.118	4.109	4.117	4.109	4.101	4.116	4.109	0.265
3 8:2 FTS	Disabled	4.110	4.117	4.118	4.109	4.109	4.101	4.084	4.107	4.106	0.257
D 51 13C6_PFDA	4.102	4.126	4.125	4.127	4.134	4.125	4.117	4.101	4.124	4.119	0.279
10 PFDA	4.102	4.118	4.133	4.135	4.134	4.125	4.117	4.101	4.124	4.120	0.315
* 37 13C2_PFDA	4.094	4.126	4.117	4.151	4.117	4.134	4.117	4.109	4.116	4.120	0.391
D 58 d3-MeFOSAA	4.318	4.336	4.344	4.346	4.345	4.345	4.326	4.317	4.334	4.334	0.265
6 N-MeFOSAA	4.327	4.346	4.344	4.346	4.354	4.345	4.336	4.326	4.343	4.340	0.213
9 PFDS	4.523	4.551	4.568	4.561	4.559	4.559	4.550	4.541	4.548	4.551	0.292
D 60 d5-EtFOSAA	4.551	4.560	4.578	4.569	4.578	4.578	4.559	4.560	4.557	4.565	0.225
25 PFUdA	4.561	4.560	4.587	4.578	4.578	4.578	4.569	4.560	4.567	4.570	0.222
D 52 13C7_PFUdA	4.561	4.560	4.578	4.588	4.578	4.578	4.569	4.560	4.567	4.570	0.220
5 N-EtFOSAA	4.578	4.569	4.587	4.588	4.588	4.588	4.578	4.560	4.567	4.577	0.235
D 61 d7-MeFOSE	4.710	4.700	4.728	4.729	4.729	4.729	4.710	4.701	4.698	4.714	0.289
32 MeFOSE	4.729	4.719	4.747	4.748	4.747	4.738	4.729	4.719	4.717	4.732	0.267
26 MeFOSA	4.748	4.728	4.756	4.757	4.757	4.757	4.747	4.738	4.736	4.747	0.224
D 57 d3-MeFOSA	4.738	4.728	4.747	4.757	4.747	4.747	4.738	4.729	4.727	4.739	0.221
31 11Cl-PF3OUDS	4.785	4.775	4.803	4.813	4.804	4.804	4.794	4.785	4.783	4.794	0.260
D 38 13C2_PFDoA	4.971	4.961	4.980	4.989	4.989	4.989	4.980	4.971	4.960	4.976	0.236
11 PFDoA	4.971	4.961	4.980	4.989	4.989	4.989	4.980	4.980	4.960	4.977	0.234
D 62 d9-EtFOSE	4.971	4.952	4.970	4.989	4.980	4.980	4.962	4.962	4.950	4.968	0.268
33 EtFOSE	4.980	4.971	4.998	4.999	4.999	4.999	4.980	4.980	4.969	4.986	0.252
4 10:2 FTS	4.980	4.952	4.989	4.999	4.999	4.989	4.980	4.980	4.969	4.981	0.293
D 59 d5-EtFOSA	4.999	4.989	5.007	5.016	5.016	5.008	4.999	4.999	4.978	5.001	0.246
27 EtFOSA	4.999	4.998	5.016	5.025	5.024	5.024	5.007	5.008	4.987	5.009	0.268
34 PFDOS	5.315	5.288	5.314	5.333	5.324	5.324	5.315	5.315	5.295	5.313	0.273
24 PFTrDA	5.351	5.324	5.341	5.360	5.360	5.360	5.351	5.351	5.322	5.346	0.283
D 42 13C2_PFTeDA	5.680	5.659	5.669	5.700	5.690	5.690	5.690	5.680	5.657	5.679	0.263
23 PFTeDA	5.690	5.659	5.669	5.700	5.690	5.690	5.690	5.690	5.657	5.681	0.277
35 PFHxDA	6.262	6.248	6.227	6.268	6.275	6.262	6.269	6.262	6.254	6.258	0.230
D 40 13C2_PFHxDA	6.262	6.241	6.219	6.268	6.269	6.262	6.269	6.262	6.247	6.255	0.268
36 PFODA	6.770	6.759	6.710	6.775	6.781	6.764	6.770	6.764	6.763	6.762	0.302

Pace Environmental Services, LLC
Analyte Quantitation Report

Data File: \\Organics\LL\LCMSMS02.i\091323-nonDOD+ICAL.b\091323018.d
Injection Date: 13-Sep-2023 17:18:58 Injection Vol: 10.0 uL
Sample Type: INSTBLK Auto Sampler: 94
Lab Sample ID: ID BLK A4 Lab Prep. Batch:
Sample Info: ID BLK A4 Misc. Info:
Inst. ID: LCMSMS02.i Operator: eqi.svoa

Method: LCMSMS02_PFAS-ID2 Version: V16 30-Jun-2022 10:54:24
Calib Method: PFAS-ID2 Lock State: Unlocked
Quant Method: IsoDil Integrator: picker

Matrix: Aqueous
Final Conc.: Amt * DF * CF
Concentration Formula: CF = (VF/1000) * 1/VI = 0.0040000

Name	Value	Units	Description
DF	1		Dilution Factor
VF	1000	ul	Final Volume
VI	250	ml	Initial Sample Volume

IsoDil Stds %Recovery = ((Area * DF)/Ical Mid Area) * 100

Reagent: Surrogates Conc. Level: Smp Vol. Added: 0.0200 ml

Signal	Quant Std	RT (Min)	Exp RT (Min)	c RT (Min)	Response	Peak Pts	S/N	Ion Ratio	Isomer Ratio	OnCol Conc ng/L	Final Conc ng/L	%Rec	Flags
D 46 13C4_PFBA CAS: SESI-0111													
217 > 172		1.642	1.642	0.000	1830826	21	>100:1			2000.00	2139.04	99	
8 Perfluoro-n-butanoic acid (PFBA) CAS: 375-22-4													
212.9 > 168.9	46	1.650	1.642	0.000	3408	15	2.1:1			3.8497	0.01540	< LOQ	
D 50 13C5_PFPeA CAS: SESI-0112													
267.9 > 223		1.973	1.974	0.000	1925241	21	>100:1			2000.00	2105.45	100	
21 Perfluoro-n-pentanoic acid (PFPeA) CAS: 2706-90-3													U
262.9 > 218.9	50		1.974		ND								
D 44 13C3_PFBS CAS: SESI-0116													
302 > 80		2.023	2.023	0.000	665359	20	>100:1			2000.00	2053.96	98	
7 Perfluoro-1-butanesulfonate (PFBS) CAS: 375-73-5													U
298.9 > 80	44		2.023		ND								
22 Perfluoro-1-pentanesulfonic acid (PFPeS) CAS: 2706-91-4													U
349 > 80	44		2.338		ND								
D 63 13C2_4:2 FTS_2 CAS: SESI-0104													
329 >81		2.278	2.268	0.000	308599	19	>100:1			10000	9879.84	95	
1 Fluorotelomer sulfonate 4:2 [1H,1H,2H,2H-perfluorohexane sulfonate] (4:2 FTS) CAS: 757124-72-4													U
327 > 307	63		2.278		ND								
D 49 13C5_PFHxA CAS: SESI-0113													
318 > 273		2.308	2.308	0.000	2125190	18	>100:1			2000.00	2111.10	101	
15 Perfluoro-n-hexanoic acid (PFHxA) CAS: 307-24-4													U
313 > 269	49		2.318		ND								
D 66 13C3_GenX CAS: SESI-0121													
287 > 185		2.427	2.428	0.000	3101632	19	>100:1			10000	10341	97	
28 Hexafluoropropylene oxide dimer acid (GenX) CAS: 13252-13-6													U
285 > 119	66		2.428		ND								
D 47 13C4_PFHpA CAS: SESI-0114													
367 > 322		2.696	2.696	0.000	2202465	19	>100:1			2000.00	2176.73	95	
13 Perfluoro-n-heptanoic acid (PFHpA) CAS: 375-85-9													U
363 > 319	47		2.696		ND								
D 45 13C3_PFHxS CAS: SESI-0096													
402 > 80		2.714	2.714	0.000	488711	23	>100:1			2000.00	2189.39	106	

Signal	Quant Std	RT (Min)	Exp RT (Min)	c RT (Min)	Response	Peak Pts	S/N	Ion Ratio	Isomer Ratio	OnCol Conc ng/L	Final Conc ng/L	%Rec	Flags
14 Perfluorohexanesulfonate (PFHxS) CAS: 355-46-4													U
399 > 80	45		2.714		ND								
29 4,8-dioxa-3H-perfluorononanoic acid (ADONA) CAS: 919005-14-4													
377 > 251	45	2.750	2.741	0.000	4906	19	5.2:1	Target = 2.99		2.7761	0.01110		
377 > 85	45	2.723	2.741		2022	13	5.5:1	2.42 (1.49-4.48)					
12 Perfluoro-1-heptanesulfonic acid (PFHpS) CAS: 375-92-8													U
449 > 80	45		3.158		ND								
D 64 13C2_6:2 FTS_2 CAS: SESI-0105													
429 > 81		3.110	3.111	0.000	366362	21	>100:1			10000	10675	106	
2 Fluorotelomer sulfonate 6:2 [1H,1H,2H,2H-perfluorooctane sulfonate] (6:2 FTS) CAS: 27619-97-2													U
427 > 407	64		3.111		ND								
D 53 13C8_PFOA CAS: SESI-0097													
421 > 376		3.149	3.149	0.000	2134328	20	>100:1			2000.00	2076.79	91	
20 Perfluoro-n-octanoic acid (PFOA) CAS: 335-67-1													U
413 > 369	53		3.149		ND								
D 56 13C9_PFNA CAS: SESI-0099													
472 > 427		3.645	3.637	0.000	2145386	22	>100:1			2000.00	2074.55	99	
17 Perfluoro-n-nonanoic acid (PFNA) CAS: 375-95-1													U
463 > 419	56		3.645		ND								
D 54 13C8_PFOS CAS: SESI-0098													
507 > 80		3.645	3.645	0.000	453745	24	>100:1			2000.00	2060.70	106	
18 Perfluorooctanesulfonate (PFOS) CAS: 1763-23-1													U
499 > 80	54		3.645		ND								
30 9-chlorohexadecafluoro-3-oxanone-1-sulfonic acid (9Cl-PF3ONS) CAS: 756426-58-1													U
531 > 351	54		3.942		ND								
16 Perfluoro-1-nonanesulfonic acid (PFNS) CAS: 68259-12-1													U
549 > 80	54		4.118		ND								
9 Perfluoro-1-decanesulfonic acid (PFDS) CAS: 335-77-3													U
599 > 80	54		4.561		ND								
31 11-chloroeicosafluoro-3-oxaundecane-1-sulfonic acid (11Cl-PF3OUdS) CAS: 763051-92-9													U
631 > 451	54		4.813		ND								
34 Perfluorododecanesulfonic acid (PFDOS) CAS: 79780-39-5													U
699 > 80	54		5.333		ND								
D 55 13C8_PFOSA CAS: SESI-0107													
506 > 78		4.076	4.085	0.000	817706	22	>100:1			2000.00	2029.25	101	
19 Perfluoro-1-octanesulfonamide (PFOSA) CAS: 754-91-6													U
498 > 78	55		4.077		ND								
D 65 13C2_8:2 FTS_2 CAS: SESI-0106													
529 > 81		4.118	4.110	0.000	281809	21	>100:1			10000	10726	108	
3 Fluorotelomer sulfonate 8:2 [1H,1H,2H,2H-perfluorodecane sulfonate] (8:2 FTS) CAS: 39108-34-4													U
527 > 507	65		4.118		ND								
4 1H,1H,2H,2H-perfluorododecane sulfonate (10:2FTS) CAS: 120226-60-0													U
627 > 607	65		4.999		ND								
D 51 13C6_PFDA CAS: SESI-0115													
519 > 474		4.126	4.127	0.000	1902373	23	>100:1			2000.00	2136.18	98	
10 Perfluoro-n-decanoic acid (PFDA) CAS: 335-76-2													U
513 > 469	51		4.135		ND								
D 58 d3-MeFOSAA CAS: SESI-0102													
573 > 419		4.346	4.346	0.000	1993529	20	>100:1			10000	10220	105	
6 N-methylperfluoro-1-octanesulfonamidoacetic acid (N-MeFOSAA) CAS: 2355-31-9													U
570 > 419	58		4.346		ND								
D 60 d5-EtFOSAA CAS: SESI-0110													
589 > 419		4.569	4.569	0.000	1846758	21	>100:1			10000	10479	102	
5 N-ethylperfluoro-1-octanesulfonamidoacetic acid (N-EtFOSAA) CAS: 2991-50-6													U
584 > 419	60		4.588		ND								
D 52 13C7_PFUdA CAS: SESI-0117													
570 > 525		4.578	4.588	0.000	1995927	19	>100:1			2000.00	2237.82	105	

Signal	Quant Std	RT (Min)	Exp RT (Min)	c RT (Min)	Response	Peak Pts	S/N	Ion Ratio	Isomer Ratio	OnCol Conc ng/L	Final Conc ng/L	%Rec	Flags
25 Perfluoro-n-undecanoic acid (PFUdA) CAS: 2058-94-8													U
563 > 519	52		4.578		ND								
D 61 d7-MeFOSE CAS: SESI-0129													
623 > 59		4.710	4.729	0.000	220623	17	>100:1			2000.00	1866.07	88	
32 2-N-methylperfluoro-1-octanesulfonamido-ethanol (MeFOSE) CAS: 24448-09-7													U
616 > 59	61		4.748		ND								
D 57 d3-MeFOSA CAS: SESI-0109													
515 > 169		4.738	4.757	0.000	130009	26	>100:1			2000.00	2116.59	109	
26 N-methylperfluoro-1-octanesulfonamide (MeFOSA) CAS: 31506-32-8													U
512 > 169	57		4.757		ND								
D 62 d9-EtFOSE CAS: SESI-0130													
639 > 59		4.961	4.989	0.000	226683	17	>100:1			2000.00	1949.93	93	
33 2-N-ethylperfluoro-1-octanesulfonamido-ethanol (EtFOSE) CAS: 1691-99-2													U
630 > 59	62		4.999		ND								
D 38 13C2_PFDoA CAS: SESI-0118													
615 > 570		4.980	4.989	0.000	1853689	21	>100:1			2000.00	2119.15	99	
11 Perfluoro-n-dodecanoic acid (PFDoA) CAS: 307-55-1													U
613 > 569	38		4.989		ND								
24 Perfluoro-n-tridecanoic acid (PFTrDA) CAS: 72629-94-8													
663 > 619	38	5.333	5.360	0.000	3730	18	8.5:1	Target = 6.66		5.3263	0.02131	< LOQ	
663 > 169	38	5.342	5.360		561	15	5.8:1	6.64 (3.33-10.00)					
D 59 d5-EtFOSA CAS: SESI-0108													
531 > 169		4.989	5.016	0.000	120150	19	>100:1			2000.00	2081.75	99	
27 N-ethylperfluoro-1-octanesulfonamide (EtFOSA) CAS: 4151-50-2													U
526 > 169	59		5.025		ND								
D 42 13C2_PFTeDA CAS: SESI-0119													
715 > 670		5.659	5.700	0.000	2003396	20	>100:1			2000.00	2222.21	105	
23 Perfluoro-n-tetradecanoic acid (PFTeDA) CAS: 376-06-7													U
713 > 669	42		5.700		ND								
D 40 13C2_PFHxDA CAS: SESI-0103													
815 > 770		6.219	6.268	0.000	1530665	23	>100:1			2000.00	1987.71	100	
35 Perfluoro-n-hexadecanoic acid (PFHxDA) CAS: 67905-19-5													U
813 > 769	40		6.268		ND								
36 Perfluoro-n-octadecanoic acid (PFODA) CAS: 16517-11-6													U
913 > 869	40		6.775		ND								
*** 37 13C2_PFDA**													U
515 > 470			4.151		ND								
*** 39 13C2_PFHxA CAS: SESI-0120**													
315 > 270		2.318	2.308	0.000	430	13	2.3:1			0			
*** 41 13C2_PFOA CAS: 864071-08-9**													U
415 > 370			2.950		ND								
*** 43 13C3_PFBA**													
216 > 172		1.642	1.642	0.000	9610	16	26:1			0			
*** 48 13C4_PFOS CAS: 2795-39-3**													
503 > 80		3.620	3.629	0.000	3991	12	14:1			0			

Compound Type Legend

D - Isotopic Dilution Std.
* - ISTD

QC Flag Legend

U - Result Less Than Method Detection Limit

Pace Environmental Services, LLC
Initial Calibration Verification Report

Data File: \\Organics\LL\LCMSMS02.i\091323-nonDOD+ICAL.b\091323019.d
Injection Date: 13-Sep-2023 17:29:56 Injection Vol: 10.0 uL
Sample Type: ICV Auto Sampler: 80
Sample Info: ICV_SVLC-3035 Misc. Info:
Inst. ID: LCMSMS02.i Operator: eqi.svoa

Method: LCMSMS02_PFAS-ID2 Version: V16 30-Jun-2022 10:54:24
Calib Method: PFAS-ID2 Lock State: Unlocked
Quant Method: IsoDil Integrator: picker

Reagent: Analytes Conc. Level: ICV-43 Vol. Added: 1.00 ml

Compound	Std Area	CCV Area	Exp. Conc ng/L	Conc ng/L	%Rec	%Rec Limits
8 PFBA			1000.00	915.81	92	70 - 130
D 46 13C4_PFBA	1849042	2052557			111	50 - 150
D 50 13C5_PFPeA	1924608	2213914			115	50 - 150
21 PFPeA			1000.00	928.51	93	70 - 130
7 PFBS			1000.00	950.41	95	70 - 130
D 44 13C3_PFBS	681588	758129			111	50 - 150
D 63 13C2_4:2 FTS_2	324762	385641			119	50 - 150
1 4:2 FTS			1000.00	924.96	92	70 - 130
D 49 13C5_PFHxA	2099693	2453344			117	50 - 150
15 PFHxA			1000.00	889.32	89	70 - 130
22 PFPeS			1000.00	966.77	97	70 - 130
D 66 13C3_GenX	3190425	3455569			108	50 - 150
28 GenX			1000.00	928.99	93	70 - 130
13 PFHpA			1000.00	845.28	85	70 - 130
D 47 13C4_PFHpA	2314826	2473800			107	50 - 150
14 PFHxS			1000.00	994.21	99	70 - 130
D 45 13C3_PFHxS	460846	516110			112	50 - 150
29 ADONA			1000.00	902.60	90	70 - 130
2 6:2 FTS			1000.00	1006.50	101	70 - 130
D 64 13C2_6:2 FTS_2	344444	395873			115	50 - 150
20 PFOA			1000.00	826.63	83	70 - 130
D 53 13C8_PFOA	2354509	2453613			104	50 - 150
12 PFHpS			1000.00	897.98	90	70 - 130
D 56 13C9_PFNA	2161832	2453744			114	50 - 150
18 PFOS			1000.00	933.87	93	70 - 130
17 PFNA			1000.00	956.79	96	70 - 130
D 54 13C8_PFOS	427442	503467			118	50 - 150
30 9Cl-PF3ONS			1000.00	879.73	88	70 - 130
19 PFOSA			1000.00	886.86	89	70 - 130
D 55 13C8_PFOSA	810487	929738			115	50 - 150
D 65 13C2_8:2 FTS_2	260184	276104			106	50 - 150
3 8:2 FTS			1000.00	1105.63	111	70 - 130
16 PFNS			1000.00	867.34	87	70 - 130
D 51 13C6_PFDA	1931518	2143645			111	50 - 150
10 PFDA			1000.00	933.80	93	70 - 130
6 N-MeFOSAA			1000.00	1083.46	108	70 - 130

Report Date: 14-Sep-2023 12:06:17 AIM Revision: 2.0.2023.0816
Data File: \\Organics\LL\LCMSMS02.i\091323-nonDOD+ICAL.b\091323019.d

Compound	Std Area	CCV Area	Exp. Conc ng/L	Conc ng/L	%Rec	%Rec Limits
D 58 d3-MeFOSAA	1903926	2048467			108	50 - 150
9 PFDS			1000.00	1044.39	104	70 - 130
D 60 d5-EtFOSAA	1811012	2081202			115	50 - 150
25 PFUdA			1000.00	904.03	90	70 - 130
5 N-EtFOSAA			1000.00	867.18	87	70 - 130
D 52 13C7_PFUdA	1894218	2131099			113	50 - 150
D 61 d7-MeFOSE	251389	251908			100	50 - 150
32 MeFOSE			1000.00	980.57	98	70 - 130
D 57 d3-MeFOSA	119677	134697			113	50 - 150
26 MeFOSA			1000.00	1018.40	102	70 - 130
31 11Cl-PF3OUDS			1000.00	964.51	96	70 - 130
D 62 d9-EtFOSE	242462	270323			111	50 - 150
D 38 13C2_PFDoA	1865990	2073546			111	50 - 150
11 PFDoA			1000.00	777.15	78	70 - 130
33 EtFOSE			1000.00	811.51	81	70 - 130
4 10:2 FTS			968.00	1105.34	114	70 - 130
D 59 d5-EtFOSA	121280	136598			113	50 - 150
27 EtFOSA			1000.00	846.95	85	70 - 130
34 PFDOS			1000.00	916.17	92	70 - 130
24 PFTrDA			1000.00	870.18	87	70 - 130
23 PFTeDA			1000.00	963.98	96	70 - 130
D 42 13C2_PFTeDA	1899115	2200924			116	50 - 150
35 PFHxDA			1000.00	930.37	93	70 - 130
D 40 13C2_PFHxDA	1537237	1625392			106	50 - 150
36 PFODA			1000.00	950.96	95	70 - 130

Pace Environmental Services, LLC
Analyte Quantitation Report

Data File: \\Organics\LL\LCMSMS02.i\091323-nonDOD+ICAL.b\091323020.d
Injection Date: 13-Sep-2023 17:40:58 Injection Vol: 10.0 uL
Sample Type: CHECKSTD Auto Sampler: 81
Sample Info: ISOMER_SVLC-2964 Misc. Info:
Inst. ID: LCMSMS02.i Operator: eqi.svoa

Method: LCMSMS02_PFAS-ID2 Version: V16 30-Jun-2022 10:54:24
Calib Method: PFAS-ID2 Lock State: Unlocked
Quant Method: IsoDil Integrator: picker

Reagent: IsomerCheck Conc. Level: Smp Vol. Added: 1.00 ml

Signal	Quant Std	RT (Min)	Exp RT (Min)	S RT (Min)	Response	Peak Pts	S/N	Ion Ratio	Isomer Ratio	Cal Conc ng/L	OnCol Conc ng/L	%Rec	Flags
20 Perfluoro-n-octanoic acid (PFOA) CAS: 335-67-1													
413 > 369	53	3.149	3.149	0.000	9867062	31	>100:1	Target = 3.07	6.01	10000	8315.39		
413 > 169	53	3.149	3.149		3696099	34	>100:1	2.66 (1.53-4.61)	3.98				
6 N-methylperfluoro-1-octanesulfonamidoacetic acid (N-MeFOSAA) CAS: 2355-31-9													
570 > 419	58	4.355	4.346	0.000	1837878	43	>100:1	Target = 1.38	7.54	10000	10033		
570 > 483	58	4.346	4.346		1289284	41	>100:1	1.42 (0.69-2.07)	3.66				
5 N-ethylperfluoro-1-octanesulfonamidoacetic acid (N-EtFOSAA) CAS: 2991-50-6													
584 > 419	60	4.588	4.588	0.000	2031584	44	>100:1	Target = 1.66	6.57	10000	9342.06		
584 > 526	60	4.588	4.588		1233239	45	>100:1	1.64 (0.83-2.50)	4.01				
*** 43 13C3_PFBA**													
216 > 172		1.642	1.642	0.000	11121	16	32:1			2000.00			
*** 39 13C2_PFHxA CAS: SESI-0120**													
315 > 270		2.298	2.308	0.000	1081	14	4.4:1			2000.00			
*** 41 13C2_PFOA CAS: 864071-08-9**													
415 > 370		2.999	2.950	0.000	1524	11	1.9:1			2000.00			
*** 48 13C4_PFOS CAS: 2795-39-3**													
503 > 80		3.637	3.629	0.000	5884	22	20:1			2000.00			
*** 37 13C2_PFDA**													
515 > 470		4.093	4.151	0.000	115	13	1.5:1			2000.00			
D 46 13C4_PFBA CAS: SESI-0111													
217 > 172		1.642	1.642	0.000	2071758	20	>100:1			2000.00	2420.53	112	
D 50 13C5_PFPeA CAS: SESI-0112													
267.9 > 223		1.973	1.974	0.000	2114108	19	>100:1			2000.00	2311.99	110	
D 44 13C3_PFBS CAS: SESI-0116													
302 > 80		2.023	2.023	0.000	754777	19	>100:1			2000.00	2329.99	111	
D 63 13C2_4:2 FTS_2 CAS: SESI-0104													
329 >81		2.278	2.268	0.000	395258	19	>100:1			10000	12654	122	
D 49 13C5_PFHxA CAS: SESI-0113													
318 > 273		2.308	2.308	0.000	2449020	18	>100:1			2000.00	2432.79	117	
D 66 13C3_GenX CAS: SESI-0121													
287 > 185		2.428	2.428	0.000	3669500	18	>100:1			10000	12234	115	
D 47 13C4_PFHpA CAS: SESI-0114													
367 > 322		2.696	2.696	0.000	2419316	19	>100:1			2000.00	2391.04	105	
D 45 13C3_PFHxS CAS: SESI-0096													
402 > 80		2.714	2.714	0.000	555738	19	>100:1			2000.00	2489.67	121	
D 64 13C2_6:2 FTS_2 CAS: SESI-0105													
429 > 81		3.111	3.111	0.000	453475	19	>100:1			10000	13214	132	
D 53 13C8_PFOA CAS: SESI-0097													
421 > 376		3.149	3.149	0.000	2438931	21	>100:1			2000.00	2373.18	104	
D 56 13C9_PFNA CAS: SESI-0099													
472 > 427		3.645	3.637	0.000	2409197	22	>100:1			2000.00	2329.65	111	

Signal	Quant Std	RT (Min)	Exp RT (Min)	S RT (Min)	Response	Peak Pts	S/N	Ion Ratio	Isomer Ratio	Cal Conc ng/L	OnCol Conc ng/L	%Rec	Flags
D 54 13C8_PFOS CAS: SESI-0098													
507 > 80		3.645	3.645	0.000	515787	23	>100:1			2000.00	2342.46	121	
D 55 13C8_PFOSA CAS: SESI-0107													
506 > 78		4.077	4.085	0.000	1011784	21	>100:1			2000.00	2510.88	125	
D 65 13C2_8:2 FTS_2 CAS: SESI-0106													
529 > 81		4.110	4.110	0.000	351424	23	>100:1			10000	13376	135	
D 51 13C6_PFDA CAS: SESI-0115													
519 > 474		4.135	4.127	0.000	2148296	23	>100:1			2000.00	2412.33	111	
D 58 d3-MeFOSAA CAS: SESI-0102													
573 > 419		4.346	4.346	0.000	2474140	21	>100:1			10000	12684	130	
D 60 d5-EtFOSAA CAS: SESI-0110													
589 > 419		4.569	4.569	0.000	2297766	20	>100:1			10000	13038	127	
D 52 13C7_PFUdA CAS: SESI-0117													
570 > 525		4.578	4.588	0.000	2213802	20	>100:1			2000.00	2482.10	117	
D 61 d7-MeFOSE CAS: SESI-0129													
623 > 59		4.719	4.729	0.000	289130	20	>100:1			2000.00	2445.52	115	
D 57 d3-MeFOSA CAS: SESI-0109													
515 > 169		4.738	4.757	0.000	156528	20	>100:1			2000.00	2548.32	131	
D 62 d9-EtFOSE CAS: SESI-0130													
639 > 59		4.980	4.989	0.000	285695	21	>100:1			2000.00	2457.56	118	
D 38 13C2_PFDoA CAS: SESI-0118													
615 > 570		4.989	4.989	0.000	2365454	20	>100:1			2000.00	2704.21	127	
D 59 d5-EtFOSA CAS: SESI-0108													
531 > 169		5.007	5.016	0.000	139814	22	>100:1			2000.00	2422.45	115	
D 42 13C2_PFTeDA CAS: SESI-0119													
715 > 670		5.690	5.700	0.000	2600250	20	>100:1			2000.00	2884.25	137	
D 40 13C2_PFHxDA CAS: SESI-0103													
815 > 770		6.268	6.268	0.000	1787231	25	>100:1			2000.00	2320.89	116	

Compound Type Legend

* - ISTD

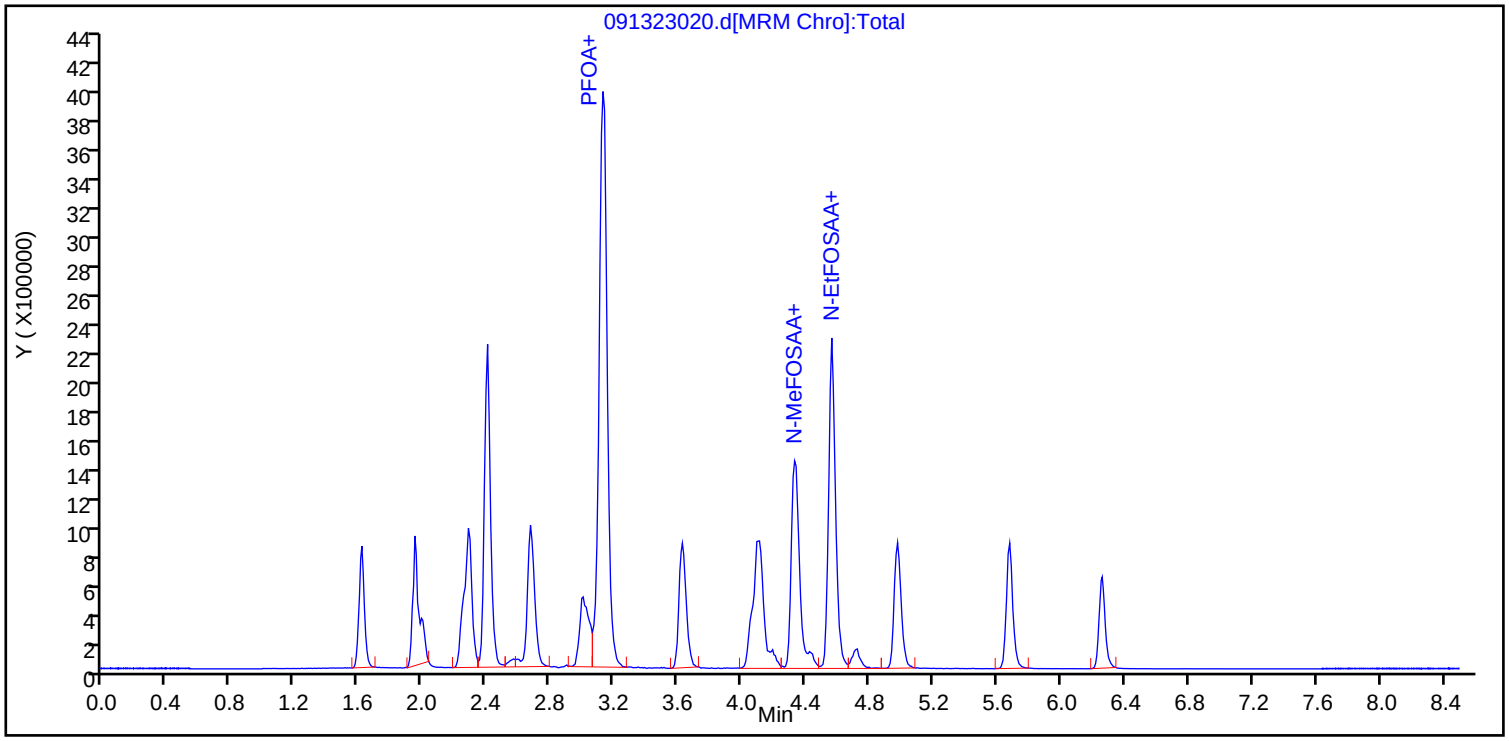
D - Isotopic Dilution Std.

QC Flag Legend

Report Date: 14-Sep-2023 12:06:18 AIM Revision: 2.0.2023.0816

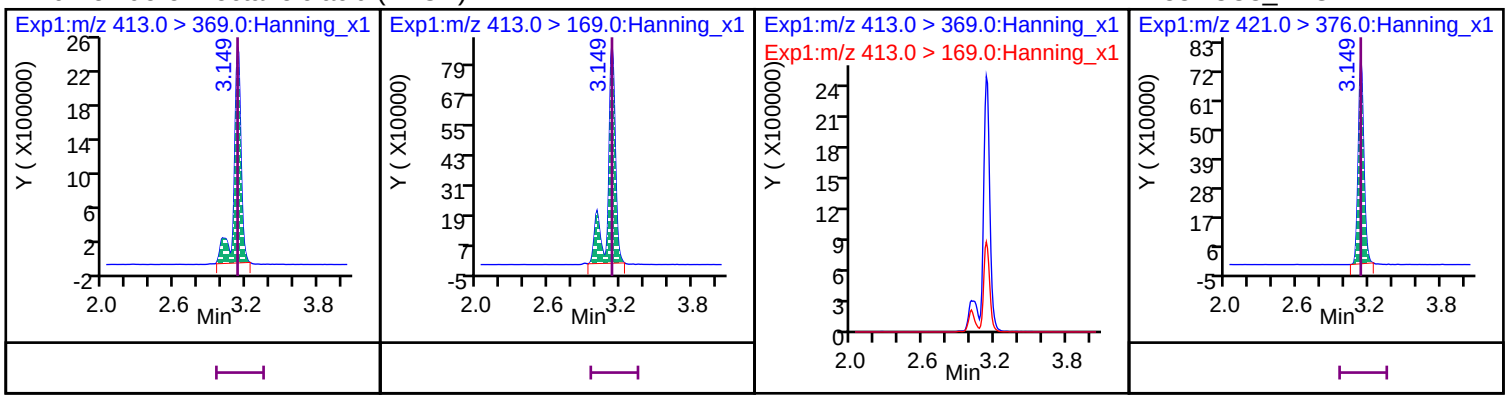
Pace Environmental Services, LLC

Data File:	\\Organics\LL\LCMSMS02.i\091323-nonDOD+ICAL.b\091323020.d		
Injection Date:	13-Sep-2023 17:40:58	Inst. ID:	LCMSMS02.i
Client ID:		Lab ID:	ISOMER_SVLC-2964
Sample Info:	ISOMER_SVLC-2964		
Dil. Factor:	1	Operator:	eqi.svoa



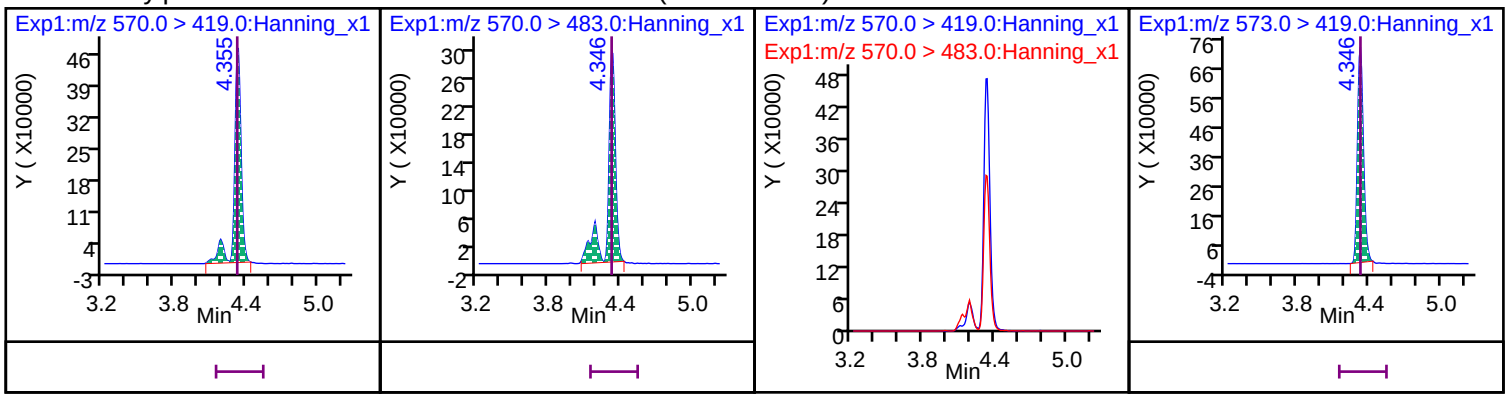
20 Perfluoro-n-octanoic acid (PFOA)

D 53 13C8_PFOA

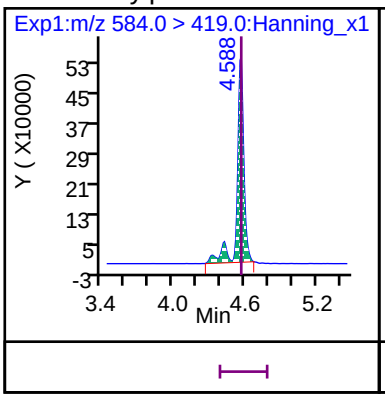


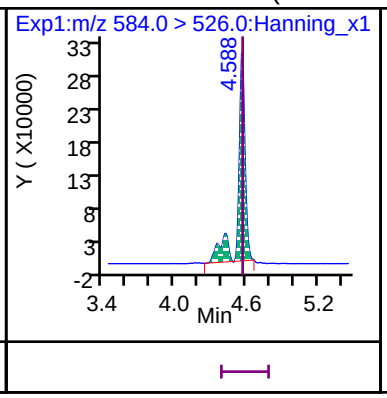
6 N-methylperfluoro-1-octanesulfonamidoacetic acid (N-MeFOSAA)

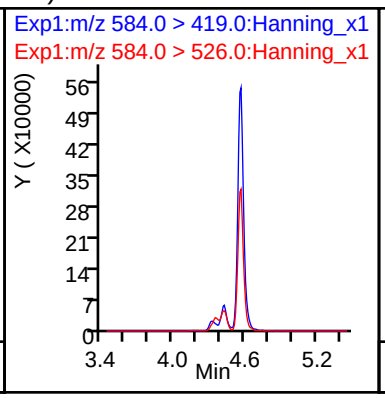
D 58 d3-MeFOSAA



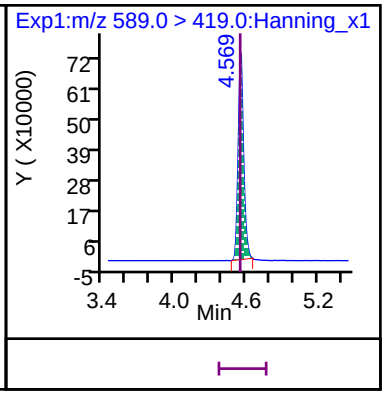
5 N-ethylperfluoro-1-octanesulfonamidoacetic acid (N-EtFOSAA)



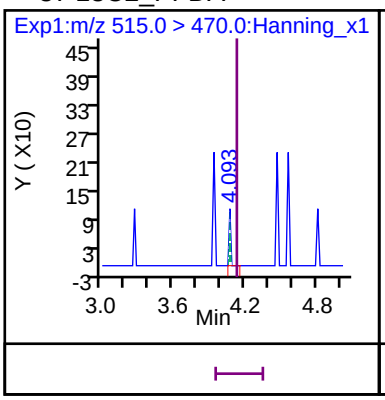




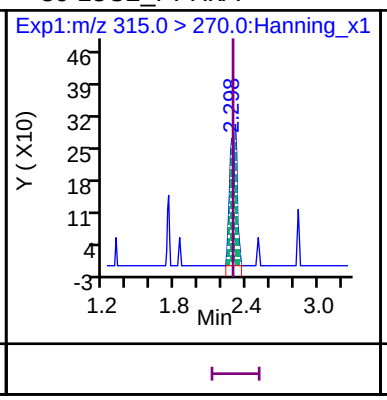
D 60 d5-EtFOSAA



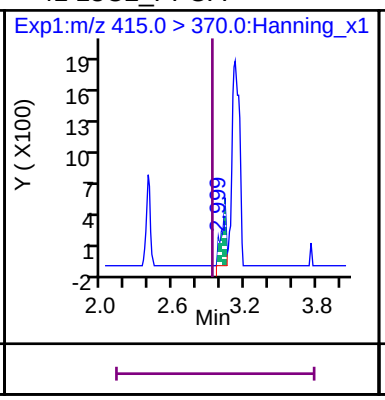
* 37 13C2_PFDA



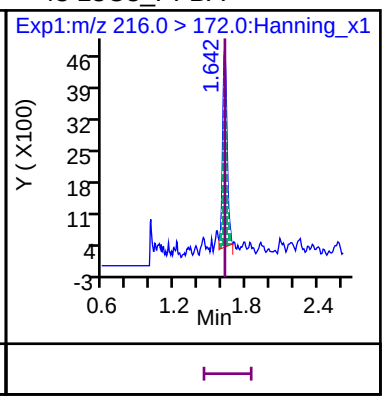
* 39 13C2_PFHxA



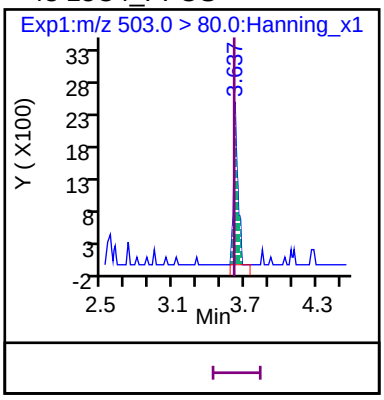
* 41 13C2_PFOA



* 43 13C3_PFBA



* 48 13C4_PFOS



Pace Environmental Services, LLC
Continuing Calibration Verification Report

Data File: \\Organics\LL\LCMSMS01.i\090723B-nonDOD+ICAL.b\090723B031.d
Injection Date: 07-Sep-2023 20:19:08 Injection Vol: 10.0 uL
Sample Type: CCV Auto Sampler: 18
Sample Info: CCV 1000_SVLC-3024 Misc. Info:
Inst. ID: LCMSMS01.i Operator: eqi.svoa

Method: LCMSMS01_PFAS-ID2 Version: V16 30-Jun-2022 10:54:24
Calib Method: PFAS-ID2 Lock State: Unlocked
Quant Method: IsoDil Integrator: picker

Reagent: Analytes Conc. Level: L-5 Vol. Added: 1.00 ml

Compound	Std Area	CCV Area	Exp. Conc ng/L	Conc ng/L	%Rec	%Rec Limits
8 PFBA			1000.00	946.84	94	70 - 130
D 46 13C4_PFBA	2431491	2907192			120	50 - 150
21 PFPeA			1000.00	965.35	96	70 - 130
D 50 13C5_PFPeA	2240815	2579160			115	50 - 150
D 44 13C3_PFBS	822330	997803			121	50 - 150
7 PFBS			884.00	842.77	95	70 - 130
D 63 13C2_4:2 FTS_2	472075	612604			130	50 - 150
1 4:2 FTS			934.00	910.20	97	70 - 130
D 49 13C5_PFHxA	1981677	2424050			122	50 - 150
15 PFHxA			1000.00	929.94	92	70 - 130
22 PFPeS			938.00	894.14	95	70 - 130
28 GenX			2000.00	1900.88	95	70 - 130
D 66 13C3_GenX	1280510	1804800			141	50 - 150
D 47 13C4_PFHpA	2476480	3211535			130	50 - 150
13 PFHpA			1000.00	884.97	88	70 - 130
D 45 13C3_PFHxS	836168	961246			115	50 - 150
14 PFHxS			910.00	846.60	93	70 - 130
29 ADONA			942.00	989.56	105	70 - 130
D 64 13C2_6:2 FTS_2	568266	642722			113	50 - 150
2 6:2 FTS			948.00	1170.62	123	70 - 130
D 53 13C8_PFOA	2287307	2702529			118	50 - 150
20 PFOA			1000.00	1012.86	101	70 - 130
12 PFHpS			952.00	906.65	95	70 - 130
D 54 13C8_PFOS	706178	850113			120	50 - 150
18 PFOS			928.00	909.07	97	70 - 130
17 PFNA			1000.00	940.45	94	70 - 130
D 56 13C9_PFNA	2070435	2715870			131	50 - 150
30 9Cl-PF3ONS			932.00	890.48	95	70 - 130
19 PFOSA			1000.00	1107.76	110	70 - 130
D 55 13C8_PFOSA	1158944	1411699			122	50 - 150
3 8:2 FTS			958.00	980.41	102	70 - 130
D 65 13C2_8:2 FTS_2	500510	553569			111	50 - 150
16 PFNS			960.00	945.47	98	70 - 130
D 51 13C6_PFDA	2109170	2502656			119	50 - 150
10 PFDA			1000.00	994.95	99	70 - 130
D 58 d3-MeFOSAA	2259303	2659332			118	50 - 150

Report Date: 11-Sep-2023 13:18:22 AIM Revision: 2.0.2023.0816
Data File: \\Organics\LL\LCMSMS01.i\090723B-nonDOD+ICAL.b\090723B031.d

Compound	Std Area	CCV Area	Exp. Conc ng/L	Conc ng/L	%Rec	%Rec Limits
6 N-MeFOSAA			1000.00	1069.46	106	70 - 130
9 PFDS			964.00	963.59	99	70 - 130
D 60 d5-EtFOSAA	1935814	2344348			121	50 - 150
D 52 13C7_PFUdA	1772741	2200806			124	50 - 150
25 PFUdA			1000.00	1024.89	102	70 - 130
5 N-EtFOSAA			1000.00	1032.13	103	70 - 130
D 61 d7-MeFOSE	379912	477743			126	50 - 150
32 MeFOSE			1000.00	1055.38	105	70 - 130
D 57 d3-MeFOSA	143502	177631			124	50 - 150
26 MeFOSA			1000.00	1170.49	117	70 - 130
31 11Cl-PF3OUDS			942.00	897.79	95	70 - 130
11 PFDoA			1000.00	977.34	97	70 - 130
D 38 13C2_PFDoA	1735380	2055476			118	50 - 150
4 10:2 FTS			964.00	1019.61	105	70 - 130
D 62 d9-EtFOSE	380859	437734			115	50 - 150
33 EtFOSE			1000.00	1010.16	101	70 - 130
D 59 d5-EtFOSA	137753	191825			139	50 - 150
27 EtFOSA			1000.00	884.84	88	70 - 130
34 PFDOS			968.00	903.01	93	70 - 130
24 PFTrDA			1000.00	971.39	97	70 - 130
D 42 13C2_PFTeDA	1797097	2187007			122	50 - 150
23 PFTeDA			1000.00	981.25	98	70 - 130
D 40 13C2_PFHxDA	905845	1177792			130	50 - 150
35 PFHxDA			1000.00	1051.74	105	70 - 130
36 PFODA			1000.00	1048.63	104	70 - 130

Pace Environmental Services, LLC
Continuing Calibration Verification Report

Data File: \\Organics\LL\LCMSMS01.i\090723B-nonDOD+ICAL.b\090723B043.d
Injection Date: 07-Sep-2023 22:26:22 Injection Vol: 10.0 uL
Sample Type: CCV Auto Sampler: 29
Sample Info: CCV 1000A_SVLC-3024 Misc. Info:
Inst. ID: LCMSMS01.i Operator: eqi.svoa

Method: LCMSMS01_PFAS-ID2 Version: V16 30-Jun-2022 10:54:24
Calib Method: PFAS-ID2 Lock State: Unlocked
Quant Method: IsoDil Integrator: picker

Reagent: Analytes Conc. Level: L-5 Vol. Added: 1.00 ml

Compound	Std Area	CCV Area	Exp. Conc ng/L	Conc ng/L	%Rec	%Rec Limits
8 PFBA			1000.00	1010.93	101	70 - 130
D 46 13C4_PFBA	2431491	2733484			112	50 - 150
21 PFPeA			1000.00	959.02	95	70 - 130
D 50 13C5_PFPeA	2240815	2684338			120	50 - 150
D 44 13C3_PFBS	822330	1005184			122	50 - 150
7 PFBS			884.00	812.23	91	70 - 130
D 63 13C2_4:2 FTS_2	472075	591526			125	50 - 150
1 4:2 FTS			934.00	949.85	101	70 - 130
D 49 13C5_PFHxA	1981677	2397103			121	50 - 150
15 PFHxA			1000.00	970.07	97	70 - 130
22 PFPeS			938.00	857.06	91 ✓	70 - 130 ✓
28 GenX			2000.00	1941.48	97	70 - 130
D 66 13C3_GenX	1280510	1585724 ✓			124 ✓	50 - 150
D 47 13C4_PFHpA	2476480	3055212			123	50 - 150
13 PFHpA			1000.00	956.86	95	70 - 130
D 45 13C3_PFHxS	836168	907254			109	50 - 150
14 PFHxS			910.00	873.24	95	70 - 130
29 ADONA			942.00	966.16	102	70 - 130
D 64 13C2_6:2 FTS_2	568266	708553			125	50 - 150
2 6:2 FTS			948.00	978.34	103	70 - 130
D 53 13C8_PFOA	2287307	2700913			118	50 - 150
20 PFOA			1000.00	985.48	98	70 - 130
12 PFHpS			952.00	936.34	98	70 - 130
D 54 13C8_PFOS	706178	786744 ✓			111 ✓	50 - 150
18 PFOS			928.00	935.70	100	70 - 130
17 PFNA			1000.00	1028.26	102	70 - 130
D 56 13C9_PFNA	2070435	2470913			119	50 - 150
30 9Cl-PF3ONS			932.00	973.77	104	70 - 130
19 PFOSA			1000.00	1032.98	103	70 - 130
D 55 13C8_PFOSA	1158944	1483891			128	50 - 150
3 8:2 FTS			958.00	962.70	100	70 - 130
D 65 13C2_8:2 FTS_2	500510	578158			116	50 - 150
16 PFNS			960.00	979.01	101	70 - 130
D 51 13C6_PFDA	2109170	2514568			119	50 - 150
10 PFDA			1000.00	1010.15	101	70 - 130
D 58 d3-MeFOSAA	2259303	2815383			125	50 - 150

Report Date: 11-Sep-2023 13:18:31 AIM Revision: 2.0.2023.0816
Data File: \\Organics\LL\LCMSMS01.i\090723B-nonDOD+ICAL.b\090723B043.d

Compound	Std Area	CCV Area	Exp. Conc ng/L	Conc ng/L	%Rec	%Rec Limits
6 N-MeFOSAA			1000.00	923.04	92	70 - 130
9 PFDS			964.00	1003.53	104	70 - 130
D 60 d5-EtFOSAA	1935814	2344440			121	50 - 150
D 52 13C7_PFUdA	1772741	2189819			124	50 - 150
25 PFUdA			1000.00	998.02	99	70 - 130
5 N-EtFOSAA			1000.00	970.66	97	70 - 130
D 61 d7-MeFOSE	379912	442261			116	50 - 150
32 MeFOSE			1000.00	1086.54	108	70 - 130
D 57 d3-MeFOSA	143502	176870			123	50 - 150
26 MeFOSA			1000.00	1087.44	108	70 - 130
31 11Cl-PF3OUDS			942.00	977.79	103	70 - 130
11 PFDoA			1000.00	945.81	94	70 - 130
D 38 13C2_PFDoA	1735380	2116593			122	50 - 150
4 10:2 FTS			964.00	1004.50	104	70 - 130
D 62 d9-EtFOSE	380859	445064			117	50 - 150
33 EtFOSE			1000.00	1006.57	100	70 - 130
D 59 d5-EtFOSA	137753	170504			124	50 - 150
27 EtFOSA			1000.00	1005.24	100	70 - 130
34 PFDOS			968.00	1004.95	103	70 - 130
24 PFTrDA			1000.00	918.90	91	70 - 130
D 42 13C2_PFTeDA	1797097	2176066			121	50 - 150
23 PFTeDA			1000.00	961.27	96	70 - 130
D 40 13C2_PFHxDA	905845	1136011			125	50 - 150
35 PFHxDA			1000.00	1046.22	104	70 - 130
36 PFODA			1000.00	1031.50	103	70 - 130

Pace Environmental Services, LLC
Continuing Calibration Verification Report

Data File: \\Organics\LL\LCMSMS01.i\090723B-nonDOD+ICAL.b\090723B057.d
Injection Date: 08-Sep-2023 00:54:57 Injection Vol: 10.0 uL
Sample Type: CCV Auto Sampler: 42
Sample Info: CCV 1000C_SVLC-3024 Misc. Info:
Inst. ID: LCMSMS01.i Operator: eqi.svoa

Not Bracketing QC, No Eval

Method: LCMSMS01_PFAS-ID2 Version: V16 30-Jun-2022 10:54:24
Calib Method: PFAS-ID2 Lock State: Unlocked
Quant Method: IsoDil Integrator: picker

Reagent: Analytes Conc. Level: L-5 Vol. Added: 1.00 ml

Compound	Std Area	CCV Area	Exp. Conc ng/L	Conc ng/L	%Rec	%Rec Limits
8 PFBA			1000.00	971.80	97	70 - 130
D 46 13C4_PFBA	2431491	1895270			78	50 - 150
21 PFPeA			1000.00	1002.24	100	70 - 130
D 50 13C5_PFPeA	2240815	1784163			80	50 - 150
D 44 13C3_PFBS	822330	689675			84	50 - 150
7 PFBS			884.00	793.57	89	70 - 130
D 63 13C2_4:2 FTS_2	472075	414806			88	50 - 150
1 4:2 FTS			934.00	935.68	100	70 - 130
D 49 13C5_PFHxA	1981677	1736584			88	50 - 150
15 PFHxA			1000.00	867.06	86	70 - 130
22 PFPeS			938.00	908.28	96	70 - 130
28 GenX			2000.00	2149.79	107	70 - 130
D 66 13C3_GenX	1280510	1125738			88	50 - 150
D 47 13C4_PFHpA	2476480	2019016			82	50 - 150
13 PFHpA			1000.00	927.18	92	70 - 130
D 45 13C3_PFHxS	836168	620837			74	50 - 150
14 PFHxS			910.00	854.78	93	70 - 130
29 ADONA			942.00	982.87	104	70 - 130
D 64 13C2_6:2 FTS_2	568266	462542			81	50 - 150
2 6:2 FTS			948.00	1102.79	116	70 - 130
D 53 13C8_PFOA	2287307	1874312			82	50 - 150
20 PFOA			1000.00	989.68	98	70 - 130
12 PFHpS			952.00	966.44	101	70 - 130
D 54 13C8_PFOS	706178	567075			80	50 - 150
18 PFOS			928.00	887.16	95	70 - 130
17 PFNA			1000.00	995.44	99	70 - 130
D 56 13C9_PFNA	2070435	1750637			85	50 - 150
30 9Cl-PF3ONS			932.00	909.45	97	70 - 130
19 PFOSA			1000.00	1017.94	101	70 - 130
D 55 13C8_PFOSA	1158944	981879			85	50 - 150
3 8:2 FTS			958.00	961.81	100	70 - 130
D 65 13C2_8:2 FTS_2	500510	405064			81	50 - 150
16 PFNS			960.00	942.71	98	70 - 130
D 51 13C6_PFDA	2109170	1858049			88	50 - 150
10 PFDA			1000.00	856.18	85	70 - 130
D 58 d3-MeFOSAA	2259303	1911201			85	50 - 150

Report Date: 11-Sep-2023 13:18:40 AIM Revision: 2.0.2023.0816
Data File: \\Organics\LL\LCMSMS01.i\090723B-nonDOD+ICAL.b\090723B057.d

Compound	Std Area	CCV Area	Exp. Conc ng/L	Conc ng/L	%Rec	%Rec Limits
6 N-MeFOSAA			1000.00	988.72	98	70 - 130
9 PFDS			964.00	1008.99	104	70 - 130
D 60 d5-EtFOSAA	1935814	1641202			85	50 - 150
D 52 13C7_PFUdA	1772741	1553362			88	50 - 150
25 PFUdA			1000.00	931.74	93	70 - 130
5 N-EtFOSAA			1000.00	977.42	97	70 - 130
D 61 d7-MeFOSE	379912	327139			86	50 - 150
32 MeFOSE			1000.00	1037.37	103	70 - 130
D 57 d3-MeFOSA	143502	133056			93	50 - 150
26 MeFOSA			1000.00	1029.39	102	70 - 130
31 11Cl-PF3OUDS			942.00	905.81	96	70 - 130
11 PFDoA			1000.00	960.34	96	70 - 130
D 38 13C2_PFDoA	1735380	1394295			80	50 - 150
4 10:2 FTS			964.00	970.60	100	70 - 130
D 62 d9-EtFOSE	380859	324679			85	50 - 150
33 EtFOSE			1000.00	878.58	87	70 - 130
D 59 d5-EtFOSA	137753	124776			91	50 - 150
27 EtFOSA			1000.00	995.13	99	70 - 130
34 PFDOS			968.00	924.52	95	70 - 130
24 PFTrDA			1000.00	992.83	99	70 - 130
D 42 13C2_PFTeDA	1797097	1504750			84	50 - 150
23 PFTeDA			1000.00	1002.71	100	70 - 130
D 40 13C2_PFHxDA	905845	817652			90	50 - 150
35 PFHxDA			1000.00	1021.77	102	70 - 130
36 PFODA			1000.00	991.96	99	70 - 130

Pace Environmental Services, LLC
Continuing Calibration Verification Report

Data File: \\Organics\LL\LCMSMS01.i\090723B-nonDOD+ICAL.b\090723B071.d
Injection Date: 08-Sep-2023 03:23:34 Injection Vol: 10.0 uL
Sample Type: CCV Auto Sampler: 55
Sample Info: CCV 1000D_SVLC-3024 Misc. Info:
Inst. ID: LCMSMS01.i Operator: eqi.svoa

Not Bracketing QC, No Eval

Method: LCMSMS01_PFAS-ID2 Version: V16 30-Jun-2022 10:54:24
Calib Method: PFAS-ID2 Lock State: Unlocked
Quant Method: IsoDil Integrator: picker

Reagent: Analytes Conc. Level: L-5 Vol. Added: 1.00 ml

Compound	Std Area	CCV Area	Exp. Conc ng/L	Conc ng/L	%Rec	%Rec Limits
8 PFBA			1000.00	966.00	96	70 - 130
D 46 13C4_PFBA	2431491	2127449			87	50 - 150
21 PFPeA			1000.00	924.23	92	70 - 130
D 50 13C5_PFPeA	2240815	1936730			86	50 - 150
D 44 13C3_PFBS	822330	729143			89	50 - 150
7 PFBS			884.00	864.09	97	70 - 130
D 63 13C2_4:2 FTS_2	472075	460040			97	50 - 150
1 4:2 FTS			934.00	870.63	93	70 - 130
D 49 13C5_PFHxA	1981677	1806506			91	50 - 150
15 PFHxA			1000.00	1023.28	102	70 - 130
22 PFPeS			938.00	920.82	98	70 - 130
28 GenX			2000.00	1912.55	95	70 - 130
D 66 13C3_GenX	1280510	1319423			103	50 - 150
D 47 13C4_PFHpA	2476480	2337201			94	50 - 150
13 PFHpA			1000.00	939.93	93	70 - 130
D 45 13C3_PFHxS	836168	677439			81	50 - 150
14 PFHxS			910.00	906.61	99	70 - 130
29 ADONA			942.00	926.42	98	70 - 130
D 64 13C2_6:2 FTS_2	568266	498042			88	50 - 150
2 6:2 FTS			948.00	1249.26	131	70 - 130
D 53 13C8_PFOA	2287307	1996527			87	50 - 150
20 PFOA			1000.00	933.09	93	70 - 130
12 PFHpS			952.00	943.48	99	70 - 130
D 54 13C8_PFOS	706178	624857			88	50 - 150
18 PFOS			928.00	908.61	97	70 - 130
17 PFNA			1000.00	944.45	94	70 - 130
D 56 13C9_PFNA	2070435	1952010			94	50 - 150
30 9Cl-PF3ONS			932.00	902.34	96	70 - 130
19 PFOSA			1000.00	1022.56	102	70 - 130
D 55 13C8_PFOSA	1158944	1083684			94	50 - 150
3 8:2 FTS			958.00	959.18	100	70 - 130
D 65 13C2_8:2 FTS_2	500510	419988			84	50 - 150
16 PFNS			960.00	996.81	103	70 - 130
D 51 13C6_PFDA	2109170	1862323			88	50 - 150
10 PFDA			1000.00	954.79	95	70 - 130
D 58 d3-MeFOSAA	2259303	2009843			89	50 - 150

Report Date: 11-Sep-2023 13:18:49 AIM Revision: 2.0.2023.0816
Data File: \\Organics\LL\LCMSMS01.i\090723B-nonDOD+ICAL.b\090723B071.d

Compound	Std Area	CCV Area	Exp. Conc ng/L	Conc ng/L	%Rec	%Rec Limits
6 N-MeFOSAA			1000.00	979.19	97	70 - 130
9 PFDS			964.00	944.99	98	70 - 130
D 60 d5-EtFOSAA	1935814	1791653			93	50 - 150
D 52 13C7_PFUdA	1772741	1723709			97	50 - 150
25 PFUdA			1000.00	948.69	94	70 - 130
5 N-EtFOSAA			1000.00	1055.45	105	70 - 130
D 61 d7-MeFOSE	379912	355420			94	50 - 150
32 MeFOSE			1000.00	1074.63	107	70 - 130
D 57 d3-MeFOSA	143502	134643			94	50 - 150
26 MeFOSA			1000.00	1184.54	118	70 - 130
31 11Cl-PF3OUDS			942.00	923.78	98	70 - 130
11 PFDoA			1000.00	1048.26	104	70 - 130
D 38 13C2_PFDoA	1735380	1528663			88	50 - 150
4 10:2 FTS			964.00	1011.32	104	70 - 130
D 62 d9-EtFOSE	380859	348110			91	50 - 150
33 EtFOSE			1000.00	965.12	96	70 - 130
D 59 d5-EtFOSA	137753	139033			101	50 - 150
27 EtFOSA			1000.00	933.37	93	70 - 130
34 PFDOS			968.00	918.25	94	70 - 130
24 PFTrDA			1000.00	918.09	91	70 - 130
D 42 13C2_PFTeDA	1797097	1584523			88	50 - 150
23 PFTeDA			1000.00	1015.94	101	70 - 130
D 40 13C2_PFHxDA	905845	884480			98	50 - 150
35 PFHxDA			1000.00	1029.93	102	70 - 130
36 PFODA			1000.00	998.42	99	70 - 130

Pace Environmental Services, LLC
Continuing Calibration Verification Report

Associated with analysis of PB 84416 MB and LCS only, no eval

Data File: \\Organics\LL\LCMSMS01.i\091223-nonDOD.b\091223011.d
Injection Date: 12-Sep-2023 16:59:48 Injection Vol: 10.0 uL
Sample Type: CCV Auto Sampler: 95
Sample Info: CCV 200_SVLC-2955 Misc. Info:
Inst. ID: LCMSMS01.i Operator: eqi.svoa

Method: LCMSMS01_PFAS-ID2 Version: V16 30-Jun-2022 10:54:24
Calib Method: PFAS-ID2 Lock State: Unlocked
Quant Method: IsoDil Integrator: picker

Reagent: Analytes Conc. Level: L-3 Vol. Added: 1.00 ml

Compound	Std Area	CCV Area	Exp. Conc ng/L	Conc ng/L	%Rec	%Rec Limits
D 46 13C4_PFBA	2106190	2169141			103	50 - 150
8 PFBA			200.00	214.64	107	70 - 130
D 50 13C5_PFPeA	2004669	2131670			106	50 - 150
21 PFPeA			200.00	204.90	102	70 - 130
7 PFBS			176.80	191.73	108	70 - 130
D 44 13C3_PFBS	766931	829646			108	50 - 150
D 63 13C2_4:2 FTS_2	468923	479164			102	50 - 150
1 4:2 FTS			186.80	191.55	102	70 - 130
D 49 13C5_PFHxA	1780605	1951405			110	50 - 150
15 PFHxA			200.00	211.01	105	70 - 130
22 PFPeS			187.60	192.13	102	70 - 130
D 66 13C3_GenX	1219720	1569415			129	50 - 150
28 GenX			400.00	398.81	99	70 - 130
D 47 13C4_PFHpA	2245621	2514939			112	50 - 150
13 PFHpA			200.00	197.18	98	70 - 130
14 PFHxS			182.00	218.76	120	70 - 130
D 45 13C3_PFHxS	718782	766965			107	50 - 150
29 ADONA			188.40	197.52	104	70 - 130
2 6:2 FTS			189.60	209.73	110	70 - 130
D 64 13C2_6:2 FTS_2	501766	546675			109	50 - 150
D 53 13C8_PFOA	1942649	2137311			110	50 - 150
20 PFOA			200.00	227.52	113	70 - 130
12 PFHpS			190.40	207.60	109	70 - 130
17 PFNA			200.00	226.66	113	70 - 130
D 54 13C8_PFOS	626806	727145			116	50 - 150
D 56 13C9_PFNA	1996040	2010025			101	50 - 150
18 PFOS			185.60	173.32	93	70 - 130
30 9Cl-PF3ONS			186.40	181.66	97	70 - 130
D 55 13C8_PFOSA	1086545	1285146			118	50 - 150
19 PFOSA			200.00	229.36	114	70 - 130
3 8:2 FTS			191.60	224.06	116	70 - 130
16 PFNS			192.00	208.90	108	70 - 130
D 65 13C2_8:2 FTS_2	419585	507936			121	50 - 150
D 51 13C6_PFDA	1844982	1957588			106	50 - 150
10 PFDA			200.00	206.28	103	70 - 130
D 58 d3-MeFOSAA	2133530	2408998			113	50 - 150

Report Date: 14-Sep-2023 11:29:46 AIM Revision: 2.0.2023.0606
Data File: \\Organics\LL\LCMSMS01.i\091223-nonDOD.b\091223011.d

Compound	Std Area	CCV Area	Exp. Conc ng/L	Conc ng/L	%Rec	%Rec Limits
6 N-MeFOSAA			200.00	216.03	108	70 - 130
9 PFDS			192.80	205.88	106	70 - 130
25 PFUdA			200.00	211.90	105	70 - 130
D 60 d5-EtFOSAA	1805665	2083533			115	50 - 150
D 52 13C7_PFUdA	1696277	1794294			106	50 - 150
5 N-EtFOSAA			200.00	216.06	108	70 - 130
D 61 d7-MeFOSE	315774	447565			142	50 - 150
32 MeFOSE			200.00	208.86	104	70 - 130
D 57 d3-MeFOSA	130619	156941			120	50 - 150
26 MeFOSA			200.00	213.21	106	70 - 130
31 11Cl-PF3OUDS			188.40	184.11	97	70 - 130
11 PFDoA			200.00	199.04	99	70 - 130
D 62 d9-EtFOSE	318319	445047			140	50 - 150
4 10:2 FTS			192.80	226.82	117	70 - 130
D 38 13C2_PFDoA	1602112	1762099			110	50 - 150
33 EtFOSE			200.00	195.64	97	70 - 130
D 59 d5-EtFOSA	129547	163633			126	50 - 150
27 EtFOSA			200.00	221.71	110	70 - 130
34 PFDOS			193.60	210.83	108	70 - 130
24 PFTrDA			200.00	210.33	105	70 - 130
23 PFTeDA			200.00	215.33	107	70 - 130
D 42 13C2_PFTeDA	1627426	1894960			116	50 - 150
35 PFHxDA			200.00	214.42	107	70 - 130
D 40 13C2_PFHxDA	913226	1041390			114	50 - 150
36 PFODA			200.00	218.17	109	70 - 130

Pace Environmental Services, LLC
Continuing Calibration Verification Report

Associated with analysis of PB 84416 MB and LCS only, no eval

Data File: \\Organics\LL\LCMSMS01.i\091223-nonDOD.b\091223025.d
Injection Date: 12-Sep-2023 19:27:51 Injection Vol: 10.0 uL
Sample Type: CCV Auto Sampler: 13
Sample Info: CCV 1000A_SVLC-3024 Misc. Info:
Inst. ID: LCMSMS01.i Operator: eqi.svoa

Method: LCMSMS01_PFAS-ID2 Version: V16 30-Jun-2022 10:54:24
Calib Method: PFAS-ID2 Lock State: Unlocked
Quant Method: IsoDil Integrator: picker

Reagent: Analytes Conc. Level: L-5 Vol. Added: 1.00 ml

Compound	Std Area	CCV Area	Exp. Conc ng/L	Conc ng/L	%Rec	%Rec Limits
D 46 13C4_PFBA	2169141	2057471			94.9	50 - 150
8 PFBA			1000.00	979.39	97	70 - 130
D 50 13C5_PFPeA	2131670	1992005			93.4	50 - 150
21 PFPeA			1000.00	979.23	97	70 - 130
7 PFBS			884.00	843.67	95	70 - 130
D 44 13C3_PFBS	829646	781402			94.2	50 - 150
D 63 13C2_4:2 FTS_2	479164	470612			98.2	50 - 150
1 4:2 FTS			934.00	958.41	102	70 - 130
D 49 13C5_PFHxA	1951405	1784858			91.5	50 - 150
15 PFHxA			1000.00	927.17	92	70 - 130
22 PFPeS			938.00	930.27	99	70 - 130
D 66 13C3_GenX	1569415	1616288			103	50 - 150
28 GenX			2000.00	1821.16	91	70 - 130
D 47 13C4_PFHpA	2514939	2482499			98.7	50 - 150
13 PFHpA			1000.00	979.55	97	70 - 130
14 PFHxS			910.00	860.74	94	70 - 130
D 45 13C3_PFHxS	766965	770884			100.5	50 - 150
29 ADONA			942.00	926.08	98	70 - 130
2 6:2 FTS			948.00	1009.69	106	70 - 130
D 64 13C2_6:2 FTS_2	546675	564141			103.2	50 - 150
D 53 13C8_PFOA	2137311	2089860			97.8	50 - 150
20 PFOA			1000.00	1014.24	101	70 - 130
12 PFHpS			952.00	998.45	104	70 - 130
17 PFNA			1000.00	966.19	96	70 - 130
D 54 13C8_PFOS	727145	694775			95.5	50 - 150
D 56 13C9_PFNA	2010025	2013248			100.2	50 - 150
18 PFOS			928.00	913.17	98	70 - 130
30 9Cl-PF3ONS			932.00	872.37	93	70 - 130
D 55 13C8_PFOSA	1285146	1137116			88.5	50 - 150
19 PFOSA			1000.00	1008.68	100	70 - 130
3 8:2 FTS			958.00	951.48	99	70 - 130
16 PFNS			960.00	970.99	101	70 - 130
D 65 13C2_8:2 FTS_2	507936	444731			87.6	50 - 150
D 51 13C6_PFDA	1957588	1971048			100.7	50 - 150
10 PFDA			1000.00	912.86	91	70 - 130
D 58 d3-MeFOSAA	2408998	2152058			89.3	50 - 150

Compound	Std Area	CCV Area	Exp. Conc ng/L	Conc ng/L	%Rec	%Rec Limits
6 N-MeFOSAA			1000.00	1083.78	108	70 - 130
9 PFDS			964.00	855.48	88	70 - 130
25 PFUdA			1000.00	966.49	96	70 - 130
D 60 d5-EtFOSAA	2083533	1980488			95.1	50 - 150
D 52 13C7_PFUdA	1794294	1691732			94.3	50 - 150
5 N-EtFOSAA			1000.00	1017.01	101	70 - 130
D 61 d7-MeFOSE	447565	375214			83.8	50 - 150
32 MeFOSE			1000.00	983.92	98	70 - 130
D 57 d3-MeFOSA	156941	135402			86.3	50 - 150
26 MeFOSA			1000.00	1014.80	101	70 - 130
31 11Cl-PF3OUDS			942.00	857.48	91	70 - 130
11 PFDoA			1000.00	939.57	93	70 - 130
D 62 d9-EtFOSE	445047	404688			90.9	50 - 150
4 10:2 FTS			964.00	1150.83	119	70 - 130
D 38 13C2_PFDoA	1762099	1618589			91.9	50 - 150
33 EtFOSE			1000.00	987.07	98	70 - 130
D 59 d5-EtFOSA	163633	137535			84.1	50 - 150
27 EtFOSA			1000.00	1093.61	109	70 - 130
34 PFDOS			968.00	927.11	95	70 - 130
24 PFTrDA			1000.00	1018.89	101	70 - 130
23 PFTeDA			1000.00	982.48	98	70 - 130
D 42 13C2_PFTeDA	1894960	1740579			91.9	50 - 150
35 PFHxDA			1000.00	1023.22	102	70 - 130
D 40 13C2_PFHxDA	1041390	955714			91.8	50 - 150
36 PFODA			1000.00	1051.58	105	70 - 130

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Continuing Calibration Verification Report

Associated with analysis of PB 84416 MB and LCS only, no eval

Data File: \\Organics\LL\LCMSMS01.i\091223-nonDOD.b\091223041.d
Injection Date: 12-Sep-2023 22:17:24 Injection Vol: 10.0 uL
Sample Type: CCV Auto Sampler: 28
Sample Info: CCV 1000B_SVLC-3024 Misc. Info:
Inst. ID: LCMSMS01.i Operator: eqi.svoa

Method: LCMSMS01_PFAS-ID2 Version: V16 30-Jun-2022 10:54:24
Calib Method: PFAS-ID2 Lock State: Unlocked
Quant Method: IsoDil Integrator: picker

Reagent: Analytes Conc. Level: L-5 Vol. Added: 1.00 ml

Compound	Std Area	CCV Area	Exp. Conc ng/L	Conc ng/L	%Rec	%Rec Limits
D 46 13C4_PFBA	2169141	2046584			94.3	50 - 150
8 PFBA			1000.00	972.19	97	70 - 130
D 50 13C5_PFPeA	2131670	1900193			89.1	50 - 150
21 PFPeA			1000.00	932.29	93	70 - 130
7 PFBS			884.00	890.34	100	70 - 130
D 44 13C3_PFBS	829646	748274			90.2	50 - 150
D 63 13C2_4:2 FTS_2	479164	422137			88.1	50 - 150
1 4:2 FTS			934.00	972.31	104	70 - 130
D 49 13C5_PFHxA	1951405	1600083			82	50 - 150
15 PFHxA			1000.00	1047.99	104	70 - 130
22 PFPeS			938.00	949.35	101	70 - 130
D 66 13C3_GenX	1569415	1448429			92.3	50 - 150
28 GenX			2000.00	1988.63	99	70 - 130
D 47 13C4_PFHpA	2514939	2303981			91.6	50 - 150
13 PFHpA			1000.00	906.59	90	70 - 130
14 PFHxS			910.00	912.74	100	70 - 130
D 45 13C3_PFHxS	766965	690103			90	50 - 150
29 ADONA			942.00	983.94	104	70 - 130
2 6:2 FTS			948.00	1093.10	115	70 - 130
D 64 13C2_6:2 FTS_2	546675	495452			90.6	50 - 150
D 53 13C8_PFOA	2137311	2023497			94.7	50 - 150
20 PFOA			1000.00	1006.09	100	70 - 130
12 PFHpS			952.00	1018.76	107	70 - 130
17 PFNA			1000.00	965.31	96	70 - 130
D 54 13C8_PFOS	727145	648894			89.2	50 - 150
D 56 13C9_PFNA	2010025	1857484			92.4	50 - 150
18 PFOS			928.00	891.96	96	70 - 130
30 9Cl-PF3ONS			932.00	814.93	87	70 - 130
D 55 13C8_PFOSA	1285146	1158038			90.1	50 - 150
19 PFOSA			1000.00	975.67	97	70 - 130
3 8:2 FTS			958.00	1037.26	108	70 - 130
16 PFNS			960.00	955.97	99	70 - 130
D 65 13C2_8:2 FTS_2	507936	440962			86.8	50 - 150
D 51 13C6_PFDA	1957588	1816862			92.8	50 - 150
10 PFDA			1000.00	981.80	98	70 - 130
D 58 d3-MeFOSAA	2408998	2070734			86	50 - 150

Compound	Std Area	CCV Area	Exp. Conc ng/L	Conc ng/L	%Rec	%Rec Limits
6 N-MeFOSAA			1000.00	1020.04	102	70 - 130
9 PFDS			964.00	914.75	94	70 - 130
25 PFUdA			1000.00	956.71	95	70 - 130
D 60 d5-EtFOSAA	2083533	1996516			95.8	50 - 150
D 52 13C7_PFUdA	1794294	1673871			93.3	50 - 150
5 N-EtFOSAA			1000.00	947.24	94	70 - 130
D 61 d7-MeFOSE	447565	396427			88.6	50 - 150
32 MeFOSE			1000.00	990.36	99	70 - 130
D 57 d3-MeFOSA	156941	136557			87	50 - 150
26 MeFOSA			1000.00	1080.74	108	70 - 130
31 11Cl-PF3OUDS			942.00	877.61	93	70 - 130
11 PFDoA			1000.00	963.29	96	70 - 130
D 62 d9-EtFOSE	445047	369339			83	50 - 150
4 10:2 FTS			964.00	1006.74	104	70 - 130
D 38 13C2_PFDoA	1762099	1503811			85.3	50 - 150
33 EtFOSE			1000.00	998.15	99	70 - 130
D 59 d5-EtFOSA	163633	152373			93.1	50 - 150
27 EtFOSA			1000.00	910.48	91	70 - 130
34 PFDOS			968.00	1010.99	104	70 - 130
24 PFTrDA			1000.00	1058.42	105	70 - 130
23 PFTeDA			1000.00	984.23	98	70 - 130
D 42 13C2_PFTeDA	1894960	1729013			91.2	50 - 150
35 PFHxDA			1000.00	999.64	99	70 - 130
D 40 13C2_PFHxDA	1041390	973457			93.5	50 - 150
36 PFODA			1000.00	1003.87	100	70 - 130

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Continuing Calibration Verification Report

Data File: \\Organics\LL\LCMSMS02.i\091323-nonDOD+ICAL.b\091323032.d
Injection Date: 13-Sep-2023 19:52:28 Injection Vol: 10.0 uL
Sample Type: CCV Auto Sampler: 11
Sample Info: CCV 1000A_SVLC-3024 Misc. Info:
Inst. ID: LCMSMS02.i Operator: eqi.svoa

Method: LCMSMS02_PFAS-ID2 Version: V16 30-Jun-2022 10:54:24
Calib Method: PFAS-ID2 Lock State: Unlocked
Quant Method: IsoDil Integrator: picker

Reagent: Analytes Conc. Level: L-5 Vol. Added: 1.00 ml

Compound	Std Area	CCV Area	Exp. Conc ng/L	Conc ng/L	%Rec	%Rec Limits
8 PFBA			1000.00	971.95	97	70 - 130
D 46 13C4_PFBA	1849042	1711762			93	50 - 150
21 PFPeA			1000.00	951.51	95	70 - 130
D 50 13C5_PFPeA	1924608	1878766			98	50 - 150
D 44 13C3_PFBS	681588	657779			97	50 - 150
7 PFBS			884.00	847.74	95	70 - 130
D 63 13C2_4:2 FTS_2	324762	289043			89	50 - 150
1 4:2 FTS			934.00	903.58	96	70 - 130
D 49 13C5_PFHxA	2099693	1977798			94	50 - 150
15 PFHxA			1000.00	973.42	97	70 - 130
22 PFPeS			938.00	950.73	101	70 - 130
28 GenX			2000.00	2018.82	100	70 - 130
D 66 13C3_GenX	3190425	2862924			90	50 - 150
D 47 13C4_PFHpA	2314826	2094414			90	50 - 150
13 PFHpA			1000.00	941.05	94	70 - 130
D 45 13C3_PFHxS	460846	440101			95	50 - 150
14 PFHxS			910.00	879.14	96	70 - 130
29 ADONA			942.00	983.37	104	70 - 130
D 64 13C2_6:2 FTS_2	344444	320003			93	50 - 150
2 6:2 FTS			948.00	1093.68	115	70 - 130
D 53 13C8_PFOA	2354509	1987208			84	50 - 150
20 PFOA			1000.00	991.49	99	70 - 130
12 PFHpS			952.00	954.51	100	70 - 130
D 56 13C9_PFNA	2161832	2008458			93	50 - 150
D 54 13C8_PFOS	427442	428832			100	50 - 150
18 PFOS			928.00	879.28	94	70 - 130
17 PFNA			1000.00	985.63	98	70 - 130
30 9Cl-PF3ONS			932.00	892.02	95	70 - 130
19 PFOSA			1000.00	1044.24	104	70 - 130
D 55 13C8_PFOSA	810487	727073			90	50 - 150
D 65 13C2_8:2 FTS_2	260184	259310			100	50 - 150
3 8:2 FTS			958.00	1068.99	111	70 - 130
16 PFNS			960.00	921.19	95	70 - 130
D 51 13C6_PFDA	1931518	1852685			96	50 - 150
10 PFDA			1000.00	957.25	95	70 - 130
6 N-MeFOSAA			1000.00	954.28	95	70 - 130

Report Date: 14-Sep-2023 12:06:23 AIM Revision: 2.0.2023.0816
Data File: \\Organics\LL\LCMSMS02.i\091323-nonDOD+ICAL.b\091323032.d

Compound	Std Area	CCV Area	Exp. Conc ng/L	Conc ng/L	%Rec	%Rec Limits
D 58 d3-MeFOSAA	1903926	1922583			101	50 - 150
9 PFDS			964.00	951.10	98	70 - 130
D 60 d5-EtFOSAA	1811012	1755185			97	50 - 150
25 PFUdA			1000.00	952.50	95	70 - 130
D 52 13C7_PFUdA	1894218	1824197			96	50 - 150
5 N-EtFOSAA			1000.00	979.04	97	70 - 130
D 61 d7-MeFOSE	251389	244905			97	50 - 150
32 MeFOSE			1000.00	872.09	87	70 - 130
D 57 d3-MeFOSA	119677	119698			100	50 - 150
26 MeFOSA			1000.00	933.64	93	70 - 130
31 11Cl-PF3OUDS			942.00	930.10	98	70 - 130
11 PFDoA			1000.00	963.22	96	70 - 130
D 62 d9-EtFOSE	242462	233178			96	50 - 150
D 38 13C2_PFDoA	1865990	1778043			95	50 - 150
33 EtFOSE			1000.00	965.40	96	70 - 130
4 10:2 FTS			964.00	964.02	100	70 - 130
D 59 d5-EtFOSA	121280	108351			89	50 - 150
27 EtFOSA			1000.00	1016.52	101	70 - 130
34 PFDOS			968.00	939.56	97	70 - 130
24 PFTrDA			1000.00	948.77	94	70 - 130
D 42 13C2_PFTeDA	1899115	1793850			94	50 - 150
23 PFTeDA			1000.00	982.78	98	70 - 130
D 40 13C2_PFHxDA	1537237	1460242			95	50 - 150
35 PFHxDA			1000.00	1052.30	105	70 - 130
36 PFODA			1000.00	1037.28	103	70 - 130

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Continuing Calibration Verification Report

Data File: \\Organics\LL\LCMSMS02.i\091323-nonDOD+ICAL.b\091323044.d
Injection Date: 13-Sep-2023 22:04:08 Injection Vol: 10.0 uL
Sample Type: CCV Auto Sampler: 22
Sample Info: CCV 1000B_SVLC-3024 Misc. Info:
Inst. ID: LCMSMS02.i Operator: eqi.svoa

Method: LCMSMS02_PFAS-ID2 Version: V16 30-Jun-2022 10:54:24
Calib Method: PFAS-ID2 Lock State: Unlocked
Quant Method: IsoDil Integrator: picker

Reagent: Analytes Conc. Level: L-5 Vol. Added: 1.00 ml

Compound	Std Area	CCV Area	Exp. Conc ng/L	Conc ng/L	%Rec	%Rec Limits
8 PFBA			1000.00	949.07	94	70 - 130
D 46 13C4_PFBA	1849042	1569195			85	50 - 150
21 PFPeA			1000.00	981.10	98	70 - 130
D 50 13C5_PFPeA	1924608	1610085			84	50 - 150
D 44 13C3_PFBS	681588	564640			83	50 - 150
7 PFBS			884.00	882.65	99	70 - 130
D 63 13C2_4:2 FTS_2	324762	247511			76	50 - 150
1 4:2 FTS			934.00	942.74	100	70 - 130
D 49 13C5_PFHxA	2099693	1800416			86	50 - 150
15 PFHxA			1000.00	922.55	92	70 - 130
22 PFPeS			938.00	912.49	97	70 - 130
28 GenX			2000.00	2094.00	104	70 - 130
D 66 13C3_GenX	3190425	2475037			78	50 - 150
D 47 13C4_PFHpA	2314826	1860250			80	50 - 150
13 PFHpA			1000.00	1008.13	100	70 - 130
D 45 13C3_PFHxS	460846	413925			90	50 - 150
14 PFHxS			910.00	771.87	84	70 - 130
29 ADONA			942.00	910.06	96	70 - 130
D 64 13C2_6:2 FTS_2	344444	317414			92	50 - 150
2 6:2 FTS			948.00	1206.95	127	70 - 130
D 53 13C8_PFOA	2354509	1825695			78	50 - 150
20 PFOA			1000.00	975.18	97	70 - 130
12 PFHpS			952.00	906.70	95	70 - 130
D 56 13C9_PFNA	2161832	1822711			84	50 - 150
D 54 13C8_PFOS	427442	365898			86	50 - 150
18 PFOS			928.00	954.43	102	70 - 130
17 PFNA			1000.00	967.39	96	70 - 130
30 9Cl-PF3ONS			932.00	961.87	103	70 - 130
19 PFOSA			1000.00	1020.05	102	70 - 130
D 55 13C8_PFOSA	810487	711838			88	50 - 150
D 65 13C2_8:2 FTS_2	260184	220975			85	50 - 150
3 8:2 FTS			958.00	1058.67	110	70 - 130
16 PFNS			960.00	926.27	96	70 - 130
D 51 13C6_PFDA	1931518	1593558			83	50 - 150
10 PFDA			1000.00	1014.26	101	70 - 130
6 N-MeFOSAA			1000.00	1067.04	106	70 - 130

Report Date: 14-Sep-2023 12:06:28 AIM Revision: 2.0.2023.0816
Data File: \\Organics\LL\LCMSMS02.i\091323-nonDOD+ICAL.b\091323044.d

Compound	Std Area	CCV Area	Exp. Conc ng/L	Conc ng/L	%Rec	%Rec Limits
D 58 d3-MeFOSAA	1903926	1674547			88	50 - 150
9 PFDS			964.00	1017.30	105	70 - 130
D 60 d5-EtFOSAA	1811012	1561305			86	50 - 150
25 PFUdA			1000.00	1008.74	100	70 - 130
D 52 13C7_PFUdA	1894218	1599229			84	50 - 150
5 N-EtFOSAA			1000.00	1026.04	102	70 - 130
D 61 d7-MeFOSE	251389	198761			79	50 - 150
32 MeFOSE			1000.00	986.27	98	70 - 130
D 57 d3-MeFOSA	119677	117284			98	50 - 150
26 MeFOSA			1000.00	906.74	90	70 - 130
31 11Cl-PF3OUDS			942.00	917.09	97	70 - 130
11 PFDoA			1000.00	967.59	96	70 - 130
D 62 d9-EtFOSE	242462	211907			87	50 - 150
D 38 13C2_PFDoA	1865990	1568902			84	50 - 150
33 EtFOSE			1000.00	949.72	94	70 - 130
4 10:2 FTS			964.00	851.72	88	70 - 130
D 59 d5-EtFOSA	121280	100248			83	50 - 150
27 EtFOSA			1000.00	998.80	99	70 - 130
34 PFDOS			968.00	992.30	102	70 - 130
24 PFTrDA			1000.00	987.78	98	70 - 130
D 42 13C2_PFTeDA	1899115	1539604			81	50 - 150
23 PFTeDA			1000.00	1026.93	102	70 - 130
D 40 13C2_PFHxDA	1537237	1387185			90	50 - 150
35 PFHxDA			1000.00	1001.72	100	70 - 130
36 PFODA			1000.00	1002.06	100	70 - 130

SCIEX
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SCIEX Triple Quad 4500/4500MD Systems

Planned Maintenance Procedure



GEN-IDV-08-6710-G

November 2021

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Introduction 1

Note: For regulatory and safety information for the mass spectrometer, refer to the document: *System User Guide*.

The planned maintenance (PM) procedure is designed to help maintain overall system performance.

Planned maintenance is not intended to take the place of an Operational Qualification (OQ) nor is it intended to verify the instrument specifications. Separate Installation Qualification (IQ) and OQ services are available. Contact a SCIEX representative.

The procedure must be performed by a trained SCIEX Field Service Employee (FSE).

The procedure has been developed for the SCIEX Triple Quad 4500/4500MD System with the Turbo V Ion Source. It does not apply to any other products or processes.

The procedure does not address any customer-specific analytical protocol (performance qualification) or method validation.

Note: If an issue is identified and the system requires repair, then the customer is responsible for the cost of the repair, except to the extent that the system and required repairs are covered by a SCIEX warranty or service contract. Open a separate service call for the repair. Do not charge repair service call hours to planned maintenance procedures.

Planned Maintenance Tasks 2

Note: Perform all procedures using the Turbo V Ion Source, unless otherwise specified.

Pre-Planned Maintenance

Note: Guideline values are for reference only. The pre-PM test results are not required to meet or exceed these values.

Pre-PM Tasks

Task	Complete	N/A
Ask the customer about system performance since the last visit and record comments.	✓	—
If the customer maintains a log for the system, then review it.	○	◉
Review the work to be performed with the customer.	✓	—

PC Health Check

Task	Complete	N/A
Inspect the status of the RAID 1 hard drives.	✓	—

Vacuum System Tests

Task			Complete
Record the turbo pump operational values. **Parameter** / **Results** Temperature (°C): 43 Current (A): 3.9 Voltage (V): 23 Power (W): 85 Driving frequency (Hz): 800			✓
Inspect the vacuum gauge filament using the appropriate service tool (Analyst Service Diagnostics (ASD) for Analyst software or Tuning Tools for SCIEX OS) and identify the filament position. If the mass spectrometer is using filament 2, then order a replacement vacuum gauge as a separate service call.	1	◉	✓
	2	○	

Pre-PM Pressure Test

Pre-PM Pressure Test is Complete	✓

Test	Guideline	Result
Vacuum chamber pressure with CAD gas off	0.4×10^{-5} torr ≤ $P_{CAD\,0}$ ≤ 1.1×10^{-5} torr	0.5e-5
Pressure difference (CAD_{12} minus CAD_0)	1.8×10^{-5} torr ≤ ($P_{CAD\,12} - P_{CAD\,0}$) ≤ 2.8×10^{-5} torr	2.1e-5

Inspect for Contamination

Task	Complete	N/A
Inspect for front-end contamination. Refer to Inspect for Contamination.	✓	—

Record Probe Position

Task	Result
Record the vertical and horizontal probe positions.	0.5, 5.0

Pre-PM System Tests

Q1 Positive MS Test is Complete: Intensity and Peak Width	✓

- **Test solution:** POS PPG, 2e-6 M
- **Flow rate:** 5 µL/min
- **Scan rate:** 10 Da/s
- **Cycles:** 10
- **MCA (Analyst software):** On

Note: SCIEX OS uses **Sum Of** 10 cycles instead of **MCA**.

- **Data required:** Spectra for masses 59.050, 175.133, 500.380, 616.464, 906.673, 1,254.925, 1,545.134, 1,952.427, with peak intensities, peak width, and mass shift results, complete with method file information. Printouts can be provided if required.

Note: After calibration, the mass shift result must be within 0.1 Da for all assigned masses.

Mass (Da)	Intensity (cps)		Peak Width (Da)	
	Guideline	Result	Guideline	Result
175.133	≥ 8.0×10^6	2.9e7	0.6 to 0.8	1.08
500.380	≥ 8.0×10^6	3.2e7	0.6 to 0.8	1.10
906.673	≥ 2.0×10^7	5.4e7	0.6 to 0.8	1.19
1,952.427	≥ 8.8×10^5	1.1e7	0.6 to 0.8	n/a

Q3 Positive MS Test is Complete: Intensity and Peak Width	✓

- **Test solution:** POS PPG, 2e-6 M
- **Flow rate:** 5 µL/min
- **Scan rate:** 10 Da/s
- **Cycles:** 10
- **MCA (Analyst software):** On

Note: SCIEX OS uses **Sum Of** 10 cycles instead of **MCA**.

- **Data required:** Spectra for masses 59.050, 175.133, 500.380, 616.464, 906.673, 1,254.925, 1,545.134, 1,952.427, with peak intensities, peak width, and mass shift results, complete with method file information. Printouts can be provided if required.

Note: After calibration, the mass shift result must be within 0.1 Da for all assigned masses.

Mass (Da)	Intensity (cps)		Peak Width (Da)	
	Guideline	Result	Guideline	Result
175.133	≥ 8.0×10^6	3.2e7	0.6 to 0.8	0.68
500.380	≥ 8.0×10^6	2.5e7	0.6 to 0.8	0.69
906.673	≥ 2.0×10^7	5.0e7	0.6 to 0.8	0.65
1,952.427	≥ 8.8×10^5	1.1e7	0.6 to 0.8	0.70

Q1 Negative MS Test is Complete: Intensity and Peak Width	✓

- **Test solution:** NEG PPG, 3e-4 M
- **Flow rate:** 10 µL/min
- **Scan rate**: 10 Da/s
- **Cycles:** 10
- **MCA (Analyst software):** On

Note: SCIEX OS uses **Sum Of** 10 cycles instead of **MCA.**

- **Data required:** Spectra for masses 44.998, 411.259, 585.385, 933.636, 1,223.845, 1,572.097, 1,863.306, 1,979.389, with peak intensities, peak width, and mass shift results, complete with method file information. Printouts can be provided if required.

Note: After calibration, the mass shift result must be within 0.1 Da for all assigned masses.

Mass (Da)	Intensity (cps)		Peak Width (Da)	
	Guideline	Result	Guideline	Result
933.636	$\geq 1.8 \times 10^7$	2.6e7	0.6 to 0.8	0.81
1,863.306	$\geq 1.4 \times 10^6$	4.5e6	0.6 to 0.8	0.79

Q3 Negative MS Test is Complete	✓

- **Test solution:** NEG PPG, 3e-4 M
- **Flow rate:** 10 µL/min
- **Scan rate**: 10 Da/s
- **Cycles:** 10
- **MCA (Analyst software):** On

Note: SCIEX OS uses **Sum Of** 10 cycles instead of **MCA.**

- **Data required:** Spectra for masses 44.998, 411.259, 585.385, 933.636, 1,223.845, 1,572.097, 1,863.306, 1,979.389, with peak intensities, peak width, and mass shift results, complete with method file information. Printouts can be provided if required.

Note: After calibration, the mass shift result must be within 0.1 Da for all assigned masses.

Mass (Da)	Intensity (cps)		Peak Width (Da)	
	Guideline	Result	Guideline	Result
933.636	$\geq 1.8 \times 10^7$	3.6e7	0.6 to 0.8	0.85
1,863.306	$\geq 2.0 \times 10^6$	5.5e6	0.6 to 0.8	1.10

Reserpine MS/MS Transmission Test is Complete	✓

- **Test solution:** Reserpine solution 0.167 pmol/µL
- **Flow rate:** 5 µL/min
- **Scan rate:** 10 Da/s (both MS and MS/MS)
- **Scan mode:** Product Ion (MS2)
- **Product Of:** 609.3 (or as calibrated)
- **Product Ion:** 195.1
- **Cycles:** 10
- **MCA (Analyst software):** On

Note: SCIEX OS uses **Sum Of** 10 cycles instead of **MCA**.

- **Data required:** Spectra for masses 609.3 and 195.1, with peak intensities, peak width, and mass shift results, complete with method file information. Printouts can be provided if required.

Guideline	Result
Transmission efficiency $\frac{Intensity\ for\ ion\ at\ m/z\ 195.1}{Intensity\ for\ ion\ at\ m/z\ 609.3\ (or\ as\ calibrated)} \times 100 \geq 10\%$	10.4%

Planned Maintenance

Mass Spectrometer Maintenance

Task	Complete	N/A
Shut down the system and then disconnect the mains supply power cable.	✓	—
If required, replace the roughing pump oil. The recommended interval is every 3 years. **Note:** If an oil change is not required, then inspect the oil level and top up the oil, if required. **CAUTION: Potential System Damage. Do not mix different types of oil. Mixing mineral oil with synthetic oil can cause pump failure.**	✓	—
If required, replace the roughing pump oil exhaust filter. The recommended interval is every 3 years.	○	◉
Confirm that there is no excessive roughing pump oil leakage. Clean up any oil.	✓	—
Make sure that the roughing pump exhaust is properly routed to the ventilation system.	✓	—

Task	Complete	N/A
Inspect the exhaust system: • Make sure that all of the gas fittings at the rear bulkhead are tight. • Make sure that all of the exhaust hoses are free of kinks. • Make sure that all of the hoses at the waste bottle are secure, and that there are no signs of leaks. • Make sure that the waste bottle is upright. • Make sure that the exhaust hose is securely connected to the lab ventilation system. • Make sure that no liquid is trapped in the exhaust lines.	✓	—
Clean or replace the four air filters in the base of the mass spectrometer chassis.	✓	—
(If applicable) Clean the turbo pump filter screen.	○	◉
(If applicable) Verify the operation of the SCIEX-supplied bench cooling fans.	◉	○
Clean the curtain plate.	✓	—
Clean the orifice plate.	✓	—
Clean the QJet Ion Guide and IQ0 lens.	✓	—
(If contamination is detected) Clean the Q0 region and the IQ1 lens.	◉	○
Inspect the cable connections: • Make sure that the power cables for the mass spectrometer, LC system, roughing pump, syringe pump, gas generator, and UPS are securely connected. • Make sure that the communications cables for the GPIB/Ethernet ports, LC connections, and roughing pump are securely connected.	✓	—

Task	Complete	N/A
Verify system support functions — gas: • Make sure that the input gas pressures at the regulators are within specifications. • Make sure that there is no liquid present in the gas lines.	✓	—
Examine the expiry date on the battery system for the UPS (sold by SCIEX), and then recommend replacement of the battery tray, if required.	○	◉
Start up the system.	✓	—

Turbo V Ion Source Maintenance

Task	Complete	N/A
If necessary, replace the electrode in the TurboIonSpray and APCI probes.	◉	○
With the TurboIonSpray probe installed, make sure that the temperature reaches the recommended set point of 500 °C.	✓	—
(If applicable) With the APCI probe installed, make sure that the temperature reaches the recommended set point of 400 °C.	○	◉
Examine the ion source and, if visible signs of contamination are present, clean the inner surfaces using lint-free wipes and a 50:50 methanol:water solution. **Note:** Remove the corona discharge needle before cleaning.	◉	○

Software Maintenance

Note: This task is not applicable to MD systems.

Task	Complete	N/A
(Obtain customer approval first) Install any applicable HotFixes for the control software. **Note:** Make sure that the compatible instrument firmware is installed.	○	◉
(Analyst software) (Obtain customer approval first) Install the Analyst Diagnostic Tool if it is not already installed.	○	◉

Post-Planned Maintenance

Voltage Tests

Task		Complete
Inspect the RF tuning voltages at the QPS amplifier module and then, if required, tune the coil boxes.		✓
Inspect the detector voltage. Optimize, if required.		✓
Detector voltage	+1900/-1900	

Post-PM Pressure Test

Post-PM Pressure Test is Complete	✓

Test	Specification	Result
Vacuum chamber pressure with CAD gas off	0.4×10^{-5} torr ≤ $P_{CAD\,0}$ ≤ 1.1×10^{-5} torr	0.5e-5
Pressure difference (CAD_{12} minus CAD_0)	1.8×10^{-5} torr ≤ ($P_{CAD\,12} - P_{CAD\,0}$) ≤ 2.8×10^{-5} torr	2.5e-5

Inspect for Contamination

Task	Complete	N/A
Inspect for front-end contamination. Refer to Inspect for Contamination.	✓	—

Post-PM System Tests

Q1 Positive MS Test is Complete: Intensity and Peak Width	✓

- **Test solution:** POS PPG, 2e-6 M
- **Flow rate:** 5 µL/min
- **Scan rate:** 10 Da/s
- **Cycles:** 10
- **MCA (Analyst software):** On

Note: SCIEX OS uses **Sum Of** 10 cycles instead of **MCA**.

- **Data required:** Spectra for masses 59.050, 175.133, 500.380, 616.464, 906.673, 1,254.925, 1,545.134, 1,952.427, with peak intensities, peak width, and mass shift results, complete with method file information. Printouts can be provided if required.

Note: After calibration, the mass shift result must be within 0.1 Da for all assigned masses.

Mass (Da)	Intensity (cps)		Peak Width (Da)	
	Specification	Result	Specification	Result
175.133	≥ 8.0×10^6	2.4e7	0.6 to 0.8	0.70
500.380	≥ 8.0×10^6	2.9e7	0.6 to 0.8	0.72
906.673	≥ 2.0×10^7	3.8e7	0.6 to 0.8	0.68
1,952.427	≥ 8.8×10^5	4.9e6	0.6 to 0.8	0.73

Q1 Positive MS Test is Complete: Peak Width for Identified Masses	✓

- **Test solution:** POS PPG, 2e-6 M
- **Flow rate:** 5 µL/min
- **MCA (Analyst software):** On

Note: SCIEX OS uses **Sum Of** 10 cycles instead of **MCA.**

- **Data required:** Spectra for masses 59.050, 175.133, 500.380, 616.464, 906.673, 1,254.925, 1,545.134, 1,952.427, with peak intensities, peak width, and mass shift results, complete with method file information. Printouts can be provided if required.

Note: After calibration, the mass shift result must be within 0.1 Da for all assigned masses.

Mass (Da)	Scan Rate (Da/s)	Cycles	Specification (Da)	Result (Passed)
59.050, 175.133, 500.380, 616.464, 906.673, 1,254.925, 1,545.134, 1,952.427	10	10	0.6 to 0.8	✓
	200	50	0.6 to 0.8	
	1,000	50	0.6 to 0.8	
	2,000	100	0.6 to 0.8	

Q3 Positive MS Test is Complete: Intensity and Peak Width	✓

- **Test solution:** POS PPG, 2e-6 M
- **Flow rate:** 5 µL/min
- **Scan rate:** 10 Da/s
- **Cycles:** 10
- **MCA (Analyst software):** On

Note: SCIEX OS uses **Sum Of** 10 cycles instead of **MCA.**

- **Data required:** Spectra for masses 59.050, 175.133, 500.380, 616.464, 906.673, 1,254.925, 1,545.134, 1,952.427, with peak intensities, peak width, and mass shift results, complete with method file information. Printouts can be provided if required.

Note: After calibration, the mass shift result must be within 0.1 Da for all assigned masses.

Mass (Da)	Intensity (cps)		Peak Width (Da)	
	Specification	Result	Specification	Result
175.133	≥ 8.0×10^6	3.5e7	0.6 to 0.8	0.66
500.380	≥ 8.0×10^6	3.1e7	0.6 to 0.8	0.72
906.673	≥ 2.0×10^7	5.4e7	0.6 to 0.8	0.72
1,952.427	≥ 8.8×10^5	1.0e7	0.6 to 0.8	0.72

Q3 Positive MS Test is Complete: Peak Width for Identified Masses	✓

- **Test solution:** POS PPG, 2e-6 M
- **Flow rate:** 5 µL/min
- **MCA (Analyst software):** On

Note: SCIEX OS uses **Sum Of** 10 cycles instead of **MCA**.

- **Data required:** Spectra for masses 59.050, 175.133, 500.380, 616.464, 906.673, 1,254.925, 1,545.134, 1,952.427, with peak intensities, peak width, and mass shift results, complete with method file information. Printouts can be provided if required.

Note: After calibration, the mass shift result must be within 0.1 Da for all assigned masses.

Mass (Da)	Scan Rate (Da/s)	Cycles	Specification (Da)	Result (Passed)
59.050, 175.133, 500.380, 616.464, 906.673, 1,254.925, 1,545.134, 1,952.427	10	10	0.6 to 0.8	✓
	200	50	0.6 to 0.8	
	1,000	50	0.6 to 0.8	
	2,000	100	0.6 to 0.8	

Q1 Negative MS Test is Complete: Intensity and Peak Width	✓

- **Test solution:** NEG PPG, 3e-4 M
- **Flow rate:** 10 µL/min
- **Scan rate**: 10 Da/s
- **Cycles:** 10
- **MCA (Analyst software):** On

Note: SCIEX OS uses **Sum Of** 10 cycles instead of **MCA.**

- **Data required:** Spectra for masses 44.998, 411.259, 585.385, 933.636, 1,223.845, 1,572.097, 1,863.306, 1,979.389, with peak intensities, peak width, and mass shift results, complete with method file information. Printouts can be provided if required.

Note: After calibration, the mass shift result must be within 0.1 Da for all assigned masses.

Mass (Da)	Intensity (cps)		Peak Width (Da)	
	Specification	Result	Specification	Result
933.636	$\geq 1.8 \times 10^7$	2.7e7	0.6 to 0.8	0.73
1,863.306	$\geq 1.4 \times 10^6$	4.6e6	0.6 to 0.8	0.71

Q1 Negative MS Test is Complete: Peak Width for Identified Masses	✓

- **Test solution:** NEG PPG, 3e-4 M
- **Flow rate:** 10 µL/min
- **MCA (Analyst software):** On

Note: SCIEX OS uses **Sum Of** 10 cycles instead of **MCA.**

- **Data required:** Spectra for masses 44.998, 411.259, 585.385, 933.636, 1,223.845, 1,572.097, 1,863.306, 1,979.389, with peak intensities, peak width, and mass shift results, complete with method file information. Printouts can be provided if required.

Note: After calibration, the mass shift result must be within 0.1 Da for all assigned masses.

Mass (Da)	Scan Rate (Da/s)	Cycles	Specification (Da)	Result (Passed)
44.998, 411.259, 585.385, 933.636, 1,223.845, 1,572.097, 1,863.306, 1,979.389	10	10	0.6 to 0.8	✓
	200	50	0.6 to 0.8	
	1,000	50	0.6 to 0.8	
	2,000	100	0.6 to 0.8	

Q3 Negative MS Test is Complete: Intensity and Peak Width	✓

- **Test solution:** NEG PPG, 3e-4 M
- **Flow rate:** 10 µL/min
- **Scan rate**: 10 Da/s
- **Cycles:** 10
- **MCA (Analyst software):** On

Note: SCIEX OS uses **Sum Of** 10 cycles instead of **MCA.**

- **Data required:** Spectra for masses 44.998, 411.259, 585.385, 933.636, 1,223.845, 1,572.097, 1,863.306, 1,979.389, with peak intensities, peak width, and mass shift results, complete with method file information. Printouts can be provided if required.

Note: After calibration, the mass shift result must be within 0.1 Da for all assigned masses.

Mass (Da)	Intensity (cps)		Peak Width (Da)	
	Specification	Result	Specification	Result
933.636	$\geq 1.8 \times 10^7$	2.0e7	0.6 to 0.8	0.68
1,863.306	$\geq 2.0 \times 10^6$	2.4e6	0.6 to 0.8	0.65

Q3 Negative MS Test is Complete: Peak Width for Identified Masses	✓

- **Test solution:** NEG PPG, 3e-4 M
- **Flow rate:** 10 µL/min
- **MCA (Analyst software):** On

Note: SCIEX OS uses **Sum Of** 10 cycles instead of **MCA**.

- **Data required:** Spectra for masses 44.998, 411.259, 585.385, 933.636, 1,223.845, 1,572.097, 1,863.306, 1,979.389, with peak intensities, peak width, and mass shift results, complete with method file information. Printouts can be provided if required.

Note: After calibration, the mass shift result must be within 0.1 Da for all assigned masses.

Mass (Da)	Scan Rate (Da/s)	Cycles	Specification (Da)	Result (Passed)
44.998, 411.259, 585.385, 933.636, 1,223.845, 1,572.097, 1,863.306, 1,979.389	10	10	0.6 to 0.8	✓
	200	50	0.6 to 0.8	
	1,000	50	0.6 to 0.8	
	2,000	100	0.6 to 0.8	

Reserpine MS/MS Transmission Test is Complete	✓

- **Test solution:** Reserpine solution 0.167 pmol/µL
- **Flow rate:** 5 µL/min
- **Scan rate:** 10 Da/s (both MS and MS/MS)
- **Scan mode:** Product Ion (MS2)
- **Product Of:** 609.3 (or as calibrated)
- **Product Ion:** 195.1
- **Cycles:** 10
- **MCA (Analyst software):** On

Note: SCIEX OS uses **Sum Of** 10 cycles instead of **MCA**.

- **Data required:** Spectra for masses 609.3 and 195.1, with peak intensities, peak width, and mass shift results, complete with method file information. Printouts can be provided if required.

Specification	Result
Transmission efficiency $\frac{Intensity\ for\ ion\ at\ m/z\ 195.1}{Intensity\ for\ ion\ at\ m/z\ 609.3\ (or\ as\ calibrated)} \times 100 \geq 10\%$	10%

Post-PM Tasks

Task	Complete	N/A
Delete any unnecessary files.	✓	—
Back up the Data folder for the control software.	✓	—
(If applicable) Defragment the hard drive.	○	◉
(Not applicable for MD instrument families) If the customer has a Software Support Plan, then perform the Software Health Check: • (Obtain customer approval first) Install any compatible HotFixes and updates for SCIEX add-on software.	○	◉

Restore Probe Position

Task	Complete	N/A
Restore vertical and horizontal probe positions to those recorded during Record Probe Position	✓	—

StatusScope Remote Monitoring Service Tasks

The StatusScope remote monitoring service is not applicable for MD systems.

Task	Complete	N/A
Note: Installation of the StatusScope remote monitoring service is available only to warranty and eligible contract customers. Refer to sciex.com/instrument-service-and-support/statusscope-remote-monitoring for a list of eligible contracts. If the StatusScope remote monitoring service is not installed, then perform these tasks: • If the customer does not want the StatusScope remote monitoring service installed, then skip the remaining steps in this section. • If the customer wants the StatusScope remote monitoring service installed, then complete the steps in this section.		—
Verify the connection to the server for the StatusScope remote monitoring service. **Note:** Use the **StatusScopePortCheck.exe**. The utility is included with the StatusScope installer.	○	◉
Install the agent for the StatusScope remote monitoring service.	○	◉
Ask the customer to log on to SCIEX Now to verify that the instrument is connected to the server for the StatusScope remote monitoring service. **Note:** The instrument is shown under the account of the **Primary Contact**.	○	◉

Wrap-up

Task	Complete	N/A
Review the work performed with the customer.	✓	—
Record the test results in this document and then attach all of the test data.	✓	—
Review the routine maintenance schedule and the procedures with the customer.	✓	—
Complete this document: • Review the test results with the customer. • (SCIEX OS) Create the folder D:/SCIEX OS Data/PM. Save reports and data in this folder. • Provide the customer with the completed document.	✓	—

Service Request Number 3

Service request number		5471360	
Organization		Pace South Carolina	
Mass spectrometer serial number		BJ29321608	
FSE name	Lynne Russell	Date (yyyy-mm-dd)	2022-05-20

Service Request Number

Comments and Exceptions

Inspect for Contamination A

Perform a Q1 and Q3 charging test to determine whether front end contamination is present.

1. Run the **Pos PPG** method for 10 minutes, monitoring the Total Ion Count (TIC) for degradation of the signal or a decrease in sensitivity.
2. Change the polarity to Negative, and then scan for one minute.
3. Change the polarity to Positive, and then make sure that the **IS** parameter returns to the original value.
4. Run the method.

   If the signal sensitivity is restored temporarily but the Total Ion Count (TIC) again degrades by more than 5% over a 10 minute run, then a possible front-end contamination is indicated.
5. Repeat the test in Negative polarity using the Q1 Neg PPG method.

Guidelines for Cleaning the Front End

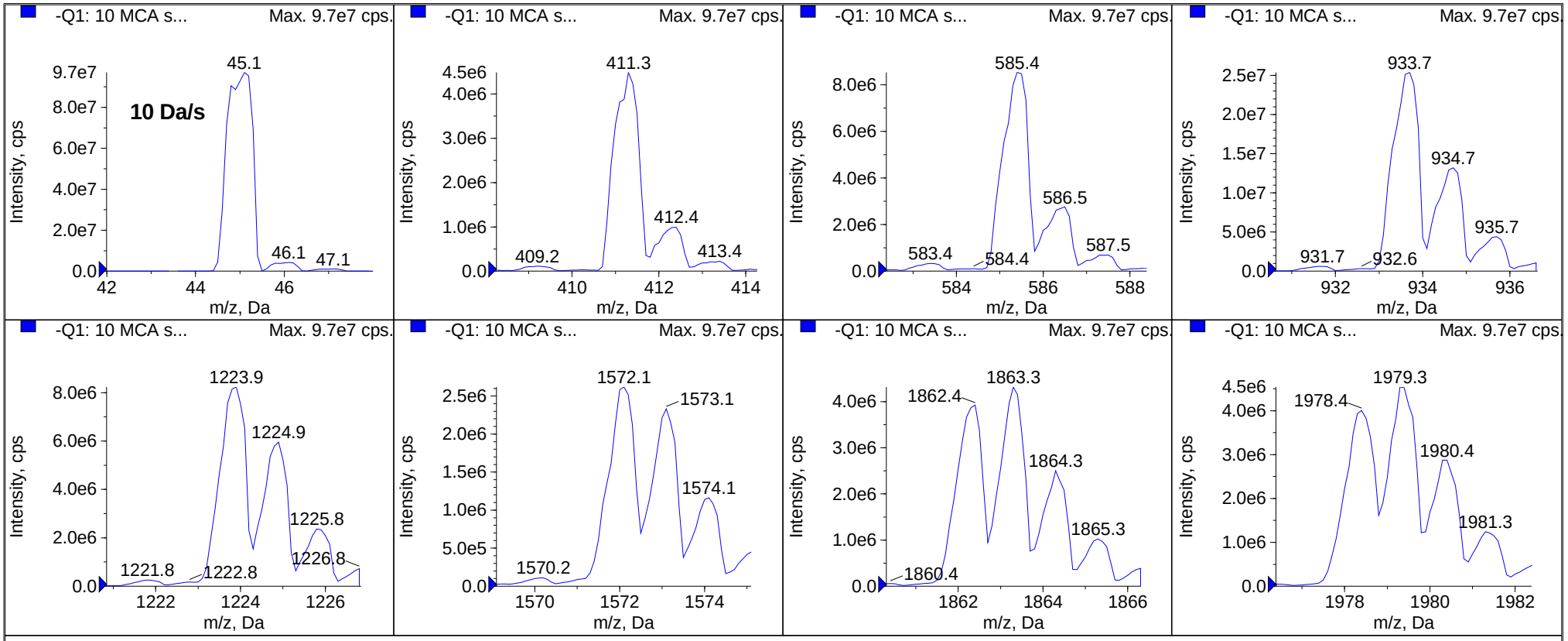
If charging tests indicate that cleaning is necessary, then clean the front-end components, including the QJet Ion Guide, IQ0 lens, Q0 quadrupole, and IQ1 lens.

Removing the ion optics is considered a repair activity. FSEs must open a separate service repair call.

Note: This procedure does not provide troubleshooting for all technical root causes of signal degradation or charging effect. Signal degradation might also result from a contaminated TurboIonSpray probe or electrode, method parameters that are not optimized, or other factors.

Printing Time: 2:37:54 PM
Printing Date: Wednesday, January 18, 2023
Polarity/Scan Type: Negative Q1 MS

Analyst Version: 1.6.3



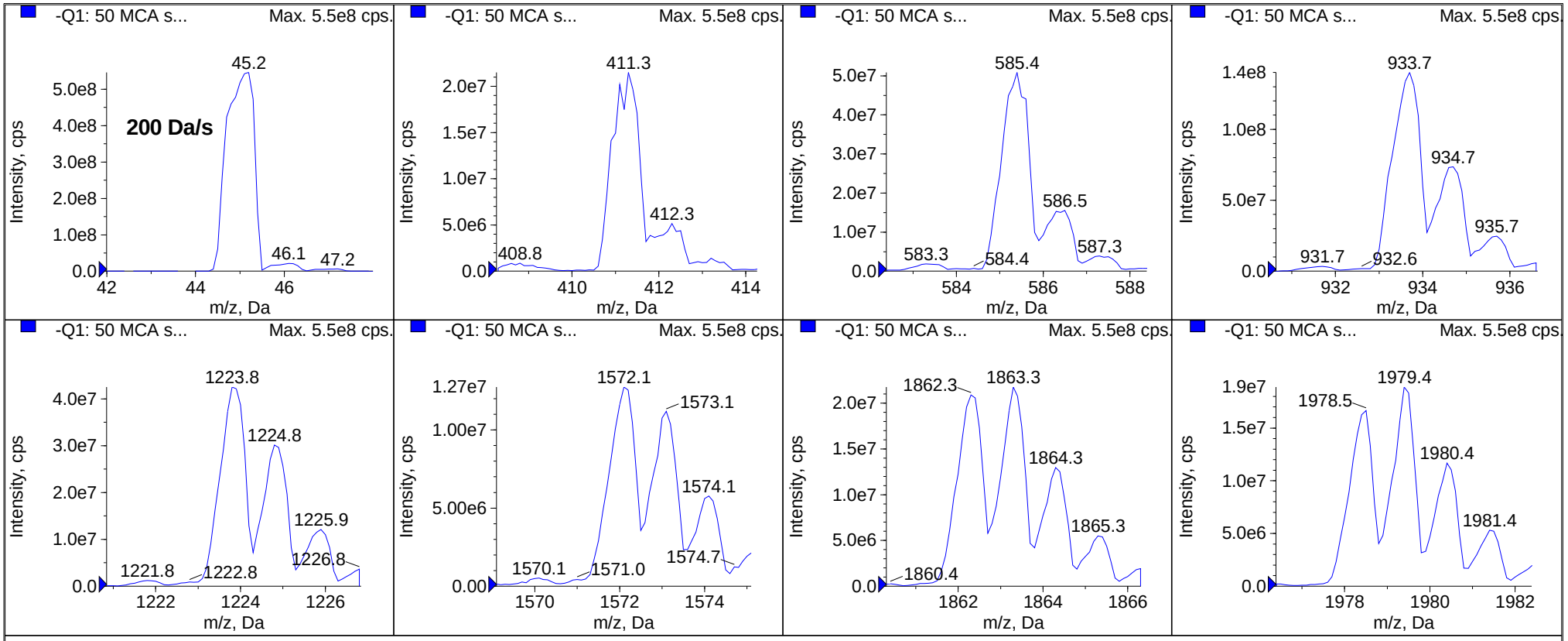
Peak List for " -Q1: 10 MCA scans from Sample 1 (TuneSampleID) of MT20230118143445.wiff (Turbo Spray)"

	Target Mass (Da)	Found At (Da)	Intensity (cps)	Width (Da)	Mass Shift (Da)
1	44.9980	45.0041	9.7048e7	0.6885	-6.1147e-3
2	411.2590	411.2594	4.4838e6	0.6873	-4.1906e-4
3	585.3850	585.3919	8.5349e6	0.6751	-6.8956e-3
4	933.6360	933.6394	2.5379e7	0.7043	-3.4180e-3
5	1223.8450	1223.8506	8.2294e6	0.6921	-5.6096e-3
6	1572.0970	1572.0803	2.6175e6	0.7119	0.0167
7	1863.3060	1863.2951	4.3139e6	0.6780	0.0109
8	1979.3890	1979.3719	4.5411e6	0.7660	0.0171

* FSAS Lynne Russell
*Post-PM Results

Printing Time: 2:39:44 PM
Printing Date: Wednesday, January 18, 2023
Polarity/Scan Type: Negative Q1 MS

Analyst Version: 1.6.3



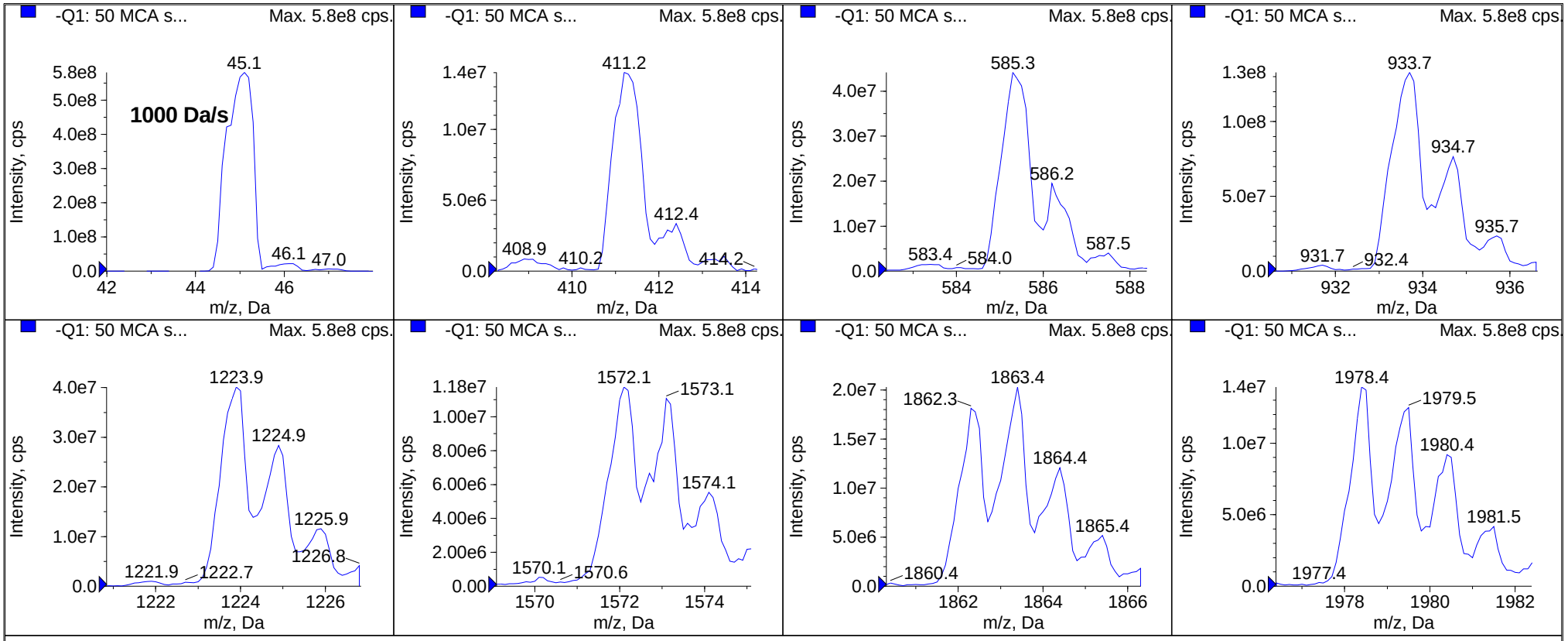
Peak List for " -Q1: 50 MCA scans from Sample 1 (TuneSampleID) of MT20230118143912.wiff (Turbo Spray)"

	Target Mass (Da)	Found At (Da)	Intensity (cps)	Width (Da)	Mass Shift (Da)
1	44.9980	45.0251	5.4597e8	0.7559	-0.0271
2	411.2590	411.2396	2.1496e7	0.7429	0.0194
3	585.3850	585.3734	5.0852e7	0.7004	0.0116
4	933.6360	933.6527	1.4005e8	0.7540	-0.0167
5	1223.8450	1223.8455	4.2506e7	0.6703	-5.3604e-4
6	1572.0970	1572.0951	1.2744e7	0.7163	1.9307e-3
7	1863.3060	1863.3113	2.1758e7	0.6470	-5.3497e-3
8	1979.3890	1979.4140	1.8884e7	0.6035	-0.0250

* FSAS Lynne Russell
*Post-PM Results

Printing Time: 2:41:14 PM
Printing Date: Wednesday, January 18, 2023
Polarity/Scan Type: Negative Q1 MS

Analyst Version: 1.6.3



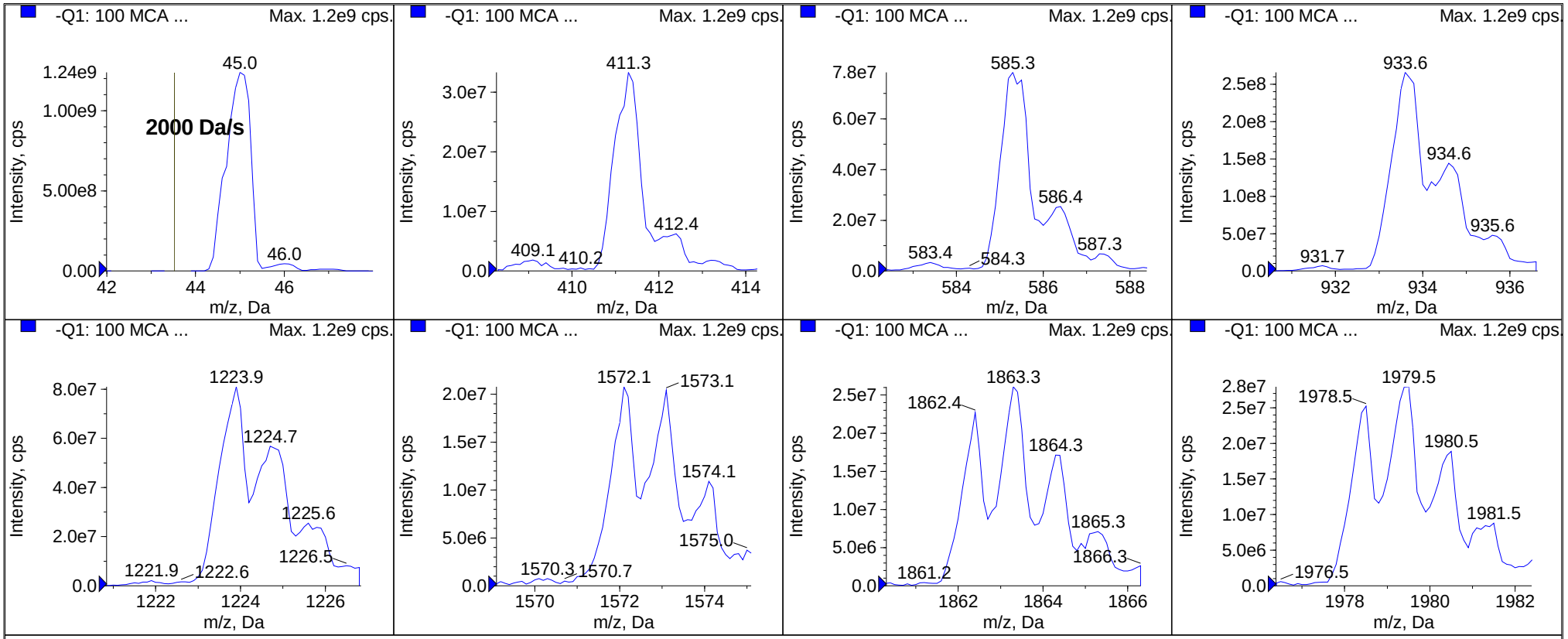
Peak List for " -Q1: 50 MCA scans from Sample 1 (TuneSampleID) of MT20230118144031.wiff (Turbo Spray)"

	Target Mass (Da)	Found At (Da)	Intensity (cps)	Width (Da)	Mass Shift (Da)
1	44.9980	45.0207	5.8066e8	0.7513	-0.0227
2	411.2590	411.2647	1.4010e7	0.7583	-5.6792e-3
3	585.3850	585.3714	4.4150e7	0.7215	0.0136
4	933.6360	933.6362	1.3282e8	0.7681	-2.2196e-4
5	1223.8450	1223.8487	4.0110e7	0.6597	-3.6873e-3
6	1572.0970	1572.0872	1.1750e7	0.7139	9.7808e-3
7	1863.3060	1863.3343	2.0290e7	0.6516	-0.0283
8	1979.3890	1979.3942	1.2480e7	0.6423	-5.1792e-3

* FSAS Lynne Russell
*Post-PM Results

Printing Time: 2:43:02 PM
Printing Date: Wednesday, January 18, 2023
Polarity/Scan Type: Negative Q1 MS

Analyst Version: 1.6.3



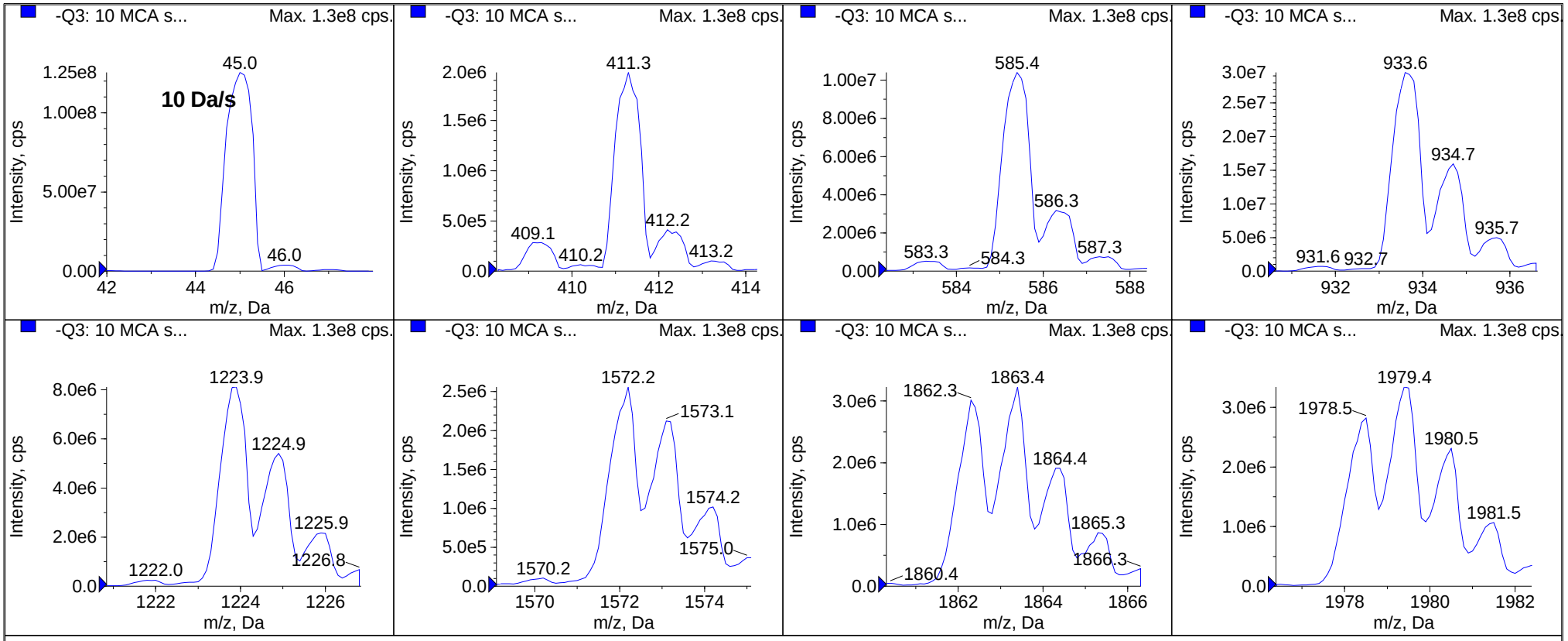
Peak List for " -Q1: 100 MCA scans from Sample 1 (TuneSampleID) of MT20230118144231.wiff (Turbo Spray)"

	Target Mass (Da)	Found At (Da)	Intensity (cps)	Width (Da)	Mass Shift (Da)
1	44.9980	45.0068	1.2387e9	0.6252	-8.7937e-3
2	411.2590	411.2741	3.3300e7	0.6803	-0.0151
3	585.3850	585.3466	7.8320e7	0.6955	0.0384
4	933.6360	933.6354	2.6584e8	0.7324	6.0001e-4
5	1223.8450	1223.8423	8.0960e7	0.7204	2.7491e-3
6	1572.0970	1572.0929	2.0780e7	0.6244	4.1405e-3
7	1863.3060	1863.3050	2.6080e7	0.6337	9.8929e-4
8	1979.3890	1979.3806	2.7940e7	0.7351	8.3901e-3

* FSAS Lynne Russell
*Post-PM Results

Printing Time: 2:52:16 PM
Printing Date: Wednesday, January 18, 2023
Polarity/Scan Type: Negative Q3 MS

Analyst Version: 1.6.3



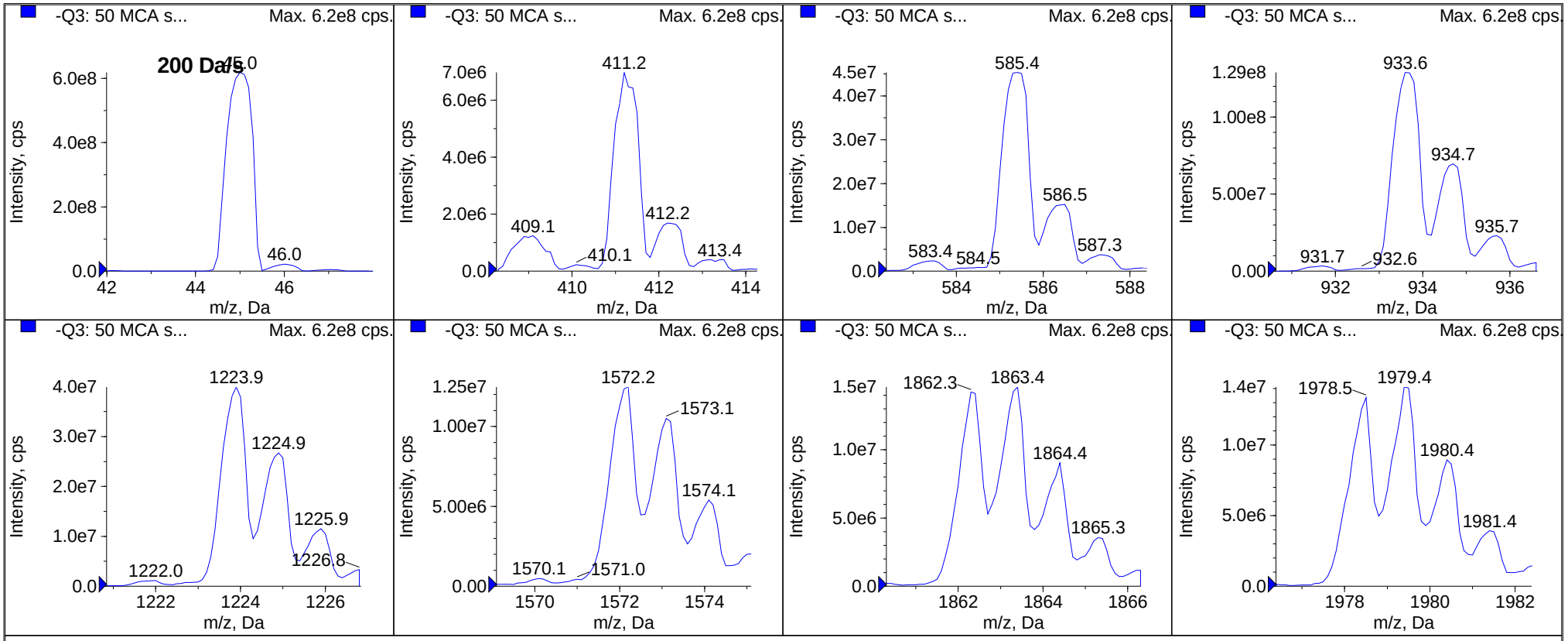
Peak List for " -Q3: 10 MCA scans from Sample 1 (TuneSampleID) of MT20230118145020.wiff (Turbo Spray)"

	Target Mass (Da)	Found At (Da)	Intensity (cps)	Width (Da)	Mass Shift (Da)
1	44.9980	45.0010	1.2545e8	0.7028	-3.0347e-3
2	411.2590	411.2880	1.9778e6	0.6875	-0.0290
3	585.3850	585.3829	1.0404e7	0.7065	2.1049e-3
4	933.6360	933.6347	2.9526e7	0.7136	1.2999e-3
5	1223.8450	1223.8515	8.1092e6	0.7001	-6.5146e-3
6	1572.0970	1572.1241	2.5581e6	0.7320	-0.0271
7	1863.3060	1863.3236	3.2253e6	0.7110	-0.0176
8	1979.3890	1979.3826	3.3397e6	0.7691	6.4418e-3

* FSAS Lynne Russell
*Post-PM Results

Printing Time: 2:54:19 PM
Printing Date: Wednesday, January 18, 2023
Polarity/Scan Type: Negative Q3 MS

Analyst Version: 1.6.3



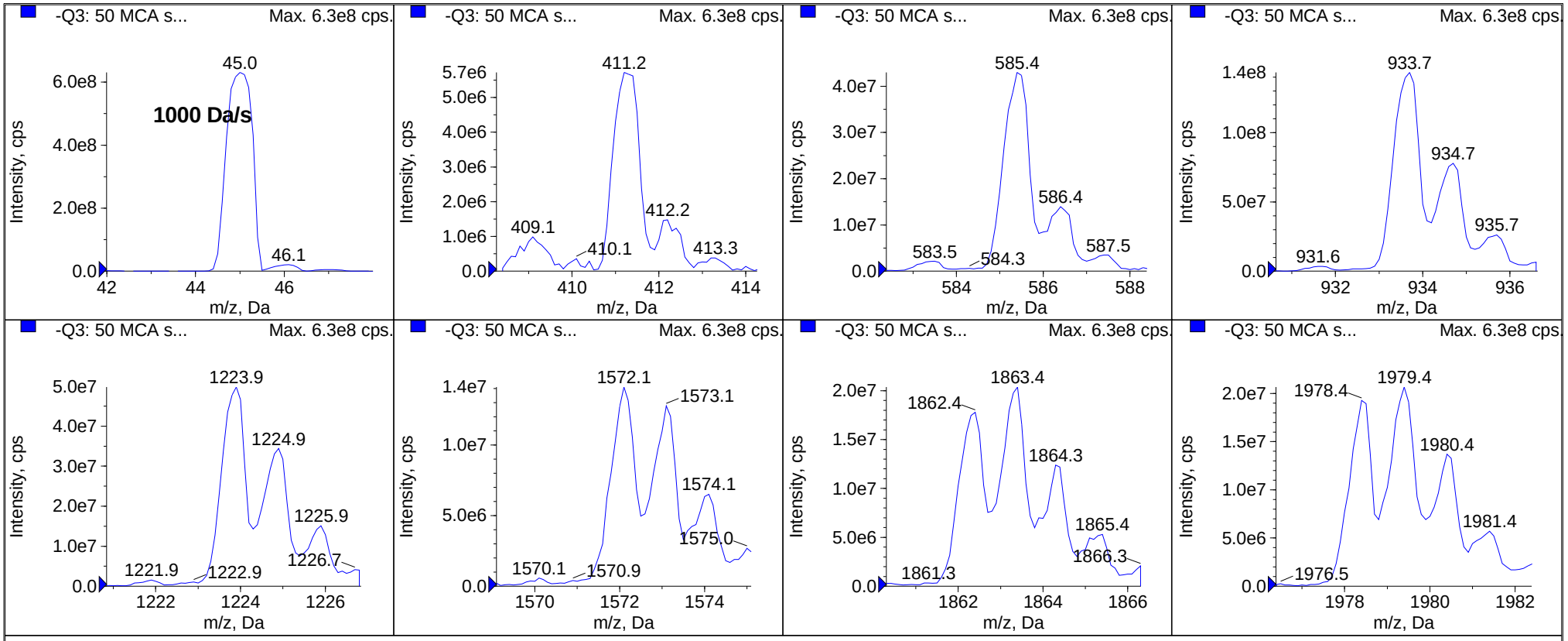
Peak List for " -Q3: 50 MCA scans from Sample 1 (TuneSampleID) of MT20230118145352.wiff (Turbo Spray)"

	Target Mass (Da)	Found At (Da)	Intensity (cps)	Width (Da)	Mass Shift (Da)
1	44.9980	45.0042	6.1833e8	0.6885	-6.2097e-3
2	411.2590	411.2602	6.9760e6	0.6598	-1.1851e-3
3	585.3850	585.3684	4.5348e7	0.6923	0.0166
4	933.6360	933.6352	1.2892e8	0.6923	8.0641e-4
5	1223.8450	1223.8584	3.9920e7	0.6550	-0.0134
6	1572.0970	1572.0993	1.2466e7	0.6628	-2.2685e-3
7	1863.3060	1863.3010	1.4596e7	0.6701	4.9724e-3
8	1979.3890	1979.3963	1.4094e7	0.6771	-7.3105e-3

* FSAS Lynne Russell
*Post-PM Results

Printing Time: 3:00:05 PM
Printing Date: Wednesday, January 18, 2023
Polarity/Scan Type: Negative Q3 MS

Analyst Version: 1.6.3



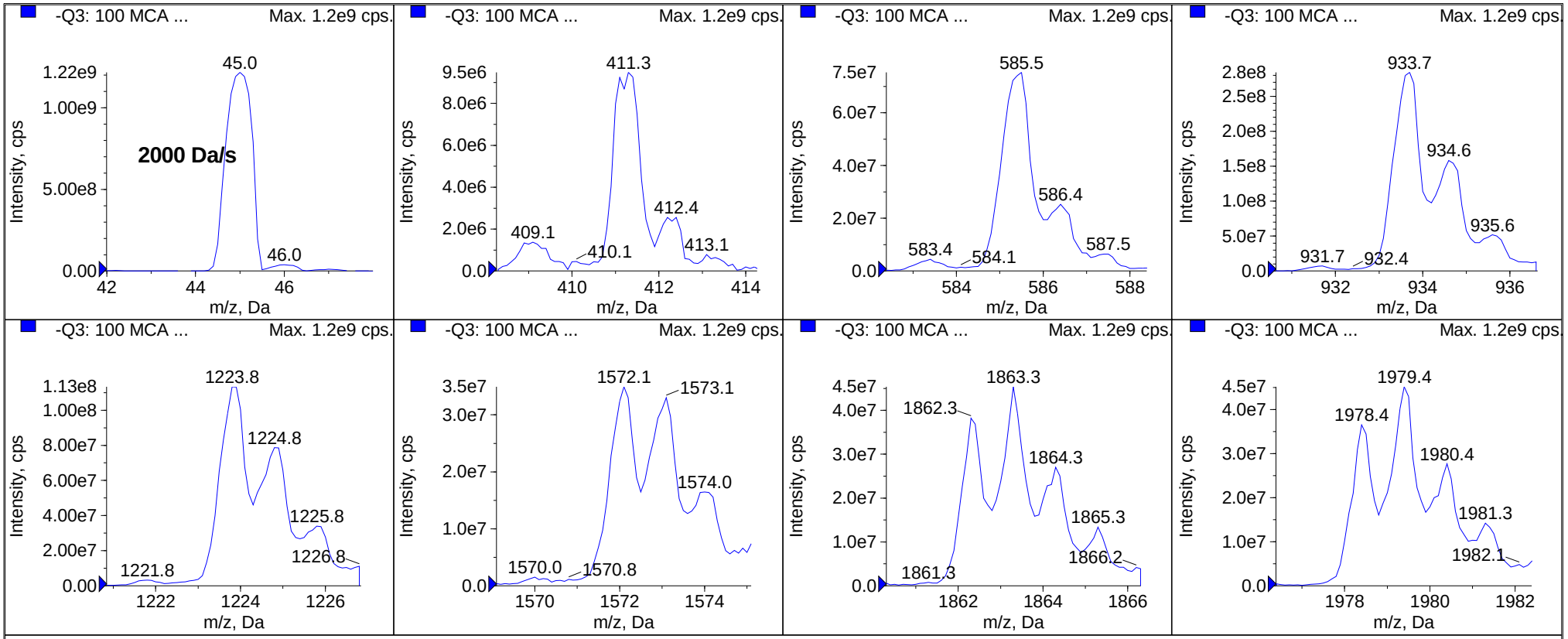
Peak List for " -Q3: 50 MCA scans from Sample 1 (TuneSampleID) of MT20230118145927.wiff (Turbo Spray)"

	Target Mass (Da)	Found At (Da)	Intensity (cps)	Width (Da)	Mass Shift (Da)
1	44.9980	45.0016	6.3051e8	0.6897	-3.6253e-3
2	411.2590	411.2575	5.7200e6	0.6818	1.4894e-3
3	585.3850	585.3884	4.2960e7	0.6523	-3.3960e-3
4	933.6360	933.6396	1.4338e8	0.6591	-3.5522e-3
5	1223.8450	1223.8462	4.9770e7	0.6204	-1.2007e-3
6	1572.0970	1572.0929	1.4100e7	0.6484	4.0605e-3
7	1863.3060	1863.3121	2.0370e7	0.6490	-6.1480e-3
8	1979.3890	1979.3676	2.0660e7	0.6773	0.0214

* FSAS Lynne Russell
*Post-PM Results

Printing Time: 3:07:07 PM
Printing Date: Wednesday, January 18, 2023
Polarity/Scan Type: Negative Q3 MS

Analyst Version: 1.6.3



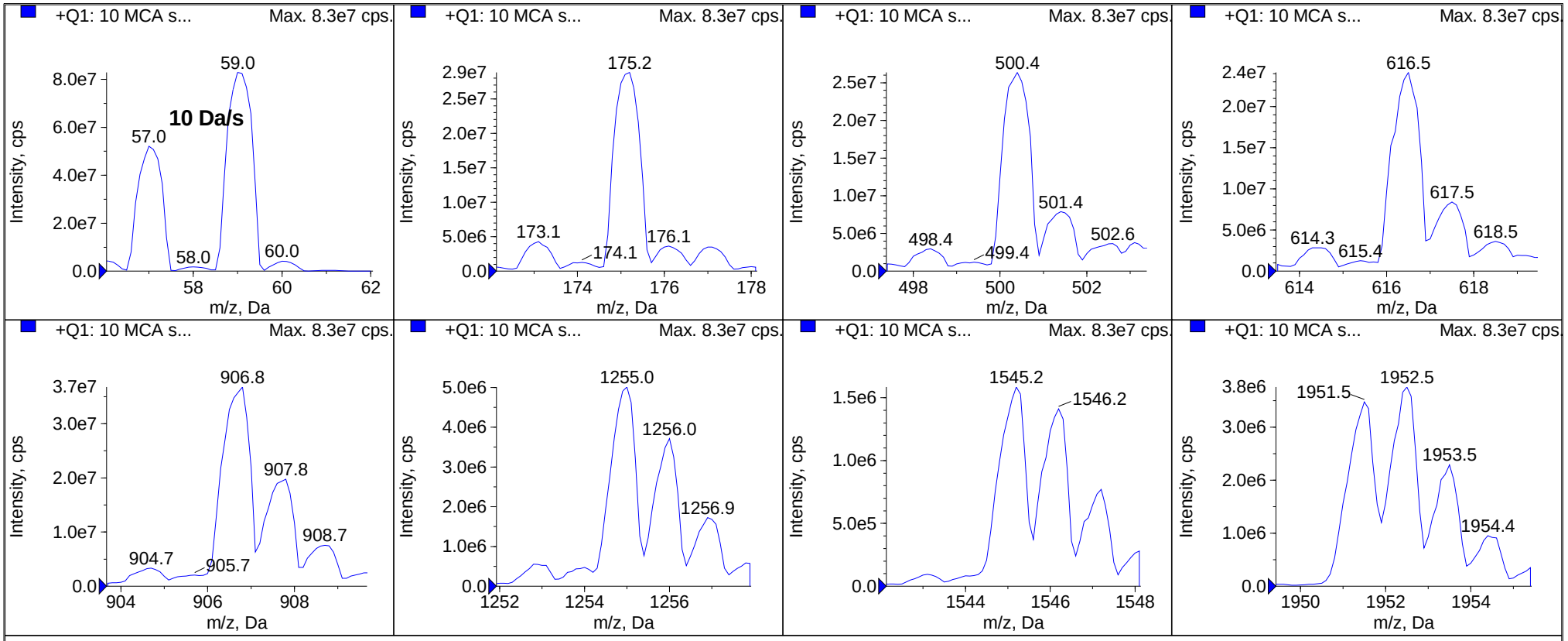
Peak List for " -Q3: 100 MCA scans from Sample 1 (TuneSampleID) of MT20230118150623.wiff (Turbo Spray)"

	Target Mass (Da)	Found At (Da)	Intensity (cps)	Width (Da)	Mass Shift (Da)
1	44.9980	44.9946	1.2160e9	0.7029	3.4006e-3
2	411.2590	411.2468	9.4800e6	0.6701	0.0122
3	585.3850	585.3842	7.5320e7	0.7283	8.4458e-4
4	933.6360	933.6436	2.8414e8	0.6735	-7.5684e-3
5	1223.8450	1223.8231	1.1332e8	0.7055	0.0219
6	1572.0970	1572.0792	3.4920e7	0.7285	0.0178
7	1863.3060	1863.3092	4.5360e7	0.6508	-3.1610e-3
8	1979.3890	1979.3856	4.5160e7	0.6610	3.4426e-3

* FSAS Lynne Russell
*Post-PM Results

Printing Time: 3:20:43 PM
Printing Date: Wednesday, January 18, 2023
Polarity/Scan Type: Positive Q1 MS

Analyst Version: 1.6.3



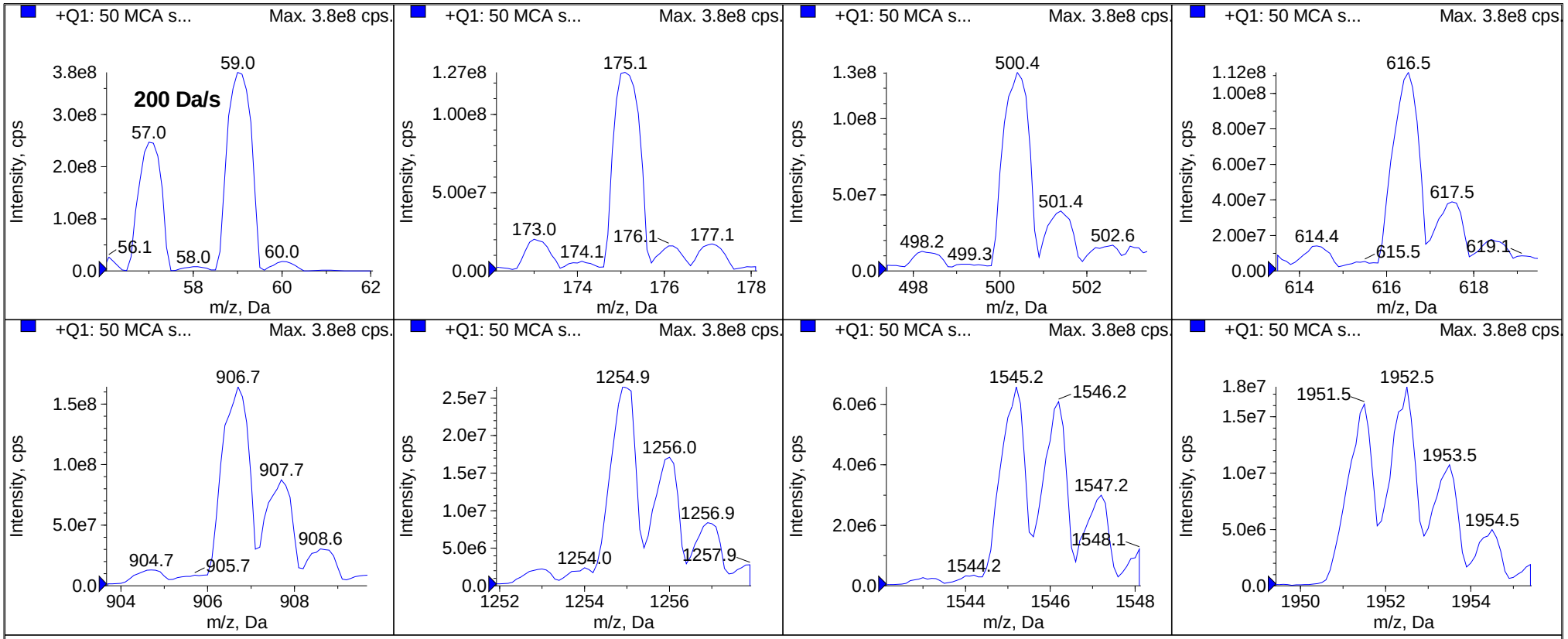
Peak List for " +Q1: 10 MCA scans from Sample 1 (TuneSampleID) of MT20230118151859.wiff (Turbo Spray)"

	Target Mass (Da)	Found At (Da)	Intensity (cps)	Width (Da)	Mass Shift (Da)
1	59.0500	59.0514	8.2863e7	0.6751	-1.3579e-3
2	175.1330	175.1313	2.8828e7	0.7059	1.6606e-3
3	500.3800	500.3842	2.6359e7	0.7305	-4.1671e-3
4	616.4640	616.4531	2.4144e7	0.7699	0.0109
5	906.6730	906.6691	3.6764e7	0.7605	3.9062e-3
6	1254.9250	1254.9332	5.0084e6	0.6671	-8.1730e-3
7	1545.1340	1545.1299	1.5850e6	0.7329	4.1341e-3
8	1952.4270	1952.4412	3.7572e6	0.7085	-0.0142

* FSAS Lynne Russell
*Post-PM Results

Printing Time: 3:26:36 PM
Printing Date: Wednesday, January 18, 2023
Polarity/Scan Type: Positive Q1 MS

Analyst Version: 1.6.3



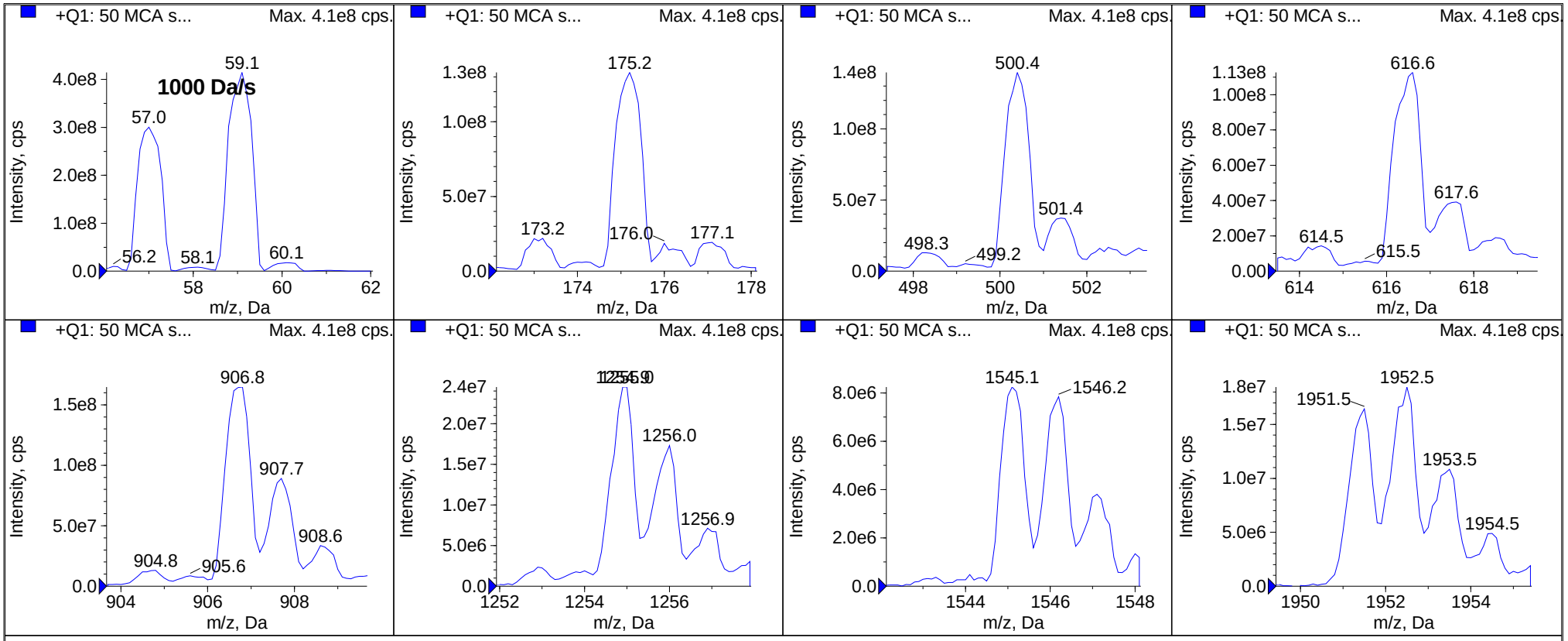
Peak List for " +Q1: 50 MCA scans from Sample 1 (TuneSampleID) of MT20230118152551.wiff (Turbo Spray)"

	Target Mass (Da)	Found At (Da)	Intensity (cps)	Width (Da)	Mass Shift (Da)
1	59.0500	59.0458	3.8075e8	0.6485	4.1781e-3
2	175.1330	175.1269	1.2675e8	0.7269	6.0561e-3
3	500.3800	500.3841	1.3037e8	0.7255	-4.0816e-3
4	616.4640	616.4530	1.1179e8	0.7190	0.0110
5	906.6730	906.6477	1.6419e8	0.7511	0.0253
6	1254.9250	1254.9339	2.6496e7	0.6797	-8.9407e-3
7	1545.1340	1545.1355	6.5800e6	0.6760	-1.4850e-3
8	1952.4270	1952.4236	1.7664e7	0.6703	3.3923e-3

* FSAS Lynne Russell
*Post-PM Results

Printing Time: 3:28:36 PM
Printing Date: Wednesday, January 18, 2023
Polarity/Scan Type: Positive Q1 MS

Analyst Version: 1.6.3



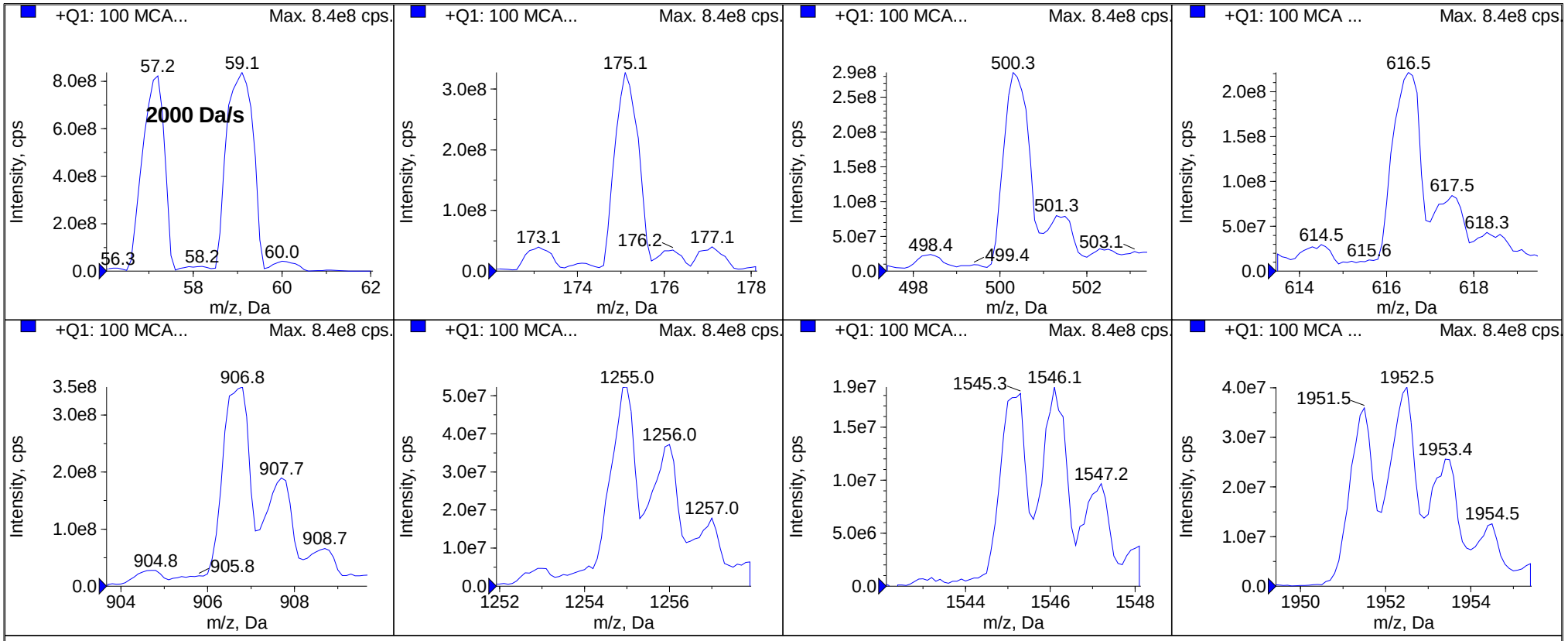
Peak List for " +Q1: 50 MCA scans from Sample 1 (TuneSampleID) of MT20230118152742.wiff (Turbo Spray)"

	Target Mass (Da)	Found At (Da)	Intensity (cps)	Width (Da)	Mass Shift (Da)
1	59.0500	59.0574	4.1445e8	0.6326	-7.3886e-3
2	175.1330	175.1759	1.3292e8	0.7212	-0.0429
3	500.3800	500.3954	1.3953e8	0.6496	-0.0154
4	616.4640	616.4761	1.1260e8	0.7302	-0.0121
5	906.6730	906.6976	1.6465e8	0.6558	-0.0246
6	1254.9250	1254.9158	2.4490e7	0.6085	9.1728e-3
7	1545.1340	1545.1113	8.2400e6	0.6368	0.0227
8	1952.4270	1952.4322	1.8460e7	0.6616	-5.2088e-3

* FSAS Lynne Russell
*Post-PM Results

Printing Time: 3:33:17 PM
Printing Date: Wednesday, January 18, 2023
Polarity/Scan Type: Positive Q1 MS

Analyst Version: 1.6.3



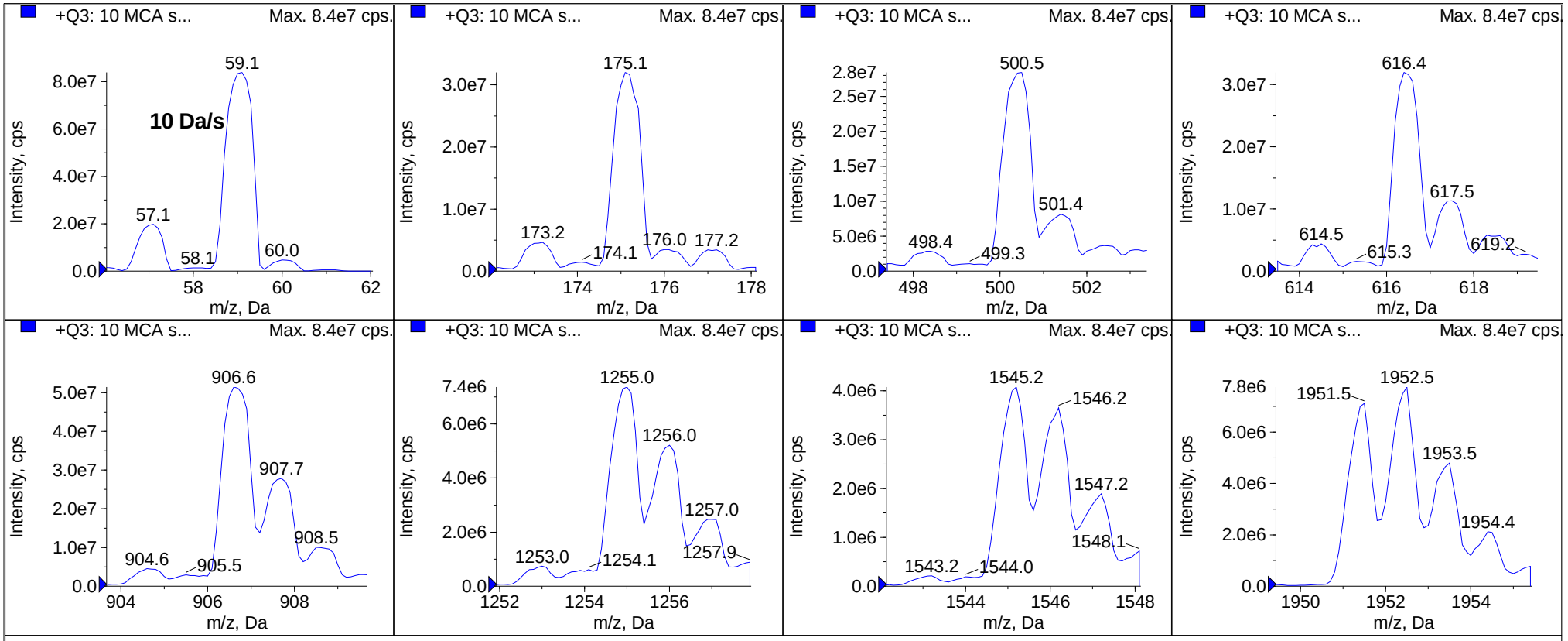
Peak List for " +Q1: 100 MCA scans from Sample 1 (TuneSampleID) of MT20230118153224.wiff (Turbo Spray)"

	Target Mass (Da)	Found At (Da)	Intensity (cps)	Width (Da)	Mass Shift (Da)
1	59.0500	59.0530	8.3712e8	0.7348	-2.9760e-3
2	175.1330	175.1377	3.2746e8	0.6545	-4.6667e-3
3	500.3800	500.3782	2.8558e8	0.6799	1.7710e-3
4	616.4640	616.4590	2.2138e8	0.7334	4.9949e-3
5	906.6730	906.6920	3.4896e8	0.6884	-0.0190
6	1254.9250	1254.9408	5.2260e7	0.6747	-0.0158
7	1545.1340	1545.2210	1.8180e7	0.6757	-0.0870
8	1952.4270	1952.4078	4.0140e7	0.6987	0.0192

* FSAS Lynne Russell
*Post-PM Results

Printing Time: 3:39:10 PM
Printing Date: Wednesday, January 18, 2023
Polarity/Scan Type: Positive Q3 MS

Analyst Version: 1.6.3



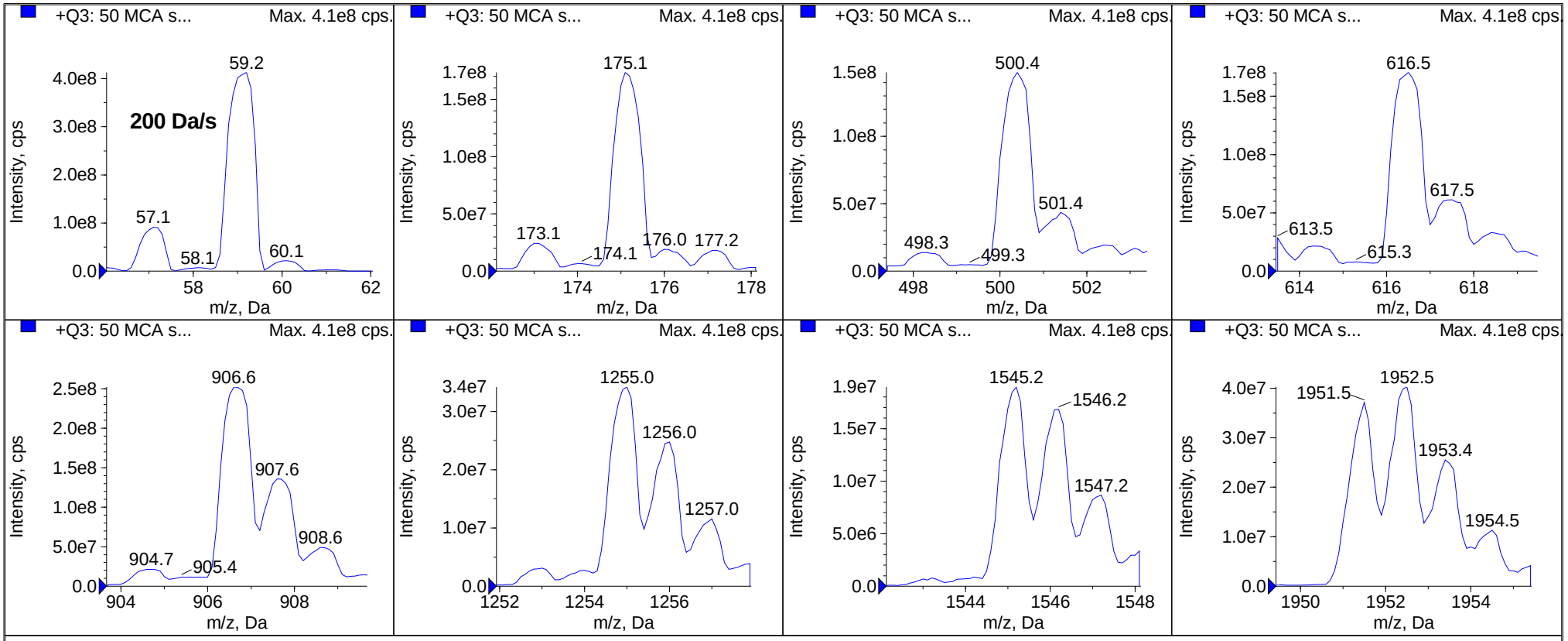
Peak List for " +Q3: 10 MCA scans from Sample 1 (TuneSampleID) of MT20230118153741.wiff (Turbo Spray)"

	Target Mass (Da)	Found At (Da)	Intensity (cps)	Width (Da)	Mass Shift (Da)
1	59.0500	59.0412	8.3822e7	0.7128	8.8467e-3
2	175.1330	175.1374	3.1992e7	0.7140	-4.4006e-3
3	500.3800	500.3978	2.8421e7	0.7465	-0.0178
4	616.4640	616.4536	3.1962e7	0.6665	0.0104
5	906.6730	906.6590	5.1442e7	0.7468	0.0140
6	1254.9250	1254.9401	7.3646e6	0.7329	-0.0151
7	1545.1340	1545.1311	4.0777e6	0.7270	2.9141e-3
8	1952.4270	1952.4044	7.7548e6	0.6823	0.0226

* FSAS Lynne Russell
*Post-PM Results

Printing Time: 3:44:18 PM
Printing Date: Wednesday, January 18, 2023
Polarity/Scan Type: Positive Q3 MS

Analyst Version: 1.6.3



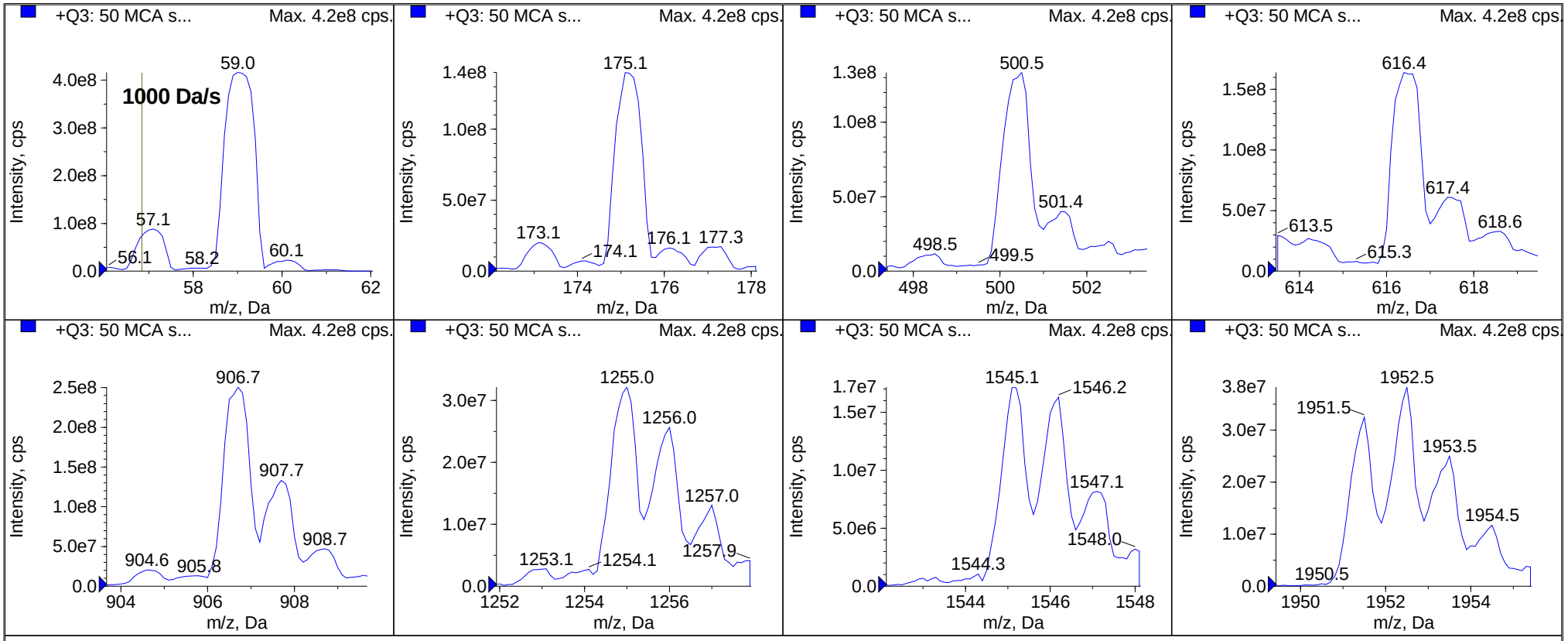
Peak List for " +Q3: 50 MCA scans from Sample 1 (TuneSampleID) of MT20230118154122.wiff (Turbo Spray)"

	Target Mass (Da)	Found At (Da)	Intensity (cps)	Width (Da)	Mass Shift (Da)
1	59.0500	59.0911	4.1279e8	0.6958	-0.0411
2	175.1330	175.1468	1.7351e8	0.7292	-0.0138
3	500.3800	500.3790	1.4742e8	0.7680	1.0274e-3
4	616.4640	616.4663	1.7034e8	0.7931	-2.2656e-3
5	906.6730	906.6585	2.5212e8	0.7701	0.0145
6	1254.9250	1254.9233	3.4202e7	0.7082	1.6918e-3
7	1545.1340	1545.1245	1.8944e7	0.7089	9.5381e-3
8	1952.4270	1952.4201	4.0236e7	0.7322	6.8731e-3

* FSAS Lynne Russell
*Post-PM Results

Printing Time: 3:45:31 PM
Printing Date: Wednesday, January 18, 2023
Polarity/Scan Type: Positive Q3 MS

Analyst Version: 1.6.3



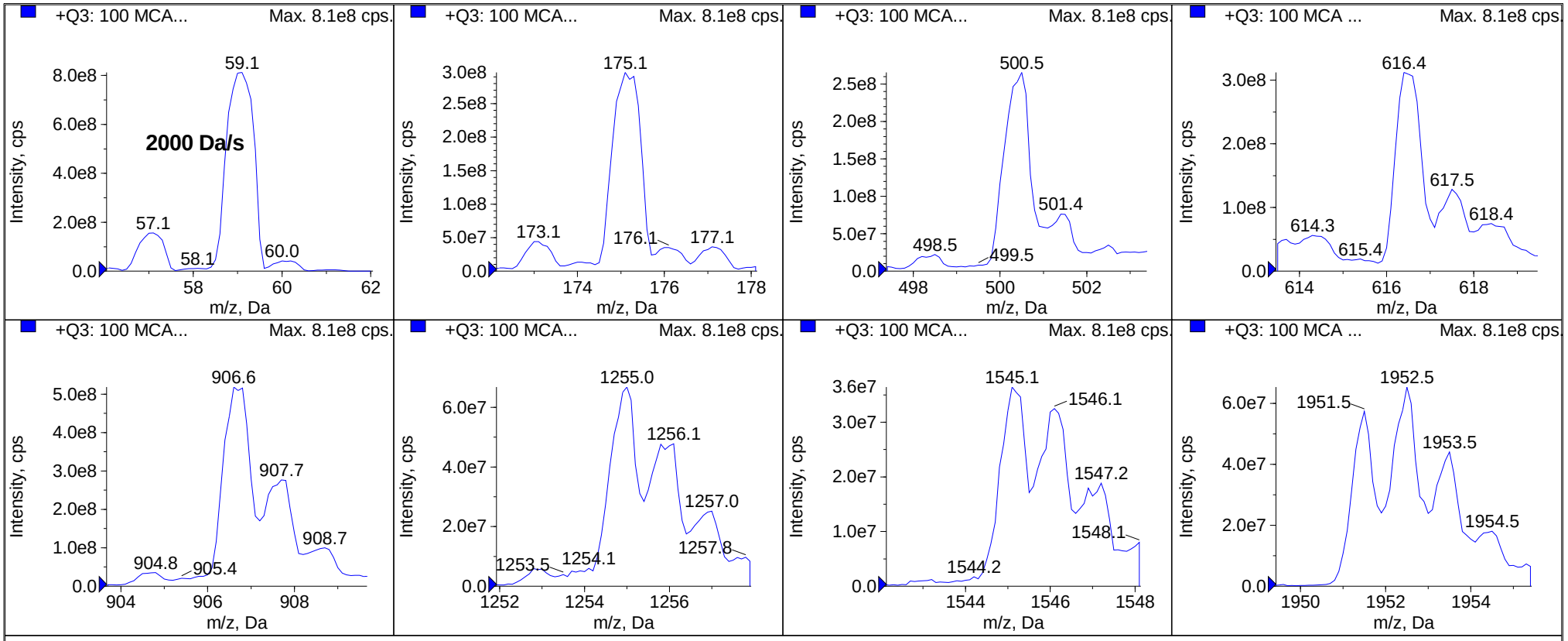
Peak List for " +Q3: 50 MCA scans from Sample 1 (TuneSampleID) of MT20230118154458.wiff (Turbo Spray)"

	Target Mass (Da)	Found At (Da)	Intensity (cps)	Width (Da)	Mass Shift (Da)
1	59.0500	59.0492	4.1599e8	0.7856	8.1782e-4
2	175.1330	175.1797	1.4000e8	0.7172	-0.0467
3	500.3800	500.3829	1.3341e8	0.7200	-2.8756e-3
4	616.4640	616.4567	1.6395e8	0.7588	7.2627e-3
5	906.6730	906.6632	2.5069e8	0.6748	9.7567e-3
6	1254.9250	1254.9393	3.2150e7	0.6795	-0.0143
7	1545.1340	1545.1465	1.7170e7	0.6518	-0.0125
8	1952.4270	1952.4355	3.8260e7	0.6002	-8.5259e-3

* FSAS Lynne Russell
*Post-PM Results

Printing Time: 3:48:19 PM
Printing Date: Wednesday, January 18, 2023
Polarity/Scan Type: Positive Q3 MS

Analyst Version: 1.6.3

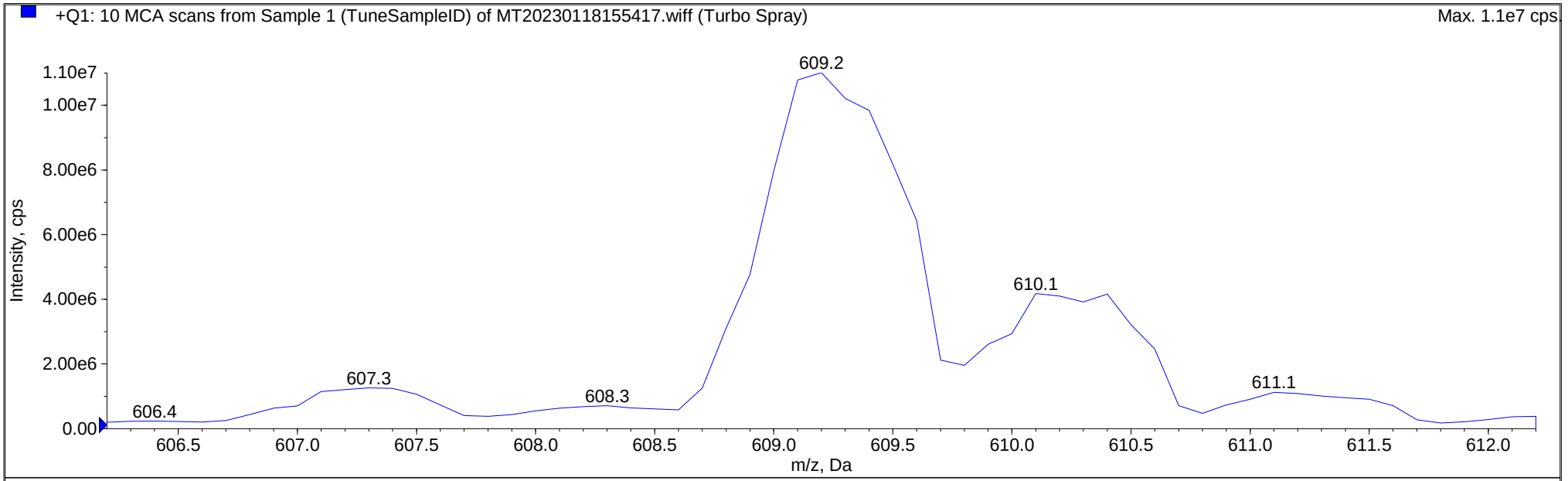


Peak List for " +Q3: 100 MCA scans from Sample 1 (TuneSampleID) of MT20230118154745.wiff (Turbo Spray)"

	Target Mass (Da)	Found At (Da)	Intensity (cps)	Width (Da)	Mass Shift (Da)
1	59.0500	59.0686	8.1216e8	0.7337	-0.0186
2	175.1330	175.1366	2.9644e8	0.7648	-3.6468e-3
3	500.3800	500.3964	2.6548e8	0.6635	-0.0164
4	616.4640	616.4952	3.1200e8	0.6699	-0.0312
5	906.6730	906.6720	5.1834e8	0.7148	9.9265e-4
6	1254.9250	1254.9231	6.6780e7	0.7299	1.8827e-3
7	1545.1340	1545.1385	3.6420e7	0.7232	-4.5195e-3
8	1952.4270	1952.4510	6.5340e7	0.6653	-0.0240

* FSAS Lynne Russell
*Post-PM Results

Printing Time: 3:55:52 PM Analyst Version: 1.6.3
Printing Date: Wednesday, January 18, 2023
Polarity/Scan Type: Positive Q1 MS



Peak List for " +Q1: 10 MCA scans from Sample 1 (TuneSampleID) of MT20230118155417.wiff (Turbo Spray)"

	Target Mass (Da)	Found At (Da)	Intensity (cps)	Width (Da)	Mass Shift (Da)
1	174.1000	n/a	n/a	n/a	n/a
2	195.1000	n/a	n/a	n/a	n/a
3	397.2000	n/a	n/a	n/a	n/a
4	448.1000	n/a	n/a	n/a	n/a
5	609.2810	609.2576	1.1014e7	0.6984	0.0234

* FSAS Lynne Russell
*Post-PM Results

Printing Time: 3:56:02 PM Analyst Version: 1.6.3
Printing Date: Wednesday, January 18, 2023
Polarity/Scan Type: Positive Q1 MS (Q1)

State Parameter Editor

Ion Source:	Turbo Spray
Ion Source Temperature Reached	
Curtain Gas (CUR):	20.0
IonSpray Voltage (IS):	3800.0
Temperature (TEM):	0.0
Ion Source Gas 1 (GS1):	18.0
Ion Source Gas 2 (GS2):	0.0
Declustering Potential (DP):	130.0
Entrance Potential (EP):	10.0
Q1 Resolution:	Unit
Ion Energy 1 (IE1):	0.5
CEM (CEM):	1900.0

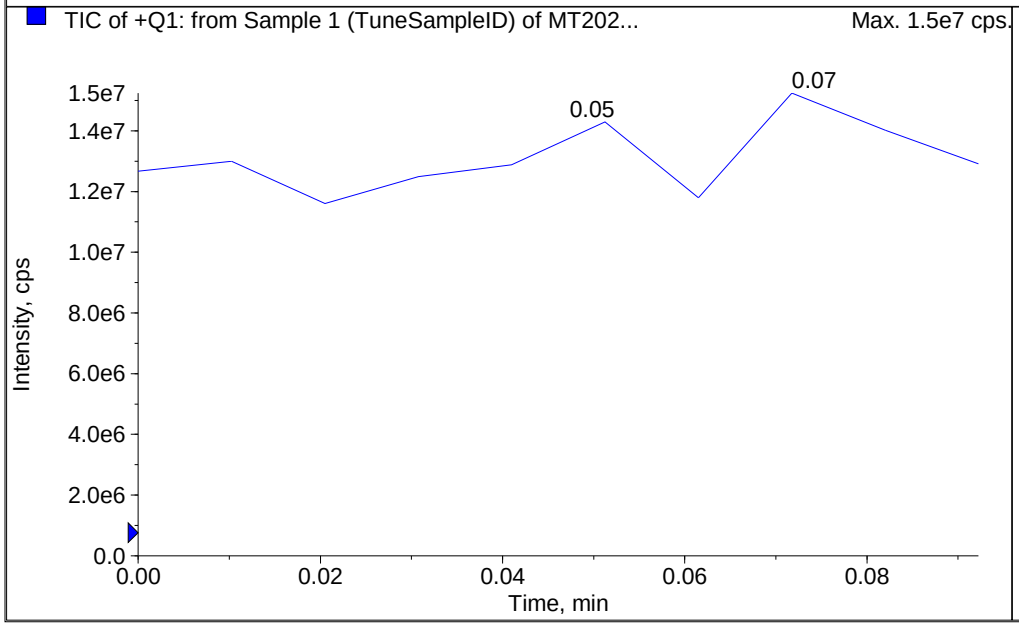
Mass Spectrometer Method Properties

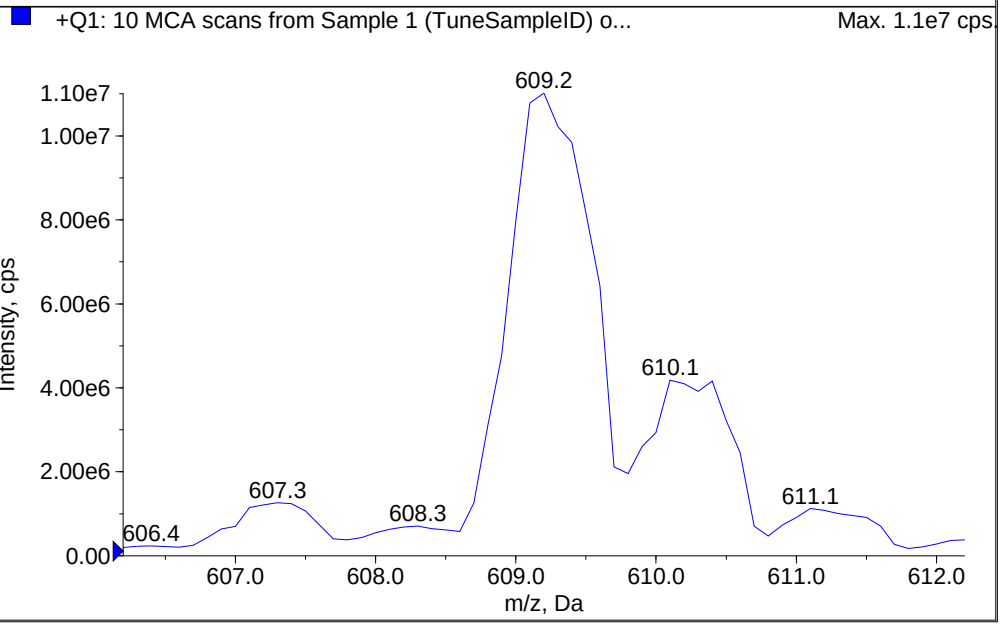
Period 1:

Scans in Period: 10
Relative Start Time: 0.00 msec
Experiments in Period: 1

Period 1 Experiment 1:

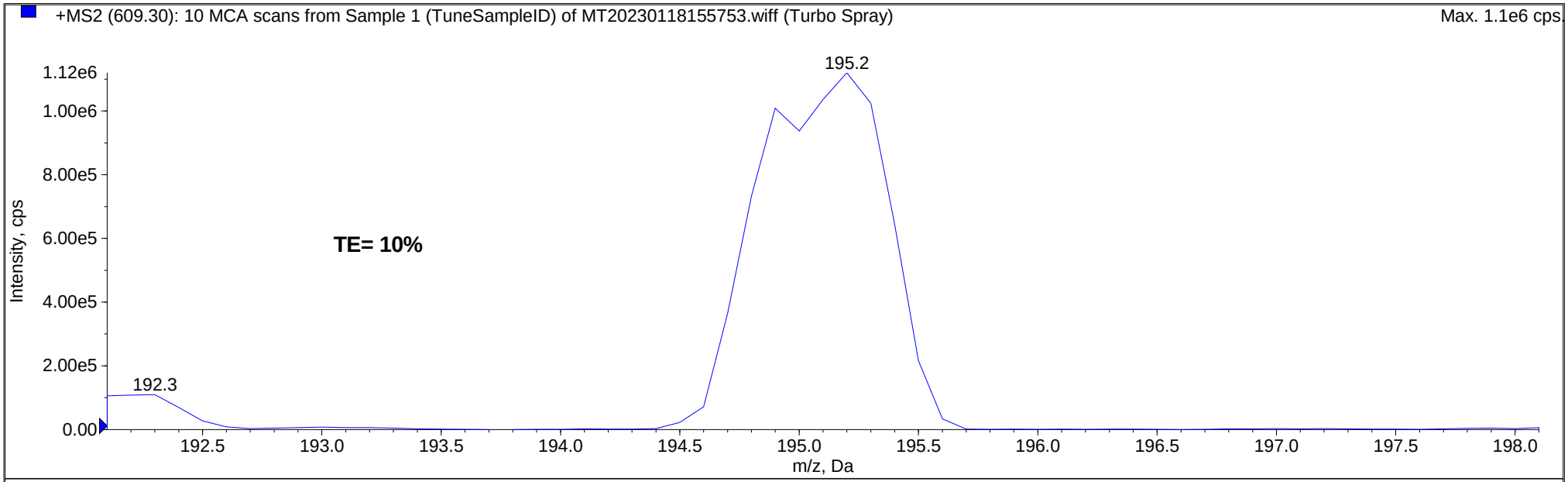
Scan Type: Q1 MS (Q1)
Polarity: Positive
Scan Mode: Profile
Ion Source: Turbo Spray
Scans to Sum: 1
Resolution Q1: Unit





* FSAS Lynne Russell
*Post-PM Results

Printing Time: 3:58:47 PM Analyst Version: 1.6.3
Printing Date: Wednesday, January 18, 2023
Polarity/Scan Type: Positive Product Ion



Peak List for " +MS2 (609.30): 10 MCA scans from Sample 1 (TuneSampleID) of MT20230118155753.wiff (Turbo Spray)"

	Target Mass (Da)	Found At (Da)	Intensity (cps)	Width (Da)	Mass Shift (Da)
1	174.1000	n/a	n/a	n/a	n/a
2	195.1000	195.0980	1.1203e6	0.6665	1.9568e-3
3	397.2000	n/a	n/a	n/a	n/a
4	448.1000	n/a	n/a	n/a	n/a
5	609.2810	n/a	n/a	n/a	n/a

* FSAS Lynne Russell
*Post-PM Results

Printing Time: 3:58:57 PM Analyst Version: 1.6.3
Printing Date: Wednesday, January 18, 2023
Polarity/Scan Type: Positive Product Ion (MS2)

State Parameter Editor

Ion Source:	Turbo Spray
Ion Source Temperature Reached	
Curtain Gas (CUR):	20.0
Collision Gas (CAD):	8
IonSpray Voltage (IS):	3800.0
Temperature (TEM):	0.0
Ion Source Gas 1 (GS1):	18.0
Ion Source Gas 2 (GS2):	0.0
Declustering Potential (DP):	130.0
Entrance Potential (EP):	10.0
Focusing Lens 1 (IQ1):	-10.5
Collision Energy (CE):	46.0
Collision Cell Exit Potential (CXP):	6.0

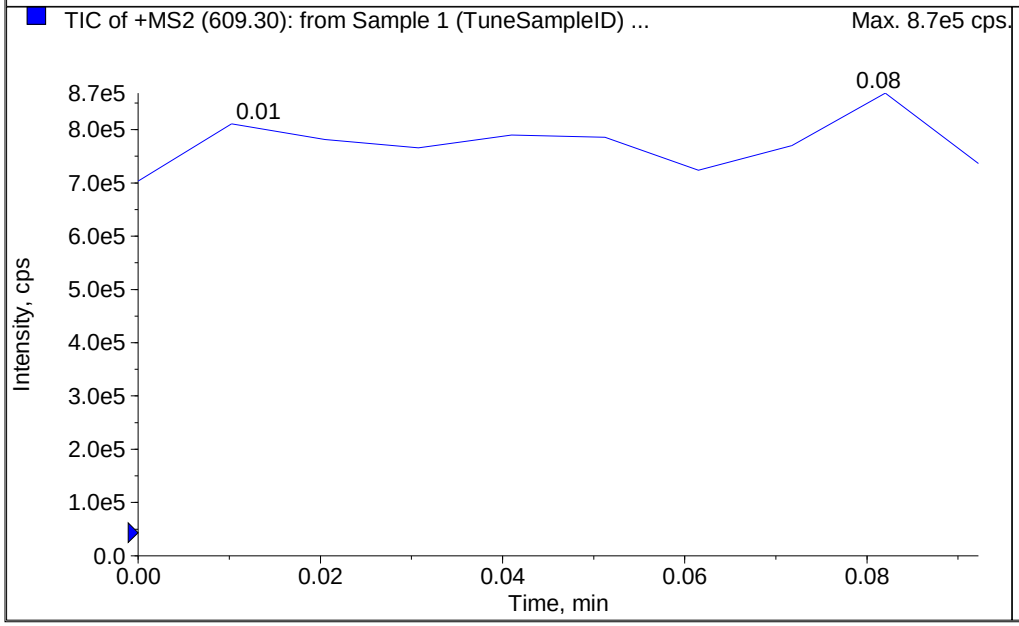
Mass Spectrometer Method Properties

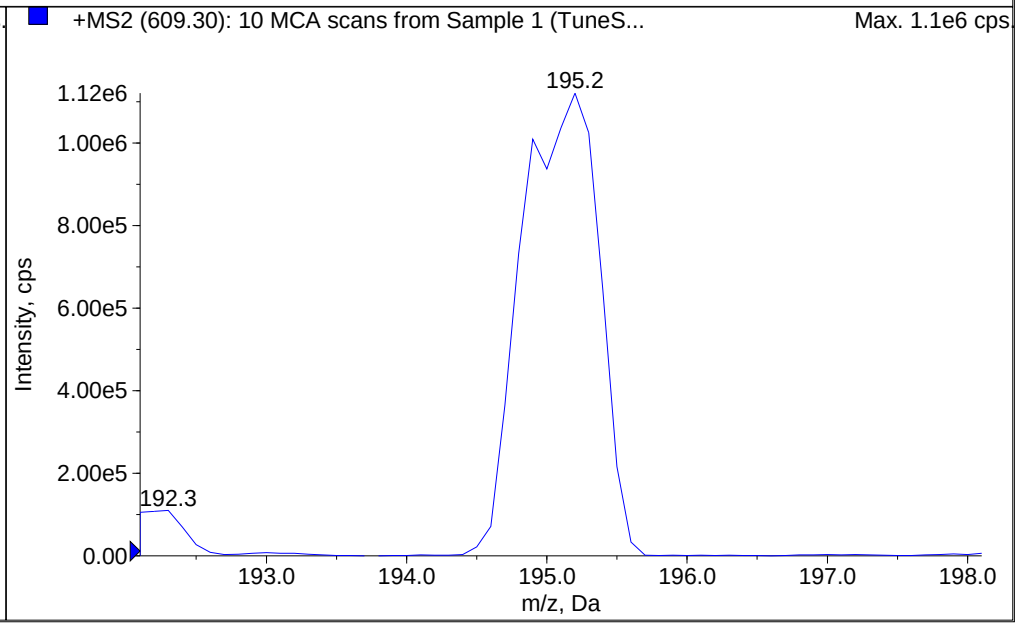
Period 1:

Scans in Period: 10
Relative Start Time: 0.00 msec
Experiments in Period: 1

Period 1 Experiment 1:

Scan Type: Product Ion (MS2)
Polarity: Positive
Scan Mode: Profile
Ion Source: Turbo Spray
Scans to Sum: 1
Product Of: 609.30 Da





* FSAS Lynne Russell
*Post-PM Results

SCIEX
The Power of Precision

SCIEX Triple Quad™ 4500/4500MD Systems

Planned Maintenance Procedure



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Introduction 1

Note: For regulatory and safety information for the mass spectrometer, refer to the *System User Guide*.

The planned maintenance (PM) procedure is designed to help maintain overall system performance.

The PM is not intended to take the place of an Operational Qualification (OQ) nor is it intended to verify the instrument specifications. Separate Installation Qualification (IQ) and OQ services are available. Contact a SCIEX representative.

The procedure must be performed by a trained SCIEX Field Service Employee (FSE).

The procedure has been developed for the SCIEX Triple Quad™ 4500/4500MD System with the Turbo V™ Ion Source. It does not apply to any other products or processes.

The procedure does not address any customer-specific analytical protocol (performance qualification) or method validation.

Note: If an issue is identified and the system requires repair, then the customer is responsible for the repair at the expense of the customer, except to the extent that the system and the required repairs are covered by a SCIEX warranty or service contract. A separate repair service call must be opened and the repair hours must not be charged against this procedure.

Planned Maintenance Tasks 2

Note: Perform all procedures using the Turbo V™ Ion Source, unless otherwise specified.

Pre-Planned Maintenance

Note: Guideline values are for reference only. The pre-PM test results are not required to meet or exceed these values.

Pre-PM Tasks

Task	Complete	N/A
Ask the customer about system performance since the last visit and record comments.	✓	—
If the customer maintains a log for the system, then review it.	○	◉
Review the work to be performed with the customer.	✓	—

PC Health Check

Task	Complete	N/A
Inspect the status of the RAID 1 hard drives.		—

Vacuum System Tests

Task			Complete
Record the turbo pump operational values. **Parameter** / **Results** Temperature (ºC) Current (A) Voltage (V) Power (W) Driving frequency (Hz)			✓
Inspect the vacuum gauge filament using the Analyst® Service Diagnostics (ASD) Software and identify the filament position. If the mass spectrometer is using filament 2, then order a replacement vacuum gauge as a separate service call.	1	◉	✓
	2	○	

Pre-PM Pressure Test

Pre-PM Pressure Test is Complete	✓

Test	Guideline	Result
Vacuum chamber pressure with CAD gas off	0.4×10^{-5} torr $\leq P_{CAD\,0} \leq 1.1 \times 10^{-5}$ torr	0.5e-5
Pressure difference (CAD_{12} minus CAD_0)	1.8×10^{-5} torr $\leq (P_{CAD\,12} - P_{CAD\,0}) \leq 2.8 \times 10^{-5}$ torr	2.1e-5

Inspect for Contamination

Task	Complete	N/A
Inspect for front-end contamination. Refer to Inspect for Contamination.	✓	—

Pre-PM System Tests

Q1 Positive MS Test is Complete: Intensity and Peak Width	✓

- **Test solution:** POS PPG, 2e-6 M
- **Flow rate:** 5 µL/min
- **Scan rate:** 10 Da/s
- **Cycles:** 10
- **MCA:** On
- **Printouts required:** Spectra for masses 59.050, 175.133, 500.380, 616.464, 906.673, 1,254.925, 1,545.134, 1,952.427, with peak intensities, peak width, and mass shift results, complete with method file information.

Note: After calibration, the mass shift result must be within 0.1 Da for all assigned masses.

Mass (Da)	Intensity (cps)		Peak Width (Da)	
	Guideline	Result	Guideline	Result
175.133	≥ 8.0×10^6	2.4e7	0.6 to 0.8	0.74
500.380	≥ 8.0×10^6	2.2e7	0.6 to 0.8	0.74
906.673	≥ 2.0×10^7	3.3e7	0.6 to 0.8	0.76
1,952.427	≥ 8.8×10^5	6.4e6	0.6 to 0.8	0.69

Q3 Positive MS Test is Complete: Intensity and Peak Width	✓

- **Test solution:** POS PPG, 2e-6 M
- **Flow rate:** 5 µL/min
- **Scan rate:** 10 Da/s
- **Cycles:** 10
- **MCA:** On
- **Printouts required:** Spectra for masses 59.050, 175.133, 500.380, 616.464, 906.673, 1,254.925, 1,545.134, 1,952.427, with peak intensities, peak width, and mass shift results, complete with method file information.

Note: After calibration, the mass shift result must be within 0.1 Da for all assigned masses.

Mass (Da)	Intensity (cps)		Peak Width (Da)	
	Guideline	Result	Guideline	Result
175.133	≥ 8.0×10^6	3.1e7	0.6 to 0.8	0.76
500.380	≥ 8.0×10^6	2.8e7	0.6 to 0.8	0.76
906.673	≥ 2.0×10^7	4.3e7	0.6 to 0.8	0.77
1,952.427	≥ 8.8×10^5	9.3e6	0.6 to 0.8	0.81

Q1 Negative MS Test is Complete: Intensity and Peak Width	✓

- **Test solution:** NEG PPG, 3e-4 M
- **Flow rate:** 10 µL/min
- **Scan rate**: 10 Da/s
- **Cycles:** 10
- **MCA:** On
- **Printouts required:** Spectra for masses 44.998, 411.259, 585.385, 933.636, 1,223.845, 1,572.097, 1,863.306, 1,979.389, with peak intensities, peak width, and mass shift results, complete with method file information.

Note: After calibration, the mass shift result must be within 0.1 Da for all assigned masses.

Mass (Da)	Intensity (cps)		Peak Width (Da)	
	Guideline	Result	Guideline	Result
933.636	≥ 1.8×10^7	1.9e7	0.6 to 0.8	0.71
1,863.306	≥ 1.4×10^6	3.8e6	0.6 to 0.8	0.73

Q3 Negative MS Test is Complete	✓

- **Test solution:** NEG PPG, 3e-4 M
- **Flow rate:** 10 µL/min
- **Scan rate**: 10 Da/s
- **Cycles:** 10
- **MCA:** On
- **Printouts required:** Spectra for masses 44.998, 411.259, 585.385, 933.636, 1,223.845, 1,572.097, 1,863.306, 1,979.389, with peak intensities, peak width, and mass shift results, complete with method file information.

Note: After calibration, the mass shift result must be within 0.1 Da for all assigned masses.

Mass (Da)	Intensity (cps)		Peak Width (Da)	
	Guideline	Result	Guideline	Result
933.636	≥ 1.8×10^7	3.3e7	0.6 to 0.8	0.81
1,863.306	≥ 2.0×10^6	7.5e6	0.6 to 0.8	0.77

Reserpine MS/MS Transmission Test is Complete	✓

- **Test solution:** Reserpine solution 0.167 pmol/µL
- **Flow rate:** 5 µL/min
- **Scan rate:** 10 Da/s (both MS and MS/MS)
- **Scan mode:** Product Ion (MS2)
- **Product Of:** 609.3 (or as calibrated)
- **Product Ion:** 195.1
- **Cycles:** 10
- **MCA:** On
- **Printouts required:** Spectra for masses 609.3 and 195.1, with peak intensities, peak width, and mass shift results, complete with method file information.

Guideline	Result
Transmission efficiency $\frac{Intensity\ for\ ion\ at\ m/z\ 195.1}{Intensity\ for\ ion\ at\ m/z\ 609.3\ (or\ as\ calibrated)} \times 100 \geq 10\%$	8.1%

Planned Maintenance

Mass Spectrometer Maintenance

Task	Complete	N/A
Shut down the system and then disconnect the mains supply power cable.	✓	—
If required, replace the roughing pump oil. The recommended interval is every 3 years. **Note:** If an oil change is not required, then inspect the oil level and top up, if necessary. **CAUTION: Potential System Damage. Do not mix different types of oil. Mixing mineral oil with synthetic oil can cause pump failure.**	✓	—
If required, replace the roughing pump oil exhaust filter. The recommended interval is every 3 years.	○	◒
Confirm that there is no excessive roughing pump oil leakage. Clean up any oil.	✓	—
Make sure that the roughing pump exhaust is properly routed to the ventilation system.	✓	—

Task	Complete	N/A
Inspect the exhaust system: • Make sure that all of the gas fittings at the rear bulkhead are tight. • Make sure that all of the exhaust hoses are free of kinks. • Make sure that all of the hoses at the waste bottle are secure, and there are no signs of leaks. • Make sure that the waste bottle is in an upright position. • Make sure that the exhaust hose is secured to the lab ventilation system. • Confirm that no liquid is trapped in the exhaust lines.	✓	—
Clean or replace the four air filters in the base of the mass spectrometer chassis.	✓	—
(If applicable) Clean the turbo pump filter screen.	○	◉
(If applicable) Verify the operation of the SCIEX-supplied bench cooling fans.	◉	○
Clean the curtain plate.	✓	—
Clean the orifice plate.	✓	—
Clean the QJet® Ion Guide and IQ0 lens.	✓	—
(If contamination is detected) Clean the Q0 region and the IQ1 lens.	◉	○
Inspect the cable connections: • Make sure that the power cables for the mass spectrometer, LC system, roughing pump, syringe pump, gas generator, and UPS are securely connected. • Make sure that the communications cables for the GPIB/Ethernet ports, LC connections, and roughing pump are securely connected.	✓	—

Task	Complete	N/A
Verify system support functions — gas: • Confirm the input gas pressures at the regulators are within specifications. • Confirm that there is no liquid present in the gas lines.	✓	—
Verify the expiry date on the battery system for the UPS (sold by SCIEX), and then recommend replacement of the battery tray, if required.	○	◉
Start up the system.	✓	—

Turbo V™ Ion Source Maintenance

Task	Complete	N/A
If necessary, replace the electrode in the TurboIonSpray® and APCI Probes.	◉	○
With the TurboIonSpray® probe installed, verify that the temperature (TEM) reaches the recommended set point of 500 °C.	✓	—
(If applicable) With the APCI probe installed, verify that the temperature (TEM) reaches the recommended set point of 400 °C.	○	◉
Inspect the ion source and, if visible signs of contamination are present, clean the inner surfaces using lint-free wipes and a 50:50 methanol:water solution. **Note:** Remove the corona discharge needle before cleaning.	◉	○

Software Maintenance

Note: This task is not applicable to MD systems.

Task	Complete	N/A
(Obtain customer approval first) Install any applicable Analyst® Software HotFixes. **Note:** Make sure that the compatible instrument firmware is installed.	○	◉

Post-Planned Maintenance

Voltage Tests

Task	Complete
Inspect the RF tuning voltages at the QPS amplifier module and then, if required, tune the coil boxes.	✓
Inspect the detector voltage. Optimize, if required. Detector voltage: +2100/-2200	✓

Post-PM Pressure Test

Post-PM Pressure Test is Complete	✓

Test	Specification	Result
Vacuum chamber pressure with CAD gas off	0.4×10^{-5} torr $\leq P_{CAD\,0} \leq 1.1 \times 10^{-5}$ torr	0.8e-5
Pressure difference (CAD_{12} minus CAD_0)	1.8×10^{-5} torr $\leq (P_{CAD\,12} - P_{CAD\,0}) \leq 2.8 \times 10^{-5}$ torr	2.4e-5

Inspect for Contamination

Task	Complete	N/A
Inspect for front-end contamination. Refer to Inspect for Contamination.	✓	—

Post-PM System Tests

Q1 Positive MS Test is Complete: Intensity and Peak Width	✓

- **Test solution:** POS PPG, 2e-6 M
- **Flow rate:** 5 µL/min
- **Scan rate:** 10 Da/s
- **Cycles:** 10
- **MCA:** On
- **Printouts required:** Spectra for masses 59.050, 175.133, 500.380, 616.464, 906.673, 1,254.925, 1,545.134, 1,952.427, with peak intensities, peak width, and mass shift results, complete with method file information.

Note: After calibration, the mass shift result must be within 0.1 Da for all assigned masses.

Mass (Da)	Intensity (cps)		Peak Width (Da)	
	Specification	Result	Specification	Result
175.133	≥ 8.0×10^6	3.1e7	0.6 to 0.8	0.69
500.380	≥ 8.0×10^6	3.1e7	0.6 to 0.8	0.73
906.673	≥ 2.0×10^7	4.2e7	0.6 to 0.8	0.77
1,952.427	≥ 8.8×10^5	1.0e7	0.6 to 0.8	0.71

Q1 Positive MS Test is Complete: Peak Width for Identified Masses	✓

- **Test solution:** POS PPG, 2e-6 M
- **Flow rate:** 5 µL/min
- **MCA:** On
- **Printouts required:** Spectra for masses 59.050, 175.133, 500.380, 616.464, 906.673, 1,254.925, 1,545.134, 1,952.427, with peak intensities, peak width, and mass shift results, complete with method file information.

Note: After calibration, the mass shift result must be within 0.1 Da for all assigned masses.

Mass (Da)	Scan Rate (Da/s)	Cycles	Specification (Da)	Result (Passed)
59.050, 175.133, 500.380, 616.464, 906.673, 1,254.925, 1,545.134, 1,952.427	10	10	0.6 to 0.8	✓
	200	50	0.6 to 0.8	
	1,000	50	0.6 to 0.8	
	2,000	100	0.6 to 0.8	

Q3 Positive MS Test is Complete: Intensity and Peak Width	✓

- **Test solution:** POS PPG, 2e-6 M
- **Flow rate:** 5 µL/min
- **Scan rate:** 10 Da/s
- **Cycles:** 10
- **MCA:** On
- **Printouts required:** Spectra for masses 59.050, 175.133, 500.380, 616.464, 906.673, 1,254.925, 1,545.134, 1,952.427, with peak intensities, peak width, and mass shift results, complete with method file information.

Note: After calibration, the mass shift result must be within 0.1 Da for all assigned masses.

Mass (Da)	Intensity (cps)		Peak Width (Da)	
	Specification	Result	Specification	Result
175.133	≥ 8.0×10^6	3.8e7	0.6 to 0.8	0.77
500.380	≥ 8.0×10^6	3.7e7	0.6 to 0.8	0.76
906.673	≥ 2.0×10^7	5.5e7	0.6 to 0.8	0.76
1,952.427	≥ 8.8×10^5	1.3e7	0.6 to 0.8	0.71

Q3 Positive MS Test is Complete: Peak Width for Identified Masses	✓

- **Test solution:** POS PPG, 2e-6 M
- **Flow rate:** 5 µL/min
- **MCA:** On
- **Printouts required:** Spectra for masses 59.050, 175.133, 500.380, 616.464, 906.673, 1,254.925, 1,545.134, 1,952.427, with peak intensities, peak width, and mass shift results, complete with method file information.

Note: After calibration, the mass shift result must be within 0.1 Da for all assigned masses.

Mass (Da)	Scan Rate (Da/s)	Cycles	Specification (Da)	Result (Passed)
59.050, 175.133, 500.380, 616.464, 906.673, 1,254.925, 1,545.134, 1,952.427	10	10	0.6 to 0.8	✓
	200	50	0.6 to 0.8	
	1,000	50	0.6 to 0.8	
	2,000	100	0.6 to 0.8	

Q1 Negative MS Test is Complete: Intensity and Peak Width	✓

- **Test solution:** NEG PPG, 3e-4 M
- **Flow rate:** 10 µL/min
- **Scan rate**: 10 Da/s
- **Cycles:** 10
- **MCA:** On
- **Printouts required:** Spectra for masses 44.998, 411.259, 585.385, 933.636, 1,223.845, 1,572.097, 1,863.306, 1,979.389, with peak intensities, peak width, and mass shift results, complete with method file information.

Note: After calibration, the mass shift result must be within 0.1 Da for all assigned masses.

Mass (Da)	Intensity (cps)		Peak Width (Da)	
	Specification	Result	Specification	Result
933.636	≥ 1.8×10^7	2.7e7	0.6 to 0.8	0.74
1,863.306	≥ 1.4×10^6	4.9e6	0.6 to 0.8	0.74

Q1 Negative MS Test is Complete: Peak Width for Identified Masses	✓

- **Test solution:** NEG PPG, 3e-4 M
- **Flow rate:** 10 µL/min
- **MCA:** On
- **Printouts required:** Spectra for masses 44.998, 411.259, 585.385, 933.636, 1,223.845, 1,572.097, 1,863.306, 1,979.389, with peak intensities, peak width, and mass shift results, complete with method file information.

Note: After calibration, the mass shift result must be within 0.1 Da for all assigned masses.

Mass (Da)	Scan Rate (Da/s)	Cycles	Specification (Da)	Result (Passed)
44.998, 411.259, 585.385, 933.636, 1,223.845, 1,572.097, 1,863.306, 1,979.389	10	10	0.6 to 0.8	✓
	200	50	0.6 to 0.8	
	1,000	50	0.6 to 0.8	
	2,000	100	0.6 to 0.8	

Q3 Negative MS Test is Complete: Intensity and Peak Width	✓

- **Test solution:** NEG PPG, 3e-4 M
- **Flow rate:** 10 µL/min
- **Scan rate**: 10 Da/s
- **Cycles:** 10
- **MCA:** On
- **Printouts required:** Spectra for masses 44.998, 411.259, 585.385, 933.636, 1,223.845, 1,572.097, 1,863.306, 1,979.389, with peak intensities, peak width, and mass shift results, complete with method file information.

Note: After calibration, the mass shift result must be within 0.1 Da for all assigned masses.

Mass (Da)	Intensity (cps)		Peak Width (Da)	
	Specification	Result	Specification	Result
933.636	≥ 1.8×10^7	3.4e7	0.6 to 0.8	0.70
1,863.306	≥ 2.0×10^6	6.2e6	0.6 to 0.8	0.71

Q3 Negative MS Test is Complete: Peak Width for Identified Masses	✓

- **Test solution:** NEG PPG, 3e-4 M
- **Flow rate:** 10 µL/min
- **MCA:** On
- **Printouts required:** Spectra for masses 44.998, 411.259, 585.385, 933.636, 1,223.845, 1,572.097, 1,863.306, 1,979.389, with peak intensities, peak width, and mass shift results, complete with method file information.

Note: After calibration, the mass shift result must be within 0.1 Da for all assigned masses.

Mass (Da)	Scan Rate (Da/s)	Cycles	Specification (Da)	Result (Passed)
44.998, 411.259, 585.385, 933.636, 1,223.845, 1,572.097, 1,863.306, 1,979.389	10	10	0.6 to 0.8	✓
	200	50	0.6 to 0.8	
	1,000	50	0.6 to 0.8	
	2,000	100	0.6 to 0.8	

Reserpine MS/MS Transmission Test is Complete	✓

- **Test solution:** Reserpine solution 0.167 pmol/µL
- **Flow rate:** 5 µL/min
- **Scan rate:** 10 Da/s (both MS and MS/MS)
- **Scan mode:** Product Ion (MS2)
- **Product Of:** 609.3 (or as calibrated)
- **Product Ion:** 195.1
- **Cycles:** 10
- **MCA:** On
- **Printouts required:** Spectra for masses 609.3 and 195.1, with peak intensities, peak width, and mass shift results, complete with method file information.

Specification	Result
Transmission efficiency $\frac{Intensity\ for\ ion\ at\ m/z\ 195.1}{Intensity\ for\ ion\ at\ m/z\ 609.3\ (or\ as\ calibrated)} \times 100 \geq 10\%$	10.4%

Post-PM Tasks

Task	Complete	N/A
Delete any unnecessary files.	✓	—
Back up the Analyst Data folder.	✓	—
(If applicable) Defragment the hard drive.	○	◉
(Not applicable for MD instrument families) If the customer has a Software Support Plan, then perform the Software Health Check: • (Obtain customer approval first) Install any compatible HotFixes and updates for SCIEX add-on software.	○	◉

StatusScope® Remote Monitoring Service Tasks

The StatusScope® Remote Monitoring Service is not applicable for MD systems.

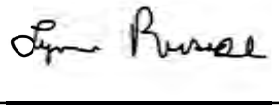
Task	Complete	N/A
Note: Installation of the StatusScope® Remote Monitoring Service is available only to warranty and eligible contract customers. Refer to sciex.com/instrument-service-and-support/statusscope-remote-monitoring for a list of eligible contracts. If the StatusScope® Remote Monitoring Service is not installed, then perform these tasks: • If the customer does not want the StatusScope® Remote Monitoring Service installed, then skip the remaining steps in this section. • If the customer wants the StatusScope® Remote Monitoring Service installed, then complete the steps in this section.	○	◉
Verify the connection to the server for the StatusScope® Remote Monitoring Service. **Note:** Use the **StatusScopePortCheck.exe**. The utility is included with the StatusScope® installer.	○	◉
Install the agent for the StatusScope® Remote Monitoring Service.	○	◉
Ask the customer to log on to SCIEX Now™ to verify that the instrument is connected to the server for the StatusScope® Remote Monitoring Service. **Note:** The instrument is shown under the account of the Primary Contact.	○	◉

Wrap-up

Task	Complete	N/A
Review the work performed with the customer.	✓	—
Record the test results in this document and then attach all of the test data.	✓	—
Review the routine maintenance schedule and the procedures with the customer.	✓	—
Complete this document: • Review the test results with the customer. • Provide the customer with the completed document and the test data. • If an electronic copy of the document is supplied to the customer, then save a copy on the Service drive.	✓	—

Signoff

3

Organization	Pace Analytical South Carolina		
Mass spectrometer serial number	EB250231807	Service request number	
FSE name	Lynne Russell	Date (yyyy-mm-dd)	2021-12-03
FSE signature			

Comments and Exceptions

Inspect for Contamination A

Perform a Q1 and Q3 charging test to determine whether front end contamination is present.

1. Run the **Pos PPG** method for 10 minutes, monitoring the Total Ion Count (TIC) for degradation of the signal or a decrease in sensitivity.
2. Change the polarity to Negative, and then scan for one minute.
3. Change the polarity to Positive, and then make sure that the **IS** parameter returns to the original value.
4. Run the method.

   If the signal sensitivity is restored temporarily but the Total Ion Count (TIC) again degrades by more than 5% over a 10 minute run, then a possible front-end contamination is indicated.
5. Repeat the test in Negative polarity using the Q1 Neg PPG method.

Guidelines for Cleaning the Front End

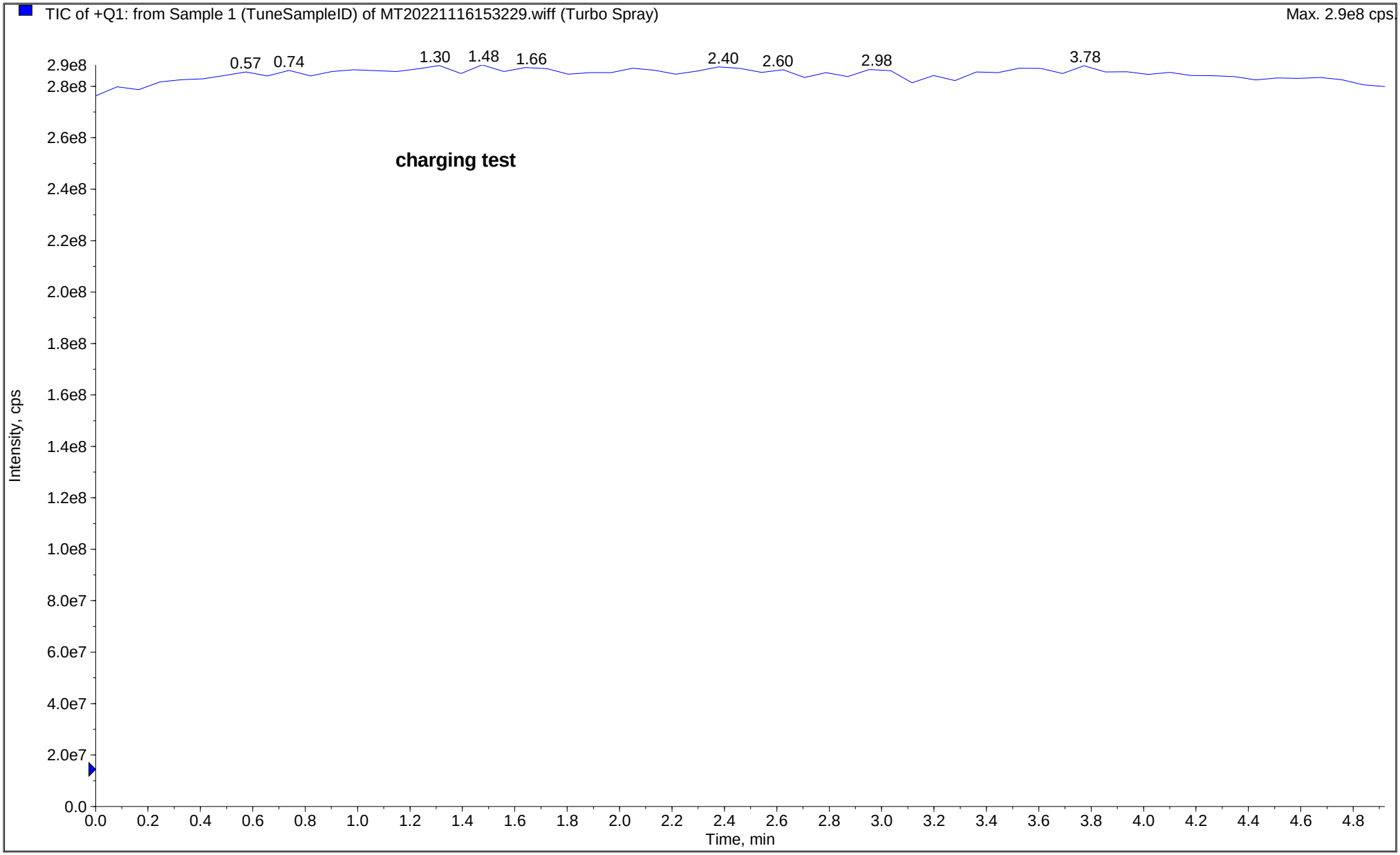
If charging tests indicate that cleaning is necessary, then clean the front-end components, including the QJet® Ion Guide, IQ0 lens, Q0 quadrupole, and IQ1 lens.

Removing the ion optics is considered a repair activity. FSEs must open a separate service repair call.

Note: This procedure does not provide troubleshooting for all technical root causes of signal degradation or charging effect. Signal degradation might also result from a contaminated TurboIonSpray® Probe or electrode, method parameters that are not optimized, or other factors.

Acq. Time: 15:32
Acq. Date: Wednesday, November 16, 2022

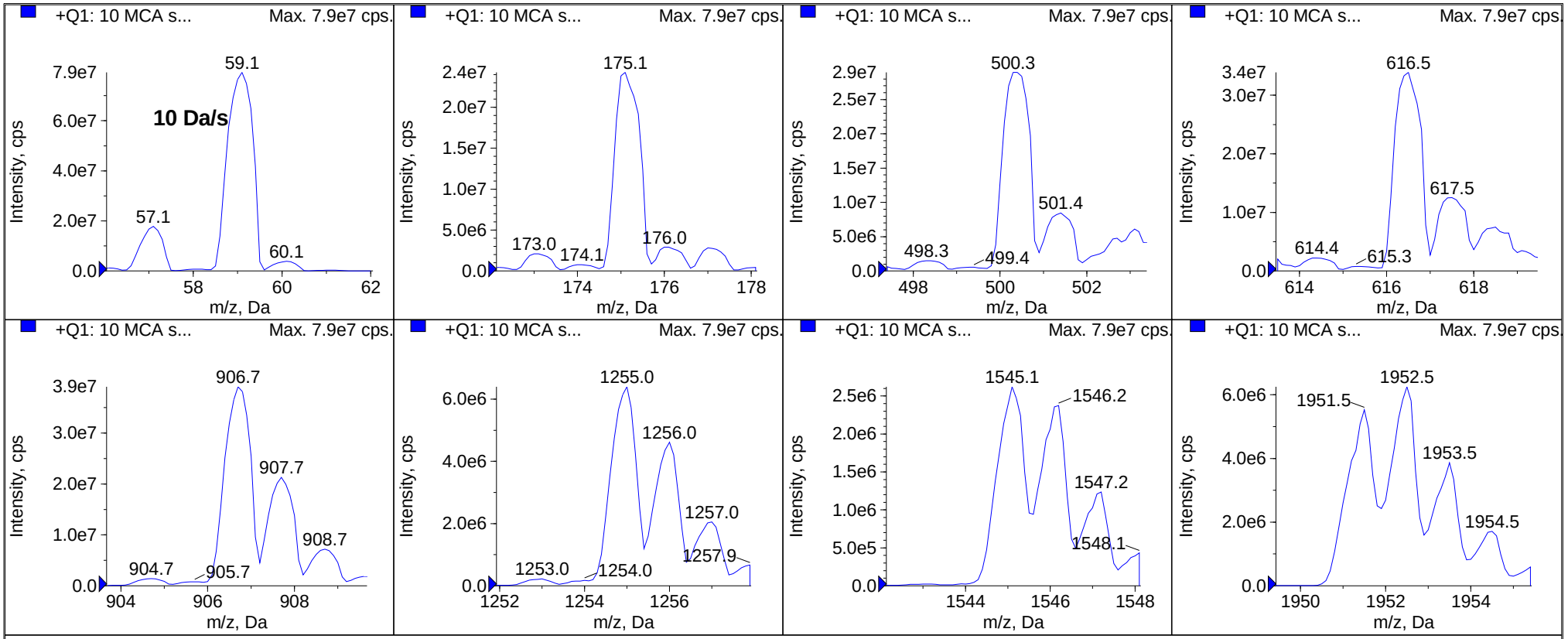
Analyst Version: 1.7.0
*SN: EB250231807



*Post-PM
*FSAS: Lynne Russell

Acq. Time: 15:43
Acq. Date: Wednesday, November 16, 2022

Analyst Version: 1.7.0
*SN: EB250231807



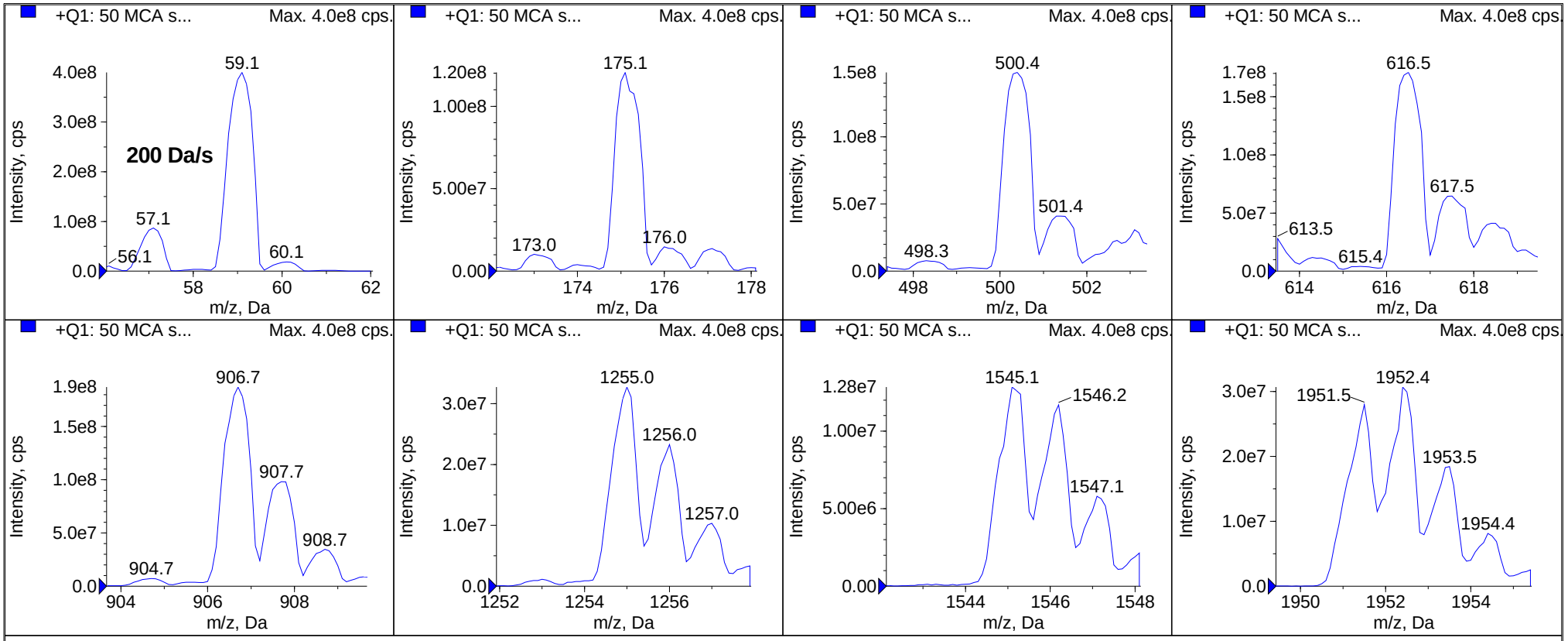
Peak List for " +Q1: 10 MCA scans from Sample 1 (TuneSampleID) of MT20221116154305.wiff (Turbo Spray)"

	Target Mass (Da)	Found At (Da)	Intensity (cps)	Width (Da)	Mass Shift (Da)
1	59.0500	59.0694	7.9301e7	0.6930	-0.0194
2	175.1330	175.1466	2.4252e7	0.6815	-0.0136
3	500.3800	500.3869	2.8950e7	0.7151	-6.8829e-3
4	616.4640	616.4905	3.3898e7	0.7077	-0.0265
5	906.6730	906.7059	3.9095e7	0.6944	-0.0329
6	1254.9250	1254.9352	6.3983e6	0.6827	-0.0102
7	1545.1340	1545.0872	2.6212e6	0.7487	0.0468
8	1952.4270	1952.4332	6.2513e6	0.6794	-6.2464e-3

*Post-PM
*FSAS: Lynne Russell

Acq. Time: 15:45
Acq. Date: Wednesday, November 16, 2022

Analyst Version: 1.7.0
*SN: EB250231807



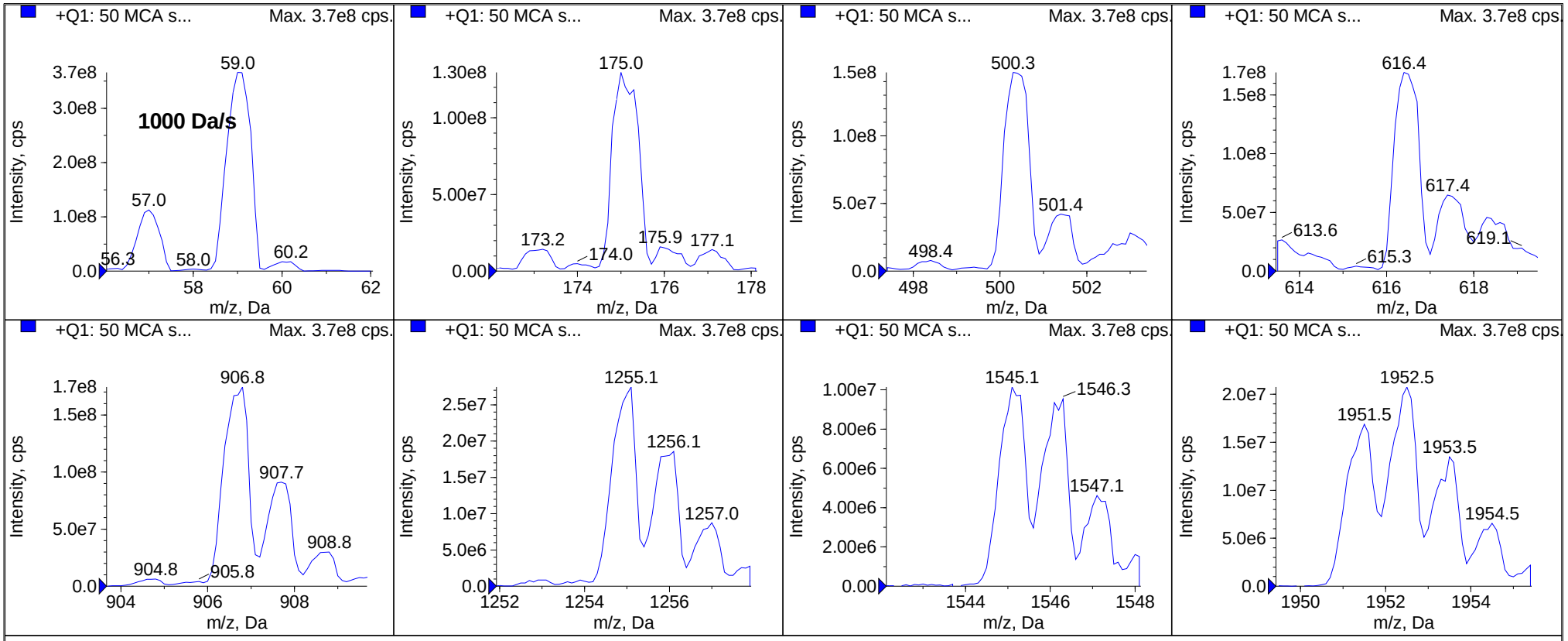
Peak List for " +Q1: 50 MCA scans from Sample 1 (TuneSampleID) of MT20221116154551.wiff (Turbo Spray)"

	Target Mass (Da)	Found At (Da)	Intensity (cps)	Width (Da)	Mass Shift (Da)
1	59.0500	59.0679	3.9961e8	0.6611	-0.0179
2	175.1330	175.1475	1.2047e8	0.6795	-0.0145
3	500.3800	500.3957	1.4794e8	0.7054	-0.0157
4	616.4640	616.4873	1.7090e8	0.7100	-0.0233
5	906.6730	906.6822	1.8708e8	0.7097	-9.2460e-3
6	1254.9250	1254.9529	3.2718e7	0.6658	-0.0279
7	1545.1340	1545.1300	1.2840e7	0.7594	4.0015e-3
8	1952.4270	1952.4147	3.0692e7	0.6993	0.0123

*Post-PM
*FSAS: Lynne Russell

Acq. Time: 15:51
Acq. Date: Wednesday, November 16, 2022

Analyst Version: 1.7.0
*SN: EB250231807



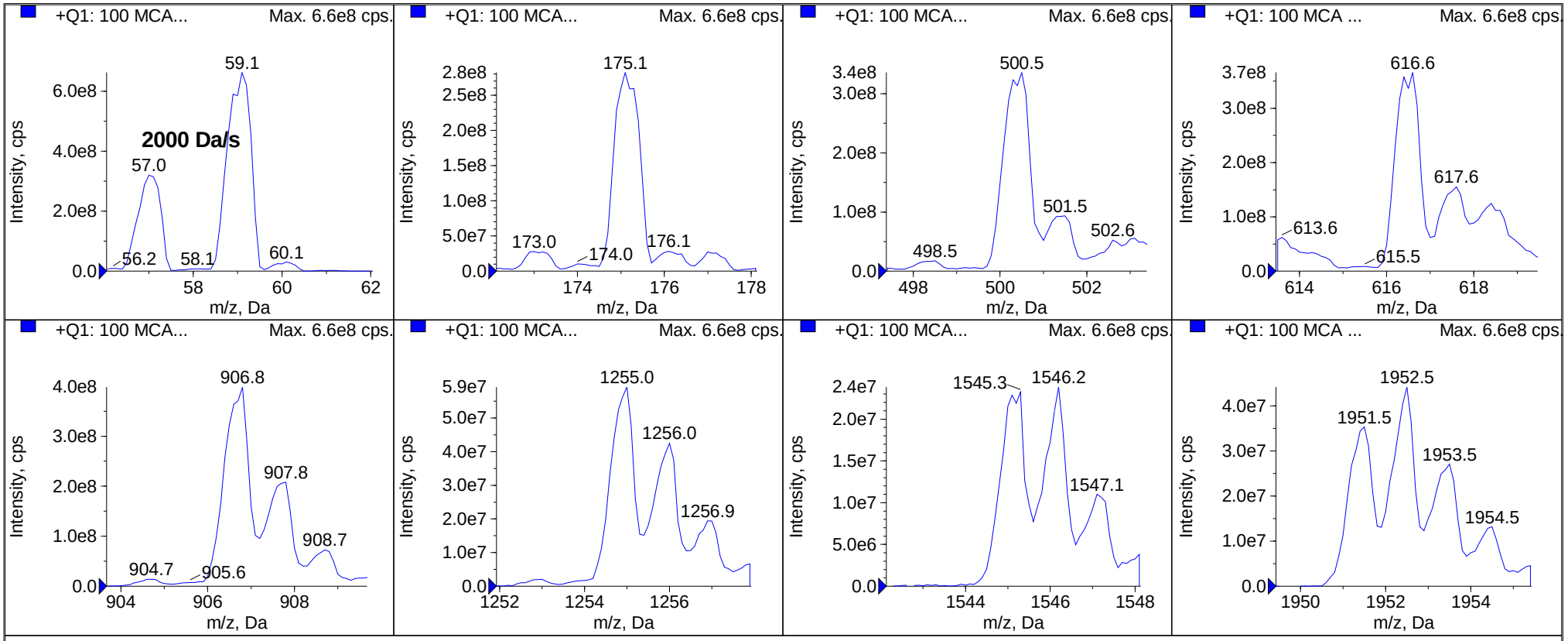
Peak List for " +Q1: 50 MCA scans from Sample 1 (TuneSampleID) of MT20221116155121.wiff (Turbo Spray)"

	Target Mass (Da)	Found At (Da)	Intensity (cps)	Width (Da)	Mass Shift (Da)
1	59.0500	59.0468	3.6592e8	0.6509	3.2379e-3
2	175.1330	175.0995	1.2960e8	0.7118	0.0335
3	500.3800	500.3778	1.4678e8	0.6580	2.1677e-3
4	616.4640	616.4624	1.6914e8	0.6468	1.5754e-3
5	906.6730	906.6749	1.7441e8	0.6573	-1.9017e-3
6	1254.9250	1254.9526	2.7440e7	0.6334	-0.0276
7	1545.1340	1545.1251	1.0140e7	0.7083	8.8637e-3
8	1952.4270	1952.4370	2.0750e7	0.7277	-0.0100

*Post-PM
*FSAS: Lynne Russell

Acq. Time: 15:58
Acq. Date: Wednesday, November 16, 2022

Analyst Version: 1.7.0
*SN: EB250231807



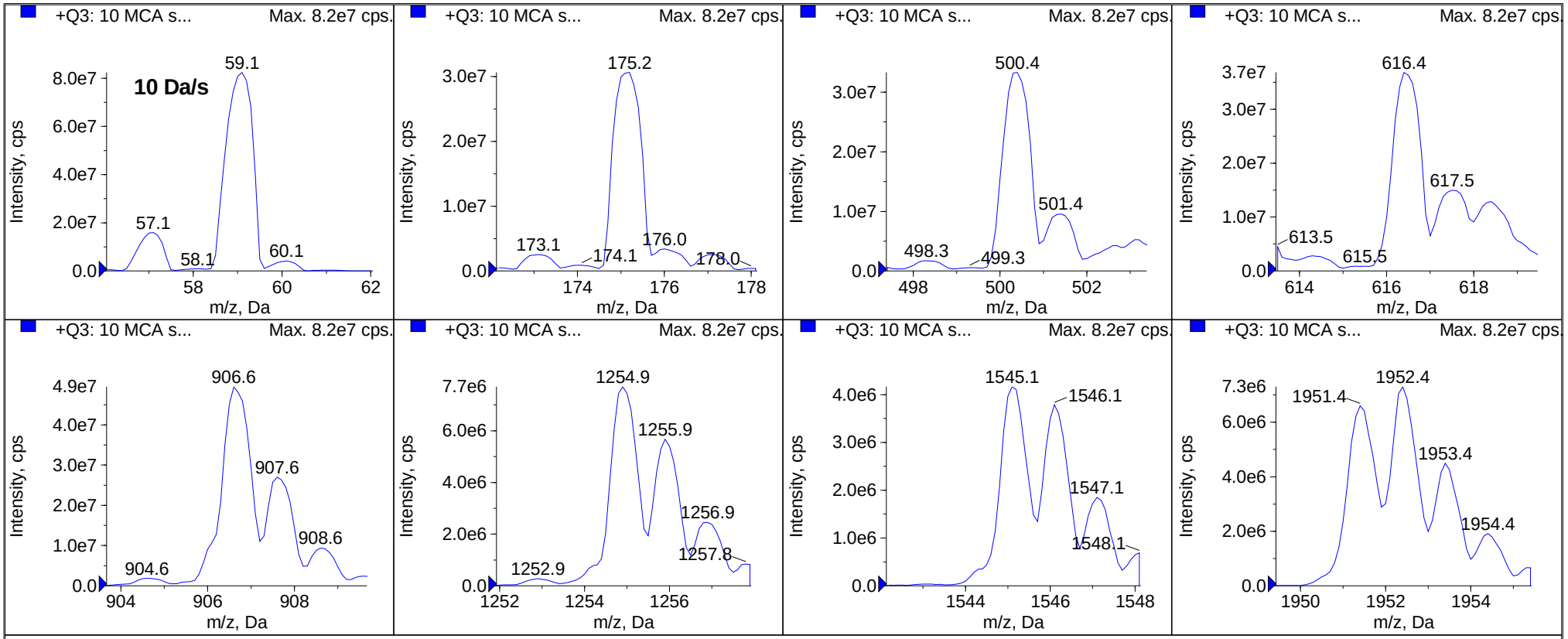
Peak List for " +Q1: 100 MCA scans from Sample 1 (TuneSampleID) of MT20221116155855.wiff (Turbo Spray)"

	Target Mass (Da)	Found At (Da)	Intensity (cps)	Width (Da)	Mass Shift (Da)
1	59.0500	59.0542	6.6222e8	0.6381	-4.1733e-3
2	175.1330	175.1414	2.8216e8	0.6823	-8.4100e-3
3	500.3800	500.3881	3.3592e8	0.6854	-8.0835e-3
4	616.4640	616.4805	3.6590e8	0.6356	-0.0165
5	906.6730	906.6757	3.9830e8	0.6331	-2.6918e-3
6	1254.9250	1254.9025	5.9200e7	0.6102	0.0225
7	1545.1340	1545.1604	2.3240e7	0.6536	-0.0264
8	1952.4270	1952.4312	4.4160e7	0.6119	-4.1826e-3

*Post-PM
*FSAS: Lynne Russell

Acq. Time: 16:04
Acq. Date: Wednesday, November 16, 2022

Analyst Version: 1.7.0
*SN: EB250231807



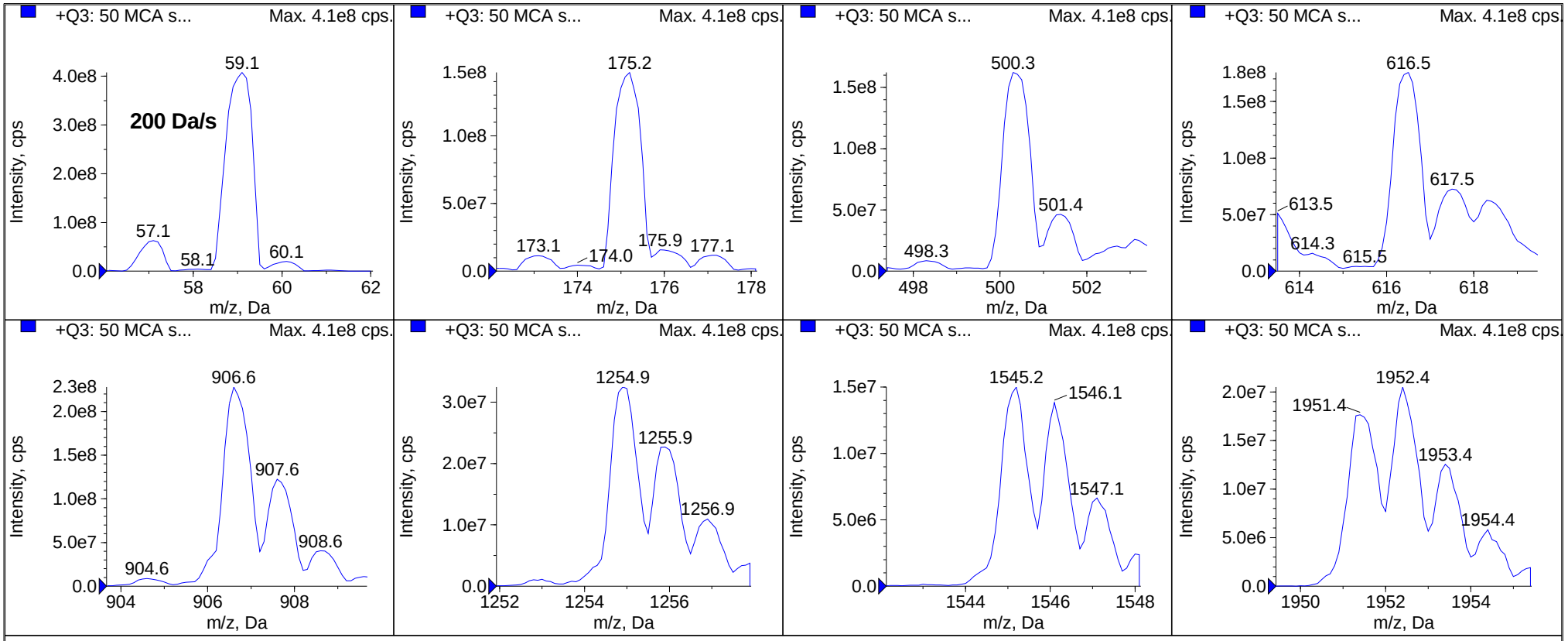
Peak List for " +Q3: 10 MCA scans from Sample 1 (TuneSampleID) of MT20221116160401.wiff (Turbo Spray)"

	Target Mass (Da)	Found At (Da)	Intensity (cps)	Width (Da)	Mass Shift (Da)
1	59.0500	59.0504	8.2425e7	0.7226	-4.4438e-4
2	175.1330	175.1364	3.0631e7	0.7570	-3.4172e-3
3	500.3800	500.3880	3.3305e7	0.7291	-8.0462e-3
4	616.4640	616.4697	3.6804e7	0.7254	-5.6524e-3
5	906.6730	906.6722	4.9456e7	0.7114	8.3719e-4
6	1254.9250	1254.9290	7.7024e6	0.7037	-3.9782e-3
7	1545.1340	1545.1359	4.1629e6	0.7086	-1.9454e-3
8	1952.4270	1952.4186	7.3003e6	0.7255	8.4013e-3

*Post-PM
*FSAS: Lynne Russell

Acq. Time: 16:07
Acq. Date: Wednesday, November 16, 2022

Analyst Version: 1.7.0
*SN: EB250231807



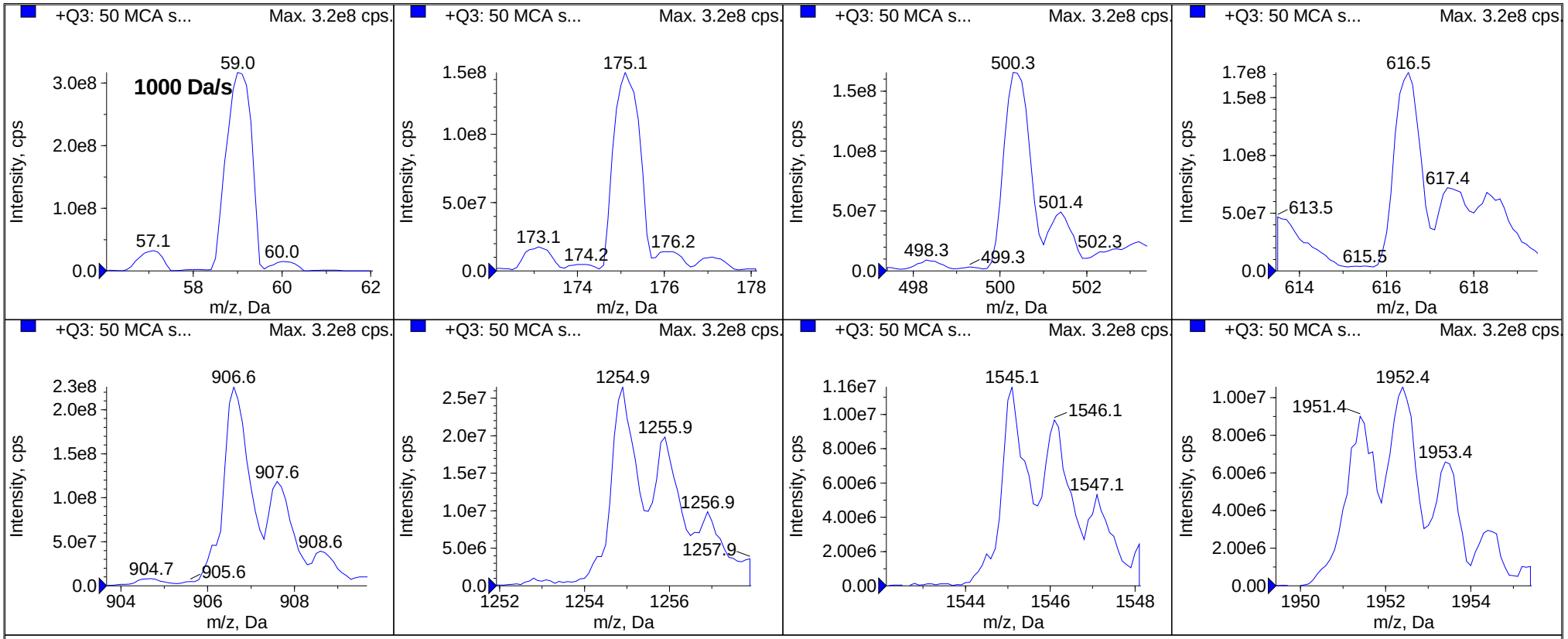
Peak List for " +Q3: 50 MCA scans from Sample 1 (TuneSampleID) of MT20221116160711.wiff (Turbo Spray)"

	Target Mass (Da)	Found At (Da)	Intensity (cps)	Width (Da)	Mass Shift (Da)
1	59.0500	59.0451	4.0772e8	0.7018	4.8898e-3
2	175.1330	175.1489	1.4674e8	0.7316	-0.0159
3	500.3800	500.3756	1.6214e8	0.7111	4.3570e-3
4	616.4640	616.4621	1.7567e8	0.7111	1.9478e-3
5	906.6730	906.6654	2.2788e8	0.6934	7.5799e-3
6	1254.9250	1254.9210	3.2466e7	0.7142	3.9709e-3
7	1545.1340	1545.1506	1.5002e7	0.7052	-0.0166
8	1952.4270	1952.4441	2.0500e7	0.7493	-0.0171

*Post-PM
*FSAS: Lynne Russell

Acq. Time: 16:16
Acq. Date: Wednesday, November 16, 2022

Analyst Version: 1.7.0
*SN: EB250231807



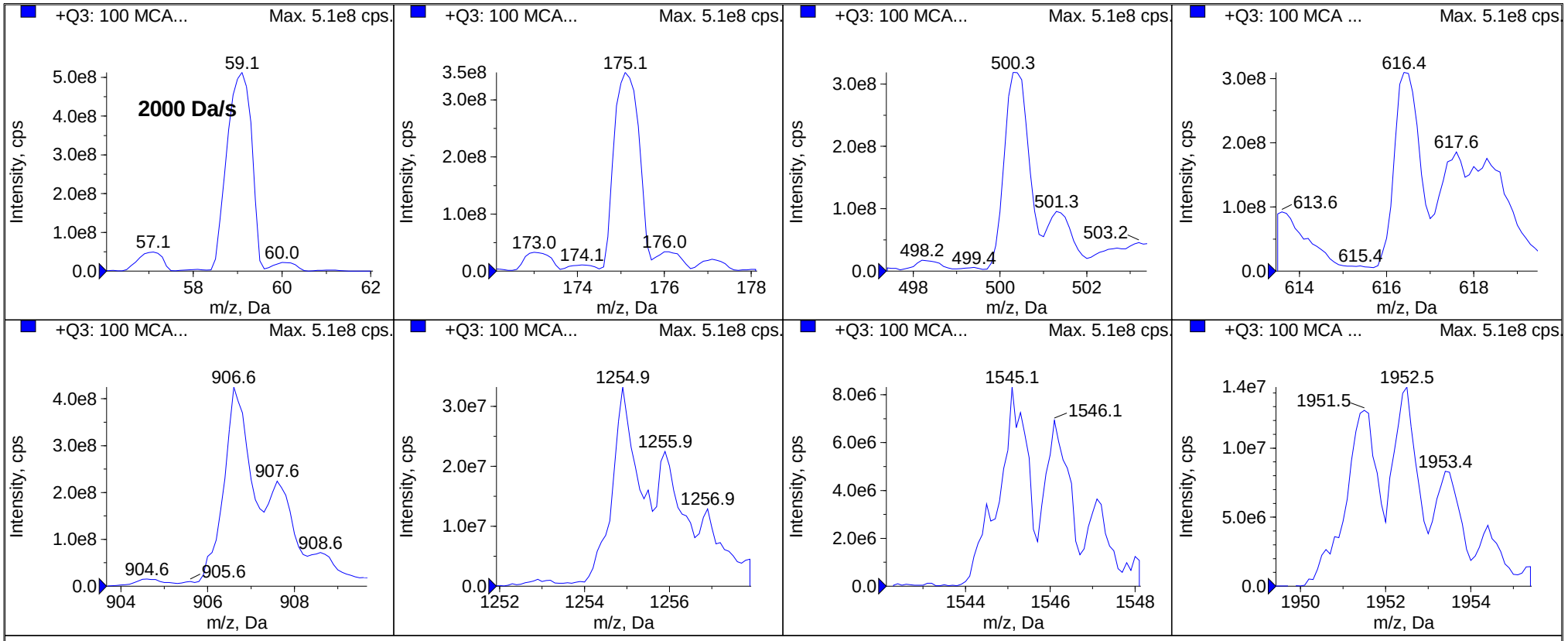
Peak List for " +Q3: 50 MCA scans from Sample 1 (TuneSampleID) of MT20221116161657.wiff (Turbo Spray)"

	Target Mass (Da)	Found At (Da)	Intensity (cps)	Width (Da)	Mass Shift (Da)
1	59.0500	59.0497	3.1701e8	0.6819	2.9362e-4
2	175.1330	175.1276	1.4528e8	0.7268	5.4100e-3
3	500.3800	500.3836	1.6556e8	0.6793	-3.5614e-3
4	616.4640	616.4684	1.7183e8	0.6858	-4.3911e-3
5	906.6730	906.6449	2.2607e8	0.6241	0.0281
6	1254.9250	1254.9157	2.6520e7	0.6580	9.3495e-3
7	1545.1340	1545.1290	1.1610e7	0.6833	5.0472e-3
8	1952.4270	1952.3857	1.0570e7	0.7887	0.0413

*Post-PM
*FSAS: Lynne Russell

Acq. Time: 16:22
Acq. Date: Wednesday, November 16, 2022

Analyst Version: 1.7.0
*SN: EB250231807



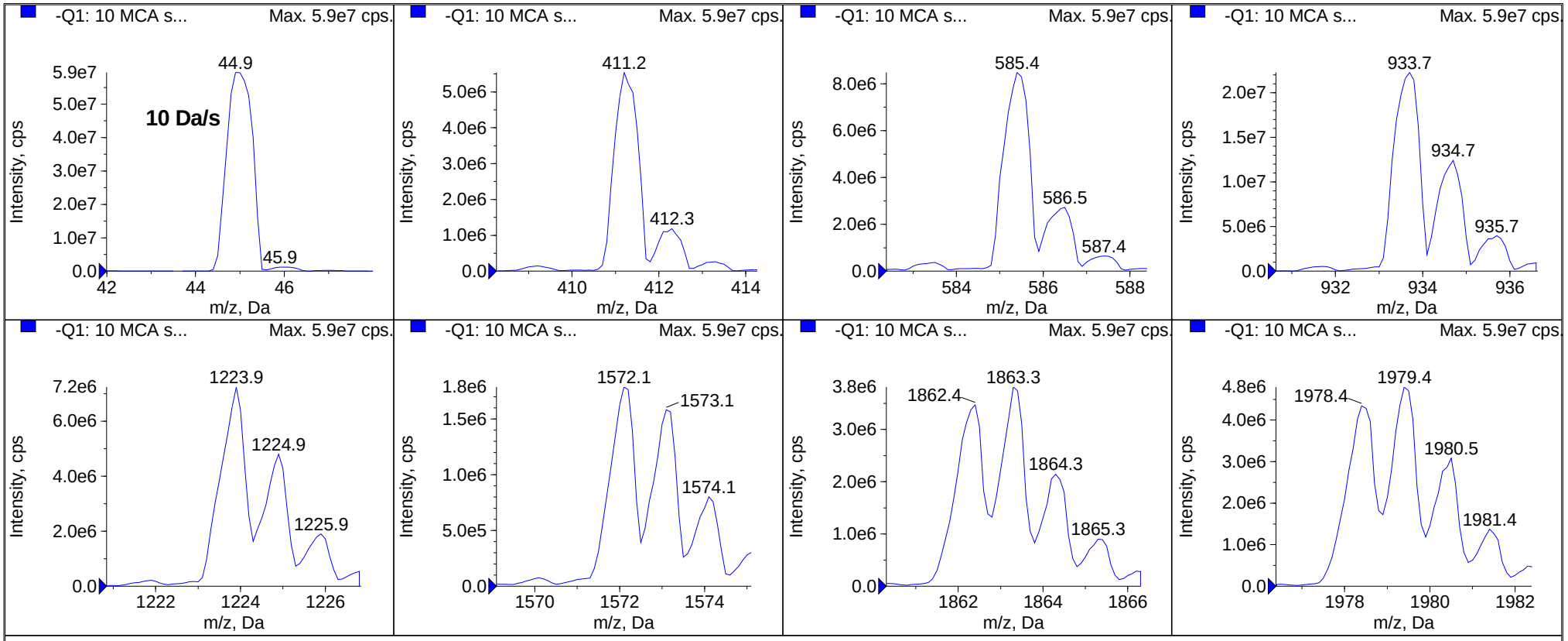
Peak List for " +Q3: 100 MCA scans from Sample 1 (TuneSampleID) of MT20221116162244.wiff (Turbo Spray)"

	Target Mass (Da)	Found At (Da)	Intensity (cps)	Width (Da)	Mass Shift (Da)
1	59.0500	59.0578	5.1262e8	0.6555	-7.8197e-3
2	175.1330	175.1314	3.4800e8	0.6855	1.5833e-3
3	500.3800	500.3737	3.1838e8	0.6276	6.3314e-3
4	616.4640	616.4567	3.0946e8	0.6412	7.2869e-3
5	906.6730	906.6822	4.2498e8	0.6614	-9.2296e-3
6	1254.9250	1254.9350	3.3220e7	0.6206	-9.9648e-3
7	1545.1340	1545.2108	8.3200e6	0.6953	-0.0768
8	1952.4270	1952.4343	1.4420e7	0.7058	-7.2815e-3

*Post-PM
*FSAS: Lynne Russell

Acq. Time: 16:39
Acq. Date: Wednesday, November 16, 2022

Analyst Version: 1.7.0
*SN: EB250231807



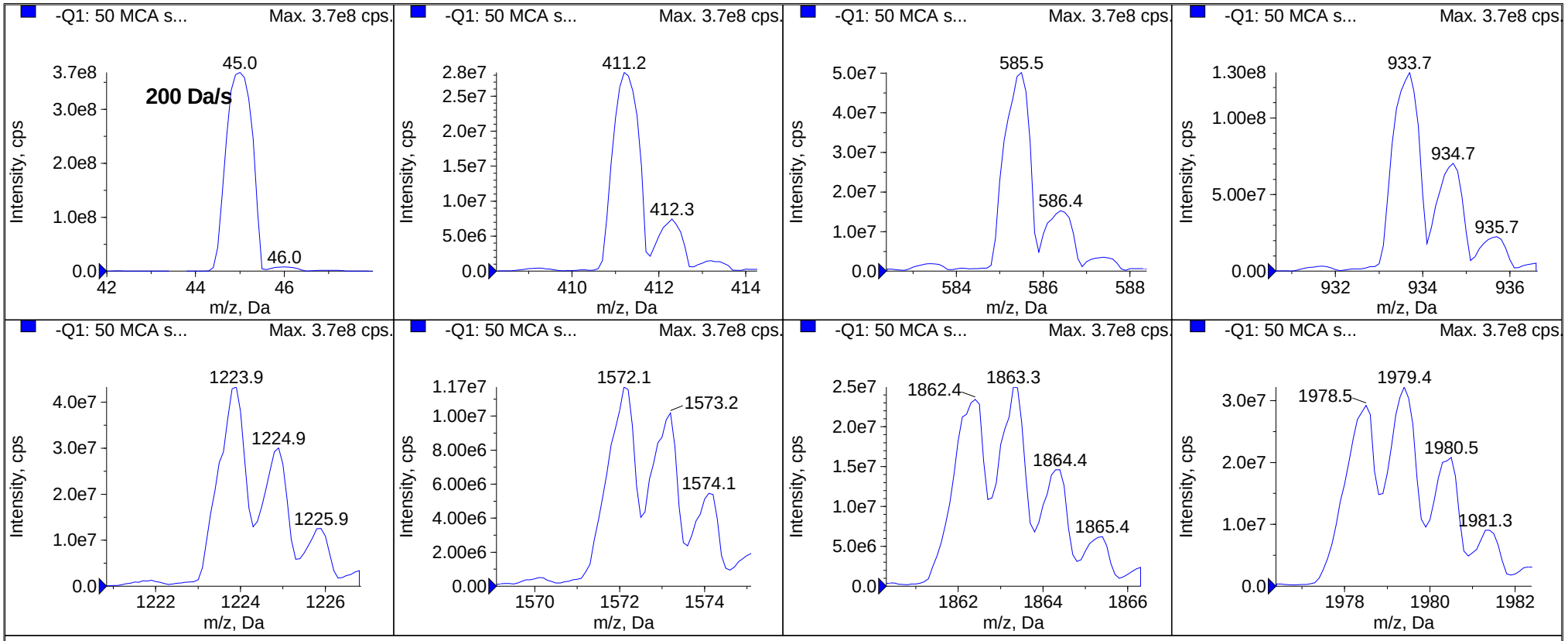
Peak List for " -Q1: 10 MCA scans from Sample 1 (TuneSampleID) of MT20221116163938.wiff (Turbo Spray)"

	Target Mass (Da)	Found At (Da)	Intensity (cps)	Width (Da)	Mass Shift (Da)
1	44.9980	45.0042	5.9476e7	0.6847	-6.2163e-3
2	411.2590	411.2530	5.5407e6	0.6501	5.9843e-3
3	585.3850	585.4024	8.4819e6	0.7023	-0.0174
4	933.6360	933.6435	2.2259e7	0.6778	-7.5025e-3
5	1223.8450	1223.8513	7.2444e6	0.6653	-6.2560e-3
6	1572.0970	1572.0915	1.7853e6	0.6497	5.4936e-3
7	1863.3060	1863.3026	3.8125e6	0.6476	3.3612e-3
8	1979.3890	1979.3973	4.7942e6	0.6613	-8.3468e-3

*Post-PM
*FSAS: Lynne Russell

Acq. Time: 16:49
Acq. Date: Wednesday, November 16, 2022

Analyst Version: 1.7.0
*SN: EB250231807



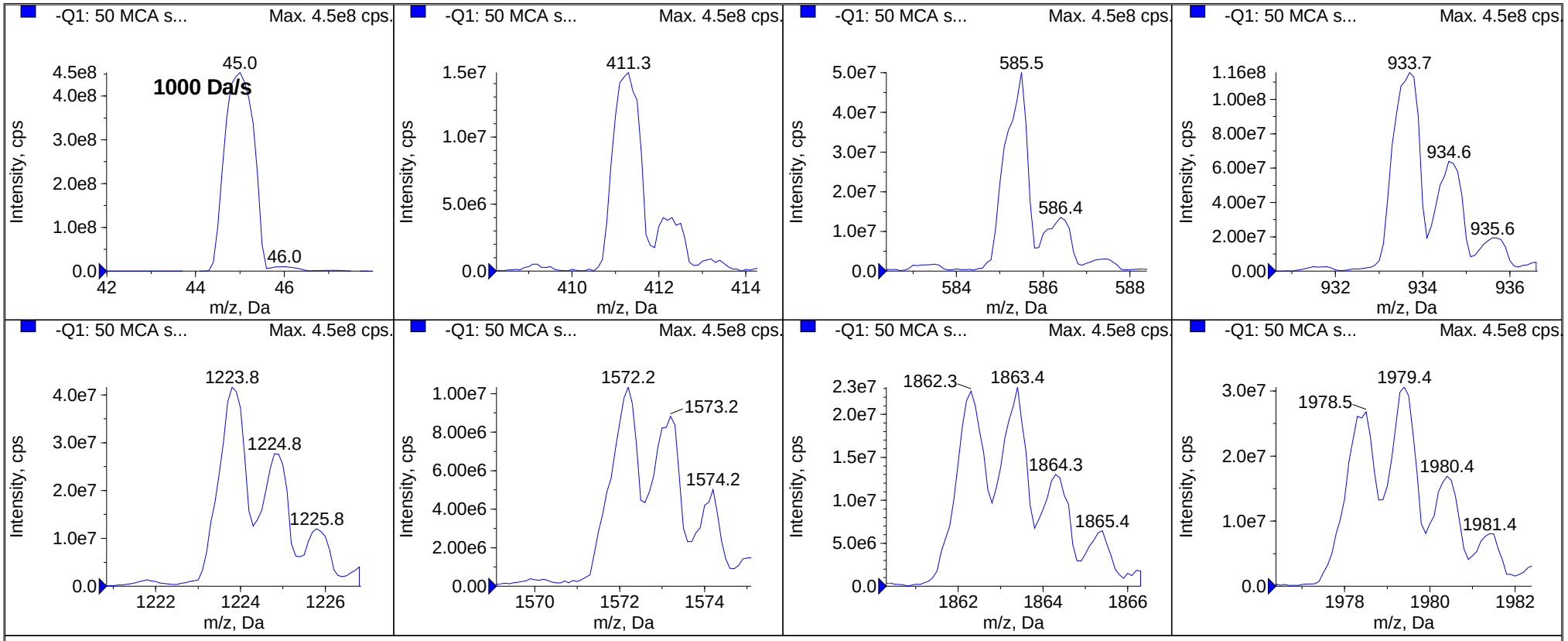
Peak List for " -Q1: 50 MCA scans from Sample 1 (TuneSampleID) of MT20221116164915.wiff (Turbo Spray)"

	Target Mass (Da)	Found At (Da)	Intensity (cps)	Width (Da)	Mass Shift (Da)
1	44.9980	44.9953	3.6845e8	0.7066	2.6706e-3
2	411.2590	411.2474	2.8374e7	0.7206	0.0116
3	585.3850	585.4153	5.0198e7	0.7107	-0.0303
4	933.6360	933.6225	1.2978e8	0.7205	0.0135
5	1223.8450	1223.8283	4.3300e7	0.7414	0.0167
6	1572.0970	1572.0670	1.1706e7	0.7577	0.0300
7	1863.3060	1863.2841	2.4976e7	0.7449	0.0219
8	1979.3890	1979.3635	3.2188e7	0.7864	0.0255

*Post-PM
*FSAS: Lynne Russell

Acq. Time: 16:53
Acq. Date: Wednesday, November 16, 2022

Analyst Version: 1.7.0
*SN: EB250231807



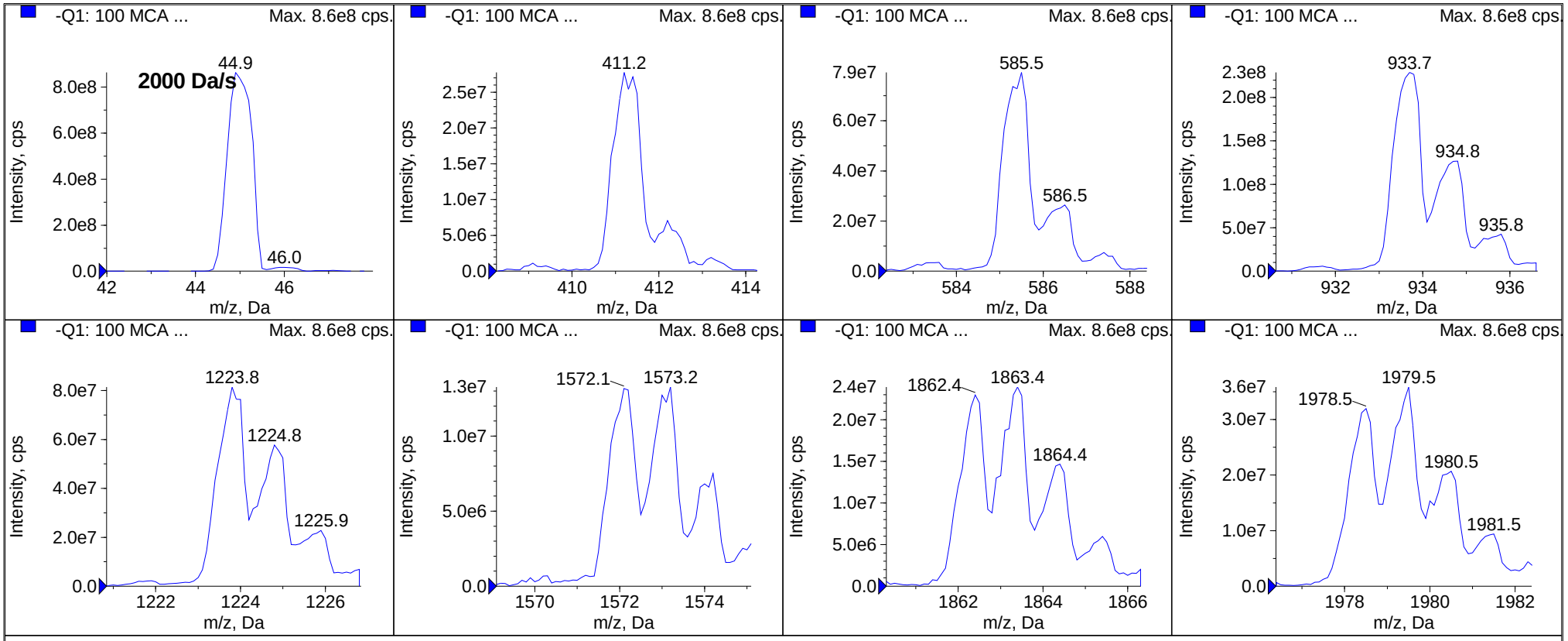
Peak List for " -Q1: 50 MCA scans from Sample 1 (TuneSampleID) of MT20221116165314.wiff (Turbo Spray)"

	Target Mass (Da)	Found At (Da)	Intensity (cps)	Width (Da)	Mass Shift (Da)
1	44.9980	44.9911	4.5367e8	0.7960	6.8767e-3
2	411.2590	411.2609	1.4820e7	0.7357	-1.9170e-3
3	585.3850	585.3960	5.0060e7	0.6277	-0.0110
4	933.6360	933.6337	1.1565e8	0.7131	2.2690e-3
5	1223.8450	1223.8293	4.1640e7	0.7010	0.0157
6	1572.0970	1572.1537	1.0340e7	0.7357	-0.0567
7	1863.3060	1863.3270	2.3180e7	0.7585	-0.0210
8	1979.3890	1979.3865	3.0600e7	0.7320	2.4549e-3

*Post-PM
*FSAS: Lynne Russell

Acq. Time: 16:55
Acq. Date: Wednesday, November 16, 2022

Analyst Version: 1.7.0
*SN: EB250231807



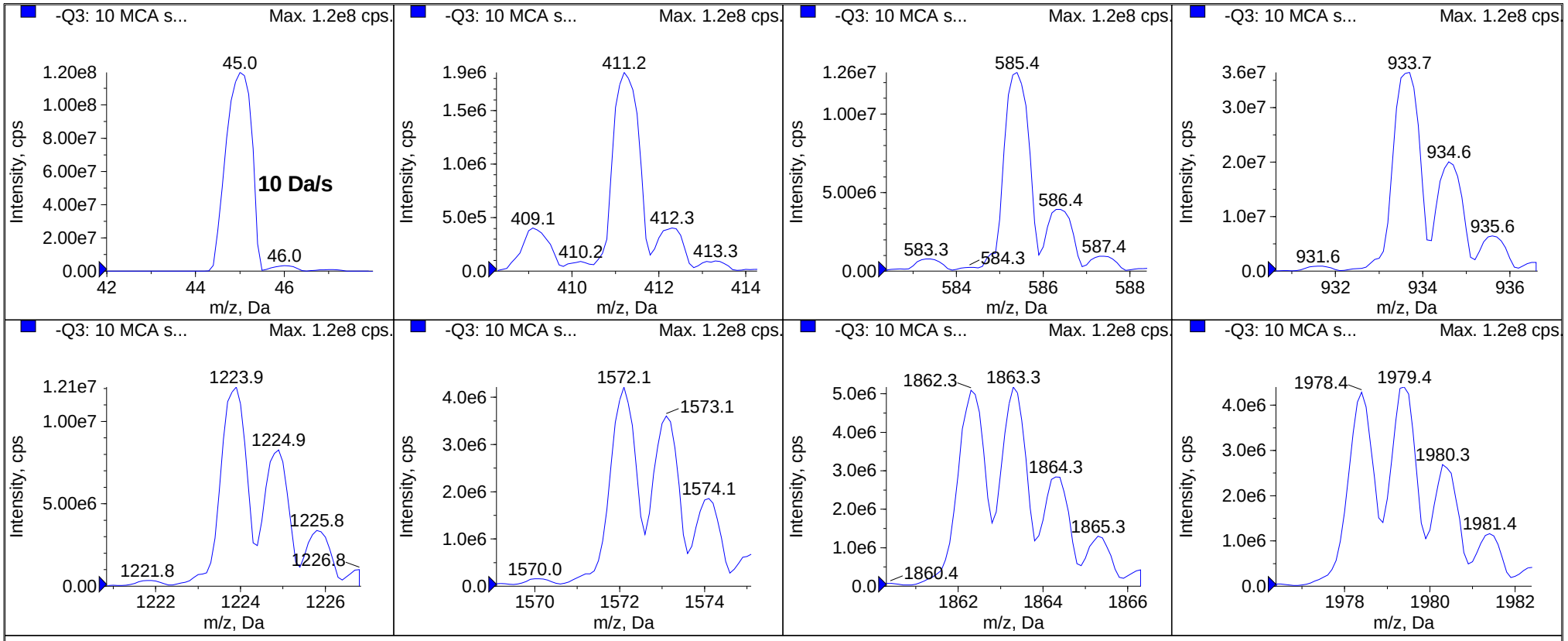
Peak List for " -Q1: 100 MCA scans from Sample 1 (TuneSampleID) of MT20221116165530.wiff (Turbo Spray)"

	Target Mass (Da)	Found At (Da)	Intensity (cps)	Width (Da)	Mass Shift (Da)
1	44.9980	45.0089	8.6310e8	0.6557	-0.0109
2	411.2590	411.2674	2.7760e7	0.7372	-8.4207e-3
3	585.3850	585.3764	7.9260e7	0.6788	8.6163e-3
4	933.6360	933.6536	2.2868e8	0.7055	-0.0176
5	1223.8450	1223.7962	8.1420e7	0.7313	0.0488
6	1572.0970	1572.0766	1.3160e7	0.7235	0.0204
7	1863.3060	1863.3310	2.3920e7	0.7591	-0.0250
8	1979.3890	1979.3911	3.5840e7	0.7518	-2.0682e-3

*Post-PM
*FSAS: Lynne Russell

Acq. Time: 17:00
Acq. Date: Wednesday, November 16, 2022

Analyst Version: 1.7.0
*SN: EB250231807



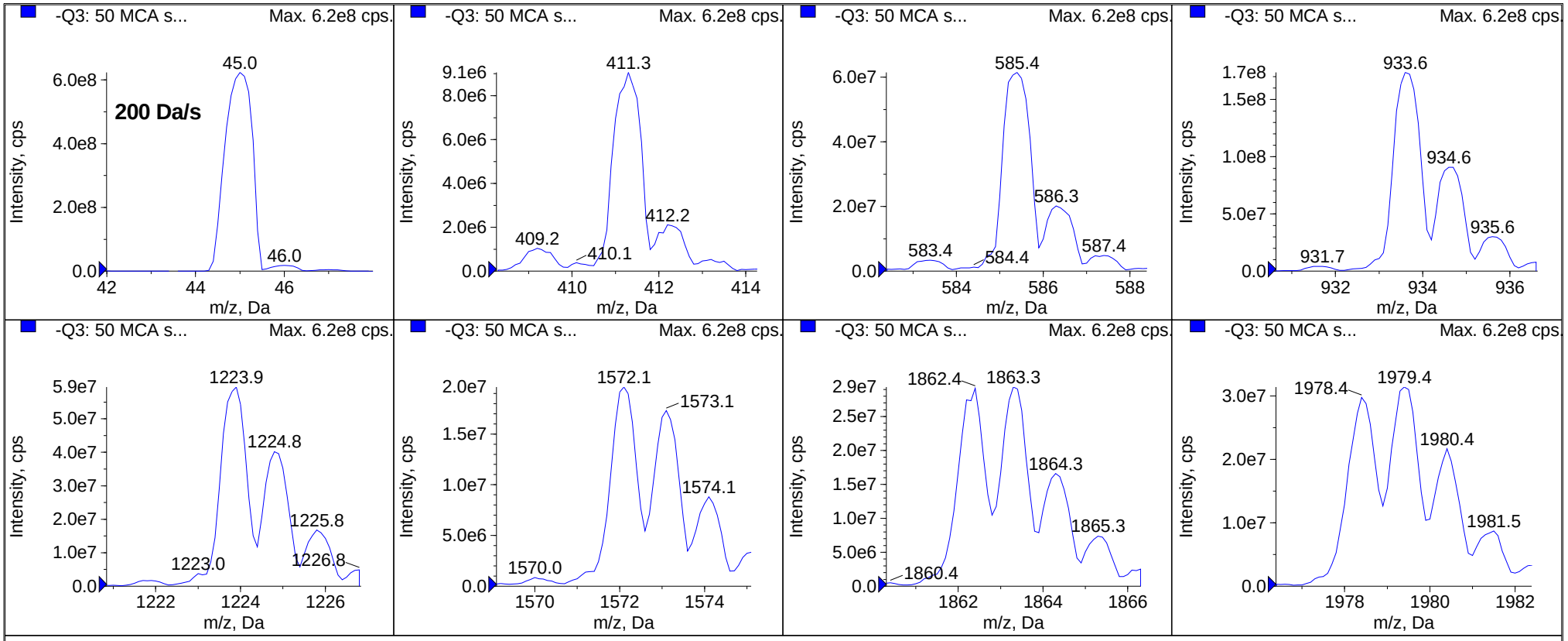
Peak List for " -Q3: 10 MCA scans from Sample 1 (TuneSampleID) of MT20221116170027.wiff (Turbo Spray)"

	Target Mass (Da)	Found At (Da)	Intensity (cps)	Width (Da)	Mass Shift (Da)
1	44.9980	44.9974	1.1953e8	0.6925	5.5971e-4
2	411.2590	411.2452	1.8556e6	0.6980	0.0138
3	585.3850	585.3893	1.2643e7	0.6583	-4.3435e-3
4	933.6360	933.6347	3.6437e7	0.6824	1.2567e-3
5	1223.8450	1223.8480	1.2082e7	0.6775	-3.0170e-3
6	1572.0970	1572.0943	4.2161e6	0.6847	2.6867e-3
7	1863.3060	1863.3177	5.1736e6	0.6938	-0.0117
8	1979.3890	1979.3845	4.3999e6	0.6895	4.5348e-3

*Post-PM
*FSAS: Lynne Russell

Acq. Time: 17:05
Acq. Date: Wednesday, November 16, 2022

Analyst Version: 1.7.0
*SN: EB250231807



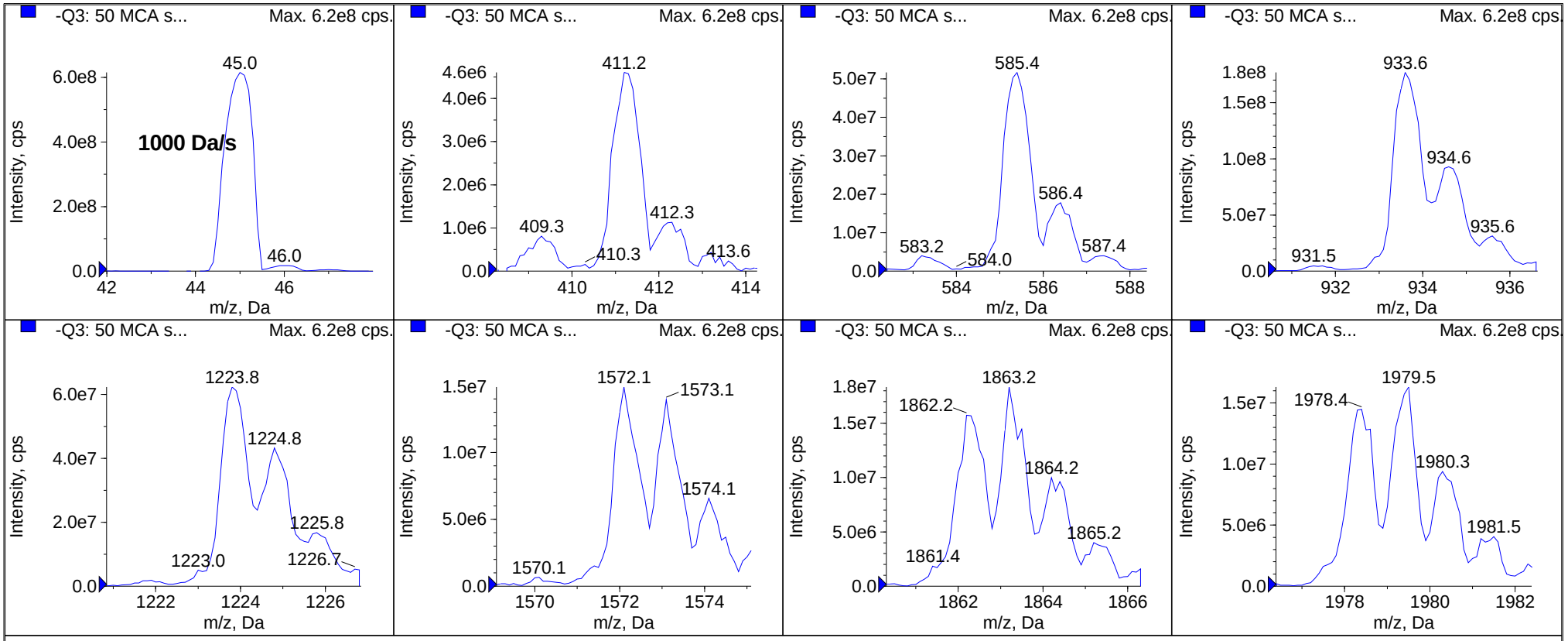
Peak List for " -Q3: 50 MCA scans from Sample 1 (TuneSampleID) of MT20221116170517.wiff (Turbo Spray)"

	Target Mass (Da)	Found At (Da)	Intensity (cps)	Width (Da)	Mass Shift (Da)
1	44.9980	44.9940	6.2328e8	0.7326	4.0049e-3
2	411.2590	411.2800	9.0580e6	0.7479	-0.0210
3	585.3850	585.3854	6.1472e7	0.7153	-4.0019e-4
4	933.6360	933.6417	1.7363e8	0.6827	-5.7086e-3
5	1223.8450	1223.8428	5.9468e7	0.6733	2.1987e-3
6	1572.0970	1572.1027	1.9624e7	0.6819	-5.7117e-3
7	1863.3060	1863.3212	2.9340e7	0.7197	-0.0152
8	1979.3890	1979.4008	3.1384e7	0.7823	-0.0118

*Post-PM
*FSAS: Lynne Russell

Acq. Time: 17:11
Acq. Date: Wednesday, November 16, 2022

Analyst Version: 1.7.0
*SN: EB250231807



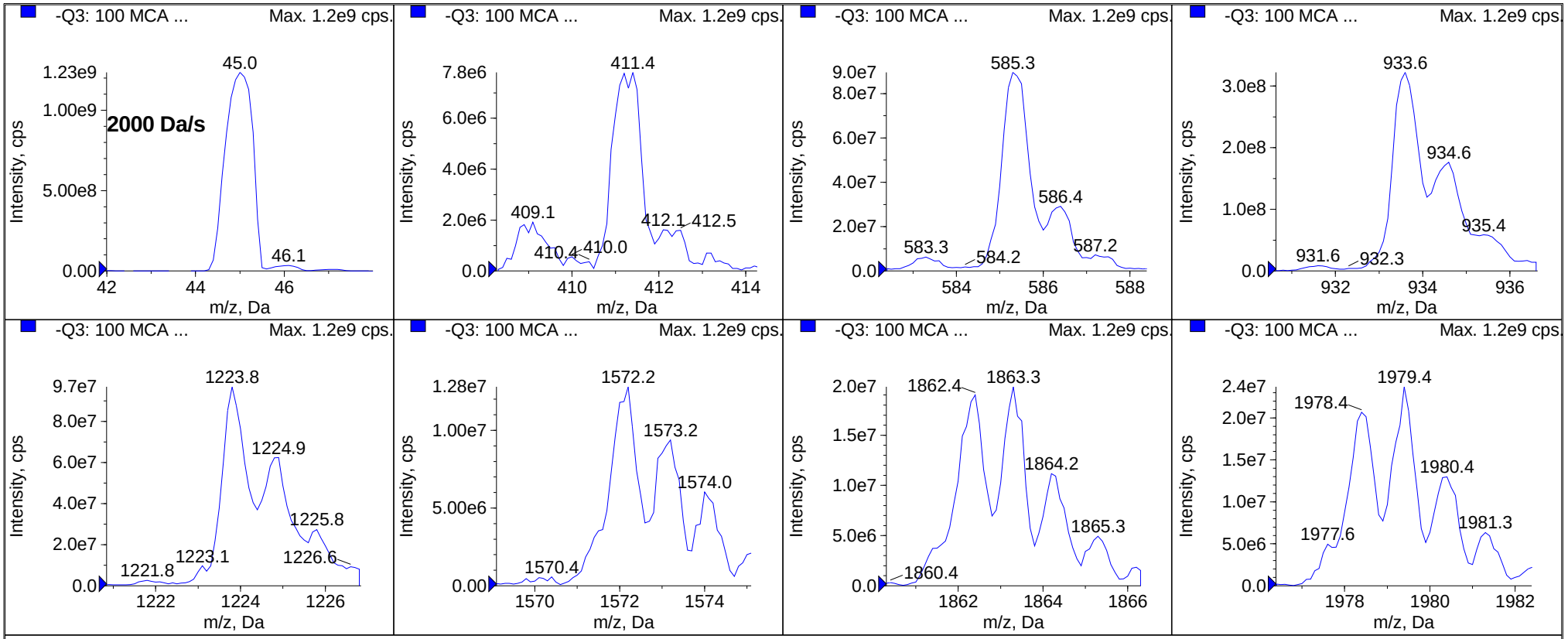
Peak List for " -Q3: 50 MCA scans from Sample 1 (TuneSampleID) of MT20221116171154.wiff (Turbo Spray)"

	Target Mass (Da)	Found At (Da)	Intensity (cps)	Width (Da)	Mass Shift (Da)
1	44.9980	44.9904	6.1512e8	0.7503	7.6433e-3
2	411.2590	411.2480	4.6000e6	0.7490	0.0110
3	585.3850	585.3788	5.1650e7	0.6907	6.1619e-3
4	933.6360	933.6371	1.7679e8	0.7084	-1.1015e-3
5	1223.8450	1223.8515	6.2350e7	0.7201	-6.5069e-3
6	1572.0970	1572.1379	1.4880e7	0.7071	-0.0409
7	1863.3060	1863.2978	1.8330e7	0.6723	8.1762e-3
8	1979.3890	1979.3906	1.6300e7	0.6689	-1.6478e-3

*Post-PM
*FSAS: Lynne Russell

Acq. Time: 17:13
Acq. Date: Wednesday, November 16, 2022

Analyst Version: 1.7.0
*SN: EB250231807



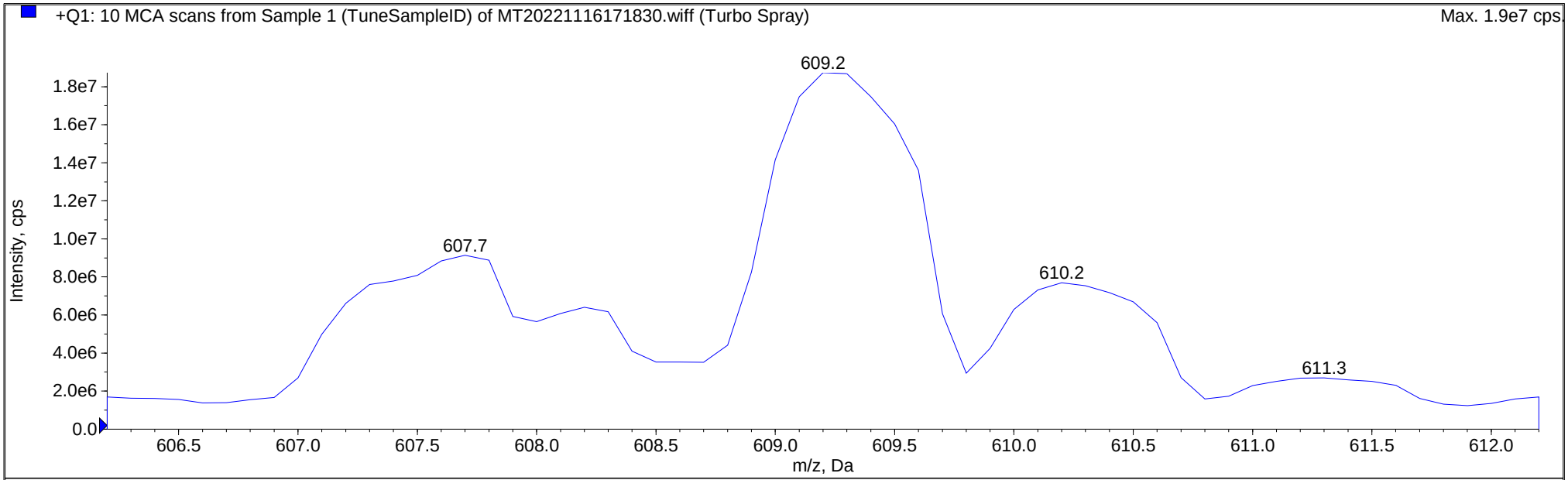
Peak List for " -Q3: 100 MCA scans from Sample 1 (TuneSampleID) of MT20221116171349.wiff (Turbo Spray)"

	Target Mass (Da)	Found At (Da)	Intensity (cps)	Width (Da)	Mass Shift (Da)
1	44.9980	45.0035	1.2344e9	0.7375	-5.5381e-3
2	411.2590	411.2575	7.8000e6	0.7518	1.4952e-3
3	585.3850	585.3505	8.9540e7	0.6698	0.0345
4	933.6360	933.6086	3.2202e8	0.6780	0.0274
5	1223.8450	1223.8390	9.6900e7	0.6463	6.0471e-3
6	1572.0970	1572.1101	1.2800e7	0.6972	-0.0131
7	1863.3060	1863.3045	1.9820e7	0.6124	1.5028e-3
8	1979.3890	1979.3792	2.3700e7	0.6444	9.8149e-3

*Post-PM
*FSAS: Lynne Russell

Acq. Time: 17:18
Acq. Date: Wednesday, November 16, 2022

Analyst Version: 1.7.0
*SN: EB250231807



Peak List for " +Q1: 10 MCA scans from Sample 1 (TuneSampleID) of MT20221116171830.wiff (Turbo Spray)"

	Target Mass (Da)	Found At (Da)	Intensity (cps)	Width (Da)	Mass Shift (Da)
1	174.1000	n/a	n/a	n/a	n/a
2	195.1000	n/a	n/a	n/a	n/a
3	397.2000	n/a	n/a	n/a	n/a
4	448.1000	n/a	n/a	n/a	n/a
5	609.2810	609.2886	1.8740e7	0.7372	-7.6115e-3

*Post-PM
*FSAS: Lynne Russell

Acq. Time: N/A
Acq. Date: N/A

Analyst Version: 1.7.0
*SN: EB250231807

State Parameter Editor

Ion Source: Turbo Spray
Ion Source Temperature Reached
Curtain Gas (CUR): 25.0
IonSpray Voltage (IS): 3500.0
Temperature (TEM): 0.0
Ion Source Gas 1 (GS1): 25.0
Ion Source Gas 2 (GS2): 0.0

Declustering Potential (DP): 100.0
Entrance Potential (EP): 10.0

Q1 Resolution: Unit
Ion Energy 1 (IE1): 1.0

Deflector (DF): -200.0

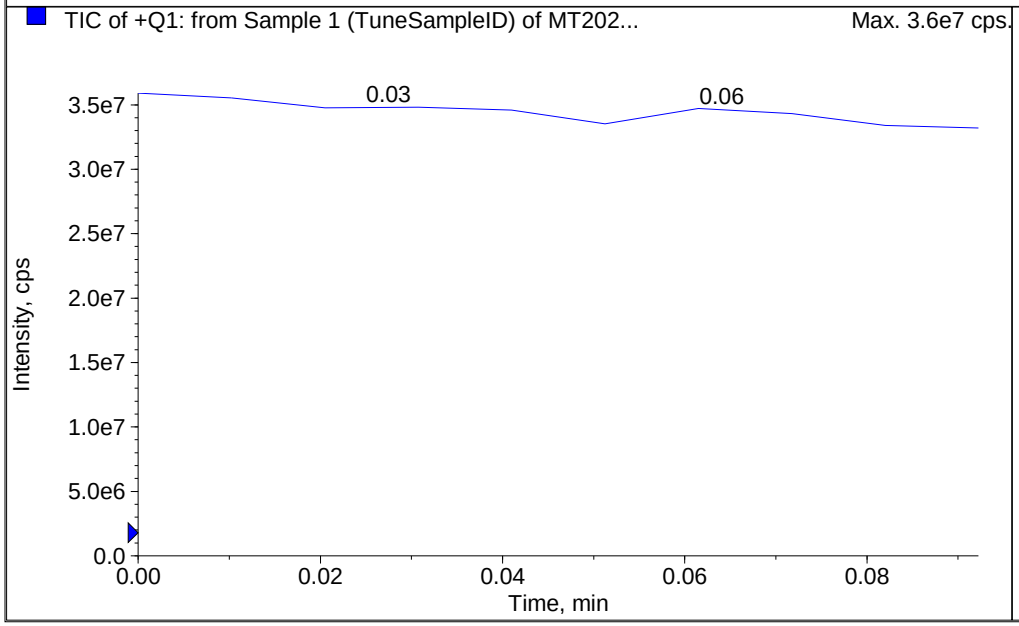
Mass Spectrometer Method Properties

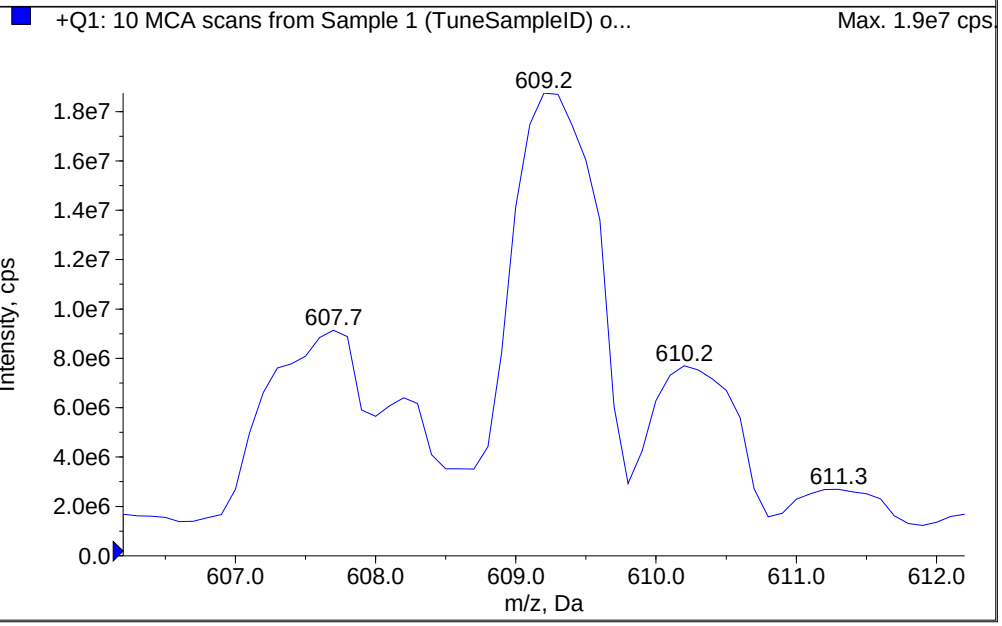
Period 1:

Scans in Period: 10
Relative Start Time: 0.00 msec
Scheduled Ionization: Off
Experiments in Period: 1

Period 1 Experiment 1:

Scan Type: Q1 MS (Q1)
Polarity: Positive
Scan Mode: Profile
Ion Source: Turbo Spray
Scans to Sum: 1

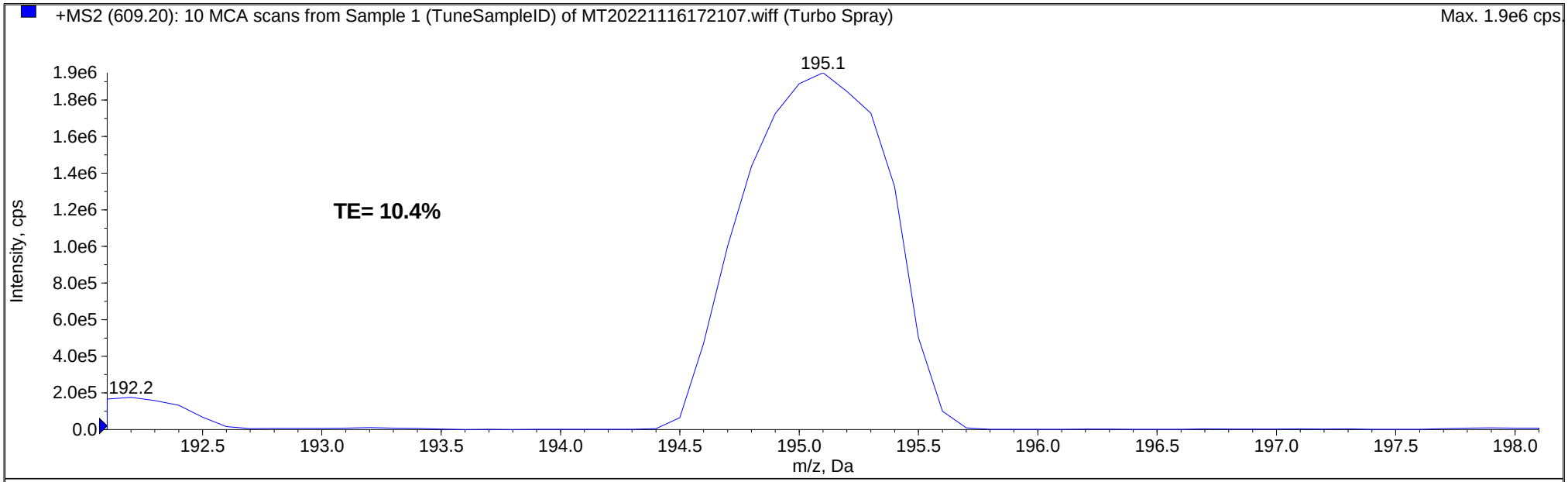




*Post-PM
*FSAS: Lynne Russell

Acq. Time: 17:21
Acq. Date: Wednesday, November 16, 2022

Analyst Version: 1.7.0
*SN: EB250231807



Peak List for " +MS2 (609.20): 10 MCA scans from Sample 1 (TuneSampleID) of MT20221116172107.wiff (Turbo Spray)"

	Target Mass (Da)	Found At (Da)	Intensity (cps)	Width (Da)	Mass Shift (Da)
1	174.1000	n/a	n/a	n/a	n/a
2	195.1000	195.0906	1.9490e6	0.7478	9.4093e-3
3	397.2000	n/a	n/a	n/a	n/a
4	448.1000	n/a	n/a	n/a	n/a
5	609.2810	n/a	n/a	n/a	n/a

*Post-PM
*FSAS: Lynne Russell

Pace Environmental Services, LLC
Analyte Quantitation Report

Data File: \\Organics\LL\LCMSMS01.i\090723B-nonDOD+ICAL.b\090723B013.d
Injection Date: 07-Sep-2023 17:08:37 Injection Vol: 10.0 uL
Sample Type: INSTBLK Auto Sampler: 80
Lab Sample ID: ID BLK A1 Lab Prep. Batch:
Sample Info: ID BLK A1 Misc. Info:
Inst. ID: LCMSMS01.i Operator: eqi.svoa

Method: LCMSMS01_PFAS-ID2 Version: V16 30-Jun-2022 10:54:24
Calib Method: PFAS-ID2 Lock State: Unlocked
Quant Method: IsoDil Integrator: picker

Matrix: Aqueous
Final Conc.: Amt * DF * CF
Concentration Formula: CF = (VF/1000) * 1/VI = 0.0040000

Name	Value	Units	Description
DF	1		Dilution Factor
VF	1000	ul	Final Volume
VI	250	ml	Initial Sample Volume

IsoDil Stds %Recovery = ((Area * DF)/Ical Mid Area) * 100

Reagent: Surrogates Conc. Level: Smp Vol. Added: 0.0200 ml

Signal	Quant Std	RT (Min)	Exp RT (Min)	c RT (Min)	Response	Peak Pts	S/N	Ion Ratio	Isomer Ratio	OnCol Conc ng/L	Final Conc ng/L	%Rec	Flags
D 46 13C4_PFBA CAS: SESI-0111													
217 > 172		1.642	1.645	0.000	2811548	17	>100:1			2000.00	2413.54	116	
8 Perfluoro-n-butanoic acid (PFBA) CAS: 375-22-4													
212.9 > 168.9	46	1.650	1.645	0.000	2814	12	2.4:1			1.9306	0.007723	< LOQ	
D 50 13C5_PFPeA CAS: SESI-0112													
267.9 > 223		1.955	1.950	0.000	2723515	17	>100:1			2000.00	2513.26	122	
21 Perfluoro-n-pentanoic acid (PFPeA) CAS: 2706-90-3													
262.9 > 218.9	50	1.962	1.950	0.000	6151	12	2.1:1			4.1432	0.01657	< LOQ	
D 44 13C3_PFBS CAS: SESI-0116													
302 > 80		1.994	1.997	0.000	956889	17	>100:1			2000.00	2357.99	116	
7 Perfluoro-1-butanesulfonate (PFBS) CAS: 375-73-5													U
298.9 > 80	44		1.997		ND								
22 Perfluoro-1-pentanesulfonic acid (PFPeS) CAS: 2706-91-4													U
349 > 80	44		2.309		ND								
D 63 13C2_4:2 FTS_2 CAS: SESI-0104													
329 >81		2.240	2.243	0.000	610863	16	>100:1			10000	12049	129	
1 Fluorotelomer sulfonate 4:2 [1H,1H,2H,2H-perfluorohexane sulfonate] (4:2 FTS) CAS: 757124-72-4													U
327 > 307	63		2.243		ND								
D 49 13C5_PFHxA CAS: SESI-0113													
318 > 273		2.277	2.281	0.000	2301776	17	>100:1			2000.00	2354.06	116	
15 Perfluoro-n-hexanoic acid (PFHxA) CAS: 307-24-4													U
313 > 269	49		2.281		ND								
D 66 13C3_GenX CAS: SESI-0121													
287 > 185		2.389	2.393	0.000	1554981	17	>100:1			10000	11989	121	
28 Hexafluoropropylene oxide dimer acid (GenX) CAS: 13252-13-6													U
285 > 119	66		2.393		ND								
D 47 13C4_PFHpA CAS: SESI-0114													
367 > 322		2.648	2.652	0.000	2874200	19	>100:1			2000.00	2390.86	116	
13 Perfluoro-n-heptanoic acid (PFHpA) CAS: 375-85-9													U
363 > 319	47		2.652		ND								
D 45 13C3_PFHxS CAS: SESI-0096													
402 > 80		2.665	2.669	0.000	917194	17	>100:1			2000.00	2344.03	110	

Signal	Quant Std	RT (Min)	Exp RT (Min)	c RT (Min)	Response	Peak Pts	S/N	Ion Ratio	Isomer Ratio	OnCol Conc ng/L	Final Conc ng/L	%Rec	Flags
14 Perfluorohexanesulfonate (PFHxS) CAS: 355-46-4													U
399 > 80	45		2.669		ND								
29 4,8-dioxa-3H-perfluorononanoic acid (ADONA) CAS: 919005-14-4													U
377 > 251	45		2.694		ND								
12 Perfluoro-1-heptanesulfonic acid (PFHpS) CAS: 375-92-8													U
449 > 80	45		3.092		ND								
D 64 13C2_6:2 FTS_2 CAS: SESI-0105													
429 > 81		3.053	3.048	0.000	719982	21	>100:1			10000	12763	127	
2 Fluorotelomer sulfonate 6:2 [1H,1H,2H,2H-perfluorooctane sulfonate] (6:2 FTS) CAS: 27619-97-2													U
427 > 407	64		3.057		ND								
D 53 13C8_PFOA CAS: SESI-0097													
421 > 376		3.079	3.083	0.000	2765028	21	>100:1			2000.00	2522.60	121	
20 Perfluoro-n-octanoic acid (PFOA) CAS: 335-67-1													U
413 > 369	53		3.083		ND								
D 56 13C9_PFNA CAS: SESI-0099													
472 > 427		3.567	3.564	0.000	2776055	23	>100:1			2000.00	2548.44	134	
17 Perfluoro-n-nonanoic acid (PFNA) CAS: 375-95-1													U
463 > 419	56		3.564		ND								
D 54 13C8_PFOS CAS: SESI-0098													
507 > 80		3.559	3.564	0.000	839347	24	>100:1			2000.00	2412.19	119	
18 Perfluorooctanesulfonate (PFOS) CAS: 1763-23-1													U
499 > 80	54		3.564		ND								
30 9-chlorohexadecafluoro-3-oxanone-1-sulfonic acid (9Cl-PF3ONS) CAS: 756426-58-1													U
531 > 351	54		3.852		ND								
16 Perfluoro-1-nonanesulfonic acid (PFNS) CAS: 68259-12-1													U
549 > 80	54		4.044		ND								
9 Perfluoro-1-decanesulfonic acid (PFDS) CAS: 335-77-3													U
599 > 80	54		4.486		ND								
31 11-chloroeicosafluoro-3-oxaundecane-1-sulfonic acid (11Cl-PF3OUdS) CAS: 763051-92-9													U
631 > 451	54		4.724		ND								
34 Perfluorododecanesulfonic acid (PFDOS) CAS: 79780-39-5													U
699 > 80	54		5.250		ND								
D 55 13C8_PFOSA CAS: SESI-0107													
506 > 78		4.013	4.019	0.000	1562687	22	>100:1			2000.00	2498.17	135	
19 Perfluoro-1-octanesulfonamide (PFOSA) CAS: 754-91-6													U
498 > 78	55		4.010		ND								
D 65 13C2_8:2 FTS_2 CAS: SESI-0106													
529 > 81		4.029	4.036	0.000	1216169	22	>100:1			10000	24516	243*	
3 Fluorotelomer sulfonate 8:2 [1H,1H,2H,2H-perfluorodecane sulfonate] (8:2 FTS) CAS: 39108-34-4													U
527 > 507	65		4.027		ND								
4 1H,1H,2H,2H-perfluorododecane sulfonate (10:2FTS) CAS: 120226-60-0													U
627 > 607	65		4.918		ND								
D 51 13C6_PFDA CAS: SESI-0115													
519 > 474		4.046	4.052	0.000	2874372	23	>100:1			2000.00	2859.29	136	
10 Perfluoro-n-decanoic acid (PFDA) CAS: 335-76-2													U
513 > 469	51		4.052		ND								
D 58 d3-MeFOSAA CAS: SESI-0102													
573 > 419		4.267	4.265	0.000	4816572	24	>100:1			10000	20692	213*	
6 N-methylperfluoro-1-octanesulfonamidoacetic acid (N-MeFOSAA) CAS: 2355-31-9													U
570 > 419	58		4.273		ND								
D 60 d5-EtFOSAA CAS: SESI-0110													
589 > 419		4.496	4.494	0.000	4932328	22	>100:1			10000	24773	255*	
5 N-ethylperfluoro-1-octanesulfonamidoacetic acid (N-EtFOSAA) CAS: 2991-50-6													U
584 > 419	60		4.503		ND								
D 52 13C7_PFUdA CAS: SESI-0117													
570 > 525		4.496	4.503	0.000	2792910	23	>100:1			2000.00	3167.37	158*	
25 Perfluoro-n-undecanoic acid (PFUdA) CAS: 2058-94-8													U
563 > 519	52		4.503		ND								

Signal	Quant Std	RT (Min)	Exp RT (Min)	c RT (Min)	Response	Peak Pts	S/N	Ion Ratio	Isomer Ratio	OnCol Conc ng/L	Final Conc ng/L	%Rec	Flags
D 61 d7-MeFOSE CAS: SESI-0129													
623 > 59		4.674	4.681	0.000	583496	25	>100:1			2000.00	2866.63	154*	
32 2-N-methylperfluoro-1-octanesulfonamido-ethanol (MeFOSE) CAS: 24448-09-7													U
616 > 59	61		4.698		ND								
D 57 d3-MeFOSA CAS: SESI-0109													
515 > 169		4.699	4.706	0.000	212203	28	>100:1			2000.00	2666.79	148	
26 N-methylperfluoro-1-octanesulfonamide (MeFOSA) CAS: 31506-32-8													U
512 > 169	57		4.706		ND								
D 38 13C2_PFDoA CAS: SESI-0118													
615 > 570		4.911	4.910	0.000	2752439	21	>100:1			2000.00	3242.62	159*	
11 Perfluoro-n-dodecanoic acid (PFDoA) CAS: 307-55-1													U
613 > 569	38		4.910		ND								
24 Perfluoro-n-tridecanoic acid (PFTrDA) CAS: 72629-94-8													U
663 > 619	38		5.277		ND								
D 62 d9-EtFOSE CAS: SESI-0130													
639 > 59		4.927	4.934	0.000	616702	22	>100:1			2000.00	3217.63	162*	
33 2-N-ethylperfluoro-1-octanesulfonamido-ethanol (EtFOSE) CAS: 1691-99-2													U
630 > 59	62		4.950		ND								
D 59 d5-EtFOSA CAS: SESI-0108													
531 > 169		4.959	4.966	0.000	195217	20	>100:1			2000.00	2578.55	142	
27 N-ethylperfluoro-1-octanesulfonamide (EtFOSA) CAS: 4151-50-2													U
526 > 169	59		4.974		ND								
D 42 13C2_PFTeDA CAS: SESI-0119													
715 > 670		5.610	5.610	0.000	2651092	23	>100:1			2000.00	2988.46	148	
23 Perfluoro-n-tetradecanoic acid (PFTeDA) CAS: 376-06-7													
713 > 669	42	5.610	5.610	0.000	4502	12	13:1	Target = 8.40		3.5063	0.01403	< LOQ	
713 > 169	42	5.610	5.610		764	13	13:1	5.89 (4.20-12.60)					
D 40 13C2_PFHxDA CAS: SESI-0103													
815 > 770		6.182	6.182	0.000	1129969	22	>100:1			2000.00	2300.78	125	
35 Perfluoro-n-hexadecanoic acid (PFHxDA) CAS: 67905-19-5													
813 > 769	40	6.174	6.182	0.000	3622	16	4.7:1	Target = 12.45		4.4980	0.01799	< LOQ	J
813 > 269	40	6.190	6.182		621	31	15:1	5.83 (6.22-18.67)*					J
36 Perfluoro-n-octadecanoic acid (PFODA) CAS: 16517-11-6													U
913 > 869	40		6.680		ND								
*** 37 13C2_PFDA**													
515 > 470		3.958	4.060	0.000	155	13	>100:1			0			
*** 39 13C2_PFHxA CAS: SESI-0120**													
315 > 270		2.277	2.271	0.000	1141	17	13:1			0			
*** 41 13C2_PFOA CAS: 864071-08-9**													U
415 > 370			3.074		ND								
*** 43 13C3_PFBA**													
216 > 172		1.642	1.645	0.000	21438	22	76:1			0			
*** 48 13C4_PFOS CAS: 2795-39-3**													
503 > 80		3.544	3.549	0.000	11337	23	31:1			0			

Compound Type Legend

D - Isotopic Dilution Std.
* - ISTD

QC Flag Legend

U - Result Less Than Method Detection Limit
J - Compound Fails Signal Ratio Limit

EIS %R > UCL
no qual on QC samples

Pace Environmental Services, LLC
Analyte Quantitation Report

Data File: \\Organics\LL\LCMSMS01.i\091223-nonDOD.b\091223012.d
Injection Date: 12-Sep-2023 17:10:21 Injection Vol: 10.0 uL
Sample Type: INSTBLK Auto Sampler: 96
Lab Sample ID: IBLK B1 Lab Prep. Batch:
Sample Info: IBLK B1 Misc. Info:
Inst. ID: LCMSMS01.i Operator: eqi.svoa

Method: LCMSMS01_PFAS-ID2 Version: V16 30-Jun-2022 10:54:24
Calib Method: PFAS-ID2 Lock State: Unlocked
Quant Method: IsoDil Integrator: picker

Matrix: Soil
Final Conc.: Amt * DF * CF
Concentration Formula: CF = (VF/WI) * 1/1000 * 1/1000 = 0.0010000

Associated with analysis of PB 84416 MB and LCS only, no eval

Name	Value	Units	Description
DF	1		Dilution Factor
VF	1000	ul	Final Volume
WI	1	g	Initial Sample Weight

IsoDil Stds %Recovery = ((Area * DF)/Opening CCV Area) * 100

Reagent: Surrogates Conc. Level: Smp Vol. Added: 0.0200 ml

Signal	Quant Std	RT (Min)	Exp RT (Min)	c RT (Min)	Response	Peak Pts	S/N	Ion Ratio	Isomer Ratio	OnCol Conc ng/L	Final Conc ug/Kg	%Rec	Flags
D 46 13C4_PFBA CAS: SESI-0111													
217 > 172		1.645	1.642	0.000	2360246	16	>100:1			2000.00	2313.43	108.8	
8 Perfluoro-n-butanoic acid (PFBA) CAS: 375-22-4													
212.9 > 168.9	46	1.645	1.642	0.000	4864	16	3.3:1			4.0046	0.004005		
D 50 13C5_PFPeA CAS: SESI-0112													
267.9 > 223		1.958	1.955	0.000	2273314	17	>100:1			2000.00	2339.69	106.6	
21 Perfluoro-n-pentanoic acid (PFPeA) CAS: 2706-90-3													U
262.9 > 218.9	50		1.962		ND								
D 44 13C3_PFBS CAS: SESI-0116													
302 > 80		2.005	2.001	0.000	869826	17	>100:1			2000.00	2365.62	104.8	
7 Perfluoro-1-butanesulfonate (PFBS) CAS: 375-73-5													U
298.9 > 80	44		2.001		ND								
22 Perfluoro-1-pentanesulfonic acid (PFPeS) CAS: 2706-91-4													U
349 > 80	44		2.314		ND								
D 63 13C2_4:2 FTS_2 CAS: SESI-0104													
329 >81		2.253	2.249	0.000	483121	16	>100:1			10000	9890.43	100.8	
1 Fluorotelomer sulfonate 4:2 [1H,1H,2H,2H-perfluorohexane sulfonate] (4:2 FTS) CAS: 757124-72-4													U
327 > 307	63		2.249		ND								
D 49 13C5_PFHxA CAS: SESI-0113													
318 > 273		2.291	2.286	0.000	2072052	16	>100:1			2000.00	2351.68	106.2	
15 Perfluoro-n-hexanoic acid (PFHxA) CAS: 307-24-4													U
313 > 269	49		2.286		ND								
D 66 13C3_GenX CAS: SESI-0121													
287 > 185		2.403	2.398	0.000	1874912	17	>100:1			10000	15247	119.5	
28 Hexafluoropropylene oxide dimer acid (GenX) CAS: 13252-13-6													U
285 > 119	66		2.408		ND								
D 47 13C4_PFHpA CAS: SESI-0114													
367 > 322		2.670	2.664	0.000	2649319	19	>100:1			2000.00	2415.88	105.3	
13 Perfluoro-n-heptanoic acid (PFHpA) CAS: 375-85-9													U
363 > 319	47		2.664		ND								
D 45 13C3_PFHxS CAS: SESI-0096													
402 > 80		2.686	2.681	0.000	832491	18	>100:1			2000.00	2344.17	108.5	

Signal	Quant Std	RT (Min)	Exp RT (Min)	c RT (Min)	Response	Peak Pts	S/N	Ion Ratio	Isomer Ratio	OnCol Conc ng/L	Final Conc ug/Kg	%Rec	Flags
14 Perfluorohexanesulfonate (PFHxS) CAS: 355-46-4													U
399 > 80	45		2.681		ND								
29 4,8-dioxa-3H-perfluorononanoic acid (ADONA) CAS: 919005-14-4													U
377 > 251	45		2.706		ND								
12 Perfluoro-1-heptanesulfonic acid (PFHpS) CAS: 375-92-8													U
449 > 80	45		3.114		ND								
D 64 13C2_6:2 FTS_2 CAS: SESI-0105													
429 > 81		3.084	3.070	0.000	564739	20	>100:1			10000	10691	103.3	
2 Fluorotelomer sulfonate 6:2 [1H,1H,2H,2H-perfluorooctane sulfonate] (6:2 FTS) CAS: 27619-97-2													U
427 > 407	64		3.079		ND								
D 53 13C8_PFOA CAS: SESI-0097													
421 > 376		3.110	3.105	0.000	2348354	21	>100:1			2000.00	2376.98	109.9	
20 Perfluoro-n-octanoic acid (PFOA) CAS: 335-67-1													U
413 > 369	53		3.105		ND								
D 54 13C8_PFOS CAS: SESI-0098													
507 > 80		3.596	3.590	0.000	774138	22	>100:1			2000.00	2517.06	106.5	
18 Perfluorooctanesulfonate (PFOS) CAS: 1763-23-1													U
499 > 80	54		3.590		ND								
30 9-chlorohexadecafluoro-3-oxanone-1-sulfonic acid (9Cl-PF3ONS) CAS: 756426-58-1													U
531 > 351	54		3.878		ND								
16 Perfluoro-1-nonanesulfonic acid (PFNS) CAS: 68259-12-1													U
549 > 80	54		4.069		ND								
9 Perfluoro-1-decanesulfonic acid (PFDS) CAS: 335-77-3													U
599 > 80	54		4.513		ND								
31 11-chloroeicosafluoro-3-oxaundecane-1-sulfonic acid (11Cl-PF3OUdS) CAS: 763051-92-9													U
631 > 451	54		4.750		ND								
34 Perfluorododecanesulfonic acid (PFDOS) CAS: 79780-39-5													U
699 > 80	54		5.278		ND								
D 56 13C9_PFNA CAS: SESI-0099													
472 > 427		3.596	3.590	0.000	2244873	22	>100:1			2000.00	2356.66	111.7	
17 Perfluoro-n-nonanoic acid (PFNA) CAS: 375-95-1													U
463 > 419	56		3.590		ND								
D 55 13C8_PFOSA CAS: SESI-0107													
506 > 78		4.052	4.046	0.000	1357297	21	>100:1			2000.00	2521.75	105.6	
19 Perfluoro-1-octanesulfonamide (PFOSA) CAS: 754-91-6													U
498 > 78	55		4.046		ND								
D 65 13C2_8:2 FTS_2 CAS: SESI-0106													
529 > 81		4.068	4.054	0.000	510952	29	>100:1			10000	11712	100.6	
3 Fluorotelomer sulfonate 8:2 [1H,1H,2H,2H-perfluorodecane sulfonate] (8:2 FTS) CAS: 39108-34-4													U
527 > 507	65		4.054		ND								
4 1H,1H,2H,2H-perfluorododecane sulfonate (10:2FTS) CAS: 120226-60-0													U
627 > 607	65		4.943		ND								
D 51 13C6_PFDA CAS: SESI-0115													
519 > 474		4.083	4.077	0.000	2221970	21	>100:1			2000.00	2495.31	113.5	
10 Perfluoro-n-decanoic acid (PFDA) CAS: 335-76-2													U
513 > 469	51		4.077		ND								
D 58 d3-MeFOSAA CAS: SESI-0102													
573 > 419		4.299	4.292	0.000	2464891	22	>100:1			10000	11425	102.3	
6 N-methylperfluoro-1-octanesulfonamidoacetic acid (N-MeFOSAA) CAS: 2355-31-9													U
570 > 419	58		4.300		ND								
D 60 d5-EtFOSAA CAS: SESI-0110													
589 > 419		4.528	4.521	0.000	2198818	22	>100:1			10000	11914	105.5	
5 N-ethylperfluoro-1-octanesulfonamidoacetic acid (N-EtFOSAA) CAS: 2991-50-6													U
584 > 419	60		4.529		ND								
D 52 13C7_PFUdA CAS: SESI-0117													
570 > 525		4.536	4.529	0.000	1977444	22	>100:1			2000.00	2465.77	110.2	
25 Perfluoro-n-undecanoic acid (PFUdA) CAS: 2058-94-8													U
563 > 519	52		4.529		ND								

Signal	Quant Std	RT (Min)	Exp RT (Min)	c RT (Min)	Response	Peak Pts	S/N	Ion Ratio	Isomer Ratio	OnCol Conc ng/L	Final Conc ug/Kg	%Rec	Flags
D 61 d7-MeFOSE CAS: SESI-0129													
623 > 59		4.706	4.708	0.000	478218	23	>100:1			2000.00	2825.16	106.8	
32 2-N-methylperfluoro-1-octanesulfonamido-ethanol (MeFOSE) CAS: 24448-09-7													U
616 > 59	61		4.716		ND								
D 57 d3-MeFOSA CAS: SESI-0109													
515 > 169		4.732	4.725	0.000	179368	26	>100:1			2000.00	2564.23	114.3	
26 N-methylperfluoro-1-octanesulfonamide (MeFOSA) CAS: 31506-32-8													U
512 > 169	57		4.733		ND								
D 62 d9-EtFOSE CAS: SESI-0130													
639 > 59		4.958	4.959	0.000	445727	21	>100:1			2000.00	2756.75	100.2	
33 2-N-ethylperfluoro-1-octanesulfonamido-ethanol (EtFOSE) CAS: 1691-99-2													U
630 > 59	62		4.983		ND								
D 38 13C2_PFDoA CAS: SESI-0118													
615 > 570		4.942	4.935	0.000	1795948	21	>100:1			2000.00	2330.01	101.9	
11 Perfluoro-n-dodecanoic acid (PFDoA) CAS: 307-55-1													U
613 > 569	38		4.943		ND								
24 Perfluoro-n-tridecanoic acid (PFTrDA) CAS: 72629-94-8													U
663 > 619	38		5.314		ND								
D 59 d5-EtFOSA CAS: SESI-0108													
531 > 169		4.990	4.983	0.000	174005	23	>100:1			2000.00	2600.29	106.3	
27 N-ethylperfluoro-1-octanesulfonamide (EtFOSA) CAS: 4151-50-2													U
526 > 169	59		5.006		ND								
D 42 13C2_PFTeDA CAS: SESI-0119													
715 > 670		5.638	5.638	0.000	2119325	22	>100:1			2000.00	2655.04	111.8	
23 Perfluoro-n-tetradecanoic acid (PFTeDA) CAS: 376-06-7													
713 > 669	42	5.645	5.638	0.000	6814	17	16:1	Target = 8.26		6.5543	0.006554		
713 > 169	42	5.638	5.638		858	14	9.6:1	7.94 (4.13-12.39)					
D 40 13C2_PFHxDA CAS: SESI-0103													
815 > 770		6.213	6.213	0.000	1111993	22	>100:1			2000.00	2355.74	106.8	
35 Perfluoro-n-hexadecanoic acid (PFHxDA) CAS: 67905-19-5													
813 > 769	40	6.213	6.213	0.000	4737	16	13:1	Target = 12.21		6.1293	0.006129		J
813 > 269	40	6.205	6.213		77	5	4.6:1	61.51 (6.10-18.32)*					J
36 Perfluoro-n-octadecanoic acid (PFODA) CAS: 16517-11-6													U
913 > 869	40		6.715		ND								
*** 37 13C2_PFDA**													U
515 > 470			4.084		ND								
*** 39 13C2_PFHxA CAS: SESI-0120**													
315 > 270		2.300	2.286	0.000	304	14	5.3:1			0			
*** 41 13C2_PFOA CAS: 864071-08-9**													U
415 > 370			3.070		ND								
*** 43 13C3_PFBA**													
216 > 172		1.645	1.642	0.000	23046	23	64:1			0			
*** 48 13C4_PFOS CAS: 2795-39-3**													
503 > 80		3.596	3.590	0.000	5283	19	18:1			0			

Compound Type Legend

D - Isotopic Dilution Std.
* - ISTD

QC Flag Legend

U - Result Less Than Method Detection Limit
J - Compound Fails Signal Ratio Limit

Pace Environmental Services, LLC
Analyte Quantitation Report

Data File: \\Organics\LL\LCMSMS02.i\091323-nonDOD+ICAL.b\091323021.d
Injection Date: 13-Sep-2023 17:51:47 Injection Vol: 10.0 uL
Sample Type: INSTBLK Auto Sampler: 82
Lab Sample ID: ID IBLK B1 Lab Prep. Batch:
Sample Info: ID IBLK B1 Misc. Info:
Inst. ID: LCMSMS02.i Operator: eqi.svoa

Method: LCMSMS02_PFAS-ID2 Version: V16 30-Jun-2022 10:54:24
Calib Method: PFAS-ID2 Lock State: Unlocked
Quant Method: IsoDil Integrator: picker

Matrix: Aqueous
Final Conc.: Amt * DF * CF
Concentration Formula: CF = (VF/1000) * 1/VI = 0.0040000

Name	Value	Units	Description
DF	1		Dilution Factor
VF	1000	ul	Final Volume
VI	250	ml	Initial Sample Volume

IsoDil Stds %Recovery = ((Area * DF)/Ical Mid Area) * 100

Reagent: Surrogates Conc. Level: Smp Vol. Added: 0.0200 ml

Signal	Quant Std	RT (Min)	Exp RT (Min)	c RT (Min)	Response	Peak Pts	S/N	Ion Ratio	Isomer Ratio	OnCol Conc ng/L	Final Conc ng/L	%Rec	Flags
D 46 13C4_PFBA CAS: SESI-0111													
217 > 172		1.642	1.642	0.000	1746734	22	>100:1			2000.00	2040.79	94	
8 Perfluoro-n-butanoic acid (PFBA) CAS: 375-22-4													U
212.9 > 168.9	46		1.642		ND								
D 50 13C5_PFPeA CAS: SESI-0112													
267.9 > 223		1.973	1.974	0.000	1892228	20	>100:1			2000.00	2069.34	98	
21 Perfluoro-n-pentanoic acid (PFPeA) CAS: 2706-90-3													U
262.9 > 218.9	50		1.974		ND								
D 44 13C3_PFBS CAS: SESI-0116													
302 > 80		2.023	2.023	0.000	668105	19	>100:1			2000.00	2062.43	98	
7 Perfluoro-1-butanesulfonate (PFBS) CAS: 375-73-5													U
298.9 > 80	44		2.023		ND								
22 Perfluoro-1-pentanesulfonic acid (PFPeS) CAS: 2706-91-4													U
349 > 80	44		2.338		ND								
D 63 13C2_4:2 FTS_2 CAS: SESI-0104													
329 >81		2.268	2.268	0.000	312871	18	>100:1			10000	10017	96	
1 Fluorotelomer sulfonate 4:2 [1H,1H,2H,2H-perfluorohexane sulfonate] (4:2 FTS) CAS: 757124-72-4													U
327 > 307	63		2.278		ND								
D 49 13C5_PFHxA CAS: SESI-0113													
318 > 273		2.298	2.308	0.000	2082993	18	>100:1			2000.00	2069.19	99	
15 Perfluoro-n-hexanoic acid (PFHxA) CAS: 307-24-4													U
313 > 269	49		2.318		ND								
D 66 13C3_GenX CAS: SESI-0121													
287 > 185		2.418	2.428	0.000	2950565	20	>100:1			10000	9837.27	92	
28 Hexafluoropropylene oxide dimer acid (GenX) CAS: 13252-13-6													U
285 > 119	66		2.428		ND								
D 47 13C4_PFHpA CAS: SESI-0114													
367 > 322		2.678	2.696	0.000	2223768	20	>100:1			2000.00	2197.78	96	
13 Perfluoro-n-heptanoic acid (PFHpA) CAS: 375-85-9													U
363 > 319	47		2.696		ND								
D 45 13C3_PFHxS CAS: SESI-0096													
402 > 80		2.696	2.714	0.000	483642	20	>100:1			2000.00	2166.68	105	

Signal	Quant Std	RT (Min)	Exp RT (Min)	c RT (Min)	Response	Peak Pts	S/N	Ion Ratio	Isomer Ratio	OnCol Conc ng/L	Final Conc ng/L	%Rec	Flags
14 Perfluorohexanesulfonate (PFHxS) CAS: 355-46-4													U
399 > 80	45		2.714		ND								
29 4,8-dioxa-3H-perfluorononanoic acid (ADONA) CAS: 919005-14-4													U
377 > 251	45		2.741		ND								
12 Perfluoro-1-heptanesulfonic acid (PFHpS) CAS: 375-92-8													U
449 > 80	45		3.158		ND								
D 64 13C2_6:2 FTS_2 CAS: SESI-0105													
429 > 81		3.091	3.111	0.000	352819	21	>100:1			10000	10281	102	
2 Fluorotelomer sulfonate 6:2 [1H,1H,2H,2H-perfluorooctane sulfonate] (6:2 FTS) CAS: 27619-97-2													U
427 > 407	64		3.111		ND								
D 53 13C8_PFOA CAS: SESI-0097													
421 > 376		3.130	3.149	0.000	2047508	22	>100:1			2000.00	1992.31	87	
20 Perfluoro-n-octanoic acid (PFOA) CAS: 335-67-1													U
413 > 369	53		3.149		ND								
D 56 13C9_PFNA CAS: SESI-0099													
472 > 427		3.620	3.637	0.000	2126270	25	>100:1			2000.00	2056.06	98	
17 Perfluoro-n-nonanoic acid (PFNA) CAS: 375-95-1													U
463 > 419	56		3.645		ND								
D 54 13C8_PFOS CAS: SESI-0098													
507 > 80		3.620	3.645	0.000	414302	23	>100:1			2000.00	1881.56	97	
18 Perfluorooctanesulfonate (PFOS) CAS: 1763-23-1													U
499 > 80	54		3.645		ND								
30 9-chlorohexadecafluoro-3-oxanone-1-sulfonic acid (9Cl-PF3ONS) CAS: 756426-58-1													U
531 > 351	54		3.942		ND								
16 Perfluoro-1-nonanesulfonic acid (PFNS) CAS: 68259-12-1													U
549 > 80	54		4.118		ND								
9 Perfluoro-1-decanesulfonic acid (PFDS) CAS: 335-77-3													U
599 > 80	54		4.561		ND								
31 11-chloroeicosafluoro-3-oxaundecane-1-sulfonic acid (11Cl-PF3OUdS) CAS: 763051-92-9													U
631 > 451	54		4.813		ND								
34 Perfluorododecanesulfonic acid (PFDOS) CAS: 79780-39-5													U
699 > 80	54		5.333		ND								
D 55 13C8_PFOSA CAS: SESI-0107													
506 > 78		4.059	4.085	0.000	770340	21	>100:1			2000.00	1911.71	95	
19 Perfluoro-1-octanesulfonamide (PFOSA) CAS: 754-91-6													U
498 > 78	55		4.077		ND								
D 65 13C2_8:2 FTS_2 CAS: SESI-0106													
529 > 81		4.102	4.110	0.000	273776	29	>100:1			10000	10420	105	
3 Fluorotelomer sulfonate 8:2 [1H,1H,2H,2H-perfluorodecane sulfonate] (8:2 FTS) CAS: 39108-34-4													U
527 > 507	65		4.118		ND								
4 1H,1H,2H,2H-perfluorododecane sulfonate (10:2FTS) CAS: 120226-60-0													U
627 > 607	65		4.999		ND								
D 51 13C6_PFDA CAS: SESI-0115													
519 > 474		4.110	4.127	0.000	1931471	22	>100:1			2000.00	2168.86	100	
10 Perfluoro-n-decanoic acid (PFDA) CAS: 335-76-2													U
513 > 469	51		4.135		ND								
D 58 d3-MeFOSAA CAS: SESI-0102													
573 > 419		4.327	4.346	0.000	1966840	22	>100:1			10000	10083	103	
6 N-methylperfluoro-1-octanesulfonamidoacetic acid (N-MeFOSAA) CAS: 2355-31-9													U
570 > 419	58		4.346		ND								
D 60 d5-EtFOSAA CAS: SESI-0110													
589 > 419		4.560	4.569	0.000	1717301	20	>100:1			10000	9744.43	95	
5 N-ethylperfluoro-1-octanesulfonamidoacetic acid (N-EtFOSAA) CAS: 2991-50-6													U
584 > 419	60		4.588		ND								
D 52 13C7_PFUdA CAS: SESI-0117													
570 > 525		4.569	4.588	0.000	1959405	19	>100:1			2000.00	2196.88	103	
25 Perfluoro-n-undecanoic acid (PFUdA) CAS: 2058-94-8													U
563 > 519	52		4.578		ND								

Signal	Quant Std	RT (Min)	Exp RT (Min)	c RT (Min)	Response	Peak Pts	S/N	Ion Ratio	Isomer Ratio	OnCol Conc ng/L	Final Conc ng/L	%Rec	Flags
D 61 d7-MeFOSE CAS: SESI-0129													
623 > 59		4.710	4.729	0.000	221578	18	>100:1			2000.00	1874.15	88	
32 2-N-methylperfluoro-1-octanesulfonamido-ethanol (MeFOSE) CAS: 24448-09-7													U
616 > 59	61		4.748		ND								
D 57 d3-MeFOSA CAS: SESI-0109													
515 > 169		4.729	4.757	0.000	133300	18	>100:1			2000.00	2170.16	111	
26 N-methylperfluoro-1-octanesulfonamide (MeFOSA) CAS: 31506-32-8													U
512 > 169	57		4.757		ND								
D 62 d9-EtFOSE CAS: SESI-0130													
639 > 59		4.971	4.989	0.000	232876	21	>100:1			2000.00	2003.21	96	
33 2-N-ethylperfluoro-1-octanesulfonamido-ethanol (EtFOSE) CAS: 1691-99-2													U
630 > 59	62		4.999		ND								
D 38 13C2_PFDoA CAS: SESI-0118													
615 > 570		4.980	4.989	0.000	1841173	21	>100:1			2000.00	2104.84	99	
11 Perfluoro-n-dodecanoic acid (PFDoA) CAS: 307-55-1													U
613 > 569	38		4.989		ND								
24 Perfluoro-n-tridecanoic acid (PFTrDA) CAS: 72629-94-8													U
663 > 619	38		5.360		ND								
D 59 d5-EtFOSA CAS: SESI-0108													
531 > 169		4.999	5.016	0.000	110231	25	>100:1			2000.00	1909.89	91	
27 N-ethylperfluoro-1-octanesulfonamide (EtFOSA) CAS: 4151-50-2													U
526 > 169	59		5.025		ND								
D 42 13C2_PFTeDA CAS: SESI-0119													
715 > 670		5.690	5.700	0.000	2397469	19	>100:1			2000.00	2659.32	126	
23 Perfluoro-n-tetradecanoic acid (PFTeDA) CAS: 376-06-7													U
713 > 669	42		5.700		ND								
D 40 13C2_PFHxDA CAS: SESI-0103													
815 > 770		6.262	6.268	0.000	1691575	25	>100:1			2000.00	2196.67	110	
35 Perfluoro-n-hexadecanoic acid (PFHxDA) CAS: 67905-19-5													U
813 > 769	40		6.268		ND								
36 Perfluoro-n-octadecanoic acid (PFODA) CAS: 16517-11-6													U
913 > 869	40		6.775		ND								
*** 37 13C2_PFDA**													U
515 > 470			4.151		ND								
*** 39 13C2_PFHxA CAS: SESI-0120**													
315 > 270		2.308	2.308	0.000	791	19	4.1:1			0			
*** 41 13C2_PFOA CAS: 864071-08-9**													U
415 > 370			2.950		ND								
*** 43 13C3_PFBA**													
216 > 172		1.650	1.642	0.000	9078	19	34:1			0			
*** 48 13C4_PFOS CAS: 2795-39-3**													
503 > 80		3.620	3.629	0.000	5945	22	19:1			0			

Compound Type Legend

D - Isotopic Dilution Std.
* - ISTD

QC Flag Legend

U - Result Less Than Method Detection Limit



PFAS by LC/MS/MS - MB

Sample ID: YQ83966-001
Batch: 83966
Analytical Method: PFAS by ID SOP

Matrix: Aqueous
Prep Method: SOP SPE
Prep Date: 09/03/2023 1816

Parameter	Result	Q	Dil	LOQ	Units	Analysis Date
9Cl-PF3ONS	ND		1	8.0	ng/L	09/07/2023 1750
11Cl-PF3OUdS	ND		1	8.0	ng/L	09/07/2023 1750
8:2 FTS	ND		1	8.0	ng/L	09/07/2023 1750
6:2 FTS	ND		1	8.0	ng/L	09/07/2023 1750
4:2 FTS	ND		1	8.0	ng/L	09/07/2023 1750
GenX	ND		1	8.0	ng/L	09/07/2023 1750
ADONA	ND		1	8.0	ng/L	09/07/2023 1750
EtFOSAA	ND		1	8.0	ng/L	09/07/2023 1750
MeFOSAA	ND		1	8.0	ng/L	09/07/2023 1750
PFBS	ND		1	4.0	ng/L	09/07/2023 1750
PFDS	ND		1	4.0	ng/L	09/07/2023 1750
PFHpS	ND		1	4.0	ng/L	09/07/2023 1750
PFNS	ND		1	4.0	ng/L	09/07/2023 1750
PFOSA	ND		1	4.0	ng/L	09/07/2023 1750
PFPeS	ND		1	4.0	ng/L	09/07/2023 1750
PFHxS	ND		1	4.0	ng/L	09/07/2023 1750
PFBA	ND		1	4.0	ng/L	09/07/2023 1750
PFDA	ND		1	4.0	ng/L	09/07/2023 1750
PFDoA	ND		1	4.0	ng/L	09/07/2023 1750
PFHpA	ND		1	4.0	ng/L	09/07/2023 1750
PFHxA	ND		1	4.0	ng/L	09/07/2023 1750
PFNA	ND		1	4.0	ng/L	09/07/2023 1750
PFOA	ND		1	4.0	ng/L	09/07/2023 1750
PFPeA	ND		1	4.0	ng/L	09/07/2023 1750
PFTeDA	ND		1	4.0	ng/L	09/07/2023 1750
PFTrDA	ND		1	4.0	ng/L	09/07/2023 1750
PFUdA	ND		1	4.0	ng/L	09/07/2023 1750
PFOS	ND		1	4.0	ng/L	09/07/2023 1750

Surrogate	Q	% Rec	Acceptance Limit
13C2_4:2FTS		112	50-150
13C2_6:2FTS		109	50-150
13C2_8:2FTS		103	50-150
13C2_PFDoA		100	50-150
13C2_PFTeDA		97	50-150
13C3_PFBS		107	50-150
13C3_PFHxS		100	50-150
13C3-HFPO-DA		114	50-150
13C4_PFBA		104	50-150
13C4_PFHpA		103	50-150
13C5_PFHxA		112	50-150
13C5_PFPeA		110	50-150

LOQ = Limit of Quantitation
ND = Not detected at or above the LOQ
N = Recovery is out of criteria
P = The RPD between two GC columns exceeds 40%
* = RSD is out of criteria
+ = RPD is out of criteria

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

PFAS by LC/MS/MS - MB

Sample ID: YQ83966-001
Batch: 83966
Analytical Method: PFAS by ID SOP

Matrix: Aqueous
Prep Method: SOP SPE
Prep Date: 09/03/2023 1816

Surrogate	Q	% Rec	Acceptance Limit
13C6_PFDA		104	50-150
13C7_PFUdA		106	50-150
13C8_PFOA		107	50-150
13C8_PFOS		100	50-150
13C8_PFOSA		109	50-150
13C9_PFNA		115	50-150
d5-EtFOSAA		107	50-150
d3-MeFOSAA		97	50-150

LOQ = Limit of Quantitation

ND = Not detected at or above the LOQ

N = Recovery is out of criteria

P = The RPD between two GC columns exceeds 40%

* = RSD is out of criteria

+ = RPD is out of criteria

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

PFAS by LC/MS/MS - MB

Sample ID: YQ84416-001
Batch: 84416
Analytical Method: PFAS by ID SOP

Matrix: Aqueous
Prep Method: SOP SPE
Prep Date: 09/10/2023 2003

Parameter	Result	Q	Dil	LOQ	Units	Analysis Date
9Cl-PF3ONS	ND		1	8.0	ng/L	09/12/2023 2145
11Cl-PF3OUdS	ND		1	8.0	ng/L	09/12/2023 2145
8:2 FTS	ND		1	8.0	ng/L	09/12/2023 2145
6:2 FTS	ND		1	8.0	ng/L	09/12/2023 2145
4:2 FTS	ND		1	8.0	ng/L	09/12/2023 2145
GenX	ND		1	8.0	ng/L	09/12/2023 2145
ADONA	ND		1	8.0	ng/L	09/12/2023 2145
EtFOSAA	ND		1	8.0	ng/L	09/12/2023 2145
MeFOSAA	ND		1	8.0	ng/L	09/12/2023 2145
PFBS	ND		1	4.0	ng/L	09/12/2023 2145
PFDS	ND		1	4.0	ng/L	09/12/2023 2145
PFHpS	ND		1	4.0	ng/L	09/12/2023 2145
PFNS	ND		1	4.0	ng/L	09/12/2023 2145
PFOSA	ND		1	4.0	ng/L	09/12/2023 2145
PFPeS	ND		1	4.0	ng/L	09/12/2023 2145
PFHxS	ND		1	4.0	ng/L	09/12/2023 2145
PFBA	ND		1	4.0	ng/L	09/12/2023 2145
PFDA	ND		1	4.0	ng/L	09/12/2023 2145
PFDoA	ND		1	4.0	ng/L	09/12/2023 2145
PFHpA	ND		1	4.0	ng/L	09/12/2023 2145
PFHxA	ND		1	4.0	ng/L	09/12/2023 2145
PFNA	ND		1	4.0	ng/L	09/12/2023 2145
PFOA	ND		1	4.0	ng/L	09/12/2023 2145
PFPeA	ND		1	4.0	ng/L	09/12/2023 2145
PFTeDA	ND		1	4.0	ng/L	09/12/2023 2145
PFTrDA	ND		1	4.0	ng/L	09/12/2023 2145
PFUdA	ND		1	4.0	ng/L	09/12/2023 2145
PFOS	ND		1	4.0	ng/L	09/12/2023 2145

Surrogate	Q	% Rec	Acceptance Limit
13C2_4:2FTS		102	50-150
13C2_6:2FTS		113	50-150
13C2_8:2FTS		96	50-150
13C2_PFDoA		91	50-150
13C2_PFTeDA		85	50-150
13C3_PFBS		97	50-150
13C3_PFHxS		102	50-150
13C3-HFPO-DA		103	50-150
13C4_PFBA		102	50-150
13C4_PFHpA		101	50-150
13C5_PFHxA		98	50-150
13C5_PFPeA		100	50-150

LOQ = Limit of Quantitation
ND = Not detected at or above the LOQ
N = Recovery is out of criteria
P = The RPD between two GC columns exceeds 40%
* = RSD is out of criteria
+ = RPD is out of criteria

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

PFAS by LC/MS/MS - MB

Sample ID: YQ84416-001
Batch: 84416
Analytical Method: PFAS by ID SOP

Matrix: Aqueous
Prep Method: SOP SPE
Prep Date: 09/10/2023 2003

Surrogate	Q	% Rec	Acceptance Limit
13C6_PFDA		94	50-150
13C7_PFUdA		100	50-150
13C8_PFOA		99	50-150
13C8_PFOS		96	50-150
13C8_PFOSA		97	50-150
13C9_PFNA		103	50-150
d5-EtFOSAA		96	50-150
d3-MeFOSAA		96	50-150



LOQ = Limit of Quantitation

ND = Not detected at or above the LOQ

N = Recovery is out of criteria

P = The RPD between two GC columns exceeds 40%

* = RSD is out of criteria

+ = RPD is out of criteria

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

Extract Dilution Preparations

DILUTION	1X	5X	10X	20X	50X	100X	200X
D8421-ID DILUTION PREP							
EXTRACT (µL)	ALIQUOT	200	100	50	100	50	25
SUR 1 (µL)	0	0	0	0	39.2	39.6	39.8
SUR 2 (µL)	0	0	0	0	39.2	39.6	39.8
1:1 H2O:MeOH w/ 0.1% Acetic Acid (µL)	0	800	900	950	4822	4871	4895
TOTAL (µL)	200	1000	1000	1000	5000	5000	5000
REFORTIFIED ID-AQ/ID-SOLID DILUTION PREP							
EXTRACT (µL)	ALIQUOT	200	100	50	20	10	5
ES-100ppb (µL)	0	16	18	19	19.6	19.8	19.9
MeOH (µL)	0	753	847	894	922	931	936
WATER (µL)	0	31	35	37	38.4	38.8	39
TOTAL (µL)	75	1000	1000	1000	1000	999.6	999.9
UNFORTIFIED ID-AQ/ID-SOLID DILUTION PREP							
EXTRACT (µL)	ALIQUOT	200	100	50	20	10	5
ES-100ppb (µL)	0	0	0	0	0	0	0
MeOH (µL)	0	768	864	912	941	950	955
WATER (µL)	0	32	36	38	39	40	40
TOTAL (µL)	75	1000	1000	1000	1000	1000	1000
In-vial 50X ID Screen							
In-vial 50X ID Screen		240µL 96%MeOH	+	5µL SUR 100ppb	+	5µL sample extract	
DAI DILUTION PREP							
SAMPLE (µL)	500	100	50	25	10	5	5
ES (µL)	25	25	25	25	25	25	50
MeOH (µL)	475	475	475	475	475	475	950
Water (µL)	0	400	450	475	490	495	995
TOTAL (µL)	1000	1000	1000	1000	1000	1000	2000
1633 DILUTION PREP							
EXTRACT (µL)	ALIQUOT	200	100	NA	NA	NA	NA
1% Amm.-MeOH (uL)	0	754	854	NA	NA	NA	NA
Water (µL)	0	40	40	NA	NA	NA	NA
Acetic Acid (µL)	0	6	6	NA	NA	NA	NA
TOTAL (µL)	75	1000	1000	NA	NA	NA	NA

NOTE: Serial dilution will be performed for dilutions higher than 200X.

Report Date: 11-Sep-2023 13:18:50 AIM Revision: 2.0.2023.0816

Pace Environmental Services, LLC

Batch Run Log Report

Batch: \\Organics\LL\LCMSMS01.i\090723B-nonDOD+ICAL.b

Method: LCMSMS01_PFAS-ID2.M Version: V16 30-Jun-2022 10:54:24

Instrument: LCMSMS01.i Integrator: picker

Cal Start Date: 07-Sep-2023 15:01:35 Cal End Date: 07-Sep-2023 16:26:20

Method Lock: Unknown Lock Date:

Calib Method: PFAS-ID2 No.Compounds: 66

ALS Vial	LIMS Sample ID	Injection Date/Time	Data File	Sample Type	Client Sample ID	Matrix/ Level	Dil Fact	Prep Batch	Primary Reagent	Conc Level	Vol. Added	Inst QC	Comments
71	ID ICAL L2_SVLC-2954	07-Sep-2023 15:01:35	090723B001.d	ICal					Analytes	L-2	1.00		
72	ID ICAL L3_SVLC-2955	07-Sep-2023 15:12:04	090723B002.d	ICal					Analytes	L-3	1.00		
73	ID ICAL L4_SVLC-2956	07-Sep-2023 15:22:34	090723B003.d	ICal					Analytes	L-4	1.00		
74	ID ICAL L5_SVLC-3024	07-Sep-2023 15:33:06	090723B004.d	ICal					Analytes	L-5	1.00		
75	ID ICAL L6_SVLC-2958	07-Sep-2023 15:43:43	090723B005.d	ICal					Analytes	L-6	1.00		
76	ID ICAL L7_SVLC-2959	07-Sep-2023 15:54:22	090723B006.d	ICal					Analytes	L-7	1.00		
77	ID ICAL L8_SVLC-2960	07-Sep-2023 16:05:00	090723B007.d	ICal					Analytes	L-8	1.00		
78	ID ICAL L9_SVLC-2961	07-Sep-2023 16:15:41	090723B008.d	ICal					Analytes	L-9	1.00		
79	ID ICAL L10_SVLC-2962	07-Sep-2023 16:26:20	090723B009.d	ICal					Analytes	L-10	1.00		
80	ID IBLK B1	07-Sep-2023 16:36:59	090723B010.d	InstBlk		Aqueous	1		Surrogates	Smp	0.0200		
81	ICV 1000_SVLC-3027	07-Sep-2023 16:47:41	090723B011.d	ICV					Analytes	ICV-43	2.00		
82	ISOMER CHECK_SVLC-2964	07-Sep-2023 16:58:09	090723B012.d	CheckStd					IsomerCheck	Smp	1.00		
80	ID BLK A1	07-Sep-2023 17:08:37	090723B013.d	InstBlk		Aqueous	1		Surrogates	Smp	0.0200		
83	SUR TEST_SVLC-3025	07-Sep-2023 17:19:18	090723B014.d	InstBlk		Aqueous	1		Surrogates	Smp	0.0200		
2	YQ83829-001	07-Sep-2023 17:29:49	090723B015.d	MBlk		Aqueous	1	83829	Surrogates	Smp	0.1000		
3	YQ83829-002	07-Sep-2023 17:40:21	090723B016.d	LCS		Aqueous	1	83829	Analytes	100x PDS	0.2000		
4	YQ83966-001	07-Sep-2023 17:50:56	090723B017.d	MBlk		Aqueous	1	83966	Surrogates	Smp	0.1000		
5	YQ83966-002	07-Sep-2023 18:01:29	090723B018.d	LCS		Aqueous	1	83966	Analytes	100x PDS	0.2000		
6	YH24014-004	07-Sep-2023 18:12:04	090723B019.d	Client	HS-MW-32D	Aqueous	1	83966	Surrogates	Smp	0.1000		NCM SUR HI ND
7	YH24014-010	07-Sep-2023 18:22:38	090723B020.d	Client	WV-MW-11D	Aqueous	1	83966	Surrogates	Smp	0.1000		
8	YH24014-010MS	07-Sep-2023 18:33:15	090723B021.d	MS		Aqueous	1	83966	Analytes	100x PDS	0.2000		
9	YH24014-010MD	07-Sep-2023 18:43:52	090723B022.d	MSD		Aqueous	1	83966	Analytes	100x PDS	0.2000		
10	YH24014-017	07-Sep-2023 18:54:29	090723B023.d	Client	WV-PMW-RI-106C	Aqueous	1	83966	Surrogates	Smp	0.1000		
11	YH24014-018	07-Sep-2023 19:05:08	090723B024.d	Client	WV-MW-11S-DUP	Aqueous	1	83966	Surrogates	Smp	0.1000		
12	YH31008-001	07-Sep-2023 19:15:41	090723B025.d	Client	HS-PMW-RI-106B	Aqueous	1	83966	Surrogates	Smp	0.1000		NCM SUR HI ND
13	YH31008-002	07-Sep-2023 19:26:13	090723B026.d	Client	HS-PMW-RI-106A	Aqueous	1	83966	Surrogates	Smp	0.1000		NCM SUR HI ND
14	YH31008-003	07-Sep-2023 19:36:48	090723B027.d	Client	HS-PMW-22	Aqueous	1	83966	Surrogates	Smp	0.1000		
15	YH31008-005	07-Sep-2023 19:47:24	090723B028.d	Client	WV-MW-4	Aqueous	1	83966	Surrogates	Smp	0.1000		
16	YH31008-006	07-Sep-2023 19:57:57	090723B029.d	Client	HS-PMW-RI-101A	Aqueous	1	83966	Surrogates	Smp	0.1000		NCM SUR HI ND
17	YH31008-007	07-Sep-2023 20:08:32	090723B030.d	Client	WV-PMW-RI-108	Aqueous	1	83966	Surrogates	Smp	0.1000		
18	CCV 1000_SVLC-3024	07-Sep-2023 20:19:08	090723B031.d	CCV					Analytes	L-5	1.00		
100	CCB C1	07-Sep-2023 20:29:43	090723B032.d	InstBlk		Aqueous	1		Surrogates	Smp	0.0200		
19	YH31008-008	07-Sep-2023 20:40:25	090723B033.d	Client	WV-PMW-RI-101B	Aqueous	1	83966	Surrogates	Smp	0.1000		
20	YH31008-010	07-Sep-2023 20:51:02	090723B034.d	Client	WV-MW-5S	Aqueous	1	83966	Surrogates	Smp	0.1000		
21	YH31008-011	07-Sep-2023 21:01:42	090723B035.d	Client	WV-MW-5D	Aqueous	1	83966	Surrogates	Smp	0.1000		
22	YH31008-012	07-Sep-2023 21:12:15	090723B036.d	Client	WV-PMW-RI-104B	Aqueous	1	83966	Surrogates	Smp	0.1000		
23	YI01015-001	07-Sep-2023 21:22:47	090723B037.d	Client	WV-MW-15C	Aqueous	1	83966	Surrogates	Smp	0.1000		
24	YI01015-002	07-Sep-2023 21:33:22	090723B038.d	Client	WV-MW-15D	Aqueous	1	83966	Surrogates	Smp	0.1000		
25	YI01015-003	07-Sep-2023 21:43:56	090723B039.d	Client	WV-MW-15B	Aqueous	1	83966	Surrogates	Smp	0.1000		
26	YI01015-004	07-Sep-2023 21:54:33	090723B040.d	Client	WV-MW-15A	Aqueous	1	83966	Surrogates	Smp	0.1000		
27	YI01015-005	07-Sep-2023 22:05:08	090723B041.d	Client	HS-PMW-RI-105A	Aqueous	1	83966	Surrogates	Smp	0.1000		
29	CCV 1000A_SVLC-3024	07-Sep-2023 22:26:22	090723B043.d	CCV					Analytes	L-5	1.00		
100	CCB C2	07-Sep-2023 22:36:58	090723B044.d	InstBlk		Aqueous	1		Surrogates	Smp	0.0200		
30	YQ84190-001	07-Sep-2023 22:47:42	090723B045.d	MBlk		Aqueous	1	84190	Surrogates	Smp	0.1000		

Report Date: 11-Sep-2023 13:18:50 AIM Revision: 2.0.2023.0816

Batch Path: \\Organics\LL\LCMSMS01.i\090723B-nonDOD+ICAL.b

ALS Vial	LIMS Sample ID	Injection Date/Time	Data File	Sample Type	Client Sample ID	Matrix/ Level	Dil Fact	Prep Batch	Primary Reagent	Conc Level	Vol. Added	Inst QC	Comments
31	YQ84190-002	07-Sep-2023 22:58:21	090723B046.d	LCS		Aqueous	1	84190	Analytes	100x PDS	0.2000		
32	YH18020-001	07-Sep-2023 23:08:54	090723B047.d	Client	Krelon Frac	Aqueous	1	84190	Surrogates	Smp	0.1000		NCM RX CNF RO
33	YH29012-001	07-Sep-2023 23:19:28	090723B048.d	Client	Outfall 001_082823	Aqueous	1	84190	Surrogates	Smp	0.1000		NCM SUR HI ND
34	YH29012-003	07-Sep-2023 23:30:05	090723B049.d	Client	North Intake_082823	Aqueous	1	84190	Surrogates	Smp	0.1000		NCM SUR HI ND
35	YH29013-001	07-Sep-2023 23:40:40	090723B050.d	Client	EB-01_082823	Aqueous	1	84190	Surrogates	Smp	0.1000		
36	YH29013-002	07-Sep-2023 23:51:17	090723B051.d	Client	MW-22-143_082823	Aqueous	1	84190	Surrogates	Smp	0.1000		NCM SUR HI ND
37	YH29013-005	08-Sep-2023 00:01:52	090723B052.d	Client	MW-22-144_082823	Aqueous	1	84190	Surrogates	Smp	0.1000		NCM SUR HI ND
38	YH29013-006	08-Sep-2023 00:12:30	090723B053.d	Client	MW-22-146_082823	Aqueous	1	84190	Surrogates	Smp	0.1000		NCM SUR HI ND
39	YH29013-007	08-Sep-2023 00:23:07	090723B054.d	Client	MW-22-160_082823	Aqueous	1	84190	Surrogates	Smp	0.1000		NCM SUR HI ND
40	YH29013-008	08-Sep-2023 00:33:44	090723B055.d	Client	Dup-02_082823	Aqueous	1	84190	Surrogates	Smp	0.1000		
41	YH29013-009	08-Sep-2023 00:44:24	090723B056.d	Client	Dup-01_082823	Aqueous	1	84190	Surrogates	Smp	0.1000		NCM SUR HI ND
42	CCV 1000C_SVLC-3024	08-Sep-2023 00:54:57	090723B057.d	CCV					Analytes	L-5	1.00		
100	CCB C3	08-Sep-2023 01:05:32	090723B058.d	InstBlk		Aqueous	1		Surrogates	Smp	0.0200		
43	YH29013-010	08-Sep-2023 01:16:13	090723B059.d	Client	MW-22-147_082823	Aqueous	1	84190	Surrogates	Smp	0.1000		NCM SUR HI ND
44	YH29013-011	08-Sep-2023 01:26:50	090723B060.d	Client	MW-22-148_082823	Aqueous	1	84190	Surrogates	Smp	0.1000		
45	YH29013-012	08-Sep-2023 01:37:26	090723B061.d	Client	MW-22-149_082823	Aqueous	1	84190	Surrogates	Smp	0.1000		
46	YH29013-013	08-Sep-2023 01:48:03	090723B062.d	Client	MW-22-150_082823	Aqueous	1	84190	Surrogates	Smp	0.1000		NCM SUR HI ND
47	YH29013-014	08-Sep-2023 01:58:39	090723B063.d	Client	MW-22-151_082823	Aqueous	1	84190	Surrogates	Smp	0.1000		NCM SUR HI ND
48	YH29013-015	08-Sep-2023 02:09:18	090723B064.d	Client	MW-22-152_082823	Aqueous	1	84190	Surrogates	Smp	0.1000		NCM SUR HI ND
49	YH29013-016	08-Sep-2023 02:19:55	090723B065.d	Client	EB-02_082823	Aqueous	1	84190	Surrogates	Smp	0.1000		
50	YH31005-001	08-Sep-2023 02:30:33	090723B066.d	Client	ResInf_083023	Aqueous	1	84190	Surrogates	Smp	0.1000		
51	YH31005-002	08-Sep-2023 02:41:11	090723B067.d	Client	Train1Mid_083023	Aqueous	1	84190	Surrogates	Smp	0.1000		
52	YH31005-002MS	08-Sep-2023 02:51:45	090723B068.d	MS		Aqueous	1	84190	Analytes	100x PDS	0.2000		
53	YH31012-001	08-Sep-2023 03:02:21	090723B069.d	Client	TW-1	Aqueous	1	84190	Surrogates	Smp	0.1000		NCM SUR MTX
54	YH31012-001DU	08-Sep-2023 03:12:59	090723B070.d	Client		Aqueous	1	84190	Surrogates	Smp	0.1000		
55	CCV 1000D_SVLC-3024	08-Sep-2023 03:23:34	090723B071.d	CCV					Analytes	L-5	1.00		
100	CCB C4	08-Sep-2023 03:34:12	090723B072.d	InstBlk		Aqueous	1		Surrogates	Smp	0.0200		EIS HI ND

10 field samples analyzed between CCVs



Report Date: 11-Sep-2023 13:42:48 AIM Revision: 2.0.2023.0816

Pace Environmental Services, LLC

Batch Run Log Report

Batch:	\\Organics\LL\LCMSMS01.i\090923-nonDOD+ICAL.b		
Method:	LCMSMS01_PFAS-ID2.M	Version: V16	30-Jun-2022 10:54:24
Instrument:	LCMSMS01.i	Integrator:	picker
Cal Start Date:	09-Sep-2023 14:10:05	Cal End Date:	09-Sep-2023 15:34:42
Method Lock:	Unknown	Lock Date:	
Calib Method:	PFAS-ID2	No.Compounds:	66

ALS Vial	LIMS Sample ID	Injection Date/Time	Data File	Sample Type	Client Sample ID	Matrix/ Level	Dil Fact	Prep Batch	Primary Reagent	Conc Level	Vol. Added	Inst QC	Comments
1	ID ICAL L2_SVLC-2954	09-Sep-2023 14:10:05	090923011.d	ICal					Analytes	L-2	1.00		
2	ID ICAL L3_SVLC-2955	09-Sep-2023 14:20:38	090923012.d	ICal					Analytes	L-3	1.00		
3	ID ICAL L4_SVLC-2956	09-Sep-2023 14:31:10	090923013.d	ICal					Analytes	L-4	1.00		
4	ID ICAL L5_SVLC-3024	09-Sep-2023 14:41:44	090923014.d	ICal					Analytes	L-5	1.00		
5	ID ICAL L6_SVLC-2958	09-Sep-2023 14:52:17	090923015.d	ICal					Analytes	L-6	1.00		
6	ID ICAL L7_SVLC-2959	09-Sep-2023 15:02:52	090923016.d	ICal					Analytes	L-7	1.00		
7	ID ICAL L8_SVLC-2960	09-Sep-2023 15:13:27	090923017.d	ICal					Analytes	L-8	1.00		
8	ID ICAL L9_SVLC-2961	09-Sep-2023 15:24:05	090923018.d	ICal					Analytes	L-9	1.00		
9	ID ICAL L10_SVLC-2962	09-Sep-2023 15:34:42	090923019.d	ICal					Analytes	L-10	1.00		
93	ID BLK A6 SUR-3048	09-Sep-2023 15:45:20	090923020.d	InstBlk		Aqueous	1		Surrogates	Smp	0.0200		EMPTY VIAL
10	ICV 1000_SVLC-3035	09-Sep-2023 15:55:52	090923021.d	ICV					Analytes	ICV-43	1.00		
94	ID BLK A6 SUR-3048	09-Sep-2023 16:06:32	090923022.d	InstBlk		Aqueous	1		Surrogates	Smp	0.0200		
9	ID L10_SVLC-2962	09-Sep-2023 16:17:33	090923023.d	Client		Aqueous	1		Analytes	L-10	1.00		
94	ID BLK A6 SUR-3048	09-Sep-2023 16:28:12	090923024.d	InstBlk		Aqueous	1		Surrogates	Smp	0.0200		
11	ISOMER CHECK_SVLC-2964	09-Sep-2023 16:38:44	090923025.d	CheckStd					IsomerCheck	Smp	1.00	Yes	
12	ID IBLK B1 SUR-3048	09-Sep-2023 16:49:17	090923026.d	InstBlk		Aqueous	1		Surrogates	Smp	0.0200		
14	YH29008-001	09-Sep-2023 17:10:25	090923028.d	Client	SCE-W-T3 Pipe	Soil	50R	84189	Surrogates	Smp	0.1000		
15	YH29008-002	09-Sep-2023 17:20:59	090923029.d	Client	SCE-W-T4 Pipe	Soil	1	84189	Surrogates	Smp	0.1000		NCM SUR HI ND, EIS HI DET, EIS LO
16	YI06035-001	09-Sep-2023 17:31:33	090923030.d	Client	MW-4	Aqueous	5U	84293	Surrogates	Smp	0.1000		
17	YI06035-002	09-Sep-2023 17:42:08	090923031.d	Client	MW-5	Aqueous	5U	84293	Surrogates	Smp	0.1000		
18	YI06035-003	09-Sep-2023 17:52:44	090923032.d	Client	MW-6	Aqueous	5U	84293	Surrogates	Smp	0.1000		
19	YI06039-001	09-Sep-2023 18:03:20	090923033.d	Client	AVIVID RAW	Aqueous	20U	84293	Surrogates	Smp	0.1000		NCM SUR MTX
20	YI06039-002	09-Sep-2023 18:13:58	090923034.d	Client	AVIVID POST EL	Aqueous	20U	84293	Surrogates	Smp	0.1000		NCM SUR MTX
21	YI06039-003	09-Sep-2023 18:24:36	090923035.d	Client	AVIVID +IX	Aqueous	10U	84293	Surrogates	Smp	0.1000		NCM SUR HI ND
23	CCV 1000A_SVLC-3024	09-Sep-2023 18:45:43	090923037.d	CCV					Analytes	L-5	1.00		
100	CCB C1	09-Sep-2023 18:56:18	090923038.d	InstBlk		Aqueous	1		Surrogates	Smp	0.0200		
71	BLK SUR TEST SVLC-3050	09-Sep-2023 20:10:37	090923045.d	InstBlk		Aqueous	1		Surrogates	Smp	0.0200		

Associated with analysis of PB 84416 MB and LCS only

Report Date: 14-Sep-2023 11:30:04 AIM Revision: 2.0.2023.0606

Pace Environmental Services, LLC

Batch Run Log Report

Batch:	\\Organics\LL\LCMSMS01.i\091223-nonDOD.b		
Method:	LCMSMS01_PFAS-ID2.M	Version: V16	30-Jun-2022 10:54:24
Instrument:	LCMSMS01.i	Integrator:	picker
Cal Start Date:	09-Sep-2023 14:10:05	Cal End Date:	09-Sep-2023 15:34:42
Method Lock:	Unknown	Lock Date:	
Calib Method:	PFAS-ID2	No.Compounds:	66

ALS Vial	LIMS Sample ID	Injection Date/Time	Data File	Sample Type	Client Sample ID	Matrix/ Level	Dil Fact	Prep Batch	Primary Reagent	Conc Level	Vol. Added	Inst QC	Comments
95	CCV 200_SVLC-2955	12-Sep-2023 16:59:48	091223011.d	CCV					Analytes	L-3	1.00		
96	IBLK B1	12-Sep-2023 17:10:21	091223012.d	InstBlk		Soil	1		Surrogates	Smp	0.0200		NE, only associated w/ MB/LCS
13	CCV 1000A_SVLC-3024	12-Sep-2023 19:27:51	091223025.d	CCV					Analytes	L-5	1.00		
100	CCB C1	12-Sep-2023 19:38:26	091223026.d	InstBlk		Aqueous	1		Surrogates	Smp	0.0200		
25	YQ84416-001	12-Sep-2023 21:45:35	091223038.d	MBlk		Aqueous	1	84416	Surrogates	Smp	0.1000		
26	YQ84416-002	12-Sep-2023 21:56:12	091223039.d	LCS		Aqueous	1	84416	Analytes	100x PDS	0.2000		
28	CCV 1000B_SVLC-3024	12-Sep-2023 22:17:24	091223041.d	CCV					Analytes	L-5	1.00		
100	CCB C2	12-Sep-2023 22:28:00	091223042.d	InstBlk		Aqueous	1		Surrogates	Smp	0.0200		



Report Date: 14-Sep-2023 12:06:30 AIM Revision: 2.0.2023.0816

Pace Environmental Services, LLC

Batch Run Log Report

Batch: \\Organics\LL\LCMSMS02.i\091323-nonDOD+ICAL.b

Method: LCMSMS02_PFAS-ID2.M Version: V16 30-Jun-2022 10:54:24

Instrument: LCMSMS02.i Integrator: picker

Cal Start Date: 13-Sep-2023 15:40:01 Cal End Date: 13-Sep-2023 17:07:56

Method Lock: Unknown Lock Date:

Calib Method: PFAS-ID2 No.Compounds: 66

ALS Vial	LIMS Sample ID	Injection Date/Time	Data File	Sample Type	Client Sample ID	Matrix/ Level	Dil Fact	Prep Batch	Primary Reagent	Conc Level	Vol. Added	Inst QC	Comments
71	ICAL 100_SVLC-2954	13-Sep-2023 15:40:01	091323009.d	ICal					Analytes	L-2	1.00		
72	ICAL 200_SVLC-2966	13-Sep-2023 15:50:57	091323010.d	ICal					Analytes	L-3	1.00		
73	ICAL 500_SVLC-2956	13-Sep-2023 16:01:48	091323011.d	ICal					Analytes	L-4	1.00		
74	ICAL 1000_SVLC-3024	13-Sep-2023 16:12:41	091323012.d	ICal					Analytes	L-5	1.00		
75	ICAL 2000_SVLC-2958	13-Sep-2023 16:23:46	091323013.d	ICal					Analytes	L-6	1.00		
76	ICAL 5000_SVLC-2967	13-Sep-2023 16:34:48	091323014.d	ICal					Analytes	L-7	1.00		
77	ICAL 10000_SVLC-2960	13-Sep-2023 16:45:52	091323015.d	ICal					Analytes	L-8	1.00		
78	ICAL 15000_SVLC-2961	13-Sep-2023 16:56:54	091323016.d	ICal					Analytes	L-9	1.00		
79	ICAL 20000_SVLC-2962	13-Sep-2023 17:07:56	091323017.d	ICal					Analytes	L-10	1.00		
94	ID BLK A4	13-Sep-2023 17:18:58	091323018.d	InstBlk		Aqueous	1		Surrogates	Smp	0.0200		
80	ICV_SVLC-3035	13-Sep-2023 17:29:56	091323019.d	ICV					Analytes	ICV-43	1.00		
81	ISOMER_SVLC-2964	13-Sep-2023 17:40:58	091323020.d	CheckStd					IsomerCheck	Smp	1.00	Yes	
82	ID IBLK B1	13-Sep-2023 17:51:47	091323021.d	InstBlk		Aqueous	1		Surrogates	Smp	0.0200		
4	YI01015-006	13-Sep-2023 18:35:27	091323025.d	Client	HS-PMW-RI-105B	Aqueous	1	84416	Surrogates	Smp	0.1000		NCM SUR HI ND
5	YI01015-007	13-Sep-2023 18:46:27	091323026.d	Client	WV-PMW-RI-105B	Aqueous	1	84416	Surrogates	Smp	0.1000		
6	YH31008-004	13-Sep-2023 18:57:26	091323027.d	Client	HS-PMW-RI-101B	Aqueous	1	84416	Surrogates	Smp	0.1000		
7	YH31008-009	13-Sep-2023 19:08:23	091323028.d	Client	WV-PMW-RI-101A	Aqueous	1	84416	Surrogates	Smp	0.1000		
8	YH31008-013	13-Sep-2023 19:19:22	091323029.d	Client	WV-PMW-RI-104A	Aqueous	1	84416	Surrogates	Smp	0.1000		
9	YI01015-008	13-Sep-2023 19:30:25	091323030.d	Client	WV-PMW-RI-105A	Aqueous	1	84416	Surrogates	Smp	0.1000		
10	YI01015-009	13-Sep-2023 19:41:27	091323031.d	Client	FB/8/31-MKM	Aqueous	1	84416	Surrogates	Smp	0.1000		
11	CCV 1000A_SVLC-3024	13-Sep-2023 19:52:28	091323032.d	CCV					Analytes	L-5	1.00		
100	CCB C1	13-Sep-2023 20:03:24	091323033.d	InstBlk		Aqueous	1		Surrogates	Smp	0.0200		
12	YI01015-010	13-Sep-2023 20:14:26	091323034.d	Client	FB/8/31-JMS	Aqueous	1	84416	Surrogates	Smp	0.1000		
13	YI01015-011	13-Sep-2023 20:25:22	091323035.d	Client	FB/8/31-BPT	Aqueous	1	84416	Surrogates	Smp	0.1000		
14	YI01015-012	13-Sep-2023 20:36:21	091323036.d	Client	FB/8/31-JET	Aqueous	1	84416	Surrogates	Smp	0.1000		
15	YI01015-013	13-Sep-2023 20:47:17	091323037.d	Client	EQB-WLM	Aqueous	1	84416	Surrogates	Smp	0.1000		
16	YI01015-014	13-Sep-2023 20:58:15	091323038.d	Client	EB-MM	Aqueous	1	84416	Surrogates	Smp	0.1000		
17	YI01015-015	13-Sep-2023 21:09:14	091323039.d	Client	EB-BP	Aqueous	1	84416	Surrogates	Smp	0.1000		
18	YI01015-016	13-Sep-2023 21:20:12	091323040.d	Client	WV-PMW-RI-107	Aqueous	1	84416	Surrogates	Smp	0.1000		
22	CCV 1000B_SVLC-3024	13-Sep-2023 22:04:08	091323044.d	CCV					Analytes	L-5	1.00		
100	CCB C2	13-Sep-2023 22:15:04	091323045.d	InstBlk		Aqueous	1		Surrogates	Smp	0.0200		
54	BLK SVLC-3050	14-Sep-2023 05:02:15	091323082.d	InstBlk		Aqueous	1		Surrogates	Smp	0.0200		

10 field samples analyzed between CCVs

Analyst: MVP2 **Level 2 Analyst:** JRG2

Status: Level 2 review released

Matrix: Aqueous

Printed: 09/13/23 1136

Prep Batch: 83966

PFAS Prep by ID GZA - PFAS Aqueous Preparation

Start Date: 09/03/2023 1816
End Date: 09/03/2023 2214

Conc Analyst: MVP2
Conc Start Date: 09/03/2023 2135
Conc End Date: 09/03/2023 2202

Ext Solvent: MECH>96%MECH/4%H2O

Reagents Vol. (mL): 10

Chem ID: 23-1613>23-1613/PFAS-23-054

Surrogate: SVLC3005
Surrogate Vol. (mL): 0.100

Balance ID: Balance # 20-1123

Sample ID	QC Code	Client Sample ID	Run	Analysis Method	Container + Sample (g)	Container Empty (g)	Initial Vol. (mL)	Spike ID	Spike Vol. (mL)	Final Vol. (mL)	Comments
YQ83966-001	MB		1	PFAS by ID SOP	250	0	250.00		0.000	5.0	Init: 276.71 g Fin: 32.85 g
YQ83966-002	LCS		1	PFAS by ID SOP	250	0	250.00	SVLC2952	0.200	5.0	Init: 275.54 g Fin: 31.15 g
YH24014-004	Sample	HS-MW-32D	2	PFAS by ID SOP	312.17	31.69	280.48		0.000	5.0	
YH24014-010	Sample	WW-MW-11D	2	PFAS by ID SOP	331.61	31.74	299.87		0.000	5.0	NCM#: 107780
YH24014-010MS	MS		2	PFAS by ID SOP	325	31.55	293.45	SVLC2952	0.200	5.0	Witness: N/A; Turbo Vap LV#1, 66°C
YH24014-010MD	MSD		2	PFAS by ID SOP	321.81	32.03	289.78	SVLC2952	0.200	5.0	Sorbent dry start/end:1st: 1950/1955 :2nd: 1952/1957;
YH24014-017	Sample	WW-PMW-RI-106C	1	PFAS by ID SOP	300.53	31.55	268.98		0.000	5.0	Buffer:LCMS23-697; Amm+MeOHLCMS23-682(4mL); QC Water: PFAS-23-054
YH24014-018	Sample	WW-MW-11S-DUP	1	PFAS by ID SOP	300.33	32.6	267.73		0.000	5.0	Bottletop: 21-2031; Pipettes: 21-1681, 22-1174;
YH31008-001	Sample	HS-PMW-RI-106B	1	PFAS by ID SOP	308.64	32.83	275.81		0.000	5.0	QC Bottles: M-3-118-02BB; Falcon tubes: 23-1600;
YH31008-002	Sample	HS-PMW-RI-106A	1	PFAS by ID SOP	300.18	32.29	267.89		0.000	5.0	MeOH Ext: 4mL, Filt: 2mL
YH31008-003	Sample	HS-PMW-22	1	PFAS by ID SOP	325.74	31.76	293.98		0.000	5.0	Reservoirs: 23-1537; GCB/WAX 500/50: 23-1618, 23-1710;
YH31008-005	Sample	WW-MW-4	1	PFAS by ID SOP	330.31	33.48	296.83		0.000	5.0	
YH31008-006	Sample	HS-PMW-RI-101A	1	PFAS by ID SOP	308.62	33.25	275.37		0.000	5.0	
YH31008-007	Sample	WW-PMW-RI-108	1	PFAS by ID SOP	320.33	31.64	288.69		0.000	5.0	
YH31008-008	Sample	WW-PMW-RI-101B	1	PFAS by ID SOP	311.53	32.28	279.25		0.000	5.0	Shared batch with 84177

Analyst: MVP2 **Level 2 Analyst:** JRG2

Status: Level 2 review released

Matrix: Aqueous

Printed: 09/13/23 1136

Prep Batch: 83966

PFAS Prep by ID GZA - PFAS Aqueous Preparation

Start Date: 09/03/2023 1816
End Date: 09/03/2023 2214

Conc Analyst: MVP2
Conc Start Date: 09/03/2023 2135
Conc End Date: 09/03/2023 2202

Surrogate: SVLC3005
Surrogate Vol. (mL): 0.100

Ext Solvent: MECH>96%MECH/4%H2O
Reagents Vol. (mL): 10
Chem ID: 23-1613>23-1613/PFAS-23-054

Balance ID: Balance # 20-1123

Sample ID	QC Code	Client Sample ID	Run	Analysis Method	Container + Sample (g)	Container Empty (g)	Initial Vol. (mL)	Spike ID	Spike Vol. (mL)	Final Vol. (mL)	Comments
YH-B1008-010	Sample	WW-MW-5S	1	PFAS by ID SOP	302.05	31.62	270.43		0.000	5.0	
YH-B1008-011	Sample	WW-MW-5D	1	PFAS by ID SOP	303.46	31.8	271.66		0.000	5.0	
YH-B1008-012	Sample	WW-PMW-R-104B	1	PFAS by ID SOP	330.23	32.56	297.67		0.000	5.0	
YI01015-001	Sample	WW-MW-15C	1	PFAS by ID SOP	313.15	33.69	279.46	✓	0.000	5.0	
YI01015-002	Sample	WW-MW-15D	1	PFAS by ID SOP	324.7	33.34	291.36		0.000	5.0	
YI01015-003	Sample	WW-MW-15B	1	PFAS by ID SOP	305.38	32.09	273.29		0.000	5.0	
YI01015-004	Sample	WW-MW-15A	1	PFAS by ID SOP	290.87	31.66	259.21	✓	0.000	5.0	
YI01015-005	Sample	HS-PMW-R-105A	1	PFAS by ID SOP	322.78	31.59	291.19		0.000	5.0	

(end of report) **Total Samples: 19**

✓

Analyst: MVP2 **Level 2 Analyst:** JRG2

Status: Level 2 review released

Matrix: Aqueous

Printed: 09/14/23 1335

Prep Batch: 84416

PFAS Prep by ID GZA - PFAS Aqueous Preparation

Start Date: 09/10/2023 2003
End Date: 09/10/2023 2304

Conc Analyst: MVP2
Conc Start Date: 09/10/2023 2228
Conc End Date: 09/10/2023 2253

Ext Solvent: MECH>96%/MECH/4%/H2O
Reagents Vol. (mL): 10
Chem ID: 23-1613>23-1613/PFAS-23-056

Surrogate: SVLC3050
Surrogate Vol. (mL): 0.100

Balance ID: Balance # 20-1123

Sample ID	QC Code	Client Sample ID	Run	Analysis Method	Container + Sample (g)	Container Empty (g)	Initial Vol. (mL)	Spike ID	Spike Vol. (mL)	Final Vol. (mL)	Comments
YQ84416-001	MB		1	PFAS by ID SOP	250	0	250.00		0.000	5.0	Init: 290.49 g Fin: 32.95 g
YQ84416-002	LCS		1	PFAS by ID SOP	250	0	250.00	SVLC2952	0.200	5.0	Init: 290.12 g Fin: 31.92 g
YH-B1008-004	Sample	HS-RMW-RI-101B	1	PFAS by ID SOP	320.3	32.52	287.78		0.000	5.0	NCM#: 108152, 108153 (shared with pb: 84415)
YH-B1008-009	Sample	WW-RMW-RI-101A	1	PFAS by ID SOP	309.93	32.27	277.66		0.000	5.0	Witness: N/A; Turbo Vap LV#1, 66°C
YH-B1008-013	Sample	WW-RMW-RI-104A	1	PFAS by ID SOP	308.81	32.25	276.56		0.000	5.0	Sorbent dry start/end:1st: 2119/2124 :2nd: 2119/2124;
YI01015-006	Sample	HS-RMW-RI-105B	1	PFAS by ID SOP	282.79	31.66	251.13	✓	0.000	5.0	Buffer:LCMS23-697; Amm+MeOHLCMS23-705(4mL); QC Water: PFAS-23-056
YI01015-007	Sample	WW-RMW-RI-105B	1	PFAS by ID SOP	311.99	33.71	278.28		0.000	5.0	Bottletop: 21-2031; Pipettes: 23-1755, 22-1174;
YI01015-008	Sample	WW-RMW-RI-105A	1	PFAS by ID SOP	314.47	33.37	281.10		0.000	5.0	QC Bottles: M3-180-01BB; Falcon tubes: 23-1600;
YI01015-009	Sample	FB/8/31-MKM	1	PFAS by ID SOP	314.35	31.57	282.78		0.000	5.0	Centrifuge #7; Centrifuge tubes: 23-1765; MeOH Ext: 4mL, Filt: 2mL;
YI01015-010	Sample	FB/8/31-JMS	1	PFAS by ID SOP	318.22	33.81	284.41	✓	0.000	5.0	Reservoirs: 23-1537; GCB/WAX 500/50: 23-1618, 23-1710;
YI01015-011	Sample	FB/8/31-BPT	1	PFAS by ID SOP	320.29	31.86	288.43		0.000	5.0	
YI01015-012	Sample	FB/8/31-JET	1	PFAS by ID SOP	313.64	31.91	281.73		0.000	5.0	
YI01015-013	Sample	EQB-WLM	1	PFAS by ID SOP	287.42	33.76	253.66		0.000	5.0	
YI01015-014	Sample	EB-MM	1	PFAS by ID SOP	306.06	31.51	274.55		0.000	5.0	
YI01015-015	Sample	EB-BP	1	PFAS by ID	308.2	31.81	276.39		0.000	5.0	

Analyst: MVP2 **Level 2 Analyst:** JRG2

Status: Level 2 review released

Matrix: Aqueous

Printed: 09/14/23 1335

Prep Batch: 84416

PFAS Prep by ID GZA - PFAS Aqueous Preparation

Start Date: 09/10/2023 2003
End Date: 09/10/2023 2304

Conc Analyst: MVP2
Conc Start Date: 09/10/2023 2228
Conc End Date: 09/10/2023 2253

Surrogate: SVLC3050
Surrogate Vol. (mL): 0.100

Ext Solvent: MECH>96%/MECH/4%/H2O
Reagents Vol. (mL): 10
Chem ID: 23-1613>23-1613/PFAS-23-056

Balance ID: Balance # 20-1123

Sample ID	QC Code	Client Sample ID	Run	Analysis Method	Container + Sample (g)	Container Empty (g)	Initial Vol. (mL)	Spike ID	Spike Vol. (mL)	Final Vol. (mL)	Comments
				SOP							
Y101015-016	Sample	VW-PMW-R-107	1	PFAS by ID SOP	301.23	32.03	269.20	✓	0.000	5.0	

(end of report) **Total Samples: 14**

SECTION 4

CASE NARRATIVE AND CHAIN-OF-CUSTODY RECORD

Sample Summary

GZA GeoEnvironmental, Inc.

Lot Number: YI01015

Sample Number	Sample ID	Matrix	Date Sampled	Date Received
001	WV-MW-15C	Aqueous	08/31/2023 1255	09/01/2023
002	WV-MW-15D	Aqueous	08/31/2023 1325	09/01/2023
003	WV-MW-15B	Aqueous	08/31/2023 1245	09/01/2023
004	WV-MW-15A	Aqueous	08/31/2023 1225	09/01/2023
005	HS-PMW-RI-105A	Aqueous	08/31/2023 1650	09/01/2023
006	HS-PMW-RI-105B	Aqueous	08/31/2023 1740	09/01/2023
007	WV-PMW-RI-105B	Aqueous	08/31/2023 1740	09/01/2023
008	WV-PMW-RI-105A	Aqueous	08/31/2023 1610	09/01/2023
009	FB/8/31-MKM	Aqueous	08/31/2023 1300	09/01/2023
010	FB/8/31-JMS	Aqueous	08/31/2023 1315	09/01/2023
011	FB/8/31-BPT	Aqueous	08/31/2023 1330	09/01/2023
012	FB/8/31-JET	Aqueous	08/31/2023 1600	09/01/2023
013	EQB-WLM	Aqueous	08/31/2023 1305	09/01/2023
014	EB-MM	Aqueous	08/31/2023 1850	09/01/2023
015	EB-BP	Aqueous	08/31/2023 1855	09/01/2023
016	WV-PMW-RI-107	Aqueous	08/30/2023 1655	09/01/2023

(16 samples)

Case Narrative
GZA GeoEnvironmental, Inc.
Lot Number: YI01015

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

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

Sample receipt, sample analysis, and data review have been performed in accordance with the Pace Quality Assurance Management Plan (QAMP), applicable Shealy standard operating procedures (SOPs), the 2003 NELAC standard, and Shealy policies. Additionally, the DoD QSM version 5.4 has been followed for these samples, and specifically Table B-15 was followed for all PFAS samples. Any exceptions to the QAMP, SOPs, NELAC standards, the DoD QSM, or policies are qualified on the results page or discussed below.

All QC associated with these samples were compliant with DOD QSM 5.4 table B-15 and our PFAS SOP.

Correction factors (CF) are used to calculate the original sample concentration. The CF is the inverse of the concentration factor (sample volume / extract final volume) times the dilution factor (DF). The CF is calculated as follows:

CF = DF * FV / Vo

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

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

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

Where

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

Pace is a TNI accredited laboratory; however, the following analyses are currently not listed on our TNI scope of accreditation: Drinking Water: VOC (excluding BTEX, MTBE, Naphthalene, & 1,2-dichloroethane) EPA 524.2, E. coli and Total coliforms SM 9223 B-2004, Solid Chemical Material: TOC Walkley-Black, Biological Tissue: All, Non-Potable Water: SGT-HEM EPA 1664B, Silica EPA 200.7, Boron, Calcium, Silicon, Strontium EPA 200.8, Bicarbonate, Carbonate, and Hydroxide Alkalinity SM 2320 B-2011, SM 9221 C E-2006 & SM 9222D-2006, Strontium SW-846 6010D, VOC SM 6200 B-2011, Fecal Coliform Colilert-18, PFAS by Isotope Dilution SOP.

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

PFAS
Sample YI01015-006 required centrifugation prior to extraction, due to excessive solids present in the samples. Centrifugation was performed following the PFAS Aqueous Centrifuge Protocol; samples were spiked with Surrogate (SUR; Extracted Internal Standard/EIS) and shaken vigorously before being poured into a conical bottle and centrifuged. The centrifuged aqueous sample was decanted back into the original sample bottle, off of the condensed solids remaining in the centrifuge bottle. Original sample bottle was rinsed as normal and centrifuge bottle was rinsed with 4mL of MeOH. Centrifuge bottle rinsate was added to the elution. Samples concentrated to <5mL and reconstituted to 5mL using MeOH by transfer pipet.

commented in DV Report, no qual

Chain of Custody
and
Miscellaneous Documents

Shealy Environmental Services, Inc.
106 Vantage Point Drive
West Columbia, South Carolina 29172
Telephone No. (803) 791-9700 Fax No. (803) 791-9111
www.shealylab.com

SHEALY

Chain of Custody Record

Number

Client: Rose and Westra / GZA	Report to Contact: Lori Powers	Telephone No. / E-mail: 616-956-6123 loretta.powers@gza.com	Quote No: 21129
Address: 801 Fifth Street NW, Suite 102	Sampler's Signature: X Jemal Thompson	Analysis (Attach list if more space is needed)	Page: 1 of 2
City: Grand Rapids / State: MI / Zip Code: 49504	Printed Name: Jemal Thompson		
Project Name: 16.0062961.01			
Project Number: 16.0062961.01	P.O. No.		

YI01015

KS92

Sample ID / Description (Containers for each sample may be combined on one line)	Date	Time	Grab / Composite	Matrix: Aqueous	Solid	Non-Aqueous	No of Containers by Preservative Type: Unpres	H2SO4	HNO3	HCl	NaOH	H2O	MeOH	PFAS	Remarks / Cooler I.D.
WV-MW-15C	8/31/2023	12:55	G	X			2							X	
WV-MW-15D	8/31/2023	13:25	G	X			2							X	
WV-MW-15B	8/31/2023	12:45	G	X			2							X	
WV-MW-15A	8/31/2023	12:25	G	X			2							X	
HS-PMW-RI-105A	8/31/2023	16:50	G	X			2							X	
HS-PMW-RI-105B	8/31/2023	17:40	G	X			2							X	
WV-PMW-RI-105B	8/31/2023	17:40	G	X			2							X	
WV-PMW-RI-105A	8/31/2023	16:10	G	X			2							X	

Turn Around Time Required (Prior lab approval required for expedited TAT): [X] Standard [ ] Rush (Please Specify)

Sample Disposal: [ ] Return to Client [X] Disposal by Lab

Possible Hazard Identification (List any known hazards in the remarks): [X] Non-Hazardous [ ] Flammable [ ] Skin Irritant [ ] DOS provided [ ] Unknown

QC Requirements: REPORT TO AECOM AND EGLE

	Date	Time
1. Relinquished by: Jemal Thompson	8/31/23	20:30
2. Relinquished by:		
3. Relinquished by:		
4. Relinquished by: FedEx	9/1/23	0945

	Date	Time
1. Received by:		
2. Received by:		
3. Received by:		
4. Laboratory Received by: Ch Hyne	9/1/23	0945

Note: All samples are retained for four weeks from receipt unless other arrangements are made. REPORT TO AECOM AND EGLE

LAB USE ONLY
Received on Ice (Check): [X] Y [ ] N [ ] Ice Pack
Receipt Temp. 3.8 °C
cooler #2 T= 3.5°C

Document Number: ME002OW-01

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

PACE ANALYTICAL SERVICES, LLC

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Chain of Custody Record

Number

Client	Report to Contact	Telephone No. / E-mail	Quote No.
Rose and Westra / GZA	Lori Powers	616-956-6123 lorette.powers@gza.com	21129

Address	Sampler's Signature	Analysis (Attach list if more space is needed)	Page
601 Fifth Street NW, Suite 102	X		2 of 2

City	State	Zip Code	Printed Name
Grand Rapids	MI	49504	Jemel Thompson

Project Name	Project Number	P.O No.
16.0062661.91	16.0062661.91	

YI01615

KES2

Sample ID / Description (Containers for each sample may be combined on one line)	Date	Time	G-Grab C-Composite	Matrix: Aqueous	Matrix: Solid	Matrix: Non-Aqueous	No of Containers by Preservative Type: Unpres	H2SO4	HNO3	HCl	NaOH	H2O	MeOH	PFAS	Remarks / Cooler I.D.
FB/8/31-MKM	8/31/2023	13:00	G	X			2							X	
FB/8/31-JMS	8/31/2023	13:15	G	X			2							X	
FB/8/31-BPT	8/31/2023	13:30	G	X			2							X	
FB/8/31-JET	8/31/2023	16:00	G	X			2							X	
EQB-WLM	8/31/2023	13:05	G	X			2							X	
EB-MM	8/31/2023	18:50	G	X			2							X	
EB-BP	8/31/2023	18:55	G	X			2							X	
WV-PMW-RI-107	8/30/2023	16:55													

Turn Around Time Required (Prior lab approval required for expedited TAT)
[X] Standard [ ] Rush (Please Specify)

Sample Disposal
[ ] Return to Client [X] Disposal by Lab

Possible Hazard Identification (List any known hazards in the remarks)
[X] Non Hazardous [ ] Flammable [ ] Skin Irritant [ ] EDB provided [ ] Unknown

QC Requirements
REPORT TO AECOM AND EGLE

	Relinquished by	Date	Time	Received by	Date	Time
1						
2						
3						
4	Fedex	9/1/23	0945	Laboratory Received by	9/1/23	0945

Note: All samples are retained for four weeks from receipt unless other arrangements are made. REPORT TO AECOM AND EGLE

LAB USE ONLY
Received on Ice (Check) [Y] [N] [Ice Pack]
Receipt Temp. 3.6 °C

Document Number: ME002OW-01

PACE ANALYTICAL SERVICES, LLC

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

DC#_Title: ENV-FRM-WCOL-0286 v02_Samples Receipt Checklist (SRC)
Effective Date: 8/2/2022

Sample Receipt Checklist (SRC)

Client: GZA Cooler Inspected by/date: CJH / 09/01/23 Lot #: YI01015

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

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

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

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

3.9 / 3.8 °C 3.5 / 3.5 °C NA / NA °C NA / NA °C

Method: ☑ Temperature Blank ☐ Against Bottles IR Gun ID: 8 IR Gun Correction Factor: 0 °C

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

☑ Yes	☐ No	☐ NA	3. Were all coolers received at or below 6.0°C? If no, was Project Manager notified? PM was Notified by: phone / email / face-to-face (circle one).
☑ Yes	☐ No	☐ NA	4. Is the commercial courier's packing slip attached to this form?
☑ Yes	☐ No		5. Were proper custody procedures (relinquished/received) followed?
☑ Yes	☐ No		6. Were sample IDs listed on the COC and all sample containers?
☑ Yes	☐ No		7. Was collection date & time listed on the COC and all sample containers?
☑ Yes	☐ No		8. Did all container label information (ID, date, time) agree with the COC?
☑ Yes	☐ No		9. Were tests to be performed listed on the COC?
☑ Yes	☐ No		10. Did all samples arrive in the proper containers for each test and/or in good condition (unbroken, lids on, etc.)? _____
☑ Yes	☐ No		11. Was adequate sample volume available?
☑ Yes	☐ No		12. Were all samples received within ½ the holding time or 48 hours, whichever comes first?
☑ Yes	☐ No		13. Were all samples containers accounted for? (No missing/excess)
☐ Yes	☐ No	☑ NA	14. Were VOA, 8015C and RSK-175 samples free of bubbles >"pea-size" (¼" or 6mm in diameter) in any of the VOA vials?
☐ Yes	☐ No	☑ NA	15. Were all DRO/metals/nutrient samples received at a pH of < 2?
☐ Yes	☐ No	☑ NA	16. Were all cyanide samples received at a pH > 12 and sulfide samples received at a pH > 9?
☐ Yes	☐ No	☑ NA	17. Were all applicable NH_3/TKN/cyanide/phenol/625.1/608.3 (< 0.5mg/L) samples free of residual chlorine?
☐ Yes	☑ No	☐ NA	18. Was the quote number listed on the container label? If yes, Quote #

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

Sample(s) NA were received incorrectly preserved and were adjusted accordingly in sample receiving with NA mL of circle one: H_2SO_4, HNO_3, HCl, NaOH using SR # NA. ☐
Time of preservation NA. If more than one preservative is needed, please note in the comments below.

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

Samples(s) NA were received with TRC > 0.5 mg/L (If #19 is *no*) and were adjusted accordingly in sample receiving with sodium thiosulfate ($Na_2S_2O_4$) with Unique ID: NA.

Comments:

Qualtrax ID: 56360 Pace® Analytical Services, LLC Page 1 of 1


GEOTECHNICAL
ENVIRONMENTAL
ECOLOGICAL
WATER
CONSTRUCTION MANAGEMENT