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AREA 5
RESPONSE ACTIVITY PLAN
North Kent Study Area

June 18, 2020, Revised December 4, 2020
File No. 16.0062961.20

PREPARED FOR:
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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
HSDS	House Street Disposal Site
HUC	Hydrologic Unit Code
ID	Identification
MDEQ	Michigan Department of Environmental Quality
MDOT	Michigan Department of Transportation
MGDL	Michigan GIS Data Library
MS/MSD	Matrix Spike/Matrix Spike Duplicates
NE	Northeast
ng/L	Nanogram per Liter
NKLF	North Kent County 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
SOW	Schedule of Work
µg/L	Micrograms per Liter
USGS	United States Geological Survey
VAP	Vertical Aquifer Profiling
Wolverine	Wolverine World Wide, Inc.

1.0 INTRODUCTION

On behalf of Wolverine, R&W/GZA, prepared this RAP for the Area 5 investigation in the NKSA. The objective of this RAP is to comply with the CD by refining the current understanding of the conceptual site model and further evaluating the potential of PFAS migration into Area 5. The following objective is stated in Section 7.9(b)(i)(A) and (B) of the CD: *(A) Define the vertical and horizontal extent of PFAS Compounds contamination as required by Part 201; and (B) confirm and monitor the location and stability of the PFAS Compounds plume(s) once the plume(s) are defined.*

Area 5 is southwest of the HSDS and south and southwest of the PFOA + PFOS plume from the HSDS. Based on the groundwater contours and groundwater flow direction, Area 5 is located hydraulically down and side-gradient of the HSDS. PFOA + PFOS were mostly absent from residential water samples in Area 5, except a few locations where PFOA + PFOS was at concentrations less than 10 ng/L and no residential wells in Area 5 identified PFOA + PFOS concentrations greater than 70 ng/L. One monitoring well location, HS-MW-26 near the southeast corner of Area 5, had PFOA + PFOS concentration greater than 10 ng/L.

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(b), and Appendix P 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 Gap
- 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 on-site investigation data, regional geology and hydrogeology, residential water well sampling data in the NKSA, and groundwater investigations performed associated with the former HSDS (i.e., within the House Street Study Area; i.e., portion of NKSA investigated as it pertains to the HSDS). The CSM is focused on the groundwater flow from the HSDS to Area 5, PFAS distribution in groundwater, and the fate and transport of PFAS in groundwater. For the purpose of this RAP, the current understanding of the CSM as related to the human receptors in Area 5 was evaluated and potential data gaps were identified. See **Figure 1** for a layout of the NKSA and the PFAS Investigation Areas. No permanent groundwater monitoring wells have yet been installed in Area 5. See **Tables 1** and **2** for a list of residential water wells and addresses in Area 5 and their associated PFAS analytical results. The following sections discuss source area, hydrology, geology, hydrogeology, PFAS distribution in groundwater, groundwater flow, and PFAS transport.

2.01 HOUSE STREET DISPOSAL SITE

The HSDS, located at 1855 House Street NE, Plainfield Township, Kent County, Michigan encompasses approximately 76 acres (**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 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. It has been determined that the tanning byproducts in which Scotchgard™ was used contained PFOS and 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 PFOS and PFOA appear to be the only PFAS compounds with Part 201 cleanup criteria materially migrating from the HSDS.

Although the presence of other sources does not impact the obligations of the parties under the CD, there are other possible sources of PFAS at residential properties such as those in Area 5, including septic systems, rain deposition, and the use of domestic products that contain PFAS (Schaider et al, 2016; EGLE, 2019a; ITRC, 2020).

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. Ground surface elevations in the NKSA range from approximately 650 feet AMSL at the Rogue River to more than 900 feet AMSL near the NKLF. Ground surface generally dips southeast toward the Rogue River. Area 5 ground surface elevations range from approximately 710 feet to 620 feet AMSL with a general downward gradient to the south-southwest.

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 the Michigan's Major Watersheds – Sub-basins GIS data (EGLE, 2019b) downloaded from MGDL, the HSDS and Area 6 study areas are 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. Area 5 is in Rogue River sub-basin HUC 04050006040120 and Lower Grand River HUC 04050006050050. The HSDS is situated on the water divide of two sub-basins: HUC 04050006040080 and HUC 04050006040120. These three 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 for the estimated annual groundwater, recharge from precipitation at the NKSA ranged from 9 to 15 inches (Michigan State University, 2005).

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 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. The top of bedrock elevations at the HSDS area were estimated to range from 540 to 580 feet (R&W/GZA, 2018).

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

NKSA Geology

This summary of the geology in the NKSA is based on borehole data collected during the subsurface exploration and groundwater monitoring well installation described in **Appendix A** 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 with lithology data are shown in **Figure 4.** Geologic cross-sections, A-A', B-B', C-C', and D-D' show the lithology in Area 5. See **Figures 5** through **9** for the geological cross-sections and their locations within Area 5.

Area 5

Area 5 cross-section A-A' (**Figure 6**) begins at the HSDS, following the interpreted groundwater flow direction to the southwest, then to the south toward the Grand River. Cross-section A-A' is located near the western boundary of Area 5. In the majority of the boreholes from the HSDS, along House Street, toward Pine Island Drive, the lithology is predominantly coarse-grained soil. As the A-A' section line turns to the south, fine-grained soil with varying thickness is observed in most of the boreholes. Water bearing units were encountered as shown on the cross-section. The presence of fine-grained soil is expected to affect the flow path locally, but not the primary groundwater flow along this cross-section toward the Grand River

Cross-section B-B' (**Figure 7**) is constructed from the HSDS, passing through MW-11 cluster, toward the Grand River. It runs east of cross-section A-A' and west of C-C'. The lithology is predominantly coarse-grained soil, with the presence of fine-grained soil of varying thickness in a few borings. The fine-grained soil is less prevalent than along cross-section A-A'.

Cross-section C-C' (**Figure 8**) is constructed from HS-MW-17 well clusters, through eastern portion of Area 5, toward the Grand River. Except for HS-MW-17, where the soil encountered was sand from ground surface to an elevation of approximately 560 feet AMSL, fine-grained soil was encountered in most of the boreholes on this cross-section, with thickness ranging from less than 10 feet to approximately 80 feet. However, water-bearing units were encountered in all wells on the cross-section. The presence of fine-grained soil is expected to affect the flow path locally, but not the primary groundwater flow toward the Rogue River or the Grand River.

Cross-section D-D' (**Figure 9**) is constructed to be approximately perpendicular to the groundwater flow direction in the northern portion of Area 5. The lithologies of the wells on cross-section D-D' are generally coarse-grained soil, sand or gravel, with the presence of clay of varying thickness in some boreholes. Fine grained soil of approximately 20 or more feet thick was observed in five boreholes west of monitoring well HS-MW-14. As shown

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[2] https://secure1.state.mi.us/wellogic/Login.aspx?ReturnUrl= percent2fwellogic percent2fdefault.aspx

in other cross-sections, water-bearing units were encountered in all wells on the cross-section. The presence of fine-grained soil is expected to affect the flow path only locally.

In general, coarse-grained soil predominates in most of the soil borings and water well logs in the larger HSDS Study Area (i.e. portion of NKSA investigated as it pertains to the HSDS) and Area 5. 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 characteristics of glacial outwash and end moraines, as documented in regional geology. Based on our review of the well log lithologies and interpreted top of bedrock elevation, the overburden thickness in Area 5 ranges from approximately 90 to 270 feet, and the top of bedrock elevation ranges from approximately 540 to 570 feet in Area 5.

2.05 HYDROGEOLOGY

NKSA House Street Study Area Groundwater Flow

Static water levels were collected from the monitoring wells and the staff gauges throughout the NKSA. 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 gauges. 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** for the well installation information in the NKSA and **Table 4** for a summary of the static groundwater water level measurements. Note these tables include information for NKSA as a whole, while only a portion of the data is relevant to Area 5.

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** 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 2** for the groundwater elevation contours in the shallow zone and **Figure 3** for the deep zone.

As shown on **Figures 2** and **3**, groundwater in both the deep and shallow zones of the NKSA flows to the Rogue River. 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 is to the northwest. Because of groundwater discharge to Freska Lake and Clear Bottom Lake, the hydraulic gradient to the southwest appears to be flat as compared to the southeast.

Area 5 Groundwater Flow

In Area 5, the shallow groundwater flows to the south and southeast toward the Grand and Rogue Rivers respectively. The deeper groundwater contours show an overall south-southeast flow toward the Grand and Rogue Rivers. However, these contours are interpolated in and near Area 5 because there are no investigative monitoring wells within Area 5. As such, this is one of the data gaps identified in this CSM. Site specific hydraulic conductivity values are not available, as such Area 5-specific groundwater seepage velocity is not estimated.

As shown on **Figure 10** and **Figure 11,** Area 5 appears to be located hydraulically downgradient of the HSDS, but not in the flow path of the primary HSDS plume, which migrates to the southeast to the Rogue River. Groundwater flow in the Area 5 appears to be to the south or southeast toward the Grand River. However, it is important to note that the groundwater contours were based on the surface water elevations and the existing groundwater monitoring well data, and groundwater elevation measurements were sparse in Area 5 and its vicinity; therefore, localized flow directions between Area 5, the HSDS primary plume, and adjacent areas remain to be evaluated.

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 House Street 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. 9 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 10** 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.

Table 5, below, summarizes the detections, maximum concentration, and frequency of detection in groundwater samples collected in the House Street Study Area for PFOA and PFOS analytes. Analytical data for the residential wells in Area 6 are provided on **Table 2**, and PFAS analytical results for the samples collected from the House Street Study Area in 2019 are provided in **Table 6.** **Figures 10** and **11** depict total PFAS (12 compounds as previously discussed) and PFOA + PFOS in the House Street Study Area near Area 6, respectively.

Table 5: Summary of PFOA, PFOS, and Combined PFOA + PFOS Data in Groundwater, 2019 HSDS Quarterly Monitoring Well Sampling

Compound	Total Samples	Number of Detections	Number of Exceedances	Maximum Conc. (µg/L)	Threshold Value (µg/L)	Basis for Value[1]
PFOA	256	126	78	11	0.008	DWC
PFOS	256	79	38	100	0.016	DWC
Combined PFOA + PFOS	256	129	91	111	0.010	CD Value[2]

1. Discussion of criterion applicability is included in Section 2.08.
2. CD value is not a state-wide criterion, but a performance objective from the CD.

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 10**), and PFOA + PFOS (**Figure 11**). 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.

The total PFAS isoconcentration map (**Figure 10**) 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 11**) 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. Area 5 is situated south of the primary House Street plume. As shown in **Figures 10** and **11**, the primary PFAS plume (consisting of primarily PFOA and PFOS) is located north and northeast of Area 5.

Distribution of PFAS in Area 5

Area 5 appears to be located outside of the primary HSDS PFAS plume; however, the groundwater data within Area 5 is limited to residential wells with generalized lithology (see **Figures 6** through **9**). As shown in **Table 2,** PFAS and PFOA + PFOS were not detected in the majority of the residential water wells in Area 5. Out of the few water wells detected with PFAS, PFOA + PFOS, only one location, 2153 Post Drive, contained PFOA + PFOS at a concentration greater than 10 ppt. Vertically, the residential water wells in Area 5 appear to be screened at a shallower elevation than monitoring wells HS-MW-17D and HS-MW-5D (located north of Area 5), where PFOA + PFOS was detected at concentrations greater than the Part 201 Drinking Water Criterion. The potential migration of PFAS including PFOA + PFOS in the deep zone into Area 5 remains to be evaluated. Data gaps are described in **Section 2.08**, and data collection to resolve the gaps is discussed in **Section 3.0.**

3-Dimensional Representation of PFAS in Area 5

Due to the lack of monitoring well clusters screened at multiple depths in Area 5, a 3-dimensional representation of PFAS is not practicable at this time. This representation may be completed once the data proposed in **Section 3.0** are collected.

2.07 APPLICABLE PART 201 CLEANUP CRITERIA AND PROJECT ACTION LEVELS

The residents in Area 5 who use groundwater for drinking water are potential receptors of PFOA + PFOS exposure via groundwater ingestion. Therefore, based on EGLE's Part 201 administrative rules, the applicable Part 201 groundwater cleanup criterion for Area 5 is the Part 201 Generic Groundwater Cleanup Criteria Protective of Drinking Water for Residential Land Uses (DWC), which is protective of human health from being exposed to groundwater via ingestion.

For PFAS compounds, Michigan only has Part 201 cleanup criteria for PFOS and PFOA. 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
Combined PFOA + PFOS	0.010	CD Value

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

Based on the Part 201 cleanup criteria and the CD requirement, the project action levels for PFOA + PFOS concentrations are set to be 10 ng/L combined, 8 ppt for PFOA, and 16 ppt for PFOS. The project objectives are to monitor possible migration of PFAS/PFOA + PFOS to Area 5 and evaluate if Area 5 receptors are potentially exposed to PFOA + PFOS above 10 ng/L, 8 ppt for PFOA, and 16 ppt for PFOS via groundwater ingestion. The following objective is stated in Section 7.9(b)(i)(A) and (B) of the CD: *(A) Define the vertical and horizontal extent of PFAS Compounds contamination as required by Part 201; and (B) confirm and monitor the location and stability of the PFAS Compounds plume(s) once the plume(s) are defined.*

2.08 DATA GAPS

Based on the current understanding of the CSM and the above discussions, the following data gaps are identified:

- Groundwater elevation and groundwater flow directions from the HSDS or the primary HSDS PFOA + PFOS, PFAS plume to Area 5; and
- Potential for PFOA + PFOS, PFAS impacted groundwater in the shallow and deep aquifer zones migrating to Area 5.

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 12.** Actual monitoring well locations may vary slightly from the proposed locations of **Figure 12** 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.

- Existing monitoring wells HS-MW-21S, HS-MW-21M, and HS-MW-21D will be utilized as part of the well network for Area 5.
- Five VAP/monitoring well locations, AREA5-RI-1 through AREA5-RI-4 and AREA5-RI-12, are proposed to delineate the extent of plume in the central portion of the eastern boundary of Area 5. (Note, location AREA5-RI-12 is a contingency location and may not be drilled, pending information from other locations.) The proposed wells are located hydraulically upgradient, downgradient, and cross-gradient.
- Three VAP/monitoring well locations, AREA5-RI-5 through AREA5-RI-7, are proposed to delineate the extent of the plume near HS-MW-26. The proposed wells are located hydraulically upgradient, downgradient, and cross-gradient.

- Seven monitoring well locations (HS-PMW-RI-103, HS-PMW-RI-104, HS-PMW-RI-107, AREA5 RI 8, AREA5 RI-9, AREA5-RI-10, and AREA5-RI-11) are proposed to provide detection monitoring of PFAS possibly migrating toward Area 5 from the HSDS. The locations are selected based on groundwater contours and groundwater flow lines backtracking to the HSDS. These seven monitoring well clusters are proposed to provide groundwater analytical data to monitor potential migration of PFOA + PFOS from the primary House Street plume into Area 5. In addition, the proposed groundwater monitoring wells clusters will provide additional groundwater elevation data for the evaluation of groundwater flow west of the primary PFAS plume originated from the HSDS.

4.0 INVESTIGATION METHODOLOGY

Relevant tasks completed under this RAP will be completed in accordance with the most recent revision of the 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 an interval of 10 feet. VAP 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.

Well installation depths are not predetermined. Based on the combination of profiling data, encountered geology, and nearby drinking water well elevations, 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. 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 Area 5 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; and
- Annual sampling until substantial completion of the Area 5 well network.

Once the Area 5 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 well locations are proposed:

Grouping/Area	Well Nomenclature
Existing	HS-MW-21S, HS-MW-21M, and HS-MW-21D
Central portion of the eastern boundary of Area 5	AREA5-RI-1, AREA5-RI-2, AREA5-RI-3, and AREA5-RI-4 (Contingency: AREA5-RI-12)
Delineation near HS-MW-26	AREA5-RI-5, AREA5-RI-6, and AREA5-RI-7
Detection monitoring for potential migration to Area 5	HS-PMW-RI-103, HS-PMW-RI-104, HS-PMW-RI-107, AREA5 RI 8, AREA5 RI-9, AREA5-RI-10, and AREA5-RI-11

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 site-specific QAPP.

Sample identification will consist of nomenclatures that include the 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 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 15 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 will likely exceed 15 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.

9.0 REFERENCES

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TABLES

TABLE 1

PARCEL LIST AND WELL INFORMATION
Area 5
Plainfield Township, Kent County, MI

Area	PPN	Address	Note	Well Screen Elevation (feet)
Area 5	411017276001	1425 PARK FOREST CT NE	MUNICIPAL WATER	NA
Area 5	411017276002	1471 PARK FOREST CT NE	SAMPLED BY R&W/GZA	659-654
Area 5	411017276003	1499 PARK FOREST CT NE	SAMPLED BY R&W/GZA	682-672
Area 5	411017276007	1500 PARK FOREST CT NE	SAMPLED BY R&W/GZA	680-675
Area 5	411017276006	1506 PARK FOREST CT NE	SAMPLED BY R&W/GZA	NA
Area 5	411017276005	1508 PARK FOREST CT NE	SAMPLED BY R&W/GZA	612-602
Area 5	411017276004	1510 PARK FOREST CT NE	SAMPLED BY R&W/GZA	648-642
Area 5	411009351006	1601 POST DR NE	MUNICIPAL WATER	NA
Area 5	411009351005	1604 POST DR NE	VACANT	NA
Area 5	411009353004	1615 POST DR NE	VACANT	NA
Area 5	411016103001	1625 CORNERSTONE CT NE	SAMPLED BY R&W/GZA	618-613
Area 5	411016103008	1628 CORNERSTONE CT NE	SAMPLED BY R&W/GZA	628-622
Area 5	411016103002	1633 CORNERSTONE CT NE	SAMPLED BY R&W/GZA	643-638
Area 5	411016101002	1646 POST DR NE	SAMPLED BY R&W/GZA	695-691
Area 5	411016103007	1650 CORNERSTONE CT NE	SAMPLED BY R&W/GZA	656-651
Area 5	411016103003	1651 CORNERSTONE CT NE	SAMPLED BY R&W/GZA	619-614
Area 5	411016103006	1662 CORNERSTONE CT NE	SAMPLED BY R&W/GZA	601-596
Area 5	411016103004	1665 CORNERSTONE CT NE	VACANT	NA
Area 5	411016103005	1678 CORNERSTONE CT NE	SAMPLED BY R&W/GZA	621-611
Area 5	411016101012	1690 POST DR NE	SAMPLED BY R&W/GZA	587-577
Area 5	411016101005	1716 POST DR NE	MUNICIPAL WATER	NA
Area 5	411016101013	1730 POST DR NE	SAMPLED BY R&W/GZA MUNICIPAL WATER	642-638
Area 5	411016101008	1756 POST DR NE	MUNICIPAL WATER	NA
Area 5	411009352003	1762 CHANDLER WOODS CT NE	MUNICIPAL WATER	NA
Area 5	411016101009	1772 POST DR NE	SAMPLED BY R&W/GZA	660-655
Area 5	411009352006	1777 CHANDLER WOODS CT NE	MUNICIPAL WATER	NA
Area 5	411009352004	1778 CHANDLER WOODS CT NE	MUNICIPAL WATER	NA
Area 5	411009352007	1785 CHANDLER WOODS CT NE	MUNICIPAL WATER	NA
Area 5	411016101010	1788 POST DR NE	MUNICIPAL WATER	NA
Area 5	411009352005	1790 CHANDLER WOODS CT NE	MUNICIPAL WATER	NA
Area 5	411016102007	1790 POST DR NE	SAMPLED BY R&W/GZA	593-590
Area 5	411009352008	1791 CHANDLER WOODS CT NE	MUNICIPAL WATER	NA
Area 5	411016101011	1798 POST DR NE	MUNICIPAL WATER	NA
Area 5	411009352009	1799 CHANDLER WOODS CT NE	MUNICIPAL WATER	NA
Area 5	411016365022	1799 ROGUE RIVER RD NE	SAMPLED BY R&W/GZA	632-627
Area 5	411016102008	1800 POST DR NE	MUNICIPAL WATER	NA
Area 5	411016126021	1815 POST DR NE	SAMPLED BY R&W/GZA	667-662
Area 5	411016176001	1818 POST DR NE	MUNICIPAL WATER	NA
Area 5	411016126002	1825 POST DR NE	SAMPLED BY R&W/GZA	690-685
Area 5	411016126010	1845 POST DR NE	SAMPLED BY R&W/GZA	684-680
Area 5	411016126013	1861 POST DR NE	SAMPLED BY R&W/GZA	697-691
Area 5	411016376009	1867 ROGUE RIVER RD NE	SAMPLED BY R&W/GZA	NA

TABLE 1
PARCEL LIST AND WELL INFORMATION
Area 5
Plainfield Township, Kent County, MI

Area	PPN	Address	Note	Well Screen Elevation (feet)
Area 5	411016376016	1879 ROGUE RIVER RD NE	SAMPLED BY R&W/GZA	NA
Area 5	411016126007	1881 POST DR NE	SAMPLED BY R&W/GZA	675-670
Area 5	411016376017	1881 ROGUE RIVER RD NE	MUNICIPAL WATER	NA
Area 5	411016126025	1901 POST DR NE	SAMPLED BY R&W/GZA	676-671
Area 5	411016376010	1901 ROGUE RIVER RD NE	SAMPLED BY R&W/GZA	641-638
Area 5	411016126026	1939 POST DR NE	SAMPLED BY R&W/GZA	670-660
Area 5	411016176012	1970 POST DR NE	SAMPLED BY R&W/GZA	NA
Area 5	411016126018	1977 POST DR NE	SAMPLED BY R&W/GZA	667-662
Area 5	411016176013	1978 POST DR NE	SAMPLED BY R&W/GZA	660-654
Area 5	411016176024	1990 POST DR NE	SAMPLED BY R&W/GZA	644-639
Area 5	411016201002	2001 POST DR NE	SAMPLED BY R&W/GZA	648-644
Area 5	411016251008	2030 POST DR NE	VACANT	NA
Area 5	411016201009	2035 POST DR NE	SAMPLED BY R&W/GZA	640-635
Area 5	411016451080	2047 REINIER CT NE	MUNICIPAL WATER	NA
Area 5	411016451093	2050 REINIER CT NE	POSSIBLE NEW CONSTRUCTION	NA
Area 5	411016451088	2055 REINIER CT NE	MUNICIPAL WATER	NA
Area 5	411016451087	2058 REINIER CT NE	MUNICIPAL WATER	NA
Area 5	411016251007	2062 POST DR NE	SAMPLED BY R&W/GZA	637-632
Area 5	411016451072	2063 REINIER CT NE	MUNICIPAL WATER	NA
Area 5	411016201015	2069 POST DR NE	SAMPLED BY R&W/GZA	658-653
Area 5	411016251005	2086 POST DR NE	SAMPLED BY R&W/GZA	626-621
Area 5	411016251003	2088 POST DR NE	VACANT	NA
Area 5	411016201011	2101 POST DR NE	SAMPLED BY R&W/GZA	649-644
Area 5	411016201007	2141 POST DR NE	SAMPLED BY R&W/GZA	650-646
Area 5	411016201017	2153 POST DR NE	SAMPLED BY R&W/GZA	656-648
Area 5	411016251002	2200 POST DR NE	VACANT	NA
Area 5	411016376044	6057 MAKSIMOWSKI AVE NE	SAMPLED BY R&W/GZA	592-587
Area 5	411016376043	6075 MAKSIMOWSKI AVE NE	SAMPLED BY R&W/GZA	630-625
Area 5	411016451030	6088 MAKSIMOWSKI AVE NE	SAMPLED BY R&W/GZA	604-600
Area 5	411016451035	6100 MAKSIMOWSKI AVE NE	SAMPLED BY R&W/GZA	619-614
Area 5	411016376005	6111 MAKSIMOWSKI AVE NE	SAMPLED BY R&W/GZA	607-599
Area 5	411016451052	6114 MAKSIMOWSKI AVE NE	SAMPLED BY R&W/GZA	574-569
Area 5	411016451094	6118 MAKSIMOWSKI AVE NE	SAMPLED BY R&W/GZA	600-595
Area 5	411016376045	6129 MAKSIMOWSKI AVE NE	SAMPLED BY R&W/GZA	646-643
Area 5	411016376015	6145 MAKSIMOWSKI AVE NE	SAMPLED BY R&W/GZA	574-569
Area 5	411016365045	6152 GEORGE ANN CT NE	SAMPLED BY R&W/GZA	NA
Area 5	411016451092	6160 MAKSIMOWSKI AVE NE	MUNICIPAL WATER	NA
Area 5	411016376022	6175 MAKSIMOWSKI AVE NE	SAMPLED BY R&W/GZA	NA
Area 5	411016365060	6176 GEORGE ANN CT NE	MUNICIPAL WATER	NA
Area 5	411016365061	6188 GEORGE ANN CT NE	MUNICIPAL WATER	NA
Area 5	411016365054	6191 GEORGE ANN CT NE	MUNICIPAL WATER	NA
Area 5	411016376035	6191 MAKSIMOWSKI AVE NE	SAMPLED BY R&W/GZA	622-617
Area 5	411016365062	6196 GEORGE ANN CT NE	MUNICIPAL WATER	NA

TABLE 1
PARCEL LIST AND WELL INFORMATION
Area 5
Plainfield Township, Kent County, MI

Area	PPN	Address	Note	Well Screen Elevation (feet)
Area 5	411016376034	6201 MAKSIMOWSKI AVE NE	SAMPLED BY R&W/GZA	594-584
Area 5	411016365053	6203 GEORGE ANN CT NE	MUNICIPAL WATER	NA
Area 5	411016451082	6206 MAKSIMOWSKI AVE NE	SAMPLED BY R&W/GZA	NA
Area 5	411016451006	6210 MAKSIMOWSKI AVE NE	SAMPLED BY R&W/GZA	547-544
Area 5	411016326002	6215 MAKSIMOWSKI AVE NE	SAMPLED BY R&W/GZA	NA
Area 5	411016451085	6240 MAKSIMOWSKI AVE NE	SAMPLED BY R&W/GZA	632-627
Area 5	411016326003	6243 MAKSIMOWSKI AVE NE	WELL INACTIVE	NA
Area 5	411016451084	6260 MAKSIMOWSKI AVE NE	SAMPLED BY R&W/GZA	550-540
Area 5	411016301020	6274 SAMRICK AVE NE	VACANT	NA
Area 5	411017426003	6335 SAMRICK AVE NE	SAMPLED BY R&W/GZA	NA
Area 5	411016301027	6346 SAMRICK AVE NE	VACANT	NA
Area 5	411016301026	6350 SAMRICK AVE NE	MUNICIPAL WATER	NA
Area 5	411017426002	6355 SAMRICK AVE NE	SAMPLED BY R&W/GZA	621-616
Area 5	411016301029	6378 SAMRICK AVE NE	SAMPLED BY R&W/GZA	650-643
Area 5	411017426008	6393 SAMRICK AVE NE	SAMPLED BY R&W/GZA	693-688
Area 5	411016176009	6400 BOTANY BLUFF DR NE	SAMPLED BY R&W/GZA	613-593
Area 5	411016151005	6408 SAMRICK AVE NE	MUNICIPAL WATER	NA
Area 5	411016176031	6411 BOTANY BLUFF DR NE	VACANT	NA
Area 5	411017277010	6421 SAMRICK AVE NE	SAMPLED BY R&W/GZA	NA
Area 5	411017277009	6433 SAMRICK AVE NE	MUNICIPAL WATER	NA
Area 5	411016176015	6440 BOTANY BLUFF DR NE	SAMPLED BY R&W/GZA	610-595
Area 5	411016176032	6455 BOTANY BLUFF DR NE	SAMPLED BY R&W/GZA WELL INACTIVE	NA
Area 5	411017277001	6464 SAMRICK AVE NE	VACANT	NA
Area 5	411016176008	6480 BOTANY BLUFF DR NE	SAMPLED BY R&W/GZA	601-596
Area 5	411016151002	6490 SAMRICK AVE NE	VACANT	NA
Area 5	411016151008	6512 SAMRICK AVE NE	VACANT	NA
Area 5	411016176023	6520 BOTANY BLUFF DR NE	SAMPLED BY R&W/GZA	634-629
Area 5	411017277003	6521 SAMRICK AVE NE	MUNICIPAL WATER	NA
Area 5	411017277002	6531 SAMRICK AVE NE	SAMPLED BY R&W/GZA	699-694
Area 5	411016151007	6534 SAMRICK AVE NE	SAMPLED BY OTHERS	613-608
Area 5	411016176028	6547 BOTANY BLUFF DR NE	VACANT	NA
Area 5	411016176011	6560 BOTANY BLUFF DR NE	SAMPLED BY OTHERS	629-624
Area 5	411016151006	6580 SAMRICK AVE NE	SAMPLED BY R&W/GZA	615-610
Area 5	411016176019	6600 BOTANY BLUFF DR NE	SAMPLED BY R&W/GZA	628-623
Area 5	411016176027	6601 BOTANY BLUFF DR NE	VACANT	NA
Area 5	411016176021	6605 BOTANY BLUFF DR NE	VACANT	NA
Area 5	411017226002	6611 SAMRICK AVE NE	SAMPLED BY R&W/GZA	601-596
Area 5	411016176026	6623 BOTANY BLUFF DR NE	VACANT	NA
Area 5	411016176017	6630 BOTANY BLUFF DR NE	SAMPLED BY R&W/GZA	610-600
Area 5	411016176025	6635 BOTANY BLUFF DR NE	VACANT	NA
Area 5	411017226008	6635 SAMRICK AVE NE	VACANT	NA
Area 5	411016201025	6648 REDTAIL RIDGE DR NE	SAMPLED BY R&W/GZA	625-617

TABLE 1

PARCEL LIST AND WELL INFORMATION
Area 5
Plainfield Township, Kent County, MI

Area	PPN	Address	Note	Well Screen Elevation (feet)
Area 5	411017226007	6659 SAMRICK AVE NE	VACANT	NA
Area 5	411017226006	6695 SAMRICK AVE NE	VACANT	NA
Area 5	411016201023	6700 REDTAIL RIDGE DR NE	SAMPLED BY R&W/GZA	592-587
Area 5	411016126017	6701 BLUE RIDGE DR NE	SAMPLED BY R&W/GZA	629-624
Area 5	411016201022	6722 REDTAIL RIDGE DR NE	SAMPLED BY R&W/GZA	624-619
Area 5	411016102001	6726 SAMRICK AVE NE	SAMPLED BY R&W/GZA	692-687
Area 5	411017226005	6729 SAMRICK AVE NE	VACANT	NA
Area 5	411016126024	6739 BLUE RIDGE DR NE	SAMPLED BY R&W/GZA	614-609
Area 5	411016201021	6744 REDTAIL RIDGE DR NE	SAMPLED BY R&W/GZA	619-614
Area 5	411017226004	6759 SAMRICK AVE NE	SAMPLED BY R&W/GZA	615-605
Area 5	411017226003	6761 SAMRICK AVE NE	SAMPLED BY R&W/GZA	650-645
Area 5	411016201020	6766 REDTAIL RIDGE DR NE	SAMPLED BY R&W/GZA	615-610
Area 5	411016126022	6777 BLUE RIDGE DR NE	SAMPLED BY R&W/GZA	NA
Area 5	411016126023	6779 BLUE RIDGE DR NE	SAMPLED BY R&W/GZA	643-638
Area 5	411016102009	6780 SAMRICK AVE NE	SAMPLED BY R&W/GZA	619-615
Area 5	411016201019	6788 REDTAIL RIDGE DR NE	SAMPLED BY R&W/GZA	592-587
Area 5	411016126020	6790 CHANDLER DR NE	VACANT	NA
Area 5	411016201018	6799 REDTAIL RIDGE DR NE	SAMPLED BY R&W/GZA	603-598
Area 5	411009376011	6801 BLUE RIDGE DR NE	SAMPLED BY R&W/GZA	650-645
Area 5	411008400012	6801 SAMRICK AVE NE	MUNICIPAL WATER	NA
Area 5	411009376012	6803 BLUE RIDGE DR NE	SAMPLED BY R&W/GZA	NA
Area 5	411009451009	6810 BLUE RIDGE DR NE	SAMPLED BY R&W/GZA	620-616
Area 5	411009376010	6812 CHANDLER DR NE	SAMPLED BY R&W/GZA	661-657
Area 5	411009451008	6830 BLUE RIDGE DR NE	SAMPLED BY R&W/GZA	682-677
Area 5	411009376006	6835 BLUE RIDGE DR NE	SAMPLED BY R&W/GZA	667-662
Area 5	411009376009	6840 CHANDLER DR NE	SAMPLED BY R&W/GZA	659-654
Area 5	411009352002	6847 CHANDLER WOODS DR NE	MUNICIPAL WATER	NA
Area 5	411009451007	6850 BLUE RIDGE DR NE	SAMPLED BY R&W/GZA	628-624
Area 5	411009352011	6850 CHANDLER WOODS DR NE	MUNICIPAL WATER	NA
Area 5	411009451001	6855 BLUE RIDGE DR NE	SAMPLED BY R&W/GZA	686-681
Area 5	411009352001	6859 CHANDLER WOODS DR NE	MUNICIPAL WATER	NA
Area 5	411009352012	6862 CHANDLER WOODS DR NE	MUNICIPAL WATER	NA
Area 5	411009451002	6865 BLUE RIDGE DR NE	SAMPLED BY R&W/GZA	672-659
Area 5	411009352013	6874 CHANDLER WOODS DR NE	MUNICIPAL WATER	NA
Area 5	411009451003	6875 BLUE RIDGE DR NE	SAMPLED BY R&W/GZA	671-667
Area 5	411009451017	6879 BLUE RIDGE DR NE	SAMPLED BY R&W/GZA	NA
Area 5	411009451010	6880 BLUE RIDGE DR NE	SAMPLED BY R&W/GZA	638-633
Area 5	411009376013	6880 CHANDLER DR NE	SAMPLED BY R&W/GZA	641-637
Area 5	411009352014	6880 CHANDLER WOODS DR NE	MUNICIPAL WATER	NA
Area 5	411009451018	6885 BLUE RIDGE DR NE	SAMPLED BY R&W/GZA	652-647
Area 5	411009451005	6887 BLUE RIDGE DR NE	SAMPLED BY R&W/GZA	651-646
Area 5	411009352015	6892 CHANDLER WOODS DR NE	MUNICIPAL WATER	NA
Area 5	411009451006	6895 BLUE RIDGE DR NE	SAMPLED BY R&W/GZA	628-623

TABLE 1

PARCEL LIST AND WELL INFORMATION
Area 5
Plainfield Township, Kent County, MI

Area	PPN	Address	Note	Well Screen Elevation (feet)
Area 5	411009351007	6895 SAMRICK AVE NE	MUNICIPAL WATER	NA
Area 5	411009451011	6900 BLUE RIDGE DR NE	SAMPLED BY R&W/GZA	639-634
Area 5	411009376005	6916 CHANDLER DR NE	SAMPLED BY R&W/GZA	NA
Area 5	411009376001	6976 CHANDLER DR NE	SAMPLED BY R&W/GZA	657-653
Area 5	411009351004	6977 CHANDLER DR NE	MUNICIPAL WATER	NA
Area 5	411009376002	6986 CHANDLER DR NE	SAMPLED BY R&W/GZA	631-626
Area 5	411009376003	6990 CHANDLER DR NE	SAMPLED BY R&W/GZA	646-641
Area 5	411009376004	6996 CHANDLER DR NE	SAMPLED BY R&W/GZA	630-625
Area 5	411016301028	6390 SAMRICK AVE NE	SAMPLED BY R&W/GZA FUTUER MUNICIPAL WATER (AREA 16)	683-679

Notes:

1. Well screen elevations provided in feet above mean sea level, North American Vertical Datum of 1988 (NAVD 88). Well screen 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.
2. "NA" indicates not available.

TABLE 2
SUMMARY OF DRINKING WATER ANALYTICAL DATA - PFAS
Area 5
Algoma and Plainfield Townships, Kent County, MI

Area	Part 201 Generic Residential Groundwater Cleanup Criteria – Drinking Water[2]	MCL[3]	CD Value[4]	Area 5	Area 5	Area 5	Area 5	Area 5	Area 5	Area 5	Area 5	Area 5	Area 5	Area 5	Area 5	Area 5	Area 5	Area 5	Area 5
PPN				411017276002	411017276003	411017276007	411017276006	411017276005	411017276004	411016103001	411016103008	411016103002	411016101002	411016103007	411016103007	411016103007	411016103007	411016103007	411016103007
Address				1471 PARK FOREST CT NE	1499 PARK FOREST CT NE	1500 PARK FOREST CT NE	1506 PARK FOREST CT NE	1508 PARK FOREST CT NE	1510 PARK FOREST CT NE	1625 CORNERSTONE CT NE	1628 CORNERSTONE CT NE	1633 CORNERSTONE CT NE	1646 POST DR NE	1650 CORNERSTONE CT NE	1650 CORNERSTONE CT NE	1650 CORNERSTONE CT NE	1650 CORNERSTONE CT NE	1650 CORNERSTONE CT NE	1650 CORNERSTONE CT NE
Sample Name				1471 Park Forest Ct NE	1499 Park Forest Ct NE	1500 Park Forest Ct NE	1506 Park Forest Ct NE	1508 Park Forest Ct NE	1510 Park Forest Ct NE	1625 Cornerstone Ct NE	1628 Cornerstone Ct NE	1633 Cornerstone Ct NE	1646 Post Dr NE	1650 Cornerstone Ct NE	1650 Cornerstone-IN-12/15 Grab Water	1650 Cornerstone-IN-7/24	1650 Cornerstone-IN-1/23	1650 Cornerstone-IN-7/16	1650 Cornerstone-IN 1/9
Matrix				Drinking Water	Drinking Water	Drinking Water	Drinking Water	Drinking Water	Drinking Water	Drinking Water	Drinking Water	Drinking Water	Drinking Water	Drinking Water	POET Influent	POET Influent	POET Influent	POET Influent	POET Influent
Laboratory ID				K1711784-006	K1711784-001	K1711784-005	K1711784-004	K1711784-003	K1711784-002	K1711784-016	K1711784-011	K1711784-015	K1711788-010	K1711784-012	9372243	TG25012-008	UA24012-002	UG18020-005	VA11011-002
Sample Date				10/27/2017	10/27/2017	10/27/2017	10/27/2017	10/27/2017	10/27/2017	10/27/2017	10/27/2017	10/27/2017	10/27/2017	10/27/2017	12/15/2017	07/24/2018	01/23/2019	07/16/2019	01/09/2020
Parameter (µg/L)																			
8:2 Fluorotelomer sulfonic acid (8:2 FTS)	NCL	NA	NA	<0.0043	<0.0048	<0.0042	<0.0043	<0.0042	<0.0042	<0.0042	<0.0043	<0.0041	<0.0042	<0.0043	<0.01	-	-	-	-
6:2 Fluorotelomer sulfonic acid (6:2 FTS)	NCL	NA	NA	<0.0043	<0.0048	<0.0042	<0.0043	<0.0042	<0.0042	<0.0042	<0.0043	<0.0041	<0.0042	<0.0043	<0.01	-	-	-	-
N-Ethyl perfluorooctane sulfonamide (EtFOSA)	NCL	NA	NA	<0.0043	<0.0048	<0.0042	<0.0043	<0.0042	<0.0042	<0.0042	<0.0043	<0.0041	<0.0042	<0.0043	<0.01	-	-	-	-
N-ethylperfluoro-1-octanesulfonamidoacetic acid (EtFOSAA)	NCL	NA	NA	-	-	-	-	-	-	-	-	-	-	-	-	<0.0037	<0.004	<0.0036	<0.0036
N-Ethyl perfluorooctane sulfonamidoethanol (N-EtFOSE)	NCL	NA	NA	<0.0043	<0.0048	<0.0042	<0.0043	<0.0042	<0.0042	<0.0042	<0.0043	<0.0041	<0.0042	<0.0043	<0.005	-	-	-	-
N-Methyl perfluorooctane sulfonamide (MeFOSA)	NCL	NA	NA	<0.0043	<0.0048	<0.0042	<0.0043	<0.0042	<0.0042	<0.0042	<0.0043	<0.0041	<0.0042	<0.0043	<0.01	-	-	-	-
N-methylperfluoro-1-octanesulfonamidoacetic acid (MeFOSAA)	NCL	NA	NA	-	-	-	-	-	-	-	-	-	-	-	-	<0.0037	<0.004	<0.0036	<0.0036
N-Methyl perfluorooctane sulfonamidoethanol (N-MeFOSE)	NCL	NA	NA	<0.0043	<0.0048	<0.0042	<0.0043	<0.0042	<0.0042	<0.0042	<0.0043	<0.0041	<0.0042	<0.0043	<0.005	-	-	-	-
Perfluorobutane sulfonic acid (PFBS)	NCL	0.42	NA	<0.0043	<0.0048	<0.0042	<0.0043	<0.0042	<0.0042	<0.0042	<0.0043	<0.0041	<0.0042	<0.0043	<0.002	<0.0037	<0.004	<0.0036	<0.0036
Perfluorodecane sulfonic acid (PFDS)	NCL	NA	NA	<0.0043	<0.0048	<0.0042	<0.0043	<0.0042	<0.0042	<0.0042	<0.0043	<0.0041	<0.0042	<0.0043	<0.003	-	-	-	-
Perfluorooctadecanoic acid (PFODA)	NCL	NA	NA	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Perfluoroheptane sulfonic acid (PFHpS)	NCL	NA	NA	<0.0043	<0.0048	<0.0042	<0.0043	<0.0042	<0.0042	<0.0042	<0.0043	<0.0041	<0.0042	<0.0043	<0.003	-	-	-	-
Perfluorooctane sulfonamide (FOSA)	NCL	NA	NA	<0.0043	<0.0048	<0.0042	<0.0043	<0.0042	<0.0042	<0.0042	<0.0043	<0.0041	<0.0042	<0.0043	<0.005	-	-	-	-
Perfluorohexane sulfonic acid (PFHxS)	NCL	0.051	NA	<0.0043	<0.0048	<0.0042	<0.0043	<0.0042	<0.0042	<0.0042	<0.0043	<0.0041	<0.0042	<0.0043	<0.003	<0.0037	<0.004	<0.0036	<0.0036
Perfluorobutanoic acid (PFBA)	NCL	NA	NA	<0.0086	<0.0097	<0.0083	<0.0086	<0.0083	<0.0083	<0.0083	<0.0086	<0.0081	<0.0083	<0.0086	<0.01	-	-	-	-
Perfluorodecanoic acid (PFDA)	NCL	NA	NA	<0.0043	<0.0048	<0.0042	<0.0043	<0.0042	<0.0042	<0.0042	<0.0043	<0.0041	<0.0042	<0.0043	<0.003	<0.0037	<0.004	<0.0036	<0.0036
Perfluorododecanoic acid (PFDoDA)	NCL	NA	NA	<0.0043	<0.0048	<0.0042	<0.0043	<0.0042	<0.0042	<0.0042	<0.0043	<0.0041	<0.0042	<0.0043	<0.002	<0.0037	<0.004	<0.0036	<0.0036
Perfluoroheptanoic acid (PFHpA)	NCL	NA	NA	<0.0043	<0.0048	<0.0042	<0.0043	<0.0042	<0.0042	<0.0042	<0.0043	<0.0041	<0.0042	<0.0043	<0.002	<0.0037	<0.004	<0.0036	<0.0036
Perfluorohexanoic acid (PFHxA)	NCL	400	NA	<0.0043	<0.0048	<0.0042	<0.0043	<0.0042	<0.0042	<0.0042	<0.0043	<0.0041	<0.0042	<0.0043	<0.003	<0.0037	<0.004	<0.0036	<0.0036
Perfluorononanoic acid (PFNA)	NCL	0.006	NA	<0.0043	<0.0048	<0.0042	<0.0043	<0.0042	<0.0042	<0.0042	<0.0043	<0.0041	<0.0042	<0.0043	<0.003	<0.0037	<0.004	<0.0036	<0.0036
Perfluorooctanoic acid (PFOA)	0.008	0.008	NA	<0.0017	<0.0019	<0.0017	<0.0017	<0.0017	<0.0017	<0.0017	<0.0017	<0.0016	<0.0017	0.0034	<0.002	<0.0037	<0.004	<0.0036	<0.0036
Perfluorooctane sulfonic acid (PFOS)	0.016	0.016	NA	<0.0043	<0.0048	<0.0042	<0.0043	<0.0042	<0.0042	<0.0042	<0.0043	<0.0041	<0.0042	<0.0043	0.004	<0.0037	<0.004	<0.0036	<0.0036
PFOA + PFOS (Calculated)	NCL	NA	0.01	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.0034	0.004	ND	ND	ND	ND
Perfluoropentanoic acid (PFPeA)	NCL	NA	NA	<0.0043	<0.0048	<0.0042	<0.0043	<0.0042	<0.0042	<0.0042	<0.0043	<0.0041	<0.0042	<0.0043	<0.01	-	-	-	-
Perfluorotetradecanoic acid (PFTeDA)	NCL	NA	NA	<0.0043	<0.0048	<0.0042	<0.0043	<0.0042	<0.0042	<0.0042	<0.0043	<0.0041	<0.0042	<0.0043	<0.002	<0.0037	<0.004	<0.0036	<0.0036
Perfluorotridecanoic acid (PFTrDA)	NCL	NA	NA	<0.0043	<0.0048	<0.0042	<0.0043	<0.0042	<0.0042	<0.0042	<0.0043	<0.0041	<0.0042	<0.0043	<0.002	<0.0037	<0.004	<0.0036	<0.0036
Perfluoroundecanoic acid (PFUnDA)	NCL	NA	NA	<0.0043	<0.0048	<0.0042	<0.0043	<0.0042	<0.0042	<0.0042	<0.0043	<0.0041	<0.0042	<0.0043	<0.003	<0.0037	<0.004	<0.0036	<0.0036
Perfluorohexadecanoic acid (PFHxDA)	NCL	NA	NA	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total PFAS (Calculated)	NCL	NA	NA	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.0034	0.004	ND	ND	ND	ND

TABLE 2

SUMMARY OF DRINKING WATER ANALYTICAL DATA - PFAS
Area 5
Algoma and Plainfield Townships, Kent County, MI

Area	**Part 201 Generic Residential Groundwater Cleanup Criteria – Drinking Water[2]**	**MCL[3]**	**CD Value[4]**	**Area 5**	**Area 5**	**Area 5**	**Area 5**	**Area 5 (Municipal)**	**Area 5**	**Area 5**	**Area 5**	**Area 5**	**Area 5**	**Area 5**	**Area 5**	**Area 5**	**Area 5**	**Area 5**	**Area 5**
PPN				**411016103003**	**411016103006**	**411016103005**	**411016101012**	**411016101013**	**411016101009**	**411016102007**	**411016365022**	**411016126021**	**411016126002**	**411016126010**	**411016126013**	**411016376009**	**411016376016**	**411016126007**	**411016126025**
Address				**1651 CORNERSTONE CT NE**	**1662 CORNERSTONE CT NE**	**1678 CORNERSTONE CT NE**	**1690 POST DR NE**	**1730 POST DR NE**	**1772 POST DR NE**	**1790 POST DR NE**	**1799 ROGUE RIVER RD NE**	**1815 POST DR NE**	**1825 POST DR NE**	**1845 POST DR NE**	**1861 POST DR NE**	**1867 ROGUE RIVER RD NE**	**1879 ROGUE RIVER RD NE**	**1881 POST DR NE**	**1901 POST DR NE**
Sample Name				**1651 Cornerstone Ct NE**	**1662 Cornerstone Ct NE**	**1678 Cornerstone Ct NE**	**1690 Post Dr NE**	**1730 Post Dr NE**	**1772 Post Dr NE**	**1790 Post Dr NE**	**1799 Rogue River Rd NE**	**1815 Post**	**1825 Post Dr NE**	**1845 Post Dr NE**	**1861 Post Dr NE**	**1867 Rogue River Rd NE**	**1879 Rogue River Rd NE**	**1881 Post**	**1901 Post Dr NE**
Matrix				**Drinking Water**	**Drinking Water**	**Drinking Water**	**Drinking Water**	**Drinking Water**	**Drinking Water**	**Drinking Water**	**Drinking Water**	**Drinking Water**	**Drinking Water**	**Drinking Water**	**Drinking Water**	**Drinking Water**	**Drinking Water**	**Drinking Water**	**Drinking Water**
Laboratory ID				**K1711784-014**	**K1711846-010**	**K1711784-013**	**K1711784-007**	**K1711961-001**	**K1712064-001**	**K1711846-004**	**K1711787-013**	**K1711844-008**	**K1711788-014**	**K1711788-013**	**K1711788-017**	**K1711787-014**	**K1711849-015**	**K1712267-001**	**K1711788-001**
Sample Date				**10/27/2017**	**10/30/2017**	**10/27/2017**	**10/27/2017**	**11/01/2017**	**11/03/2017**	**10/30/2017**	**10/27/2017**	**10/31/2017**	**10/27/2017**	**10/27/2017**	**10/27/2017**	**10/27/2017**	**10/30/2017**	**11/09/2017**	**10/27/2017**
Parameter (µg/L)																			
8:2 Fluorotelomer sulfonic acid (8:2 FTS)	NCL	NA	NA	<0.0043	<0.0043	<0.0042	<0.0043	<0.0042	<0.0044	<0.0042	<0.0043	<0.0043	<0.0041	<0.0044	<0.0042	<0.0044	<0.0043	<0.0041	<0.0042
6:2 Fluorotelomer sulfonic acid (6:2 FTS)	NCL	NA	NA	<0.0043	<0.0043	<0.0042	<0.0043	<0.0042	<0.0044	<0.0042	<0.0043	<0.0043	<0.0041	<0.0044	<0.0042	<0.0044	<0.0043	<0.0041	<0.0042
N-Ethyl perfluorooctane sulfonamide (EtFOSA)	NCL	NA	NA	<0.0043	<0.0043	<0.0042	<0.0043	<0.0042	<0.0044	<0.0042	<0.0043	<0.0043	<0.0041	<0.0044	<0.0042	<0.0044	<0.0043	<0.0041	<0.0042
N-ethylperfluoro-1-octanesulfonamidoacetic acid (EtFOSAA)	NCL	NA	NA	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
N-Ethyl perfluorooctane sulfonamidoethanol (N-EtFOSE)	NCL	NA	NA	<0.0043	<0.0043	<0.0042	<0.0043	<0.0042	<0.0044	<0.0042	<0.0043	<0.0043	<0.0041	<0.0044	<0.0042	<0.0044	<0.0043	<0.0041	<0.0042
N-Methyl perfluorooctane sulfonamide (MeFOSA)	NCL	NA	NA	<0.0043	<0.0043	<0.0042	<0.0043	<0.0042	<0.0044	<0.0042	<0.0043	<0.0043	<0.0041	<0.0044	<0.0042	<0.0044	<0.0043	<0.0041	<0.0042
N-methylperfluoro-1-octanesulfonamidoacetic acid (MeFOSAA)	NCL	NA	NA	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
N-Methyl perfluorooctane sulfonamidoethanol (N-MeFOSE)	NCL	NA	NA	<0.0043	<0.0043	<0.0042	<0.0043	<0.0042	<0.0044	<0.0042	<0.0043	<0.0043	<0.0041	<0.0044	<0.0042	<0.0044	<0.0043	<0.0041	<0.0042
Perfluorobutane sulfonic acid (PFBS)	NCL	0.42	NA	<0.0043	<0.0043	<0.0042	<0.0043	<0.0042	<0.0044	<0.0042	<0.0043	<0.0043	<0.0041	<0.0044	<0.0042	<0.0044	<0.0043	<0.0041	<0.0042
Perfluorodecane sulfonic acid (PFDS)	NCL	NA	NA	<0.0043	<0.0043	<0.0042	<0.0043	<0.0042	<0.0044	<0.0042	<0.0043	<0.0043	<0.0041	<0.0044	<0.0042	<0.0044	<0.0043	<0.0041	<0.0042
Perfluorooctadecanoic acid (PFODA)	NCL	NA	NA	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Perfluoroheptane sulfonic acid (PFHpS)	NCL	NA	NA	<0.0043	<0.0043	<0.0042	<0.0043	<0.0042	<0.0044	<0.0042	<0.0043	<0.0043	<0.0041	<0.0044	<0.0042	<0.0044	<0.0043	<0.0041	<0.0042
Perfluorooctane sulfonamide (FOSA)	NCL	NA	NA	<0.0043	<0.0043	<0.0042	<0.0043	<0.0042	<0.0044	<0.0042	<0.0043	<0.0043	<0.0041	<0.0044	<0.0042	<0.0044	<0.0043	<0.0041	<0.0042
Perfluorohexane sulfonic acid (PFHxS)	NCL	0.051	NA	<0.0043	<0.0043	<0.0042	<0.0043	<0.0042	<0.0044	<0.0042	<0.0043	<0.0043	<0.0041	<0.0044	<0.0042	<0.0044	<0.0043	<0.0041	<0.0042
Perfluorobutanoic acid (PFBA)	NCL	NA	NA	<0.0086	<0.0086	<0.0083	<0.0086	<0.0085	<0.0088	<0.0083	<0.0086	<0.0086	<0.0081	<0.0088	<0.0083	<0.0088	<0.0087	<0.0081	<0.0083
Perfluorodecanoic acid (PFDA)	NCL	NA	NA	<0.0043	<0.0043	<0.0042	<0.0043	<0.0042	<0.0044	<0.0042	<0.0043	<0.0043	<0.0041	<0.0044	<0.0042	<0.0044	<0.0043	<0.0041	<0.0042
Perfluorododecanoic acid (PFDoDA)	NCL	NA	NA	<0.0043	<0.0043	<0.0042	<0.0043	<0.0042	<0.0044	<0.0042	<0.0043	<0.0043	<0.0041	<0.0044	<0.0042	<0.0044	<0.0043	<0.0041	<0.0042
Perfluoroheptanoic acid (PFHpA)	NCL	NA	NA	<0.0043	<0.0043	<0.0042	<0.0043	<0.0042	<0.0044	<0.0042	<0.0043	<0.0043	<0.0041	<0.0044	<0.0042	<0.0044	<0.0043	<0.0041	<0.0042
Perfluorohexanoic acid (PFHxA)	NCL	400	NA	<0.0043	<0.0043	<0.0042	<0.0043	<0.0042	<0.0044	<0.0042	<0.0043	<0.0043	<0.0041	0.0055	<0.0042	<0.0044	<0.0043	<0.0041	<0.0042
Perfluorononanoic acid (PFNA)	NCL	0.006	NA	<0.0043	<0.0043	<0.0042	<0.0043	<0.0042	<0.0044	<0.0042	<0.0043	<0.0043	<0.0041	<0.0044	<0.0042	<0.0044	<0.0043	<0.0041	<0.0042
Perfluorooctanoic acid (PFOA)	0.008	0.008	NA	<0.0017	<0.0017	<0.0017	<0.0017	<0.0017	<0.0018	<0.0017	<0.0017	<0.0017	<0.0016	<0.0018	<0.0017	<0.0018	<0.0017	<0.0016	<0.0017
Perfluorooctane sulfonic acid (PFOS)	0.016	0.016	NA	<0.0043	<0.0043	<0.0042	<0.0043	<0.0042	<0.0044	<0.0042	<0.0043	<0.0043	<0.0041	<0.0044	<0.0042	<0.0044	<0.0043	<0.0041	<0.0042
PFOA + PFOS (Calculated)	NCL	NA	0.01	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Perfluoropentanoic acid (PFPeA)	NCL	NA	NA	<0.0043	<0.0043	<0.0042	<0.0043	<0.0042	<0.0044	<0.0042	<0.0043	<0.0043	<0.0041	<0.0044	<0.0042	<0.0044	<0.0043	<0.0041	<0.0042
Perfluorotetradecanoic acid (PFTeDA)	NCL	NA	NA	<0.0043	<0.0043	<0.0042	<0.0043	<0.0042	<0.0044	<0.0042	<0.0043	<0.0043	<0.0041	<0.0044	<0.0042	<0.0044	<0.0043	<0.0041	<0.0042
Perfluorotridecanoic acid (PFTrDA)	NCL	NA	NA	<0.0043	<0.0043	<0.0042	<0.0043	<0.0042	<0.0044	<0.0042	<0.0043	<0.0043	<0.0041	<0.0044	<0.0042	<0.0044	<0.0043	<0.0041	<0.0042
Perfluoroundecanoic acid (PFUnDA)	NCL	NA	NA	<0.0043	<0.0043	<0.0042	<0.0043	<0.0042	<0.0044	<0.0042	<0.0043	<0.0043	<0.0041	<0.0044	<0.0042	<0.0044	<0.0043	<0.0041	<0.0042
Perfluorohexadecanoic acid (PFHxDA)	NCL	NA	NA	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total PFAS (Calculated)	NCL	NA	NA	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.0055	ND	ND	ND	ND	ND

TABLE 2
SUMMARY OF DRINKING WATER ANALYTICAL DATA - PFAS
Area 5
Algoma and Plainfield Townships, Kent County, MI

Area	**Part 201 Generic Residential Groundwater Cleanup Criteria – Drinking Water^{2}**	**MCL^{3}**	**CD Value^{4}**	**Area 5**	**Area 5**	**Area 5**	**Area 5**	**Area 5**	**Area 5**	**Area 5**	**Area 5**	**Area 5**	**Area 5**	**Area 5**	**Area 5**	**Area 5**	**Area 5**	**Area 5**	**Area 5**
PPN				**411016376010**	**411016126026**	**411016126026**	**411016126026**	**411016126026**	**411016126026**	**411016126026**	**411016176012**	**411016126018**	**411016176013**	**411016176024**	**411016201002**	**411016201009**	**411016201009**	**411016251007**	**411016201015**
Address				**1901 ROGUE RIVER RD NE**	**1939 POST DR NE**	**1939 POST DR NE**	**1939 POST DR NE**	**1939 POST DR NE**	**1939 POST DR NE**	**1939 POST DR NE**	**1970 POST DR NE**	**1977 POST DR NE**	**1978 POST DR NE**	**1990 POST DR NE**	**2001 POST DR NE**	**2035 POST DR NE**	**2035 POST DR NE**	**2062 POST DR NE**	**2069 POST DR NE**
Sample Name				**1901 Rogue River Rd**	**1939 Post Drive NE**	**1939 Post-IN-11/29 Grab Potable Water**	**1939 Post Dr-IN-5/30**	**1939 Post Dr NE-IN-11/28**	**1939 Post-IN-5/28**	**1939 Post-IN-12/10**	**1970 Post**	**1977 Post Drive NE**	**1978 Post Dr NE**	**1990 Post Dr NE**	**2001 Post Dr NE**	**2035 Post Drive NE**	**2035 Post Drive**	**2062 Post Dr NE**	**2069 Post Drive NE**
Matrix				**Drinking Water**	**Drinking Water**	**POET Influent**	**POET Influent**	**POET Influent**	**POET Influent**	**POET Influent**	**Drinking Water**	**Drinking Water**	**Drinking Water**	**Drinking Water**	**Drinking Water**	**Drinking Water**	**Drinking Water**	**Drinking Water**	**Drinking Water**
Laboratory ID				**K1711849-016**	**K1711614-007**	**9341056**	**TE31015-002**	**TK29070-008**	**UE30027-005**	**UL12029-006**	**UA10018-001**	**K1711614-008**	**K1711846-005**	**K1711846-006**	**K1711716-021**	**K1711614-009**	**K1800841-001**	**K1711846-007**	**K1711614-010**
Sample Date				**10/30/2017**	**10/24/2017**	**11/29/2017**	**05/30/2018**	**11/28/2018**	**05/28/2019**	**12/10/2019**	**01/07/2019**	**10/24/2017**	**10/30/2017**	**10/30/2017**	**10/26/2017**	**10/24/2017**	**01/25/2018**	**10/30/2017**	**10/24/2017**
Parameter (μg/L)																			
8:2 Fluorotelomer sulfonic acid (8:2 FTS)	NCL	NA	NA	<0.0044	<0.0042	<0.006	-	-	-	-	-	<0.0042	<0.0042	<0.0043	<0.0041	<0.0042	<0.0041	<0.0043	<0.0042
6:2 Fluorotelomer sulfonic acid (6:2 FTS)	NCL	NA	NA	<0.0044	<0.0042	<0.009	-	-	-	-	-	<0.0042	<0.0042	<0.0043	<0.0041	<0.0042	<0.0041	<0.0043	<0.0042
N-Ethyl perfluorooctane sulfonamide (EtFOSA)	NCL	NA	NA	<0.0044	<0.0042	<0.009	-	-	-	-	-	<0.0042	<0.0042	<0.0043	<0.0041	<0.0042	<0.0041	<0.0043	<0.0042
N-ethylperfluoro-1-octanesulfonamidoacetic acid (EtFOSAA)	NCL	NA	NA	-	-	-	<0.0036	<0.0036	<0.0036	<0.0036	<0.0038	-	-	-	-	-	-	-	-
N-Ethyl perfluorooctane sulfonamidoethanol (N-EtFOSE)	NCL	NA	NA	<0.0044	<0.0042	<0.003	-	-	-	-	-	<0.0042	<0.0042	<0.0043	<0.0041	<0.0042	<0.0041	<0.0043	<0.0042
N-Methyl perfluorooctane sulfonamide (MeFOSA)	NCL	NA	NA	<0.0044	<0.0042	<0.009	-	-	-	-	-	<0.0042	<0.0042	<0.0043	<0.0041	<0.0042	<0.0041	<0.0043	<0.0042
N-methylperfluoro-1-octanesulfonamidoacetic acid (MeFOSAA)	NCL	NA	NA	-	-	-	<0.0036	<0.0036	<0.0036	<0.0036	<0.0038	-	-	-	-	-	-	-	-
N-Methyl perfluorooctane sulfonamidoethanol (N-MeFOSE)	NCL	NA	NA	<0.0044	<0.0042	<0.003	-	-	-	-	-	<0.0042	<0.0042	<0.0043	<0.0041	<0.0042	<0.0041	<0.0043	<0.0042
Perfluorobutane sulfonic acid (PFBS)	NCL	0.42	NA	<0.0044	<0.0042	0.004	0.0036	0.0036	0.006	0.004	<0.0038	<0.0042	<0.0042	<0.0043	<0.0041	<0.0042	<0.0041	<0.0043	<0.0042
Perfluorodecane sulfonic acid (PFDS)	NCL	NA	NA	<0.0044	<0.0042	<0.002	-	-	-	-	-	<0.0042	<0.0042	<0.0043	<0.0041	<0.0042	<0.0041	<0.0043	<0.0042
Perfluorooctadecanoic acid (PFODA)	NCL	NA	NA	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Perfluoroheptane sulfonic acid (PFHpS)	NCL	NA	NA	<0.0044	<0.0042	<0.002	-	-	-	-	-	<0.0042	<0.0042	<0.0043	<0.0041	<0.0042	<0.0041	<0.0043	<0.0042
Perfluorooctane sulfonamide (FOSA)	NCL	NA	NA	<0.0044	<0.0042	<0.003	-	-	-	-	-	<0.0042	<0.0042	<0.0043	<0.0041	<0.0042	<0.0041	<0.0043	<0.0042
Perfluorohexene sulfonic acid (PFHxS)	NCL	0.051	NA	<0.0044	<0.0042	0.003	<0.0036	<0.0036	<0.0036	<0.0036	<0.0038	<0.0042	<0.0042	<0.0043	<0.0041	<0.0042	<0.0041	<0.0043	<0.0042
Perfluorobutanoic acid (PFBA)	NCL	NA	NA	<0.0088	<0.0083	0.004 J	-	-	-	-	-	<0.0083	<0.0083	<0.0086	<0.0081	<0.0083	<0.0082	<0.0086	<0.0083
Perfluorodecanoic acid (PFDA)	NCL	NA	NA	<0.0044	<0.0042	0.001 J	<0.0036	<0.0036	<0.0036	<0.0036	<0.0038	<0.0042	<0.0042	<0.0043	<0.0041	<0.0042	<0.0041	<0.0043	<0.0042
Perfluorododecanoic acid (PFDoDA)	NCL	NA	NA	<0.0044	<0.0042	<0.001	<0.0036	<0.0036	<0.0036	<0.0036	<0.0038	<0.0042	<0.0042	<0.0043	<0.0041	<0.0042	<0.0041	<0.0043	<0.0042
Perfluoroheptanoic acid (PFHpA)	NCL	NA	NA	<0.0044	<0.0042	0.002	<0.0036	<0.0036	<0.0036	<0.0036	<0.0038	<0.0042	<0.0042	<0.0043	<0.0041	<0.0042	<0.0041	<0.0043	<0.0042
Perfluorohexanoic acid (PFHxA)	NCL	400	NA	<0.0044	0.0044	0.005	<0.0036	<0.0036	0.0087	<0.0036	<0.0038	<0.0042	<0.0042	<0.0043	<0.0041	<0.0042	<0.0041	<0.0043	<0.0042
Perfluorononanoic acid (PFNA)	NCL	0.006	NA	<0.0044	<0.0042	<0.002	<0.0036	<0.0036	<0.0036	<0.0036	<0.0038	<0.0042	<0.0042	<0.0043	<0.0041	<0.0042	<0.0041	<0.0043	<0.0042
Perfluorooctanoic acid (PFOA)	0.008	0.008	NA	<0.0018	0.0026	0.004	<0.0036	<0.0036	0.0057	0.0042	<0.0038	<0.0017	<0.0017	<0.0017	<0.0016	<0.0017	<0.0016	<0.0017	<0.0017
Perfluorooctane sulfonic acid (PFOS)	0.016	0.016	NA	<0.0044	<0.0042	0.003	<0.0036	<0.0036	<0.0036	<0.0036	<0.0038	<0.0042	<0.0042	<0.0043	<0.0041	<0.0042	<0.0041	<0.0043	<0.0042
PFOA + PFOS (Calculated)	NCL	NA	0.01	ND	0.0026	0.007	ND	ND	0.0057	0.0042	ND	ND	ND	ND	ND	ND	ND	ND	ND
Perfluoropentanoic acid (PFPeA)	NCL	NA	NA	<0.0044	<0.0042	0.004 J	-	-	-	-	-	<0.0042	<0.0042	<0.0043	<0.0041	<0.0042	<0.0041	<0.0043	<0.0042
Perfluorotetradecanoic acid (PFTeDA)	NCL	NA	NA	<0.0044	<0.0042	<0.001	<0.0036	<0.0036	<0.0036	<0.0036	<0.0038	<0.0042	<0.0042	<0.0043	<0.0041	<0.0042	<0.0041	<0.0043	<0.0042
Perfluorotridecanoic acid (PFTrDA)	NCL	NA	NA	<0.0044	<0.0042	<0.001	<0.0036	<0.0036	<0.0036	<0.0036	<0.0038	<0.0042	<0.0042	<0.0043	<0.0041	<0.0042	<0.0041	<0.0043	<0.0042
Perfluoroundecanoic acid (PFUnDA)	NCL	NA	NA	<0.0044	<0.0042	<0.002	<0.0036	<0.0036	<0.0036	<0.0036	<0.0038	<0.0042	<0.0042	<0.0043	<0.0041	<0.0042	<0.0041	<0.0043	<0.0042
Perfluorohexadecanoic acid (PFHxDA)	NCL	NA	NA	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total PFAS (Calculated)	NCL	NA	NA	ND	0.007	0.03	0.0036	0.0036	0.02	0.0082	ND	ND	ND	ND	ND	ND	ND	ND	ND

TABLE 2
SUMMARY OF DRINKING WATER ANALYTICAL DATA - PFAS
Area 5
Algoma and Plainfield Townships, Kent County, MI

Area	**Part 201 Generic Residential Groundwater Cleanup Criteria – Drinking Water^2**	**MCL^3**	**CD Value^4**	**Area 5**	**Area 5**	**Area 5**	**Area 5**	**Area 5**	**Area 5**	**Area 5**	**Area 5**	**Area 5**	**Area 5**	**Area 5**	**Area 5**	**Area 5**	**Area 5**	**Area 5**	**Area 5**
PPN				**411016251005**	**411016201011**	**411016201011**	**411016201011**	**411016201011**	**411016201011**	**411016201011**	**411016201007**	**411016201007**	**411016201007**	**411016201007**	**411016201007**	**411016201007**	**411016201017**	**411016201017**	**411016201017**
Address				**2086 POST DR NE**	**2101 POST DR NE**	**2101 POST DR NE**	**2101 POST DR NE**	**2101 POST DR NE**	**2101 POST DR NE**	**2101 POST DR NE**	**2141 POST DR NE**	**2141 POST DR NE**	**2141 POST DR NE**	**2141 POST DR NE**	**2141 POST DR NE**	**2141 POST DR NE**	**2153 POST DR NE**	**2153 POST DR NE**	**2153 POST DR NE**
Sample Name				**2086 Post Dr NE**	**2101 Post Dr NE**	**2101 Post-IN-12/13 Grab Potable Water**	**2101 Post-IN-6/13**	**2101 Post Dr NE-IN-12/12**	**2101 Post-IN-7/10**	**2101 Post-IN-1/15**	**2141 Post Drive NE**	**2141 Post-IN-12/7 Grab Potable Water**	**2141 Post-IN-7/24**	**2141 Post-IN-1/22**	**2141 Post-IN-7/31**	**2141 Post-IN-1/29**	**2153 Post Drive NE**	**2153 Post-IN-12/12 Grab Potable Water**	**2153 POST-IN-8/6**
Matrix				**Drinking Water**	**Drinking Water**	**POET Influent**	**POET Influent**	**POET Influent**	**POET Influent**	**POET Influent**	**Drinking Water**	**POET Influent**	**POET Influent**	**POET Influent**	**POET Influent**	**POET Influent**	**Drinking Water**	**POET Influent**	**POET Influent**
Laboratory ID				**K1711846-008**	**K1711788-002**	**9367796**	**TF14010-012**	**TL14024-009**	**UG11014-004**	**VA16025-003**	**K1711614-011**	**9359938**	**TG25012-006**	**UA24005-007**	**UH01045-006**	**VA30052-011**	**K1711614-012**	**9367879**	**L1830458-02**
Sample Date				**10/30/2017**	**10/27/2017**	**12/13/2017**	**06/13/2018**	**12/12/2018**	**07/10/2019**	**01/15/2020**	**10/24/2017**	**12/07/2017**	**07/24/2018**	**01/22/2019**	**07/31/2019**	**01/29/2020**	**10/24/2017**	**12/12/2017**	**08/06/2018**
Parameter (µg/L)																			
8:2 Fluorotelomer sulfonic acid (8:2 FTS)	NCL	NA	NA	<0.0043	<0.0042	<0.006	-	-	-	-	<0.0042	<0.005	-	-	-	-	<0.0042	<0.006	-
6:2 Fluorotelomer sulfonic acid (6:2 FTS)	NCL	NA	NA	<0.0043	<0.0042	<0.008	-	-	-	-	<0.0042	<0.008	-	-	-	-	<0.0042	<0.008	-
N-Ethyl perfluorooctane sulfonamide (EtFOSA)	NCL	NA	NA	<0.0043	<0.0042	<0.008	-	-	-	-	<0.0042	<0.008	-	-	-	-	<0.0042	<0.008	-
N-ethylperfluoro-1-octanesulfonamidoacetic acid (EtFOSAA)	NCL	NA	NA	-	-	-	<0.0036	<0.0037	<0.0034	<0.0036	-	-	<0.0038	<0.004	<0.0035	<0.0036	-	-	<0.00386
N-Ethyl perfluorooctane sulfonamidoethanol (N-EtFOSE)	NCL	NA	NA	<0.0043	<0.0042	<0.003	-	-	-	-	<0.0042	<0.003	-	-	-	-	<0.0042	<0.003	-
N-Methyl perfluorooctane sulfonamide (MeFOSA)	NCL	NA	NA	<0.0043	<0.0042	<0.008	-	-	-	-	<0.0042	<0.008	-	-	-	-	<0.0042	<0.008	-
N-methylperfluoro-1-octanesulfonamidoacetic acid (MeFOSAA)	NCL	NA	NA	-	-	-	<0.0036	<0.0037	<0.0034	<0.0036	-	-	<0.0038	<0.004	<0.0035	<0.0036	-	-	<0.00386
N-Methyl perfluorooctane sulfonamidoethanol (N-MeFOSE)	NCL	NA	NA	<0.0043	<0.0042	<0.003	-	-	-	-	<0.0042	<0.003	-	-	-	-	<0.0042	<0.003	-
Perfluorobutane sulfonic acid (PFBS)	NCL	0.42	NA	<0.0043	0.0058	0.006	0.0066	0.0051	<0.0034	<0.0036	0.0097	0.011	0.0069	0.0044	0.0064	0.0048	<0.0042	0.004	<0.00386
Perfluorodecane sulfonic acid (PFDS)	NCL	NA	NA	<0.0043	<0.0042	<0.002	-	-	-	-	<0.0042	<0.002	-	-	-	-	<0.0042	<0.002	-
Perfluorooctadecanoic acid (PFODA)	NCL	NA	NA	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Perfluoroheptane sulfonic acid (PFHpS)	NCL	NA	NA	<0.0043	<0.0042	<0.002	-	-	-	-	<0.0042	<0.002	-	-	-	-	<0.0042	<0.002	-
Perfluorooctane sulfonamide (FOSA)	NCL	NA	NA	<0.0043	<0.0042	<0.003	-	-	-	-	<0.0042	<0.003	-	-	-	-	<0.0042	<0.003	-
Perfluorohexane sulfonic acid (PFHxS)	NCL	0.051	NA	<0.0043	<0.0042	0.002 J	<0.0036	<0.0037	<0.0034	<0.0036	<0.0042	0.001 J	<0.0038	<0.004	<0.0035	<0.0036	<0.0042	0.001 J	<0.00386
Perfluorobutanoic acid (PFBA)	NCL	NA	NA	<0.0086	<0.0083	<0.006	-	-	-	-	<0.0083	0.002 J	-	-	-	-	<0.0083	<0.006	-
Perfluorodecanoic acid (PFDA)	NCL	NA	NA	<0.0043	<0.0042	0.001 JB	<0.0036	<0.0037	<0.0034	<0.0036	<0.0042	0.001 J	<0.0038	<0.004	<0.0035	<0.0036	<0.0042	<0.002	<0.00386
Perfluorododecanoic acid (PFDoDA)	NCL	NA	NA	<0.0043	<0.0042	<0.0009	<0.0036	<0.0037	<0.0034	<0.0036	<0.0042	<0.0009	<0.0038	<0.004	<0.0035	<0.0036	<0.0042	<0.0009	<0.00386
Perfluoroheptanoic acid (PFHpA)	NCL	NA	NA	<0.0043	<0.0042	0.0008 J	<0.0036	<0.0037	<0.0034	<0.0036	<0.0042	0.0009	<0.0038	<0.004	<0.0035	<0.0036	<0.0042	0.0007 J	<0.00386
Perfluorohexanoic acid (PFHxA)	NCL	400	NA	<0.0043	<0.0042	0.002	<0.0036	<0.0037	<0.0034	<0.0036	<0.0042	0.002	<0.0038	<0.004	<0.0035	<0.0036	<0.0042	0.001 J	<0.00386
Perfluorononanoic acid (PFNA)	NCL	0.006	NA	<0.0043	<0.0042	<0.002	<0.0036	<0.0037	<0.0034	<0.0036	<0.0042	<0.002	<0.0038	<0.004	<0.0035	<0.0036	<0.0042	<0.002	<0.00386
Perfluorooctanoic acid (PFOA)	0.008	0.008	NA	<0.0017	0.0035	0.003	<0.0036	<0.0037	<0.0034	<0.0036	0.0022	0.003	<0.0038	<0.004	<0.0035	<0.0036	0.0033	0.003	0.00393
Perfluorooctane sulfonic acid (PFOS)	0.016	0.016	NA	<0.0043	<0.0042	0.005	<0.0036	<0.0037	<0.0034	<0.0036	<0.0042	0.003	<0.0038	<0.004	<0.0035	<0.0036	<0.0042	0.01	<0.00386
PFOA + PFOS (Calculated)	NCL	NA	0.01	ND	0.0035	0.008	ND	ND	ND	ND	0.0022	0.006	ND	ND	ND	ND	0.0033	***0.013***	0.0039
Perfluoropentanoic acid (PFPeA)	NCL	NA	NA	<0.0043	<0.0042	<0.006	-	-	-	-	<0.0042	<0.005	-	-	-	-	<0.0042	<0.006	-
Perfluorotetradecanoic acid (PFTeDA)	NCL	NA	NA	<0.0043	<0.0042	<0.0009	<0.0036	<0.0037	<0.0034	<0.0036	<0.0042	<0.0009	<0.0038	<0.004	<0.0035	<0.0036	<0.0042	<0.0009	<0.00386
Perfluorotridecanoic acid (PFTrDA)	NCL	NA	NA	<0.0043	<0.0042	<0.0009	<0.0036	<0.0037	<0.0034	<0.0036	<0.0042	<0.0009	<0.0038	<0.004	<0.0035	<0.0036	<0.0042	<0.0009	<0.00386
Perfluoroundecanoic acid (PFUnDA)	NCL	NA	NA	<0.0043	<0.0042	<0.002	<0.0036	<0.0037	<0.0034	<0.0036	<0.0042	<0.002	<0.0038	<0.004	<0.0035	<0.0036	<0.0042	<0.002	<0.00386
Perfluorohexadecanoic acid (PFHxDA)	NCL	NA	NA	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total PFAS (Calculated)	NCL	NA	NA	ND	0.0093	0.02	0.0066	0.0051	ND	ND	0.012	0.024	0.0069	0.0044	0.0064	0.0048	0.0033	0.02	0.0039

TABLE 2
SUMMARY OF DRINKING WATER ANALYTICAL DATA - PFAS
Area 5
Algoma and Plainfield Townships, Kent County, MI

Area	Part 201 Generic Residential Groundwater Cleanup Criteria – Drinking Water^2	MCL^3	CD Value^4	Area 5	Area 5	Area 5	Area 5	Area 5	Area 5	Area 5	Area 5	Area 5	Area 5	Area 5	Area 5	Area 5	Area 5	Area 5	Area 5
PPN				411016201017	411016201017	411016201017	411016376044	411016376043	411016451030	411016451035	411016376005	411016451052	411016451094	411016376045	411016376015	411016365045	411016376022	411016376022	411016376035
Address				2153 POST DR NE	2153 POST DR NE	2153 POST DR NE	6057 MAKSIMOWSKI AVE NE	6075 MAKSIMOWSKI AVE NE	6088 MAKSIMOWSKI AVE NE	6100 MAKSIMOWSKI AVE NE	6111 MAKSIMOWSKI AVE NE	6114 MAKSIMOWSKI AVE NE	6118 MAKSIMOWSKI AVE NE	6129 MAKSIMOWSKI AVE NE	6145 MAKSIMOWSKI AVE NE	6152 GEORGE ANN CT NE	6175 MAKSIMOWSKI AVE NE	6175 MAKSIMOWSKI AVE NE	6191 MAKSIMOWSKI AVE NE
Sample Name				2153 Post-IN-2/6	2153 Post-IN-8/23	2153 Post-IN-2/6	6057 Maksimowski Dr	6075 Maksimowski Dr	6088 Maksimowski Dr	6100 Maksimowski Dr	6111 Maksimowski Ave	6114 Maksimowski Dr	6118 Maksimowski Dr	6129 Maksimowski Dr	6145 Maksimowski Dr	6152 George Ann Ct NE	6175 Maksimowski Dr	6175 Maksimoski Dr-12/7	6191 Maksimowski Dr
Matrix				POET Influent	POET Influent	POET Influent	Drinking Water	Drinking Water	Drinking Water	Drinking Water	Drinking Water	Drinking Water	Drinking Water	Drinking Water	Drinking Water	Drinking Water	Drinking Water	Drinking Water	Drinking Water
Laboratory ID				UB07040-004	UH24016-005	VB07052-008	K1711849-017	K1711849-001	K1711849-002	K1711849-003	K1711853-013	K1711849-004	K1711849-005	K1711849-006	K1711849-007	K1712064-005	K1711849-008	TL08013-001	K1711849-009
Sample Date				02/06/2019	08/23/2019	02/06/2020	10/30/2017	10/30/2017	10/30/2017	10/30/2017	10/31/2017	10/30/2017	10/30/2017	10/30/2017	10/30/2017	11/03/2017	10/30/2017	12/07/2018	10/30/2017
Parameter (µg/L)																			
8:2 Fluorotelomer sulfonic acid (8:2 FTS)	NCL	NA	NA	-	-	-	<0.0043	<0.0043	<0.0043	<0.0043	<0.0043	<0.0054	<0.0044	<0.0044	<0.0044	<0.0044	<0.0044	-	<0.0043
6:2 Fluorotelomer sulfonic acid (6:2 FTS)	NCL	NA	NA	-	-	-	<0.0043	<0.0043	<0.0043	<0.0043	<0.0043	<0.0054	<0.0044	<0.0044	<0.0044	<0.0044	<0.0044	-	<0.0043
N-Ethyl perfluorooctane sulfonamide (EtFOSA)	NCL	NA	NA	-	-	-	<0.0043	<0.0043	<0.0043	<0.0043	<0.0043	<0.0054	<0.0044	<0.0044	<0.0044	<0.0044	<0.0044	-	<0.0043
N-ethylperfluoro-1-octanesulfonamidoacetic acid (EtFOSAA)	NCL	NA	NA	<0.0037	<0.0037	<0.0036	-	-	-	-	-	-	-	-	-	-	-	<0.0035	-
N-Ethyl perfluorooctane sulfonamidoethanol (N-EtFOSE)	NCL	NA	NA	-	-	-	<0.0043	<0.0043	<0.0043	<0.0043	<0.0043	<0.0054	<0.0044	<0.0044	<0.0044	<0.0044	<0.0044	-	<0.0043
N-Methyl perfluorooctane sulfonamide (MeFOSA)	NCL	NA	NA	-	-	-	<0.0043	<0.0043	<0.0043	<0.0043	<0.0043	<0.0054	<0.0044	<0.0044	<0.0044	<0.0044	<0.0044	-	<0.0043
N-methylperfluoro-1-octanesulfonamidoacetic acid (MeFOSAA)	NCL	NA	NA	<0.0037	<0.0037	<0.0036	-	-	-	-	-	-	-	-	-	-	-	<0.0035	-
N-Methyl perfluorooctane sulfonamidoethanol (N-MeFOSE)	NCL	NA	NA	-	-	-	<0.0043	<0.0043	<0.0043	<0.0043	<0.0043	<0.0054	<0.0044	<0.0044	<0.0044	<0.0044	<0.0044	-	<0.0043
Perfluorobutane sulfonic acid (PFBS)	NCL	0.42	NA	0.0037	<0.0037	0.0039	<0.0043	<0.0043	<0.0043	<0.0043	<0.0043	<0.0054	<0.0044	<0.0044	<0.0044	<0.0044	<0.0044	<0.0035	<0.0043
Perfluorodecane sulfonic acid (PFDS)	NCL	NA	NA	-	-	-	<0.0043	<0.0043	<0.0043	<0.0043	<0.0043	<0.0054	<0.0044	<0.0044	<0.0044	<0.0044	<0.0044	-	<0.0043
Perfluorooctadecanoic acid (PFODA)	NCL	NA	NA	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Perfluoroheptane sulfonic acid (PFHpS)	NCL	NA	NA	-	-	-	<0.0043	<0.0043	<0.0043	<0.0043	<0.0043	<0.0054	<0.0044	<0.0044	<0.0044	<0.0044	<0.0044	-	<0.0043
Perfluorooctane sulfonamide (FOSA)	NCL	NA	NA	-	-	-	<0.0043	<0.0043	<0.0043	<0.0043	<0.0043	<0.0054	<0.0044	<0.0044	<0.0044	<0.0044	<0.0044	-	<0.0043
Perfluorohexane sulfonic acid (PFHxS)	NCL	0.051	NA	<0.0037	<0.0037	<0.0036	<0.0043	<0.0043	<0.0043	<0.0043	<0.0043	<0.0054	<0.0044	<0.0044	<0.0044	<0.0044	<0.0044	<0.0035	<0.0043
Perfluorobutanoic acid (PFBA)	NCL	NA	NA	-	-	-	<0.0087	<0.0087	<0.0087	<0.0087	<0.0087	<0.011	<0.0088	<0.0088	<0.0088	<0.0088	<0.0088	-	<0.0087
Perfluorodecanoic acid (PFDA)	NCL	NA	NA	<0.0037	<0.0037	<0.0036	<0.0043	<0.0043	<0.0043	<0.0043	<0.0043	<0.0054	<0.0044	<0.0044	<0.0044	<0.0044	<0.0044	<0.0035	<0.0043
Perfluorododecanoic acid (PFDoDA)	NCL	NA	NA	<0.0037	<0.0037	<0.0036	<0.0043	<0.0043	<0.0043	<0.0043	<0.0043	<0.0054	<0.0044	<0.0044	<0.0044	<0.0044	<0.0044	<0.0035	<0.0043
Perfluoroheptanoic acid (PFHpA)	NCL	NA	NA	<0.0037	<0.0037	<0.0036	<0.0043	<0.0043	<0.0043	<0.0043	<0.0043	<0.0054	<0.0044	<0.0044	<0.0044	<0.0044	<0.0044	<0.0035	<0.0043
Perfluorohexanoic acid (PFHxA)	NCL	400	NA	<0.0037	<0.0037	<0.0036	<0.0043	<0.0043	<0.0043	<0.0043	<0.0043	<0.0054	<0.0044	<0.0044	<0.0044	<0.0044	<0.0044	<0.0035	<0.0043
Perfluorononanoic acid (PFNA)	NCL	0.006	NA	<0.0037	<0.0037	<0.0036	<0.0043	<0.0043	<0.0043	<0.0043	<0.0043	<0.0054	<0.0044	<0.0044	<0.0044	<0.0044	<0.0044	<0.0035	<0.0043
Perfluorooctanoic acid (PFOA)	0.008	0.008	NA	0.0037	<0.0037	<0.0036	<0.0017	<0.0017	<0.0017	<0.0017	<0.0017	<0.0021	<0.0018	<0.0018	<0.0018	<0.0018	<0.0018	<0.0035	<0.0017
Perfluorooctane sulfonic acid (PFOS)	0.016	0.016	NA	<0.0037	<0.0037	<0.0036	<0.0043	<0.0043	<0.0043	<0.0043	<0.0043	<0.0054	<0.0044	<0.0044	<0.0044	<0.0044	<0.0044	<0.0035	<0.0043
PFOA + PFOS (Calculated)	NCL	NA	0.01	0.0037	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Perfluoropentanoic acid (PFPeA)	NCL	NA	NA	-	-	-	<0.0043	<0.0043	<0.0043	<0.0043	<0.0043	<0.0054	<0.0044	<0.0044	<0.0044	<0.0044	<0.0044	-	<0.0043
Perfluorotetradecanoic acid (PFTeDA)	NCL	NA	NA	<0.0037	<0.0037	<0.0036	<0.0043	<0.0043	<0.0043	<0.0043	<0.0043	<0.0054	<0.0044	<0.0044	<0.0044	<0.0044	<0.0044	<0.0035	<0.0043
Perfluorotridecanoic acid (PFTrDA)	NCL	NA	NA	<0.0037	<0.0037	<0.0036	<0.0043	<0.0043	<0.0043	<0.0043	<0.0043	<0.0054	<0.0044	<0.0044	<0.0044	<0.0044	<0.0044	<0.0035	<0.0043
Perfluoroundecanoic acid (PFUnDA)	NCL	NA	NA	<0.0037	<0.0037	<0.0036	<0.0043	<0.0043	<0.0043	<0.0043	<0.0043	<0.0054	<0.0044	<0.0044	<0.0044	<0.0044	<0.0044	<0.0035	<0.0043
Perfluorohexadecanoic acid (PFHxDA)	NCL	NA	NA	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total PFAS (Calculated)	NCL	NA	NA	0.0074	ND	0.0039	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND

TABLE 2

SUMMARY OF DRINKING WATER ANALYTICAL DATA - PFAS
Area 5
Algoma and Plainfield Townships, Kent County, MI

Area	**Part 201 Generic Residential Groundwater Cleanup Criteria – Drinking Water[2]**	**MCL[3]**	**CD Value[4]**	**Area 5**	**Area 5**	**Area 5**	**Area 5**	**Area 5**	**Area 5**	**Area 5**	**Area 5**	**Area 5**	**Area 5**	**Area 5**	**Area 5**	**Area 5**	**Area 5**	**Area 5**	**Area 5**
PPN				**411016376034**	**411016376034**	**411016451082**	**411016451082**	**411016451006**	**411016451006**	**411016326002**	**411016326002**	**411016451085**	**411016451085**	**411016451084**	**411016451084**	**411017426003**	**411017426002**	**411016301029**	**411017426008**
Address				**6201 MAKSIMOWSKI AVE NE**	**6201 MAKSIMOWSKI AVE NE**	**6206 MAKSIMOWSKI AVE NE**	**6206 MAKSIMOWSKI AVE NE**	**6210 MAKSIMOWSKI AVE NE**	**6210 MAKSIMOWSKI AVE NE**	**6215 MAKSIMOWSKI AVE NE**	**6215 MAKSIMOWSKI AVE NE**	**6240 MAKSIMOWSKI AVE NE**	**6240 MAKSIMOWSKI AVE NE**	**6260 MAKSIMOWSKI AVE NE**	**6260 MAKSIMOWSKI AVE NE**	**6335 SAMRICK AVE NE**	**6355 SAMRICK AVE NE**	**6378 SAMRICK AVE NE**	**6393 SAMRICK AVE NE**
Sample Name				**6201 Maksimowski Dr**	**6201 Maksimoski Dr-10/30**	**6206 Maksimowski Dr**	**6206 Maksimoski Dr-10/31**	**6210 Maksimowski**	**6210 Maksimoski Dr-10/31**	**6215 Maksimowski Dr**	**6215 Maksimoski Dr-11/08**	**6240 Maksimowski Dr**	**6240 Maksimoski Dr-10/31**	**6260 Maksimowski Dr**	**6260 Maksimoski Dr-11/02**	**6335 Samrick Ave NE**	**6355 Samrick Ave NE**	**6378 Samrick Ave NE**	**6393 Samrick Ave NE**
Matrix				**Drinking Water**	**Drinking Water**	**Drinking Water**	**Drinking Water**	**Drinking Water**	**Drinking Water**	**Drinking Water**	**Drinking Water**	**Drinking Water**	**Drinking Water**	**Drinking Water**	**Drinking Water**	**Drinking Water**	**Drinking Water**	**Drinking Water**	**Drinking Water**
Laboratory ID				**K1711849-010**	**Tk01046-009**	**K1711849-011**	**Tk01046-010**	**K1712267-004**	**TK01049-001**	**K1711849-012**	**TK10019-001**	**K1711849-013**	**TK01049-002**	**K1711849-014**	**TK03010-007**	**K1711787-015**	**K1711787-012**	**K1711787-011**	**K1711787-010**
Sample Date				**10/30/2017**	**10/30/2018**	**10/30/2017**	**10/31/2018**	**11/09/2017**	**10/31/2018**	**10/30/2017**	**11/08/2018**	**10/30/2017**	**10/31/2018**	**10/30/2017**	**11/02/2018**	**10/27/2017**	**10/27/2017**	**10/27/2017**	**10/27/2017**
Parameter (µg/L)																			
8:2 Fluorotelomer sulfonic acid (8:2 FTS)	NCL	NA	NA	<0.005	-	<0.0046	-	<0.0042	-	<0.0044	-	<0.0044	-	<0.0044	-	<0.0044	<0.0044	<0.0043	<0.0043
6:2 Fluorotelomer sulfonic acid (6:2 FTS)	NCL	NA	NA	<0.005	-	<0.0046	-	<0.0042	-	<0.0044	-	<0.0044	-	<0.0044	-	<0.0044	<0.0044	<0.0043	<0.0043
N-Ethyl perfluorooctane sulfonamide (EtFOSA)	NCL	NA	NA	<0.005	-	<0.0046	-	<0.0042	-	<0.0044	-	<0.0044	-	<0.0044	-	<0.0044	<0.0044	<0.0043	<0.0043
N-ethylperfluoro-1-octanesulfonamidoacetic acid (EtFOSAA)	NCL	NA	NA	-	<0.0035	-	<0.0037	-	<0.0037	-	<0.0034	-	<0.0036	-	<0.0036	-	-	-	-
N-Ethyl perfluorooctane sulfonamidoethanol (N-EtFOSE)	NCL	NA	NA	<0.005	-	<0.0046	-	<0.0042	-	<0.0044	-	<0.0044	-	<0.0044	-	<0.0044	<0.0044	<0.0043	<0.0043
N-Methyl perfluorooctane sulfonamide (MeFOSA)	NCL	NA	NA	<0.005	-	<0.0046	-	<0.0042	-	<0.0044	-	<0.0044	-	<0.0044	-	<0.0044	<0.0044	<0.0043	<0.0043
N-methylperfluoro-1-octanesulfonamidoacetic acid (MeFOSAA)	NCL	NA	NA	-	<0.0035	-	<0.0037	-	<0.0037	-	<0.0034	-	<0.0036	-	<0.0036	-	-	-	-
N-Methyl perfluorooctane sulfonamidoethanol (N-MeFOSE)	NCL	NA	NA	<0.005	-	<0.0046	-	<0.0042	-	<0.0044	-	<0.0044	-	<0.0044	-	<0.0044	<0.0044	<0.0043	<0.0043
Perfluorobutane sulfonic acid (PFBS)	NCL	0.42	NA	<0.005	<0.0035	0.067	0.04	<0.0042	<0.0037	<0.0044	<0.0034	<0.0044	<0.0036	<0.0044	<0.0036	<0.0044	<0.0044	<0.0043	<0.0043
Perfluorodecane sulfonic acid (PFDS)	NCL	NA	NA	<0.005	-	<0.0046	-	<0.0042	-	<0.0044	-	<0.0044	-	<0.0044	-	<0.0044	<0.0044	<0.0043	<0.0043
Perfluorooctadecanoic acid (PFODA)	NCL	NA	NA	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Perfluoroheptane sulfonic acid (PFHpS)	NCL	NA	NA	<0.005	-	<0.0046	-	<0.0042	-	<0.0044	-	<0.0044	-	<0.0044	-	<0.0044	<0.0044	<0.0043	<0.0043
Perfluorooctane sulfonamide (FOSA)	NCL	NA	NA	<0.005	-	<0.0046	-	<0.0042	-	<0.0044	-	<0.0044	-	<0.0044	-	<0.0044	<0.0044	<0.0043	<0.0043
Perfluorohexane sulfonic acid (PFHxS)	NCL	0.051	NA	<0.005	<0.0035	<0.0046	<0.0037	<0.0042	<0.0037	<0.0044	<0.0034	<0.0044	<0.0036	<0.0044	<0.0036	<0.0044	<0.0044	<0.0043	<0.0043
Perfluorobutanoic acid (PFBA)	NCL	NA	NA	<0.01	-	<0.0092	-	<0.0083	-	<0.0088	-	<0.0088	-	<0.0088	-	<0.0088	<0.0088	<0.0086	<0.0086
Perfluorodecanoic acid (PFDA)	NCL	NA	NA	<0.005	<0.0035	<0.0046	<0.0037	<0.0042	<0.0037	<0.0044	<0.0034	<0.0044	<0.0036	<0.0044	<0.0036	<0.0044	<0.0044	<0.0043	<0.0043
Perfluorododecanoic acid (PFDoDA)	NCL	NA	NA	<0.005	<0.0035	<0.0046	<0.0037	<0.0042	<0.0037	<0.0044	<0.0034	<0.0044	<0.0036	<0.0044	<0.0036	<0.0044	<0.0044	<0.0043	<0.0043
Perfluoroheptanoic acid (PFHpA)	NCL	NA	NA	<0.005	<0.0035	<0.0046	<0.0037	<0.0042	<0.0037	<0.0044	<0.0034	<0.0044	<0.0036	<0.0044	<0.0036	<0.0044	<0.0044	<0.0043	<0.0043
Perfluorohexanoic acid (PFHxA)	NCL	400	NA	<0.005	<0.0035	<0.0046	<0.0037	<0.0042	<0.0037	<0.0044	<0.0034	<0.0044	<0.0036	<0.0044	<0.0036	<0.0044	<0.0044	<0.0043	<0.0043
Perfluorononanoic acid (PFNA)	NCL	0.006	NA	<0.005	<0.0035	<0.0046	<0.0037	<0.0042	<0.0037	<0.0044	<0.0034	<0.0044	<0.0036	<0.0044	<0.0036	<0.0044	<0.0044	<0.0043	<0.0043
Perfluorooctanoic acid (PFOA)	0.008	0.008	NA	<0.002	<0.0035	<0.0018	<0.0037	<0.0017	<0.0037	<0.0018	<0.0034	<0.0018	<0.0036	<0.0018	<0.0036	<0.0018	<0.0018	<0.0017	<0.0017
Perfluorooctane sulfonic acid (PFOS)	0.016	0.016	NA	<0.005	<0.0035	<0.0046	<0.0037	<0.0042	<0.0037	<0.0044	<0.0034	<0.0044	<0.0036	<0.0044	<0.0036	<0.0044	<0.0044	<0.0043	<0.0043
PFOA + PFOS (Calculated)	NCL	NA	0.01	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Perfluoropentanoic acid (PFPeA)	NCL	NA	NA	<0.005	-	<0.0046	-	<0.0042	-	<0.0044	-	<0.0044	-	<0.0044	-	<0.0044	<0.0044	<0.0043	<0.0043
Perfluorotetradecanoic acid (PFTeDA)	NCL	NA	NA	<0.005	<0.0035	<0.0046	<0.0037	<0.0042	<0.0037	<0.0044	<0.0034	<0.0044	<0.0036	<0.0044	<0.0036	<0.0044	<0.0044	<0.0043	<0.0043
Perfluorotridecanoic acid (PFTrDA)	NCL	NA	NA	<0.005	<0.0035	<0.0046	<0.0037	<0.0042	<0.0037	<0.0044	<0.0034	<0.0044	<0.0036	<0.0044	<0.0036	<0.0044	<0.0044	<0.0043	<0.0043
Perfluoroundecanoic acid (PFUnDA)	NCL	NA	NA	<0.005	<0.0035	<0.0046	<0.0037	<0.0042	<0.0037	<0.0044	<0.0034	<0.0044	<0.0036	<0.0044	<0.0036	<0.0044	<0.0044	<0.0043	<0.0043
Perfluorohexadecanoic acid (PFHxDA)	NCL	NA	NA	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total PFAS (Calculated)	NCL	NA	NA	ND	ND	0.067	0.04	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND

TABLE 2
SUMMARY OF DRINKING WATER ANALYTICAL DATA - PFAS
Area 5
Algoma and Plainfield Townships, Kent County, MI

Area	**Part 201 Generic Residential Groundwater Cleanup Criteria – Drinking Water^2**	**MCL^3**	**CD Value^4**	**Area 5**	**Area 5**	**Area 5**	**Area 5 (Well Inactive)**	**Area 5**	**Area 5**	**Area 5**	**Area 5**	**Area 5**	**Area 5**	**Area 5**	**Area 5**	**Area 5**	**Area 5**	**Area 5**	**Area 5**
PPN				**411016176009**	**411017277010**	**411016176015**	**411016176032**	**411016176008**	**411016176023**	**411017277002**	**411016151007**	**411016176011**	**411016151006**	**411016176019**	**411017226002**	**411016176017**	**411016201025**	**411016201023**	**411016126017**
Address				**6400 BOTANY BLUFF DR NE**	**6421 SAMRICK AVE NE**	**6440 BOTANY BLUFF DR NE**	**6455 BOTANY BLUFF DR NE**	**6480 BOTANY BLUFF DR NE**	**6520 BOTANY BLUFF DR NE**	**6531 SAMRICK AVE NE**	**6534 SAMRICK AVE NE**	**6560 BOTANY BLUFF DR NE**	**6580 SAMRICK AVE NE**	**6600 BOTANY BLUFF DR NE**	**6611 SAMRICK AVE NE**	**6630 BOTANY BLUFF DR NE**	**6648 REDTAIL RIDGE DR NE**	**6700 REDTAIL RIDGE DR NE**	**6701 BLUE RIDGE DR NE**
Sample Name				**6400 Botany Bluff Dr NE**	**6421 Samrick Ave NE**	**6440 Botany Bluff Dr NE**	**6455 Botany Bluff**	**6480 Botany Bluff**	**6520 Botany Bluff-6/6**	**6531 Samrick Ave NE**	**WR1712111500JLB**	**WR1712111440JLB**	**6580 Samrick**	**6600 Botany Bluff Dr NE**	**6611Samrick Ave NE**	**6630 Botany Bluff Dr NE**	**6648 Redtail Ridge Dr NE**	**6700 Redtail Ridge Dr NE**	**6701 Blue Ridge Dr NE**
Matrix				**Drinking Water**	**Drinking Water**	**Drinking Water**	**Drinking Water**	**Drinking Water**	**Drinking Water**	**Drinking Water**	**Drinking Water**	**Drinking Water**	**Drinking Water**	**Drinking Water**	**Drinking Water**	**Drinking Water**	**Drinking Water**	**Drinking Water**	**Drinking Water**
Laboratory ID				**K1711846-001**	**K1711787-009**	**K1711846-002**	**UD20010-001**	**K1711844-004**	**TF07026-001**	**K1711716-016**	**1701971-09**	**1701971-08**	**K1712267-006**	**K1712980-001**	**K1711787-008**	**K1711846-003**	**K1711788-012**	**K1711788-003**	**K1711716-007**
Sample Date				**10/30/2017**	**10/27/2017**	**10/30/2017**	**04/19/2019**	**10/31/2017**	**06/06/2018**	**10/26/2017**	**12/11/2017**	**12/11/2017**	**11/09/2017**	**12/01/2017**	**10/27/2017**	**10/30/2017**	**10/27/2017**	**10/27/2017**	**10/26/2017**
Parameter (µg/L)																			
8:2 Fluorotelomer sulfonic acid (8:2 FTS)	NCL	NA	NA	<0.0043	<0.0043	<0.0044	-	<0.0043	-	<0.0044	<0.00242	<0.00245	<0.0042	<0.0043	<0.0043	<0.0043	<0.0042	<0.0041	<0.0041
6:2 Fluorotelomer sulfonic acid (6:2 FTS)	NCL	NA	NA	<0.0043	<0.0043	<0.0044	-	<0.0043	-	<0.0044	<0.00242	<0.00245	<0.0042	<0.0062	<0.0043	<0.0043	<0.0042	<0.0041	<0.0041
N-Ethyl perfluorooctane sulfonamide (EtFOSA)	NCL	NA	NA	<0.0043	<0.0043	<0.0044	-	<0.0043	-	<0.0044	-	-	<0.0042	<0.0043	<0.0043	<0.0043	<0.0042	<0.0041	<0.0041
N-ethylperfluoro-1-octanesulfonamidoacetic acid (EtFOSAA)	NCL	NA	NA	-	-	-	<0.0033	-	<0.0036	-	-	-	-	-	-	-	-	-	-
N-Ethyl perfluorooctane sulfonamidoethanol (N-EtFOSE)	NCL	NA	NA	<0.0043	<0.0043	<0.0044	-	<0.0043	-	<0.0044	-	-	<0.0042	<0.0043	<0.0043	<0.0043	<0.0042	<0.0041	<0.0041
N-Methyl perfluorooctane sulfonamide (MeFOSA)	NCL	NA	NA	<0.0043	<0.0043	<0.0044	-	<0.0043	-	<0.0044	-	-	<0.0042	<0.0043	<0.0043	<0.0043	<0.0042	<0.0041	<0.0041
N-methylperfluoro-1-octanesulfonamidoacetic acid (MeFOSAA)	NCL	NA	NA	-	-	-	<0.0033	-	<0.0036	-	-	-	-	-	-	-	-	-	-
N-Methyl perfluorooctane sulfonamidoethanol (N-MeFOSE)	NCL	NA	NA	<0.0043	<0.0043	<0.0044	-	<0.0043	-	<0.0044	-	-	<0.0042	<0.0043	<0.0043	<0.0043	<0.0042	<0.0041	<0.0041
Perfluorobutane sulfonic acid (PFBS)	NCL	0.42	NA	<0.0043	<0.0043	<0.0044	<0.0033	<0.0043	<0.0036	<0.0044	<0.00242	<0.00245	<0.0042	<0.0043	<0.0043	<0.0043	<0.0042	<0.0041	<0.0041
Perfluorodecene sulfonic acid (PFDS)	NCL	NA	NA	<0.0043	<0.0043	<0.0044	-	<0.0043	-	<0.0044	<0.00242	<0.00245	<0.0042	<0.0043	<0.0043	<0.0043	<0.0042	<0.0041	<0.0041
Perfluorooctadecanoic acid (PFODA)	NCL	NA	NA	-	-	-	-	-	-	-	<0.00727	<0.00735	-	-	-	-	-	-	-
Perfluoroheptane sulfonic acid (PFHpS)	NCL	NA	NA	<0.0043	<0.0043	<0.0044	-	<0.0043	-	<0.0044	<0.00242	<0.00245	<0.0042	<0.0043	<0.0043	<0.0043	<0.0042	<0.0041	<0.0041
Perfluorooctane sulfonamide (FOSA)	NCL	NA	NA	<0.0043	<0.0043	<0.0044	-	<0.0043	-	<0.0044	<0.00242	<0.00245	<0.0042	<0.0043	<0.0043	<0.0043	<0.0042	<0.0041	<0.0041
Perfluorohexene sulfonic acid (PFHxS)	NCL	0.051	NA	<0.0043	<0.0043	<0.0044	<0.0033	<0.0043	<0.0036	<0.0044	<0.00242	<0.00245	<0.0042	<0.0043	<0.0043	<0.0043	<0.0042	<0.0041	0.0047
Perfluorobutanoic acid (PFBA)	NCL	NA	NA	<0.0086	<0.0086	<0.0088	-	<0.0086	-	<0.0088	<0.00242	<0.00245	<0.0085	<0.0086	<0.0086	<0.0086	<0.0083	<0.0081	<0.0081
Perfluorodecenoic acid (PFDA)	NCL	NA	NA	<0.0043	<0.0043	<0.0044	<0.0033	<0.0043	<0.0036	<0.0044	<0.00242	<0.00245	<0.0042	<0.0043	<0.0043	<0.0043	<0.0042	<0.0041	<0.0041
Perfluorododecanoic acid (PFDoDA)	NCL	NA	NA	<0.0043	<0.0043	<0.0044	<0.0033	<0.0043	<0.0036	<0.0044	<0.00242	<0.00245	<0.0042	<0.0043	<0.0043	<0.0043	<0.0042	<0.0041	<0.0041
Perfluoroheptanoic acid (PFHpA)	NCL	NA	NA	<0.0043	<0.0043	<0.0044	<0.0033	<0.0043	<0.0036	<0.0044	<0.00242	<0.00245	<0.0042	<0.0043	<0.0043	<0.0043	<0.0042	<0.0041	<0.0041
Perfluorohexenoic acid (PFHxA)	NCL	400	NA	<0.0043	<0.0043	<0.0044	<0.0033	<0.0043	<0.0036	<0.0044	<0.00242	<0.00245	<0.0042	<0.0043	<0.0043	<0.0043	<0.0042	<0.0041	<0.0041
Perfluorononanoic acid (PFNA)	NCL	0.006	NA	<0.0043	<0.0043	<0.0044	<0.0033	<0.0043	<0.0036	<0.0044	<0.00242	<0.00245	<0.0042	<0.0043	<0.0043	<0.0043	<0.0042	<0.0041	<0.0041
Perfluorooctanoic acid (PFOA)	0.008	0.008	NA	<0.0017	<0.0017	<0.0018	<0.0033	<0.0017	<0.0036	<0.0018	<0.00242	<0.00245	<0.0017	***0.0092***	<0.0017	<0.0017	<0.0017	<0.0016	0.0019
Perfluorooctane sulfonic acid (PFOS)	0.016	0.016	NA	<0.0043	<0.0043	<0.0044	<0.0033	<0.0043	<0.0036	<0.0044	<0.00242	<0.00245	<0.0042	<0.0043	<0.0043	<0.0043	<0.0042	<0.0041	<0.0041
PFOA + PFOS (Calculated)	NCL	NA	0.01	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.0092	ND	ND	ND	ND	0.0019
Perfluoropentanoic acid (PFPeA)	NCL	NA	NA	<0.0043	<0.0043	<0.0044	-	<0.0043	-	<0.0044	<0.00242	<0.00245	<0.0042	<0.0043	<0.0043	<0.0043	<0.0042	<0.0041	<0.0041
Perfluorotetradecanoic acid (PFTeDA)	NCL	NA	NA	<0.0043	<0.0043	<0.0044	<0.0033	<0.0043	<0.0036	<0.0044	<0.00242	<0.00245	<0.0042	<0.0043	<0.0043	<0.0043	<0.0042	<0.0041	<0.0041
Perfluorotridecanoic acid (PFTrDA)	NCL	NA	NA	<0.0043	<0.0043	<0.0044	<0.0033	<0.0043	<0.0036	<0.0044	<0.00242	<0.00245	<0.0042	<0.0043	<0.0043	<0.0043	<0.0042	<0.0041	<0.0041
Perfluoroundecanoic acid (PFUnDA)	NCL	NA	NA	<0.0043	<0.0043	<0.0044	<0.0033	<0.0043	<0.0036	<0.0044	<0.00242	<0.00245	<0.0042	<0.0043	<0.0043	<0.0043	<0.0042	<0.0041	<0.0041
Perfluorohexadecanoic acid (PFHxDA)	NCL	NA	NA	-	-	-	-	-	-	-	<0.00242	<0.00245	-	-	-	-	-	-	-
Total PFAS (Calculated)	NCL	NA	NA	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.0092	ND	ND	ND	ND	0.0066

TABLE 2
SUMMARY OF DRINKING WATER ANALYTICAL DATA - PFAS
Area 5
Algoma and Plainfield Townships, Kent County, MI

Area	Part 201 Generic Residential Groundwater Cleanup Criteria – Drinking Water^2	MCL^3	CD Value^4	Area 5	Area 5	Area 5	Area 5	Area 5	Area 5	Area 5	Area 5	Area 5	Area 5	Area 5	Area 5	Area 5	Area 5	Area 5	Area 5
PPN				**411016126017**	**411016126017**	**411016126017**	**411016126017**	**411016201022**	**411016102001**	**411016126024**	**411016201021**	**411017226004**	**411017226003**	**411016201020**	**411016126022**	**411016126023**	**411016102009**	**411016201019**	**411016201018**
Address				**6701 BLUE RIDGE DR NE**	**6701 BLUE RIDGE DR NE**	**6701 BLUE RIDGE DR NE**	**6701 BLUE RIDGE DR NE**	**6722 REDTAIL RIDGE DR NE**	**6726 SAMRICK AVE NE**	**6739 BLUE RIDGE DR NE**	**6744 REDTAIL RIDGE DR NE**	**6759 SAMRICK AVE NE**	**6761 SAMRICK AVE NE**	**6766 REDTAIL RIDGE DR NE**	**6777 BLUE RIDGE DR NE**	**6779 BLUE RIDGE DR NE**	**6780 SAMRICK AVE NE**	**6788 REDTAIL RIDGE DR NE**	**6799 REDTAIL RIDGE DR NE**
Sample Name				**6701 Blue Ridge-IN-1/12 Grab Potable Water**	**6701 BLUE RIDGE-IN-8/14**	**6701 Blue Ridge-IN-3/8**	**6701 Blue Ridge-IN-9/26**	**6722 Redtail Ridge Dr NE**	**6726 Samrick Ave**	**6739 Blue Ridge**	**6744 Red Tail Ridge NE**	**6759 Samrick Ave NE**	**6761 Samrick**	**6766 Redtail Ridge Dr NE**	**6777 Blue Ridge Dr NE**	**6779 Blue Ridge Dr NE**	**6780 Samrick Ave NE**	**6788 Red Tail Ridge NE**	**6799 Red Tail Ridge NE**
Matrix				**POET Influent**	**POET Influent**	**POET Influent**	**POET Influent**	**Drinking Water**	**Drinking Water**	**Drinking Water**	**Drinking Water**	**Drinking Water**	**Drinking Water**	**Drinking Water**	**Drinking Water**	**Drinking Water**	**Drinking Water**	**Drinking Water**	**Drinking Water**
Laboratory ID				**9406613**	**L1832038-07**	**UC09035-003**	**UI27045-004**	**K1711716-022**	**K1711849-018**	**K1711844-001**	**K1711614-013**	**K1711787-007**	**K1711844-011**	**K1711716-023**	**K1711716-008**	**K1711788-004**	**K1711787-006**	**K1711614-014**	**K1711614-015**
Sample Date				**01/12/2018**	**08/14/2018**	**03/08/2019**	**09/26/2019**	**10/26/2017**	**10/30/2017**	**10/31/2017**	**10/24/2017**	**10/27/2017**	**10/31/2017**	**10/26/2017**	**10/26/2017**	**10/27/2017**	**10/27/2017**	**10/24/2017**	**10/24/2017**
Parameter (µg/L)																			
8:2 Fluorotelomer sulfonic acid (8:2 FTS)	NCL	NA	NA	<0.005	-	-	-	<0.0042	<0.0046	<0.0043	<0.0042	<0.0043	<0.0043	<0.0041	<0.0041	<0.0043	<0.0043	<0.0042	<0.0042
6:2 Fluorotelomer sulfonic acid (6:2 FTS)	NCL	NA	NA	<0.008	-	-	-	<0.0042	<0.0046	<0.0043	<0.0042	<0.0043	<0.0043	<0.0041	<0.0041	<0.0043	<0.0043	<0.0042	<0.0042
N-Ethyl perfluorooctane sulfonamide (EtFOSA)	NCL	NA	NA	<0.008	-	-	-	<0.0042	<0.0046	<0.0043	<0.0042	<0.0043	<0.0043	<0.0041	<0.0041	<0.0043	<0.0043	<0.0042	<0.0042
N-ethylperfluoro-1-octanesulfonamidoacetic acid (EtFOSAA)	NCL	NA	NA	-	<0.00391	<0.0041	<0.0037	-	-	-	-	-	-	-	-	-	-	-	-
N-Ethyl perfluorooctane sulfonamidoethanol (N-EtFOSE)	NCL	NA	NA	<0.003	-	-	-	<0.0042	<0.0046	<0.0043	<0.0042	<0.0043	<0.0043	<0.0041	<0.0041	<0.0043	<0.0043	<0.0042	<0.0042
N-Methyl perfluorooctane sulfonamide (MeFOSA)	NCL	NA	NA	<0.008	-	-	-	<0.0042	<0.0046	<0.0043	<0.0042	<0.0043	<0.0043	<0.0041	<0.0041	<0.0043	<0.0043	<0.0042	<0.0042
N-methylperfluoro-1-octanesulfonamidoacetic acid (MeFOSAA)	NCL	NA	NA	-	<0.00391	<0.0041	<0.0037	-	-	-	-	-	-	-	-	-	-	-	-
N-Methyl perfluorooctane sulfonamidoethanol (N-MeFOSE)	NCL	NA	NA	<0.003	-	-	-	<0.0042	<0.0046	<0.0043	<0.0042	<0.0043	<0.0043	<0.0041	<0.0041	<0.0043	<0.0043	<0.0042	<0.0042
Perfluorobutane sulfonic acid (PFBS)	NCL	0.42	NA	0.002	<0.00391	<0.0041	<0.0037	<0.0042	<0.0046	<0.0043	<0.0042	<0.0043	<0.0043	<0.0041	<0.0041	<0.0043	<0.0043	<0.0042	<0.0042
Perfluorodecane sulfonic acid (PFDS)	NCL	NA	NA	<0.002	-	-	-	<0.0042	<0.0046	<0.0043	<0.0042	<0.0043	<0.0043	<0.0041	<0.0041	<0.0043	<0.0043	<0.0042	<0.0042
Perfluorooctadecanoic acid (PFODA)	NCL	NA	NA	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Perfluoroheptane sulfonic acid (PFHpS)	NCL	NA	NA	<0.002	-	-	-	<0.0042	<0.0046	<0.0043	<0.0042	<0.0043	<0.0043	<0.0041	<0.0041	<0.0043	<0.0043	<0.0042	<0.0042
Perfluorooctane sulfonamide (FOSA)	NCL	NA	NA	<0.003	-	-	-	<0.0042	<0.0046	<0.0043	<0.0042	<0.0043	<0.0043	<0.0041	<0.0041	<0.0043	<0.0043	<0.0042	<0.0042
Perfluorohexane sulfonic acid (PFHxS)	NCL	0.051	NA	0.003	<0.00391	<0.0041	<0.0037	<0.0042	<0.0046	<0.0043	<0.0042	<0.0043	<0.0043	<0.0041	<0.0041	<0.0043	<0.0043	<0.0042	<0.0042
Perfluorobutanoic acid (PFBA)	NCL	NA	NA	<0.005	-	-	-	<0.0083	<0.0092	<0.0086	<0.0083	<0.0086	<0.0086	<0.0081	<0.0081	<0.0086	<0.0086	<0.0083	<0.0083
Perfluorodecanoic acid (PFDA)	NCL	NA	NA	<0.002	<0.00391	<0.0041	<0.0037	<0.0042	<0.0046	<0.0043	<0.0042	<0.0043	<0.0043	<0.0041	<0.0041	<0.0043	<0.0043	<0.0042	<0.0042
Perfluorododecanoic acid (PFDoDA)	NCL	NA	NA	<0.0009	<0.00391	<0.0041	<0.0037	<0.0042	<0.0046	<0.0043	<0.0042	<0.0043	<0.0043	<0.0041	<0.0041	<0.0043	<0.0043	<0.0042	<0.0042
Perfluoroheptanoic acid (PFHpA)	NCL	NA	NA	0.0007 J	<0.00391	<0.0041	<0.0037	<0.0042	<0.0046	<0.0043	<0.0042	<0.0043	<0.0043	<0.0041	<0.0041	<0.0043	<0.0043	<0.0042	<0.0042
Perfluorohexanoic acid (PFHxA)	NCL	400	NA	0.001 J	<0.00391	<0.0041	<0.0037	<0.0042	<0.0046	<0.0043	<0.0042	<0.0043	<0.0043	<0.0041	<0.0041	<0.0043	<0.0043	<0.0042	<0.0042
Perfluorononanoic acid (PFNA)	NCL	0.006	NA	<0.002	<0.00391	<0.0041	<0.0037	<0.0042	<0.0046	<0.0043	<0.0042	<0.0043	<0.0043	<0.0041	<0.0041	<0.0043	<0.0043	<0.0042	<0.0042
Perfluorooctanoic acid (PFOA)	0.008	0.008	NA	0.001	<0.00391	<0.0041	<0.0037	<0.0017	<0.0018	<0.0017	<0.0017	<0.0017	<0.0017	<0.0016	<0.0016	<0.0017	<0.0017	<0.0017	<0.0017
Perfluorooctane sulfonic acid (PFOS)	0.016	0.016	NA	0.0008 J	<0.00391	<0.0041	<0.0037	<0.0042	<0.0046	<0.0043	<0.0042	<0.0043	<0.0043	<0.0041	<0.0041	<0.0043	<0.0043	<0.0042	<0.0042
PFOA + PFOS (Calculated)	NCL	NA	0.01	0.0018	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Perfluoropentanoic acid (PFPeA)	NCL	NA	NA	<0.005	-	-	-	<0.0042	<0.0046	<0.0043	<0.0042	<0.0043	<0.0043	<0.0041	<0.0041	<0.0043	<0.0043	<0.0042	<0.0042
Perfluorotetradecanoic acid (PFTeDA)	NCL	NA	NA	<0.0009	<0.00391	<0.0041	<0.0037	<0.0042	<0.0046	<0.0043	<0.0042	<0.0043	<0.0043	<0.0041	<0.0041	<0.0043	<0.0043	<0.0042	<0.0042
Perfluorotridecanoic acid (PFTrDA)	NCL	NA	NA	<0.0009	<0.00391	<0.0041	<0.0037	<0.0042	<0.0046	<0.0043	<0.0042	<0.0043	<0.0043	<0.0041	<0.0041	<0.0043	<0.0043	<0.0042	<0.0042
Perfluoroundecanoic acid (PFUnDA)	NCL	NA	NA	<0.002	<0.00391	<0.0041	<0.0037	<0.0042	<0.0046	<0.0043	<0.0042	<0.0043	<0.0043	<0.0041	<0.0041	<0.0043	<0.0043	<0.0042	<0.0042
Perfluorohexadecanoic acid (PFHxDA)	NCL	NA	NA	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total PFAS (Calculated)	NCL	NA	NA	0.0085	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND

TABLE 2

SUMMARY OF DRINKING WATER ANALYTICAL DATA - PFAS
Area 5
Algoma and Plainfield Townships, Kent County, MI

Area	**Part 201 Generic Residential Groundwater Cleanup Criteria – Drinking Water^2**	**MCL^3**	**CD Value^4**	**Area 5**	**Area 5**	**Area 5**	**Area 5**	**Area 5**	**Area 5**	**Area 5**	**Area 5**	**Area 5**	**Area 5**	**Area 5**	**Area 5**	**Area 5**	**Area 5**	**Area 5**	**Area 5**
PPN				**411009376011**	**411009376011**	**411009376011**	**411009376011**	**411009376011**	**411009376011**	**411009376012**	**411009451009**	**411009376010**	**411009451008**	**411009376006**	**411009376009**	**411009451007**	**411009451001**	**411009451002**	**411009451003**
Address				**6801 BLUE RIDGE DR NE**	**6801 BLUE RIDGE DR NE**	**6801 BLUE RIDGE DR NE**	**6801 BLUE RIDGE DR NE**	**6801 BLUE RIDGE DR NE**	**6801 BLUE RIDGE DR NE**	**6803 BLUE RIDGE DR NE**	**6810 BLUE RIDGE DR NE**	**6812 CHANDLER DR NE**	**6830 BLUE RIDGE DR NE**	**6835 BLUE RIDGE DR NE**	**6840 CHANDLER DR NE**	**6850 BLUE RIDGE DR NE**	**6855 BLUE RIDGE DR NE**	**6865 BLUE RIDGE DR NE**	**6875 BLUE RIDGE DR NE**
Sample Name				**6801 Blue Ridge Dr NE**	**6801 Blue Ridge-IN-12/7 Grab Potable Water**	**6801 Blue Ridge-IN-6/7**	**6801 Blue Ridge Dr NE-IN-12/6**	**6801 Blue Ridge-IN-6/18**	**6801 Blue Ridge-IN-12/05**	**6803 Blue Ridge Dr NE**	**6810 Blue Ridge Dr NE**	**6812 Chandler Dr NE**	**6830 Blue Ridge Dr NE**	**6835 Blue Ridge**	**6840 Chandler Dr NE**	**6850 Blue Ridge Dr NE**	**6855 Blue Ridge Dr NE**	**6865 Blue Ridge Dr NE**	**6875 Blue Ridge Dr NE**
Matrix				**Drinking Water**	**POET Influent**	**POET Influent**	**POET Influent**	**POET Influent**	**POET Influent**	**Drinking Water**	**Drinking Water**	**Drinking Water**	**Drinking Water**	**Drinking Water**	**Drinking Water**	**Drinking Water**	**Drinking Water**	**Drinking Water**	**Drinking Water**
Laboratory ID				**K1711716-009**	**9359944**	**TF08015-010**	**TL08016-008**	**UF20013-010**	**UL07003-012**	**K1711716-010**	**K1711716-011**	**K1711716-002**	**K1711716-018**	**K1711844-003**	**K1711716-001**	**K1711788-011**	**K1711716-012**	**K1711716-013**	**K1711658-002**
Sample Date				**10/26/2017**	**12/07/2017**	**06/07/2018**	**12/06/2018**	**06/18/2019**	**12/05/2019**	**10/26/2017**	**10/26/2017**	**10/26/2017**	**10/26/2017**	**10/31/2017**	**10/26/2017**	**10/27/2017**	**10/26/2017**	**10/26/2017**	**10/25/2017**
Parameter (µg/L)																			
8:2 Fluorotelomer sulfonic acid (8:2 FTS)	NCL	NA	NA	<0.0043	<0.006	-	-	-	-	<0.0041	<0.0043	<0.0044	<0.0043	<0.0042	<0.0043	<0.0042	<0.0041	<0.0043	<0.0043
6:2 Fluorotelomer sulfonic acid (6:2 FTS)	NCL	NA	NA	<0.0043	<0.008	-	-	-	-	<0.0041	<0.0043	<0.0044	<0.0043	<0.0042	<0.0043	<0.0042	<0.0041	<0.0043	<0.0043
N-Ethyl perfluorooctane sulfonamide (EtFOSA)	NCL	NA	NA	<0.0043	<0.008	-	-	-	-	<0.0041	<0.0043	<0.0044	<0.0043	<0.0042	<0.0043	<0.0042	<0.0041	<0.0043	<0.0043
N-ethylperfluoro-1-octanesulfonamidoacetic acid (EtFOSAA)	NCL	NA	NA	-	-	<0.0036	<0.0038	<0.0035	<0.0037	-	-	-	-	-	-	-	-	-	-
N-Ethyl perfluorooctane sulfonamidoethanol (N-EtFOSE)	NCL	NA	NA	<0.0043	<0.003	-	-	-	-	<0.0041	<0.0043	<0.0044	<0.0043	<0.0042	<0.0043	<0.0042	<0.0041	<0.0043	<0.0043
N-Methyl perfluorooctane sulfonamide (MeFOSA)	NCL	NA	NA	<0.0043	<0.008	-	-	-	-	<0.0041	<0.0043	<0.0044	<0.0043	<0.0042	<0.0043	<0.0042	<0.0041	<0.0043	<0.0043
N-methylperfluoro-1-octanesulfonamidoacetic acid (MeFOSAA)	NCL	NA	NA	-	-	<0.0036	<0.0038	<0.0035	<0.0037	-	-	-	-	-	-	-	-	-	-
N-Methyl perfluorooctane sulfonamidoethanol (N-MeFOSE)	NCL	NA	NA	<0.0043	<0.003	-	-	-	-	<0.0041	<0.0043	<0.0044	<0.0043	<0.0042	<0.0043	<0.0042	<0.0041	<0.0043	<0.0043
Perfluorobutane sulfonic acid (PFBS)	NCL	0.42	NA	<0.0043	0.0008 J	<0.0036	<0.0038	<0.0035	<0.0037	<0.0041	<0.0043	<0.0044	<0.0043	<0.0042	<0.0043	<0.0042	<0.0041	<0.0043	<0.0043
Perfluorodecane sulfonic acid (PFDS)	NCL	NA	NA	<0.0043	<0.002	-	-	-	-	<0.0041	<0.0043	<0.0044	<0.0043	<0.0042	<0.0043	<0.0042	<0.0041	<0.0043	<0.0043
Perfluorooctadecanoic acid (PFODA)	NCL	NA	NA	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Perfluoroheptane sulfonic acid (PFHpS)	NCL	NA	NA	<0.0043	<0.002	-	-	-	-	<0.0041	<0.0043	<0.0044	<0.0043	<0.0042	<0.0043	<0.0042	<0.0041	<0.0043	<0.0043
Perfluorooctane sulfonamide (FOSA)	NCL	NA	NA	<0.0043	<0.003	-	-	-	-	<0.0041	<0.0043	<0.0044	<0.0043	<0.0042	<0.0043	<0.0042	<0.0041	<0.0043	<0.0043
Perfluorohexane sulfonic acid (PFHxS)	NCL	0.051	NA	<0.0043	<0.002	<0.0036	<0.0038	<0.0035	<0.0037	<0.0041	<0.0043	<0.0044	<0.0043	<0.0042	<0.0043	<0.0042	<0.0041	<0.0043	<0.0043
Perfluorobutanoic acid (PFBA)	NCL	NA	NA	<0.0086	<0.006	-	-	-	-	<0.0081	<0.0086	<0.0088	<0.0086	<0.0083	<0.0086	<0.0083	<0.0081	<0.0086	<0.0086
Perfluorodecanoic acid (PFDA)	NCL	NA	NA	<0.0043	<0.002	<0.0036	<0.0038	<0.0035	<0.0037	<0.0041	<0.0043	<0.0044	<0.0043	<0.0042	<0.0043	<0.0042	<0.0041	<0.0043	<0.0043
Perfluorododecanoic acid (PFDoDA)	NCL	NA	NA	<0.0043	<0.0009	<0.0036	<0.0038	<0.0035	<0.0037	<0.0041	<0.0043	<0.0044	<0.0043	<0.0042	<0.0043	<0.0042	<0.0041	<0.0043	<0.0043
Perfluoroheptanoic acid (PFHpA)	NCL	NA	NA	<0.0043	<0.0009	<0.0036	<0.0038	<0.0035	<0.0037	<0.0041	<0.0043	<0.0044	<0.0043	<0.0042	<0.0043	<0.0042	<0.0041	<0.0043	<0.0043
Perfluorohexanoic acid (PFHxA)	NCL	400	NA	<0.0043	<0.002	<0.0036	<0.0038	<0.0035	<0.0037	<0.0041	<0.0043	<0.0044	<0.0043	<0.0042	<0.0043	<0.0042	<0.0041	<0.0043	<0.0043
Perfluorononanoic acid (PFNA)	NCL	0.006	NA	<0.0043	<0.002	<0.0036	<0.0038	<0.0035	<0.0037	<0.0041	<0.0043	<0.0044	<0.0043	<0.0042	<0.0043	<0.0042	<0.0041	<0.0043	<0.0043
Perfluorooctanoic acid (PFOA)	0.008	0.008	NA	0.0024	<0.0009	<0.0036	<0.0038	<0.0035	<0.0037	<0.0016	<0.0017	<0.0018	<0.0017	<0.0017	<0.0017	<0.0017	<0.0016	<0.0017	<0.0017
Perfluorooctane sulfonic acid (PFOS)	0.016	0.016	NA	<0.0043	0.003	<0.0036	<0.0038	<0.0035	<0.0037	<0.0041	<0.0043	<0.0044	<0.0043	<0.0042	<0.0043	<0.0042	<0.0041	<0.0043	<0.0043
PFOA + PFOS (Calculated)	NCL	NA	0.01	0.0024	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Perfluoropentanoic acid (PFPeA)	NCL	NA	NA	<0.0043	<0.006	-	-	-	-	<0.0041	<0.0043	<0.0044	<0.0043	<0.0042	<0.0043	<0.0042	<0.0041	<0.0043	<0.0043
Perfluorotetradecanoic acid (PFTeDA)	NCL	NA	NA	<0.0043	<0.0009	<0.0036	<0.0038	<0.0035	<0.0037	<0.0041	<0.0043	<0.0044	<0.0043	<0.0042	<0.0043	<0.0042	<0.0041	<0.0043	<0.0043
Perfluorotridecanoic acid (PFTrDA)	NCL	NA	NA	<0.0043	<0.0009	<0.0036	<0.0038	<0.0035	<0.0037	<0.0041	<0.0043	<0.0044	<0.0043	<0.0042	<0.0043	<0.0042	<0.0041	<0.0043	<0.0043
Perfluoroundecanoic acid (PFUnDA)	NCL	NA	NA	<0.0043	<0.002	<0.0036	<0.0038	<0.0035	<0.0037	<0.0041	<0.0043	<0.0044	<0.0043	<0.0042	<0.0043	<0.0042	<0.0041	<0.0043	<0.0043
Perfluorohexadecanoic acid (PFHxDA)	NCL	NA	NA	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total PFAS (Calculated)	NCL	NA	NA	0.0024	0.0008	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND

TABLE 2
SUMMARY OF DRINKING WATER ANALYTICAL DATA - PFAS
Area 5
Algoma and Plainfield Townships, Kent County, MI

Area	**Part 201 Generic Residential Groundwater Cleanup Criteria – Drinking Water^2**	**MCL^3**	**CD Value^4**	**Area 5**	**Area 5**	**Area 5**	**Area 5**	**Area 5**	**Area 5**	**Area 5**	**Area 5**	**Area 5**	**Area 5**	**Area 5**	**Area 5**	**Area 5**	**(Future Muni Water**
PPN				**411009451017**	**411009451010**	**411009376013**	**411009451018**	**411009451005**	**411009451005**	**411009451006**	**411009451011**	**411009376005**	**411009376001**	**411009376002**	**411009376003**	**411009376004**	**411016301028**
Address				**6879 BLUE RIDGE DR NE**	**6880 BLUE RIDGE DR NE**	**6880 CHANDLER DR NE**	**6885 BLUE RIDGE DR NE**	**6887 BLUE RIDGE DR NE**	**6887 BLUE RIDGE DR NE**	**6895 BLUE RIDGE DR NE**	**6900 BLUE RIDGE DR NE**	**6916 CHANDLER DR NE**	**6976 CHANDLER DR NE**	**6986 CHANDLER DR NE**	**6990 CHANDLER DR NE**	**6996 CHANDLER DR NE**	**6390 SAMRICK AVE NE**
Sample Name				**6879 Blue Ridge Dr NE**	**6880 Blue Ridge Dr NE**	**6880 Chandler Dr NE**	**1996 Meek**	**6887 Blue Ridge Dr NE**	**6887 Blue Ridge Dr-10/31**	**6895 Blue Ridge Dr NE**	**6900 Blue Ridge Dr NE**	**6916 Chandler Dr NE**	**6976 Chandler Drive NE**	**6986 Chandler Drive NE**	**6990 Chandler Dr NE**	**6996 Chandler Dr NE**	**6390 Samrick Avenue NE**
Matrix				**Drinking Water**	**Drinking Water**	**Drinking Water**	**Drinking Water**	**Drinking Water**	**Drinking Water**	**Drinking Water**	**Drinking Water**	**Drinking Water**	**Drinking Water**	**Drinking Water**	**Drinking Water**	**Drinking Water**	**Drinking Water**
Laboratory ID				**K1711716-014**	**K1711716-015**	**K1711716-003**	**K1710498-013**	**K1711658-003**	**TK01049-009**	**K1711716-019**	**K1711716-020**	**K1711716-004**	**K1711614-005**	**K1711614-006**	**K1711716-017**	**K1711716-006**	**K1713716-004**
Sample Date				**10/26/2017**	**10/26/2017**	**10/26/2017**	**09/28/2017**	**10/25/2017**	**10/31/2018**	**10/26/2017**	**10/26/2017**	**10/26/2017**	**10/24/2017**	**10/24/2017**	**10/26/2017**	**10/26/2017**	**12/19/2017**
Parameter (µg/L)																	
8:2 Fluorotelomer sulfonic acid (8:2 FTS)	NCL	NA	NA	<0.0044	<0.0041	<0.0043	<0.0043	<0.0043	-	<0.0041	<0.0041	<0.0044	<0.0041	<0.0043	<0.0043	<0.0043	<0.0042
6:2 Fluorotelomer sulfonic acid (6:2 FTS)	NCL	NA	NA	<0.0044	<0.0041	<0.0043	<0.0043	<0.0043	-	<0.0041	<0.0041	<0.0044	<0.0041	<0.0043	<0.0043	<0.0043	<0.0042
N-Ethyl perfluorooctane sulfonamide (EtFOSA)	NCL	NA	NA	<0.0044	<0.0041	<0.0043	<0.0043	<0.0043	-	<0.0041	<0.0041	<0.0044	<0.0041	<0.0043	<0.0043	<0.0043	<0.0042
N-ethylperfluoro-1-octanesulfonamidoacetic acid (EtFOSAA)	NCL	NA	NA	-	-	-	-	-	<0.0038	-	-	-	-	-	-	-	-
N-Ethyl perfluorooctane sulfonamidoethanol (N-EtFOSE)	NCL	NA	NA	<0.0044	<0.0041	<0.0043	<0.0043	<0.0043	-	<0.0041	<0.0041	<0.0044	<0.0041	<0.0043	<0.0043	<0.0043	<0.0042
N-Methyl perfluorooctane sulfonamide (MeFOSA)	NCL	NA	NA	<0.0044	<0.0041	<0.0043	<0.0043	<0.0043	-	<0.0041	<0.0041	<0.0044	<0.0041	<0.0043	<0.0043	<0.0043	<0.0042
N-methylperfluoro-1-octanesulfonamidoacetic acid (MeFOSAA)	NCL	NA	NA	-	-	-	-	-	<0.0038	-	-	-	-	-	-	-	-
N-Methyl perfluorooctane sulfonamidoethanol (N-MeFOSE)	NCL	NA	NA	<0.0044	<0.0041	<0.0043	<0.0043	<0.0043	-	<0.0041	<0.0041	<0.0044	<0.0041	<0.0043	<0.0043	<0.0043	<0.0042
Perfluorobutane sulfonic acid (PFBS)	NCL	0.42	NA	<0.0044	<0.0041	<0.0043	<0.0043	<0.0043	<0.0038	<0.0041	<0.0041	0.0063	<0.0041	<0.0043	<0.0043	<0.0043	0.0047
Perfluorodecane sulfonic acid (PFDS)	NCL	NA	NA	<0.0044	<0.0041	<0.0043	<0.0043	<0.0043	-	<0.0041	<0.0041	<0.0044	<0.0041	<0.0043	<0.0043	<0.0043	<0.0042
Perfluorooctadecanoic acid (PFODA)	NCL	NA	NA	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Perfluoroheptane sulfonic acid (PFHpS)	NCL	NA	NA	<0.0044	<0.0041	<0.0043	<0.0043	<0.0043	-	<0.0041	<0.0041	<0.0044	<0.0041	<0.0043	<0.0043	<0.0043	<0.0042
Perfluorooctane sulfonamide (FOSA)	NCL	NA	NA	<0.0044	<0.0041	<0.0043	<0.0043	<0.0043	-	<0.0041	<0.0041	<0.0044	<0.0041	<0.0043	<0.0043	<0.0043	<0.0042
Perfluorohexane sulfonic acid (PFHxS)	NCL	0.051	NA	<0.0044	<0.0041	<0.0043	<0.0043	<0.0043	<0.0038	<0.0041	<0.0041	<0.0044	<0.0041	<0.0043	<0.0043	<0.0043	0.0099
Perfluorobutanoic acid (PFBA)	NCL	NA	NA	<0.0088	<0.0081	<0.0086	<0.0086	<0.0086	-	<0.0081	<0.0081	<0.0088	<0.0081	<0.0086	<0.0086	<0.0086	<0.0085
Perfluorodecanoic acid (PFDA)	NCL	NA	NA	<0.0044	<0.0041	<0.0043	<0.0043	<0.0043	<0.0038	<0.0041	<0.0041	<0.0044	<0.0041	<0.0043	<0.0043	<0.0043	<0.0042
Perfluorododecanoic acid (PFDoDA)	NCL	NA	NA	<0.0044	<0.0041	<0.0043	<0.0043	<0.0043	<0.0038	<0.0041	<0.0041	<0.0044	<0.0041	<0.0043	<0.0043	<0.0043	<0.0042
Perfluoroheptanoic acid (PFHpA)	NCL	NA	NA	<0.0044	<0.0041	<0.0043	<0.0043	<0.0043	<0.0038	<0.0041	<0.0041	<0.0044	<0.0041	<0.0043	<0.0043	<0.0043	<0.0042
Perfluorohexanoic acid (PFHxA)	NCL	400	NA	<0.0044	<0.0041	<0.0043	<0.0043	<0.0043	<0.0038	<0.0041	<0.0041	<0.0044	<0.0041	<0.0043	<0.0043	<0.0043	<0.0042
Perfluorononanoic acid (PFNA)	NCL	0.006	NA	<0.0044	<0.0041	<0.0043	<0.0043	<0.0043	<0.0038	<0.0041	<0.0041	<0.0044	<0.0041	<0.0043	<0.0043	<0.0043	<0.0042
Perfluorooctanoic acid (PFOA)	0.008	0.008	NA	<0.0018	0.0021	<0.0017	<0.0017	<0.0017	<0.0038	<0.0016	<0.0016	<0.0018	<0.0016	<0.0017	<0.0017	<0.0017	<0.0017
Perfluorooctane sulfonic acid (PFOS)	0.016	0.016	NA	<0.0044	<0.0041	<0.0043	<0.0043	<0.0043	<0.0038	<0.0041	<0.0041	<0.0044	<0.0041	<0.0043	<0.0043	<0.0043	<0.0042
PFOA + PFOS (Calculated)	NCL	NA	0.01	ND	0.0021	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Perfluoropentanoic acid (PFPeA)	NCL	NA	NA	<0.0044	<0.0041	<0.0043	<0.0043	<0.0043	-	<0.0041	<0.0041	<0.0044	<0.0041	<0.0043	<0.0043	<0.0043	<0.0042
Perfluorotetradecanoic acid (PFTeDA)	NCL	NA	NA	<0.0044	<0.0041	<0.0043	<0.0043	<0.0043	<0.0038	<0.0041	<0.0041	<0.0044	<0.0041	<0.0043	<0.0043	<0.0043	<0.0042
Perfluorotridecanoic acid (PFTrDA)	NCL	NA	NA	<0.0044	<0.0041	<0.0043	<0.0043	<0.0043	<0.0038	<0.0041	<0.0041	<0.0044	<0.0041	<0.0043	<0.0043	<0.0043	<0.0042
Perfluoroundecanoic acid (PFUnDA)	NCL	NA	NA	<0.0044	<0.0041	<0.0043	<0.0043	<0.0043	<0.0038	<0.0041	<0.0041	<0.0044	<0.0041	<0.0043	<0.0043	<0.0043	<0.0042
Perfluorohexadecanoic acid (PFHxDA)	NCL	NA	NA	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total PFAS (Calculated)	NCL	NA	NA	ND	0.0021	ND	ND	ND	ND	ND	ND	0.0063	ND	ND	ND	ND	0.015

TABLE 2 NOTES

Area 5

Algoma and Plainfield Townships, Kent County, MI

NOTES:

1. Concentration and criteria units are micrograms per Liter (µg/L) or parts per billion (ppb). Calculated criteria and concentrations are rounded to two significant digits. "ND" indicates the parameters used in the calculation were not detected.
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 August 3, 2020.
   Abbreviations Include:
   "NCL" indicates no criterion listed in EGLE Table 1.
3. Maxium Contaminant Levels (MCLs) were published by EGLE, effective August 3, 2020.
   Abbreviations Include:
   "NA" indicates no MCL listed.
4. "CD Value" refers to the PFOA+PFOS value of 0.01 µg/L in the Consent Decree.
5. Bold, italic number with thick line border or italic parameter name indicates that parameter was detected above the Michigan Part 201 Groundwater Cleanup Criteria, MCLs, or CD Value listed.
6. Abbreviations include:
   "< RL" indicates the parameter was analyzed for but not detected above the method detection limit; RL = Reporting Limit.
   "DUP" indicates a duplicate sample.
   "-" indicates the paramater was not analyzed.
   "B" indicates the parameter was also detected in the method blank.
   "J" indicates the parameter was detected at a concentration greater than the limit of quantitation (LOQ) but less than the detection limit (DL) and the result is estimated.

TABLE 3
MONITORING WELL INSTALLATION INFORMATION
Area 5
Algoma and Plainfield Townships, Kent County, MI

Site Location	Well Ownership/ Data Provider	Well Field ID	Top of Casing Elevation (ft)	Ground Surface Elevation (ft)	Top of Screen Depth (ft bgs)	Bottom of Screen Depth (ft bgs)	Casing Diameter (in)	Casing Type	Aquifer Zone	Protective Casing Type
House Street	EGLE	HS-DEQ-MW1D	799.43	799.7	*ND*	123.82	*ND*	*ND*	*D*	*ND*
House Street	EGLE	HS-DEQ-MW1I	799.83	800.2	*ND*	77.58	*ND*	*ND*	*S*	*ND*
House Street	EGLE	HS-DEQ-MW1S	799.42	799.7	*ND*	56.56	*ND*	*ND*	*S*	*ND*
House Street	EGLE	HS-DEQ-MW3D	857.29	857.9	*ND*	177.41	*ND*	*ND*	*D*	*ND*
House Street	EGLE	HS-DEQ-MW3S	857.40	857.9	*ND*	106.45	*ND*	*ND*	*S*	*ND*
House Street	EGLE	HS-DEQ-MW4-102	733.80	734.4	*ND*	102.8	*ND*	*ND*	*D*	*ND*
House Street	EGLE	HS-DEQ-MW4-16	734.23	734.7	*ND*	16.04	*ND*	*ND*	*S*	*ND*
House Street	EGLE	HS-DEQ-MW4-53	734.33	734.7	*ND*	53.85	*ND*	*ND*	*D*	*ND*
House Street	EGLE	HS-DEQ-MW4-80	734.33	734.7	*ND*	80.09	*ND*	*ND*	*D*	*ND*
House Street	EGLE	HS-DEQ-MW4-85	733.61	734.4	*ND*	85.79	*ND*	*ND*	*D*	*ND*
House Street	EGLE	HS-DEQ-MW4-90	733.99	734.4	*ND*	89.68	*ND*	*ND*	*D*	*ND*
House Street	EGLE	HS-DEQ-MW4-97	733.71	734.4	*ND*	98.81	*ND*	*ND*	*D*	*ND*
House Street	EGLE	HS-DEQ-MW5D	812.95	813.5	*ND*	130.16	*ND*	*ND*	*S*	*ND*
House Street	EGLE	HS-DEQ-MW5S	813.12	813.5	*ND*	47.28	*ND*	*ND*	*S*	*ND*
House Street	EGLE	HS-DEQ-MW6D	795.59	796.4	*ND*	176.36	*ND*	*ND*	*D*	*ND*
House Street	EGLE	HS-DEQ-MW6S	796.09	796.4	*ND*	45.71	*ND*	*ND*	*S*	*ND*
House Street	EGLE	HS-DEQ-MW7-102	775.04	775.4	*ND*	102.11	*ND*	*ND*	*S*	*ND*
House Street	EGLE	HS-DEQ-MW7-33	775.15	775.4	*ND*	33.33	*ND*	*ND*	*S*	*ND*
House Street	EGLE	HS-DEQ-MW7-87	775.02	775.4	*ND*	87.71	*ND*	*ND*	*S*	*ND*
House Street	EGLE	HS-DEQ-MW7-94	775.16	775.4	*ND*	94.32	*ND*	*ND*	*S*	*ND*
House Street	EGLE	HS-DEQ-MW8D	677.86	678.2	*ND*	33.37	*ND*	*ND*	*S*	*ND*
House Street	EGLE	HS-DEQ-MW8S	677.87	678.2	*ND*	28.28	*ND*	*ND*	*S*	*ND*
House Street	R&W/GZA	HS-MW-10D	780.94	778.1	188.2	193.2	2	PVC	D	Stickup
House Street	R&W/GZA	HS-MW-10M	780.64	777.7	126.4	131.4	2	PVC	S	Stickup
House Street	R&W/GZA	HS-MW-10S	780.06	777.2	48.3	58.3	2	PVC	S	Stickup
House Street	R&W/GZA	HS-MW-11D	744.75	742.1	153.6	158.6	2	PVC	D	Stickup
House Street	R&W/GZA	HS-MW-11M	744.96	742.3	96.4	101.4	2	PVC	D	Stickup
House Street	R&W/GZA	HS-MW-11S	744.78	742.1	21.2	31.2	2	PVC	S	Stickup
House Street	R&W/GZA	HS-MW-12A	716.50	716.8	15.4	20.4	2	PVC	S	Flush
House Street	R&W/GZA	HS-MW-12B	716.36	716.8	51.5	56.5	2	PVC	S	Flush
House Street	R&W/GZA	HS-MW-12C	716.17	716.9	127.7	132.7	2	PVC	D	Flush
House Street	R&W/GZA	HS-MW-12D	716.48	717.0	158.7	163.7	2	PVC	D	Flush
House Street	R&W/GZA	HS-MW-12E	716.29	716.8	187.5	192.5	2	PVC	D	Flush
House Street	R&W/GZA	HS-MW-13A	*ND*	*ND*	79.0	84.0	2	PVC	ND	*ND*
House Street	R&W/GZA	HS-MW-13B	*ND*	*ND*	149.0	154.0	2	PVC	ND	*ND*
House Street	R&W/GZA	HS-MW-13C	*ND*	*ND*	199.5	114.5	2	PVC	ND	*ND*
House Street	R&W/GZA	HS-MW-14D	673.20	670.7	109.0	114.0	2	PVC	D	Stickup
House Street	R&W/GZA	HS-MW-14M	673.53	671.0	68.1	73.1	2	PVC	D	Stickup
House Street	R&W/GZA	HS-MW-14S	673.64	671.2	13.0	23.0	2	PVC	S	Stickup
House Street	R&W/GZA	HS-MW-15D	642.86	639.7	108.6	118.6	2	PVC	D	Stickup
House Street	R&W/GZA	HS-MW-15M	640.98	638.0	44.8	49.8	2	PVC	D	Stickup
House Street	R&W/GZA	HS-MW-15S	640.71	637.5	6.9	16.9	2	PVC	S	Stickup
House Street	R&W/GZA	HS-MW-17D	784.64	782.3	222.1	227.1	2	PVC	D	Stickup
House Street	R&W/GZA	HS-MW-17M	784.17	781.9	167.3	172.3	2	PVC	D	Stickup
House Street	R&W/GZA	HS-MW-17S	784.77	782.0	105.8	110.8	2	PVC	S	Stickup
House Street	R&W/GZA	HS-MW-18D	684.73	682.0	140.6	145.6	2	PVC	D	Stickup
House Street	R&W/GZA	HS-MW-18S	683.93	682.0	12.8	22.8	2	PVC	S	Stickup
House Street	R&W/GZA	HS-MW-19D	680.79	677.7	85.9	95.9	2	PVC	D	Stickup
House Street	R&W/GZA	HS-MW-19S	680.83	677.8	58.4	61.4	2	PVC	S	Stickup
House Street	R&W/GZA	HS-MW-1D	790.73	788.7	172.3	176.9	2	PVC	D	Stickup
House Street	R&W/GZA	HS-MW-1S	791.01	788.8	67.4	72.1	2	PVC	S	Stickup
House Street	R&W/GZA	HS-MW-20D	706.64	703.9	126.1	131.1	2	PVC	D	Stickup
House Street	R&W/GZA	HS-MW-20M	706.90	704.2	101.5	106.5	2	PVC	S	Stickup
House Street	R&W/GZA	HS-MW-20S	706.72	703.9	61.1	66.1	2	PVC	S	Stickup
House Street	R&W/GZA	HS-MW-21D	648.38	645.7	76.2	86.2	2	PVC	D	Stickup
House Street	R&W/GZA	HS-MW-21M	648.85	645.9	59.0	64.0	2	PVC	D	Stickup
House Street	R&W/GZA	HS-MW-21S	648.67	645.8	9.8	19.8	2	PVC	S	Stickup
House Street	R&W/GZA	HS-MW-23A	791.23	791.7	72.1	77.1	2	PVC	S	Flush
House Street	R&W/GZA	HS-MW-23B	791.21	791.5	137.9	142.8	2	PVC	D	Flush
House Street	R&W/GZA	HS-MW-23C	791.09	791.4	210.2	215.0	2	PVC	D	Flush
House Street	R&W/GZA	HS-MW-23D	791.47	792.0	238.9	243.9	2	PVC	D	Flush
House Street	R&W/GZA	HS-MW-24A	776.01	776.3	55.6	60.4	2	PVC	S	Flush
House Street	R&W/GZA	HS-MW-24B	775.72	776.2	225.2	230.0	2	PVC	D	Flush
House Street	R&W/GZA	HS-MW-25D	650.61	651.1	65.7	70.7	2	PVC	D	Flush
House Street	R&W/GZA	HS-MW-25S	650.83	651.2	51.1	56.1	2	PVC	S	Flush
House Street	R&W/GZA	HS-MW-26D	651.75	652.1	79.6	84.6	2	PVC	D	Flush
House Street	R&W/GZA	HS-MW-26M	651.31	651.7	61.7	66.7	2	PVC	D	Flush
House Street	R&W/GZA	HS-MW-26S	651.88	652.0	25.8	30.8	2	PVC	S	Flush
House Street	R&W/GZA	HS-MW-27A	668.44	668.7	21.6	26.2	2	PVC	S	Flush
House Street	R&W/GZA	HS-MW-27B	668.49	668.9	35.4	38.0	2	PVC	S	Flush
House Street	R&W/GZA	HS-MW-27C	668.64	669.0	41.3	45.9	2	PVC	S	Flush

TABLE 3
MONITORING WELL INSTALLATION INFORMATION
Area 5
Algoma and Plainfield Townships, Kent County, MI

Site Location	Well Ownership/ Data Provider	Well Field ID	Top of Casing Elevation (ft)	Ground Surface Elevation (ft)	Top of Screen Depth (ft bgs)	Bottom of Screen Depth (ft bgs)	Casing Diameter (in)	Casing Type	Aquifer Zone	Protective Casing Type
House Street	R&W/GZA	HS-MW-27D	668.54	668.9	52.4	56.4	2	PVC	D	Flush
House Street	R&W/GZA	HS-MW-27E	668.56	668.9	58.5	62.5	2	PVC	D	Flush
House Street	R&W/GZA	HS-MW-28A	665.88	666.2	39.1	43.7	2	PVC	S	Flush
House Street	R&W/GZA	HS-MW-28B	666.14	666.4	43.3	47.9	2	PVC	S	Flush
House Street	R&W/GZA	HS-MW-28C	666.16	666.5	49.2	53.8	2	PVC	S	Flush
House Street	R&W/GZA	HS-MW-28D	665.89	666.3	62.2	66.8	2	PVC	D	Flush
House Street	R&W/GZA	HS-MW-28E	665.61	666.0	82.7	87.3	2	PVC	D	Flush
House Street	R&W/GZA	HS-MW-29A	633.13	630.3	3.5	13.5	2	PVC	S	Stickup
House Street	R&W/GZA	HS-MW-29B	633.89	630.5	16.8	21.8	2	PVC	S	Stickup
House Street	R&W/GZA	HS-MW-29C	633.60	630.4	27.2	32.2	2	PVC	D	Stickup
House Street	R&W/GZA	HS-MW-29D	633.19	630.7	37.1	42.1	2	PVC	D	Stickup
House Street	R&W/GZA	HS-MW-2S	799.66	797.6	77.9	82.5	2	PVC	S	Stickup
House Street	R&W/GZA	HS-MW-30A	672.78	673.0	46.9	51.5	2	PVC	S	Flush
House Street	R&W/GZA	HS-MW-30B	673.09	673.4	51.5	56.1	2	PVC	S	Flush
House Street	R&W/GZA	HS-MW-30C	672.90	673.1	77.4	82.0	2	PVC	D	Flush
House Street	R&W/GZA	HS-MW-30D	673.37	673.6	112.7	117.3	2	PVC	D	Flush
House Street	R&W/GZA	HS-MW-30E	672.32	672.9	123.2	127.7	2	PVC	D	Flush
House Street	R&W/GZA	HS-MW-31A	639.30	639.5	17.1	21.6	2	PVC	S	Flush
House Street	R&W/GZA	HS-MW-31B	639.27	639.3	26.0	30.5	2	PVC	S	Flush
House Street	R&W/GZA	HS-MW-31C	639.27	639.4	41.3	45.8	2	PVC	S	Flush
House Street	R&W/GZA	HS-MW-31D	638.96	639.1	48.8	53.4	2	PVC	D	Flush
House Street	R&W/GZA	HS-MW-31E	638.95	639.2	64.1	68.7	2	PVC	D	Flush
House Street	R&W/GZA	HS-MW-32A	727.36	724.8	60.9	65.5	2	PVC	S	Stickup
House Street	R&W/GZA	HS-MW-32B	727.85	725.1	79.1	83.7	2	PVC	D	Stickup
House Street	R&W/GZA	HS-MW-32C	727.72	725.1	108.8	113.4	2	PVC	D	Stickup
House Street	R&W/GZA	HS-MW-32D	727.55	725.0	142.3	146.9	2	PVC	D	Stickup
House Street	R&W/GZA	HS-MW-3P	790.15	787.7	19.3	24.3	2	PVC	P	Stickup
House Street	R&W/GZA	HS-MW-3S	790.69	788.1	70.1	75.0	2	PVC	S	Stickup
House Street	R&W/GZA	HS-MW-4S	784.88	782.3	70.2	74.8	2	PVC	S	Stickup
House Street	R&W/GZA	HS-MW-5D	781.99	779.3	190.5	200.5	2	PVC	D	Stickup
House Street	R&W/GZA	HS-MW-5P	781.55	779.1	17.7	22.4	2	PVC	P	Stickup
House Street	R&W/GZA	HS-MW-5S	781.79	779.2	60.3	65.0	2	PVC	S	Stickup
House Street	R&W/GZA	HS-MW-6D	773.44	771.0	157.5	162.5	2	PVC	D	Stickup
House Street	R&W/GZA	HS-MW-6S	773.34	770.7	58.2	62.9	2	PVC	S	Stickup
House Street	R&W/GZA	HS-MW-7S	791.09	788.9	69.9	74.5	2	PVC	S	Stickup
House Street	R&W/GZA	HS-MW-8	745.09	742.2	30.0	35.0	2	PVC	S	Stickup
House Street	R&W/GZA	HS-MW-9D	820.88	818.2	204.3	209.3	2	PVC	D	Stickup
House Street	R&W/GZA	HS-MW-9M	820.66	817.9	126.8	131.8	2	PVC	S	Stickup
House Street	R&W/GZA	HS-MW-9S	820.20	817.8	26.2	31.2	2	PVC	P	Stickup
North Kent Landfill	NKL	NKLF-MW-35	900.23	ND	ND	ND	ND	ND	ND	ND
North Kent Landfill	NKL	NKLF-MW-48	901.64	ND	ND	ND	ND	ND	ND	ND
North Kent Landfill	NKL	NKLF-MW-53	893.99	ND	ND	ND	ND	ND	ND	ND
North Kent Landfill	NKL	NKLF-MW-54	912.79	ND	ND	ND	ND	ND	ND	ND
North Kent Landfill	NKL	NKLF-MW-55	893.11	ND	ND	ND	ND	ND	ND	ND
North Kent Landfill	NKL	NKLF-MW-56	867.88	866.4	ND	43.97	ND	ND	S	ND
North Kent Landfill	NKL	NKLF-MW-57	894.35	ND	ND	ND	ND	ND	ND	ND
North Kent Landfill	NKL	NKLF-MW-60	844.35	ND	ND	ND	ND	ND	ND	ND
North Kent Landfill	NKL	NKLF-MW-61	841.14	839.8	ND	28.47	ND	ND	S	ND
North Kent Landfill	NKL	NKLF-MW-63	840.81	839.1	ND	102.41	ND	ND	D	ND
North Kent Landfill	NKL	NKLF-MW-65	835.27	834.2	ND	21.87	ND	ND	S	ND
North Kent Landfill	NKL	NKLF-MW-66	874.57	ND	ND	ND	ND	ND	ND	ND
North Kent Landfill	NKL	NKLF-MW-67	902.72	ND	ND	ND	ND	ND	ND	ND
North Kent Landfill	NKL	NKLF-MW-68	900.98	899.2	ND	92.79	ND	ND	S	ND
North Kent Landfill	NKL	NKLF-MW-69	893.04	ND	ND	ND	ND	ND	ND	ND
North Kent Landfill	NKL	NKLF-MW-70	897.8	895.6	ND	63.33	ND	ND	S	ND
North Kent Landfill	NKL	NKLF-MW-71	894.71	ND	ND	ND	ND	ND	ND	ND
North Kent Landfill	NKL	NKLF-MW-72	882.18	879.5	ND	26.98	ND	ND	S	ND
North Kent Landfill	NKL	NKLF-MW-73	900.19	ND	ND	ND	ND	ND	ND	ND
North Kent Landfill	NKL	NKLF-MW-74	880.34	ND	ND	ND	ND	ND	ND	ND
North Kent Landfill	NKL	NKLF-MW-75	881.23	ND	ND	ND	ND	ND	ND	ND
North Kent Landfill	NKL	NKLF-MW-76	849.47	ND	ND	ND	ND	ND	ND	ND
North Kent Landfill	NKL	NKLF-MW-77	837.14	834.2	ND	22.8	ND	ND	S	ND
North Kent Landfill	NKL	NKLF-MW-78	883.89	ND	ND	ND	ND	ND	ND	ND
North Kent Landfill	NKL	NKLF-MW-80	888.05	887.4	ND	42.44	ND	ND	S	ND
North Kent Landfill	NKL	NKLF-MW-81	834.71	ND	ND	ND	ND	ND	ND	ND
North Kent Landfill	NKL	NKLF-MW-82	896.26	ND	ND	ND	ND	ND	ND	ND
North Kent Landfill	NKL	NKLF-TW-02	900.95	ND	ND	ND	ND	ND	ND	ND
North Kent Landfill	NKL	NKLF-TW-04	858.20	ND	ND	ND	ND	ND	ND	ND
North Kent Landfill	NKL	NKLF-TW-05	838.64	ND	ND	ND	ND	ND	ND	ND
North Kent Landfill	NKL	NKLF-TW-06	883.99	ND	ND	ND	ND	ND	ND	ND
Wolven	EGLE	WV-DEQ-MW10-121	764.74	763.865	ND	120.72	ND	ND	D	ND

TABLE 3
MONITORING WELL INSTALLATION INFORMATION
Area 5
Algoma and Plainfield Townships, Kent County, MI

Site Location	Well Ownership/ Data Provider	Well Field ID	Top of Casing Elevation (ft)	Ground Surface Elevation (ft)	Top of Screen Depth (ft bgs)	Bottom of Screen Depth (ft bgs)	Casing Diameter (in)	Casing Type	Aquifer Zone	Protective Casing Type
Wolven	EGLE	WV-DEQ-MW10-177	764.934	763.865	*ND*	177.63	*ND*	*ND*	*D*	*ND*
Wolven	EGLE	WV-DEQ-MW10-55	764.909	763.376	*ND*	55.21	*ND*	*ND*	*S*	*ND*
Wolven	EGLE	WV-DEQ-MW10-84	764.442	763.376	*ND*	84.14	*ND*	*ND*	*D*	*ND*
Wolven	EGLE	WV-DEQ-MW10-95	764.931	763.376	*ND*	95.25	*ND*	*ND*	*D*	*ND*
Wolven	EGLE	WV-DEQ-MW11-130	859.121	855.95	*ND*	130.22	*ND*	*ND*	*D*	*ND*
Wolven	EGLE	WV-DEQ-MW11-137	859.212	855.763	*ND*	136.65	*ND*	*ND*	*D*	*ND*
Wolven	EGLE	WV-DEQ-MW11-145	859.14	855.95	*ND*	145.71	*ND*	*ND*	*D*	*ND*
Wolven	EGLE	WV-DEQ-MW11-57	858.794	855.95	*ND*	56.99	*ND*	*ND*	*S*	*ND*
Wolven	EGLE	WV-DEQ-MW11-95	859.129	855.763	*ND*	95.47	*ND*	*ND*	*S*	*ND*
Wolven	EGLE	WV-DEQ-MW2D	877.53	877.80	*ND*	168.72	*ND*	*ND*	*D*	*ND*
Wolven	EGLE	WV-DEQ-MW2S	877.57	877.80	*ND*	58.04	*ND*	*ND*	*S*	*ND*
Wolven	EGLE	WV-DEQ-MW9-114	712.079	712.402	*ND*	114.07	*ND*	*ND*	*D*	*ND*
Wolven	EGLE	WV-DEQ-MW9-131	712.031	712.402	*ND*	130.97	*ND*	*ND*	*D*	*ND*
Wolven	EGLE	WV-DEQ-MW9-57	712.128	712.562	*ND*	56.85	*ND*	*ND*	*ND*	*ND*
Wolven	EGLE	WV-DEQ-MW9-73	712.096	712.562	*ND*	73.34	*ND*	*ND*	*D*	*ND*
Wolven	EGLE	WV-DEQ-MW9-94	711.979	712.562	*ND*	94.09	*ND*	*ND*	*D*	*ND*
Wolven	R&W/GZA	WV-MW-1	859.24	859.2	137.8	142.8	2	PVC	D	Stickup
Wolven	R&W/GZA	WV-MW-10D	751.00	748.6	165	170	2	PVC	D	Stickup
Wolven	R&W/GZA	WV-MW-10M	751.19	748.7	69.9	74.9	2	PVC	S	Stickup
Wolven	R&W/GZA	WV-MW-10S	751.26	748.4	7.0	12.0	2	PVC	S	Stickup
Wolven	R&W/GZA	WV-MW-11D	735.96	733.0	158.9	163.9	2	PVC	D	Stickup
Wolven	R&W/GZA	WV-MW-11S	735.89	732.8	29.4	34.4	2	PVC	S	Stickup
Wolven	R&W/GZA	WV-MW-12D	771.12	771.4	179.2	184.2	2	PVC	D	Flush
Wolven	R&W/GZA	WV-MW-12M	770.75	771.3	146.6	151.6	2	PVC	D	Flush
Wolven	R&W/GZA	WV-MW-12S	771.06	771.3	75.8	80.8	2	PVC	S	Flush
Wolven	R&W/GZA	WV-MW-13D	823.91	821.3	58.8	63.8	2	PVC	D	Stickup
Wolven	R&W/GZA	WV-MW-13M	823.75	821.6	18.1	23.1	2	PVC	S	Stickup
Wolven	R&W/GZA	WV-MW-13S	823.68	821.3	1.7	6.7	2	PVC	S	Stickup
Wolven	R&W/GZA	WV-MW-14D	872.05	872.3	142.3	147.3	2	PVC	D	Flush
Wolven	R&W/GZA	WV-MW-14S	872.18	872.5	8.9	13.9	2	PVC	S	Flush
Wolven	R&W/GZA	WV-MW-15A	721.25	721.5	9.0	14	2	PVC	P	Flush
Wolven	R&W/GZA	WV-MW-15B	721.07	721.4	33.1	38.1	2	PVC	S	Flush
Wolven	R&W/GZA	WV-MW-15C	720.84	721.3	43.7	48.5	2	PVC	S	Flush
Wolven	R&W/GZA	WV-MW-15D	721.09	721.3	135.1	137.8	2	PVC	D	Flush
Wolven	R&W/GZA	WV-MW-16D	823.45	820.9	91.7	96.7	2	PVC	D	Stickup
Wolven	R&W/GZA	WV-MW-16S	823.42	820.9	17.5	22.5	2	PVC	S	Stickup
Wolven	R&W/GZA	WV-MW-2D	791.36	790.5	30.2	35.2	2	PVC	D	Stickup
Wolven	R&W/GZA	WV-MW-2S	793.39	790.6	20.2	25.2	2	PVC	S	Stickup
Wolven	R&W/GZA	WV-MW-3D	823.28	820.7	57.5	62.5	2	PVC	D	Stickup
Wolven	R&W/GZA	WV-MW-3S	823.31	820.6	5.1	10.1	2	PVC	S	Stickup
Wolven	R&W/GZA	WV-MW-4	854.99	852.5	130.2	135.2	2	PVC	D	Stickup
Wolven	R&W/GZA	WV-MW-5D	865.07	862.0	68.7	73.7	2	PVC	D	Stickup
Wolven	R&W/GZA	WV-MW-5S	865.01	862.1	61.5	66.5	2	PVC	S	Stickup
Wolven	R&W/GZA	WV-MW-6D	786.51	784.1	99.1	104.1	2	PVC	D	Stickup
Wolven	R&W/GZA	WV-MW-6S	786.62	784.6	13.3	18.3	2	PVC	S	Stickup
Wolven	R&W/GZA	WV-MW-7D	727.36	727.8	89.5	94.5	2	PVC	S	Flush
Wolven	R&W/GZA	WV-MW-7M	728.19	728.5	49.9	54.9	2	PVC	S	Flush
Wolven	R&W/GZA	WV-MW-7S	727.61	728.0	16.1	21.1	2	PVC	S	Flush
Wolven	R&W/GZA	WV-MW-8D	845.81	846.0	117.2	122.2	2	PVC	D	Flush
Wolven	R&W/GZA	WV-MW-8M	845.74	845.9	60.0	65.0	2	PVC	S	Flush
Wolven	R&W/GZA	WV-MW-8S	845.55	846.0	30.0	35.0	2	PVC	S	Flush
Wolven	R&W/GZA	WV-MW-9	859.86	857.4	92.3	97.3	2	PVC	S	Stickup

Abbreviations
ND = No data provided/ available
ft = feet
bgs = below ground surface
in = inches
NKL = Kent County North Kent Landfill
EGLE = Michigan Department of Environment, Great Lakes, and Energy
R&W/GZA = Rose & Westra, a Division of GZA
P = perched zone
S = shallow zone
D = deep zone

Notes
1) Elevations are provided in North American Vertical Datum of 1988 (NAVD 88).
2) North Kent Landfill elevations converted from NGVD29 to NAVD88 by R&W/GZA by subtracting 0.43 feet from provided elevation.

TABLE 4
MONITORING WELL STATIC WATER LEVELS
Area 5
Algoma and Plainfield Townships, Kent County, MI

Site Location	Well Field ID	November 4, 2019 Static Water Level Elevation (ft)
House Street	HS-DEQ-MW1D	739.09
House Street	HS-DEQ-MW1I	748.63
House Street	HS-DEQ-MW1S	749.96
House Street	HS-DEQ-MW3D	748.76
House Street	HS-DEQ-MW3S	839.76
House Street	HS-DEQ-MW4-102	687.91
House Street	HS-DEQ-MW4-16	729.17
House Street	HS-DEQ-MW4-53	688.26
House Street	HS-DEQ-MW4-80	688.11
House Street	HS-DEQ-MW4-85	688.07
House Street	HS-DEQ-MW4-90	688.00
House Street	HS-DEQ-MW4-97	687.77
House Street	HS-DEQ-MW5D	740.83
House Street	HS-DEQ-MW5S	*Dry*
House Street	HS-DEQ-MW6D	650.30
House Street	HS-DEQ-MW6S	*Dry*
House Street	HS-DEQ-MW7-102	751.35
House Street	HS-DEQ-MW7-33	751.20
House Street	HS-DEQ-MW7-87	751.33
House Street	HS-DEQ-MW7-94	751.36
House Street	HS-DEQ-MW8D	652.76
House Street	HS-DEQ-MW8S	653.68
House Street	HS-MW-10D	734.19
House Street	HS-MW-10M	726.19
House Street	HS-MW-10S	726.18
House Street	HS-MW-11D	719.37
House Street	HS-MW-11M	719.35
House Street	HS-MW-11S	720.13
House Street	HS-MW-12A	*ND*
House Street	HS-MW-12B	*ND*
House Street	HS-MW-12C	*ND*
House Street	HS-MW-12D	*ND*
House Street	HS-MW-12E	*ND*
House Street	HS-MW-13A	*ND*
House Street	HS-MW-13B	*ND*
House Street	HS-MW-13C	*ND*
House Street	HS-MW-14D	660.09
House Street	HS-MW-14M	661.24
House Street	HS-MW-14S	656.70
House Street	HS-MW-15D	635.56
House Street	HS-MW-15M	634.13
House Street	HS-MW-15S	630.84
House Street	HS-MW-17D	689.38
House Street	HS-MW-17M	689.45
House Street	HS-MW-17S	703.64
House Street	HS-MW-18D	663.55
House Street	HS-MW-18S	670.37
House Street	HS-MW-19D	649.16
House Street	HS-MW-19S	651.59
House Street	HS-MW-1D	727.41
House Street	HS-MW-1S	728.00
House Street	HS-MW-20D	648.97
House Street	HS-MW-20M	649.07
House Street	HS-MW-20S	649.12
House Street	HS-MW-21D	638.75
House Street	HS-MW-21M	637.58
House Street	HS-MW-21S	637.79
House Street	HS-MW-23A	723.53
House Street	HS-MW-23B	723.47
House Street	HS-MW-23C	723.48
House Street	HS-MW-23D	723.45
House Street	HS-MW-24A	723.25
House Street	HS-MW-24B	723.21
House Street	HS-MW-25D	627.83
House Street	HS-MW-25S	627.93
House Street	HS-MW-26D	640.12
House Street	HS-MW-26M	639.96
House Street	HS-MW-26S	636.05
House Street	HS-MW-27A	644.51
House Street	HS-MW-27B	644.58
House Street	HS-MW-27C	645.51
House Street	HS-MW-27D	645.74
House Street	HS-MW-27E	645.61
House Street	HS-MW-28A	629.35

TABLE 4
MONITORING WELL STATIC WATER LEVELS
Area 5
Algoma and Plainfield Townships, Kent County, MI

Site Location	Well Field ID	November 4, 2019 Static Water Level Elevation (ft)
House Street	HS-MW-28B	629.37
House Street	HS-MW-28C	629.30
House Street	HS-MW-28D	630.25
House Street	HS-MW-28E	630.35
House Street	HS-MW-29A	*ND*
House Street	HS-MW-29B	*ND*
House Street	HS-MW-29C	*ND*
House Street	HS-MW-29D	*ND*
House Street	HS-MW-2S	725.55
House Street	HS-MW-30A	631.99
House Street	HS-MW-30B	632.00
House Street	HS-MW-30C	632.35
House Street	HS-MW-30D	632.53
House Street	HS-MW-30E	632.54
House Street	HS-MW-31A	624.83
House Street	HS-MW-31B	625.05
House Street	HS-MW-31C	624.83
House Street	HS-MW-31D	624.69
House Street	HS-MW-31E	624.77
House Street	HS-MW-32A	720.65
House Street	HS-MW-32B	720.67
House Street	HS-MW-32C	720.90
House Street	HS-MW-32D	720.75
House Street	HS-MW-3P	763.67
House Street	HS-MW-3S	724.86
House Street	HS-MW-4S	724.49
House Street	HS-MW-5D	724.82
House Street	HS-MW-5P	758.61
House Street	HS-MW-5S	724.82
House Street	HS-MW-6D	725.47
House Street	HS-MW-6S	725.44
House Street	HS-MW-7S	726.43
House Street	HS-MW-8	724.19
House Street	HS-MW-9D	744.72
House Street	HS-MW-9M	744.56
House Street	HS-MW-9S	793.72
North Kent Landfill	NKLF-MW-35	867.33
North Kent Landfill	NKLF-MW-48	870.29
North Kent Landfill	NKLF-MW-53	872.08
North Kent Landfill	NKLF-MW-54	877.50
North Kent Landfill	NKLF-MW-55	867.98
North Kent Landfill	NKLF-MW-56	845.56
North Kent Landfill	NKLF-MW-57	862.99
North Kent Landfill	NKLF-MW-60	834.09
North Kent Landfill	NKLF-MW-61	834.67
North Kent Landfill	NKLF-MW-63	752.97
North Kent Landfill	NKLF-MW-65	834.86
North Kent Landfill	NKLF-MW-66	871.83
North Kent Landfill	NKLF-MW-67	863.70
North Kent Landfill	NKLF-MW-68	867.15
North Kent Landfill	NKLF-MW-69	855.72
North Kent Landfill	NKLF-MW-70	848.12
North Kent Landfill	NKLF-MW-71	862.76
North Kent Landfill	NKLF-MW-72	856.81
North Kent Landfill	NKLF-MW-73	895.07
North Kent Landfill	NKLF-MW-74	871.50
North Kent Landfill	NKLF-MW-75	870.84
North Kent Landfill	NKLF-MW-76	848.24
North Kent Landfill	NKLF-MW-77	832.26
North Kent Landfill	NKLF-MW-78	836.08
North Kent Landfill	NKLF-MW-80	867.52
North Kent Landfill	NKLF-MW-81	831.74
North Kent Landfill	NKLF-MW-82	863.27
North Kent Landfill	NKLF-TW-02	863.72
North Kent Landfill	NKLF-TW-04	846.15
North Kent Landfill	NKLF-TW-05	835.50
North Kent Landfill	NKLF-TW-06	854.24
Wolven	WV-DEQ-MW10-121	719.14
Wolven	WV-DEQ-MW10-177	721.88
Wolven	WV-DEQ-MW10-55	723.29
Wolven	WV-DEQ-MW10-84	720.09
Wolven	WV-DEQ-MW10-95	715.81
Wolven	WV-DEQ-MW11-130	757.03
Wolven	WV-DEQ-MW11-137	757.20

TABLE 4
MONITORING WELL STATIC WATER LEVELS
Area 5
Algoma and Plainfield Townships, Kent County, MI

Site Location	Well Field ID	November 4, 2019 Static Water Level Elevation (ft)
Wolven	WV-DEQ-MW11-145	756.95
Wolven	WV-DEQ-MW11-57	815.57
Wolven	WV-DEQ-MW11-95	810.62
Wolven	WV-DEQ-MW2D	753.80
Wolven	WV-DEQ-MW2S	826.21
Wolven	WV-DEQ-MW9-114	711.27
Wolven	WV-DEQ-MW9-131	711.27
Wolven	WV-DEQ-MW9-57	703.29
Wolven	WV-DEQ-MW9-73	711.32
Wolven	WV-DEQ-MW9-94	711.39
Wolven	WV-MW-1	751.30
Wolven	WV-MW-10D	749.49
Wolven	WV-MW-10M	747.82
Wolven	WV-MW-10S	742.24
Wolven	WV-MW-11D	*Artesian Conditions*
Wolven	WV-MW-11S	726.20
Wolven	WV-MW-12D	716.97
Wolven	WV-MW-12M	716.94
Wolven	WV-MW-12S	721.81
Wolven	WV-MW-13D	803.32
Wolven	WV-MW-13M	820.92
Wolven	WV-MW-13S	820.91
Wolven	WV-MW-14D	731.14
Wolven	WV-MW-14S	861.25
Wolven	WV-MW-15A	*ND*
Wolven	WV-MW-15B	*ND*
Wolven	WV-MW-15C	*ND*
Wolven	WV-MW-15D	*ND*
Wolven	WV-MW-16D	761.52
Wolven	WV-MW-16S	815.71
Wolven	WV-MW-2D	785.38
Wolven	WV-MW-2S	790.29
Wolven	WV-MW-3D	802.01
Wolven	WV-MW-3S	819.14
Wolven	WV-MW-4	753.96
Wolven	WV-MW-5D	802.39
Wolven	WV-MW-5S	802.11
Wolven	WV-MW-6D	765.11
Wolven	WV-MW-6S	781.51
Wolven	WV-MW-7D	715.73
Wolven	WV-MW-7M	715.73
Wolven	WV-MW-7S	715.71
Wolven	WV-MW-8D	754.38
Wolven	WV-MW-8M	823.77
Wolven	WV-MW-8S	823.75
Wolven	WV-MW-9	824.90
Rogue River	Dam Seawall	680.71
Rogue River	E Bridge Street Bridge	680.34
Rogue River	Rogue River Road Bridge	618.90
Rogue River	Jericho Ave Bridge	672.24
Rogue River	USGS04118500	630.419
Rogue River	Rogue River at Rum Creek	692.84

Abbreviations

ND = No data provided/available
ft = feet

Notes

1) Elevations are provided in North American Vertical Datum of 1988 (NAVD 88).
2) Water level static measurements were completed on November 4, 2019 by R&W/GZA, AECOM (for EGLE), and North Kent Landfill.
3) North Kent Landfill elevations converted from NGVD29 to NAVD88 by R&W/GZA by subtracting 0.43 feet from provided elevation.

TABLE 6
SUMMARY OF GROUNDWATER SAMPLE ANALYSIS - PFAS (HSDS, 2019)
Area 5
Algoma and Plainfield Townships, Kent County, MI

Sample Location	Part 201 Generic Residential Groundwater Cleanup Criteria – Drinking Water[2]	Part 201 Generic Groundwater Cleanup Criteria – Groundwater Surface Water Interface[2]	Part 201 Generic Residential Groundwater Cleanup Criteria – Groundwater Volatilization to Indoor Air Inhalation[2]	CD Value[3]	EGLE Residential Recommended Volatilization to Indoor Air Interim Action Screening Level - Groundwater[4]	U.S. EPA Residential Tap Water Regional Removal Management Levels[5]	HS-MW-1D	HS-MW-1D	HS-MW-1D	HS-MW-1D	HS-MW-1S	HS-MW-1S	HS-MW-1S	HS-MW-1S	HS-MW-2S	HS-MW-2S	HS-MW-2S	HS-MW-2S	HS-MW-3S
Sample Name							**HS-MW-1D**	**HS-GW-MW1D**	**HS-GW-MW1D**	**HS-GW-MW-1D**	**HS-MW-1S**	**HS-GW-MW1S**	**HS-GW-MW1S**	**HS-GW-MW-1S**	**HS-MW-2**	**HS-GW-MW2**	**HS-GW-MW2**	**HS-GW-MW-2S**	**HS-MW-3S**
Well Screen Interval (Feet below ground surface)							**172.3-176.9**	**172.3-176.9**	**172.3-176.9**	**172.3-176.9**	**67.4-72.1**	**67.4-72.1**	**67.4-72.1**	**67.4-72.1**	**77.9-82.5**	**77.9-82.5**	**77.9-82.5**	**77.9-82.5**	**70.1-75**
Laboratory Sample ID(s)							**UC16019-001**	**UE30036-007**	**UI28005-011**	**UL05055-005**	**UC16019-002**	**UE30036-008**	**UI28005-010**	**UL05055-003**	**UC16019-003**	**UE30036-015**	**UI28005-012**	**UL05055-009**	**UC16019-005**
Sample Date							**03/11/2019**	**05/29/2019**	**09/27/2019**	**12/02/2019**	**03/11/2019**	**05/29/2019**	**09/27/2019**	**12/02/2019**	**03/11/2019**	**05/30/2019**	**09/27/2019**	**12/03/2019**	**03/13/2019**
Parameter (µg/L)																			
8:2 Fluorotelomer sulfonic acid (8:2 FTS)	NCL	NCL	NCL	NA	NCL	NCL	<0.0035	<0.0036	<0.0034	<0.0034	<0.0035	<0.0038	<0.0035	<0.0035	<0.0035	<0.0036	<0.0036	<0.0037	<0.0035
6:2 Fluorotelomer sulfonic acid (6:2 FTS)	NCL	NCL	NCL	NA	NCL	NCL	<0.0035	<0.0036	<0.0034	<0.0034	<0.0035	<0.0038	<0.0035	<0.0035	<0.0035	<0.0036	<0.0036	<0.0037	<0.0035
N-Ethyl perfluorooctane sulfonamide (EtFOSA)	NCL	NCL	NCL	NA	NCL	NCL	<0.0035	<0.0036	<0.0034	<0.0034	<0.0035	<0.0038	<0.0035	<0.0035	<0.0035	<0.0036	<0.0036	<0.0037	<0.0035
N-Methyl perfluorooctane sulfonamide (MeFOSA)	NCL	NCL	NCL	NA	NCL	NCL	<0.0071	<0.0072	<0.0068	<0.0069	<0.007	<0.0076	<0.007	<0.0071	<0.0071	<0.0072	<0.0071	<0.0075	<0.007
Perfluorobutane sulfonic acid (PFBS)	NCL	NCL	NCL	NA	NCL	1,200	0.0056	0.0057	0.005	0.0054	0.0057	0.0059	0.0051	0.0054	0.079	0.099	0.089	0.04	0.38
Perfluorodecane sulfonic acid (PFDS)	NCL	NCL	NCL	NA	NCL	NCL	<0.0035	<0.0036	<0.0034	<0.0034	<0.0035	<0.0038	<0.0035	<0.0035	<0.0035	<0.0036	<0.0036	<0.0037	<0.0035
Perfluoroheptane sulfonic acid (PFHpS)	NCL	NCL	NCL	NA	NCL	NCL	<0.0035	<0.0036	<0.0034	<0.0034	<0.0035	<0.0038	<0.0035	<0.0035	<0.0035	<0.0036	<0.0036	<0.0037	0.034
Perfluorononane sulfonic acid (PFNS)	NCL	NCL	NCL	NA	NCL	NCL	<0.0071	<0.0072	<0.0068	<0.0069	<0.007	<0.0076	<0.007	<0.0071	<0.0071	<0.0072	<0.0071	<0.0075	<0.007
Perfluorooctane sulfonamide (FOSA)	NCL	NCL	NCL	NA	NCL	NCL	<0.0035	<0.0036	<0.0034	<0.0034	<0.0035	<0.0038	<0.0035	<0.0035	<0.0035	<0.0036	<0.0036	<0.0037	<0.0035
Perfluoropentane sulfonic acid (PFPeS)	NCL	NCL	NCL	NA	NCL	NCL	<0.0035	<0.0036	<0.0034	<0.0034	<0.0035	0.0038	<0.0035	<0.0035	0.097	0.11	0.094	0.028	0.68
Perfluorohexane sulfonic acid (PFHxS)	NCL	NCL	NCL	NA	NCL	NCL	<0.0035	<0.0036	<0.0034	0.0035	0.04	0.034	0.026	0.022	0.046	0.055	0.03	0.022	1.5
Perfluorobutanoic acid (PFBA)	NCL	NCL	NCL	NA	NCL	NCL	<0.0035	<0.0036	<0.0034	<0.0034	<0.0035	<0.0038	<0.0035	<0.0035	0.0095	0.011	0.01	0.0063	0.093
Perfluorodecanoic acid (PFDA)	NCL	NCL	NCL	NA	NCL	NCL	<0.0035	<0.0036	<0.0034	<0.0034	<0.0035	<0.0038	<0.0035	<0.0035	<0.0035	<0.0036	<0.0036	<0.0037	<0.0035
Perfluorododecanoic acid (PFDoDA)	NCL	NCL	NCL	NA	NCL	NCL	<0.0035	<0.0036	<0.0034	<0.0034	<0.0035	<0.0038	<0.0035	<0.0035	<0.0035	<0.0036	<0.0036	<0.0037	<0.0035
Perfluoroheptanoic acid (PFHpA)	NCL	NCL	NCL	NA	NCL	NCL	<0.0035	<0.0036	<0.0034	<0.0034	<0.0035	<0.0038	<0.0035	<0.0035	0.023	0.022	0.018	0.0065	0.14
Perfluorohexanoic acid (PFHxA)	NCL	NCL	NCL	NA	NCL	NCL	<0.0035	<0.0036	<0.0034	<0.0034	0.0053	0.0061	<0.0035	<0.0035	0.053	0.072	0.05	0.03	0.35
Perfluorononanoic acid (PFNA)	NCL	NCL	NCL	NA	NCL	NCL	<0.0035	<0.0036	<0.0034	<0.0034	<0.0035	<0.0038	<0.0035	<0.0035	<0.0035	<0.0036	<0.0036	<0.0037	<0.0035
Perfluorooctanoic acid (PFOA)	0.008	12	ID	NA	NCL	NCL	***0.0091***	***0.0098***	***0.0087***	***0.01***	***0.0095***	***0.013***	0.0064	0.0072	***0.0088***	***0.019***	0.006	0.0044	***0.69***
Perfluorooctane sulfonic acid (PFOS)	0.016	0.012	NLV	NA	NCL	NCL	0.0042	0.0044	0.0034	0.0038	0.0046	0.012	<0.0035	0.006	<0.0035	<0.0036	<0.0036	<0.0037	***0.032***
PFOA + PFOS (Calculated)	NCL	NCL	NCL	0.01	NCL	NCL	***0.013***	***0.014***	***0.012***	***0.014***	***0.014***	***0.025***	0.0064	***0.013***	0.0088	***0.019***	0.006	0.0044	***0.72***
Perfluoropentanoic acid (PFPeA)	NCL	NCL	NCL	NA	NCL	NCL	<0.0035	<0.0036	<0.0034	<0.0034	<0.0035	<0.0038	<0.0035	<0.0035	0.012	0.015	0.014	0.0076	0.11
Perfluorotetradecanoic acid (PFTeDA)	NCL	NCL	NCL	NA	NCL	NCL	<0.0035	<0.0036	<0.0034	<0.0034	<0.0035	<0.0038	<0.0035	<0.0035	<0.0035	<0.0036	<0.0036	<0.0037	<0.0035
Perfluorotridecanoic acid (PFTrDA)	NCL	NCL	NCL	NA	NCL	NCL	<0.0035	<0.0036	<0.0034	<0.0034	<0.0035	<0.0038	<0.0035	<0.0035	<0.0035	<0.0036	<0.0036	<0.0037	<0.0035
Perfluoroundecanoic acid (PFUnDA)	NCL	NCL	NCL	NA	NCL	NCL	<0.0035	<0.0036	<0.0034	<0.0034	<0.0035	<0.0038	<0.0035	<0.0035	<0.0035	<0.0036	<0.0036	<0.0037	<0.0035
Total PFAS (Calculated)	NCL	NCL	NCL	NA	NCL	NCL	0.019	0.02	0.017	0.023	0.065	0.074	0.038	0.041	0.33	0.4	0.31	0.14	4

TABLE 6
SUMMARY OF GROUNDWATER SAMPLE ANALYSIS - PFAS (HSDS, 2019)
Area 5
Algoma and Plainfield Townships, Kent County, MI

Sample Location	**Part 201 Generic Residential Groundwater Cleanup Criteria – Drinking Water[2]**	**Part 201 Generic Groundwater Cleanup Criteria – Groundwater Surface Water Interface[2]**	**Part 201 Generic Residential Groundwater Cleanup Criteria – Groundwater Volatilization to Indoor Air Inhalation[2]**	**CD Value[3]**	**EGLE Residential Recommended Volatilization to Indoor Air Interim Action Screening Level - Groundwater[4]**	**U.S. EPA Residential Tap Water Regional Removal Management Levels[5]**	**HS-MW-3S**	**HS-MW-3S**	**HS-MW-3S**	**HS-MW-3S**	**HS-MW-4S**	**HS-MW-4S**	**HS-MW-4S**	**HS-MW-4S**	**HS-MW-5D**	**HS-MW-5D**	**HS-MW-5D**	**HS-MW-5D**	**HS-MW-5D**
Sample Name							**HS-MW-3S DUP**	**HS-GW-MW3S**	**HS-GW-MW3S**	**HS-GW-MW-3S**	**HS-MW-4**	**HS-GW-MW4**	**HS-GW-MW4S**	**HS-GW-MW-4S**	**HS-MW-5D**	**HS-GW-MW5D**	**HS-GW-MW5D**	**HS-GW-MW-5D**	**HS-GW-MW-5D DUP**
Well Screen Interval (Feet below ground surface)							**70.1-75**	**70.1-75**	**70.1-75**	**70.1-75**	**70.2-74.8**	**70.2-74.8**	**70.2-74.8**	**70.2-74.8**	**190.5-200.5**	**190.5-200.5**	**190.5-200.5**	**190.5-200.5**	**190.5-200.5**
Laboratory Sample ID(s)							**UC16019-006**	**UE30036-016**	**UI26001-008**	**UL05055-011**	**UC16019-015**	**UE30036-014**	**UI26001-009**	**UL05055-020**	**UC16019-013**	**UE30036-005**	**UI26001-007**	**UL05055-018**	**UL05055-019**
Sample Date							**03/13/2019**	**05/30/2019**	**09/24/2019**	**12/03/2019**	**03/15/2019**	**05/30/2019**	**09/24/2019**	**12/04/2019**	**03/14/2019**	**05/28/2019**	**09/24/2019**	**12/04/2019**	**12/04/2019**
Parameter (µg/L)																			
8:2 Fluorotelomer sulfonic acid (8:2 FTS)	NCL	NCL	NCL	NA	NCL	NCL	<0.0035	<0.0035	<0.0035	<0.0036	<0.0035	<0.0035	<0.0035	<0.0037	<0.0035	<0.0034	<0.0036	<0.0035	<0.0036
6:2 Fluorotelomer sulfonic acid (6:2 FTS)	NCL	NCL	NCL	NA	NCL	NCL	<0.0035	<0.0035	<0.0035	<0.0036	<0.0035	<0.0035	<0.0035	<0.0037	<0.0035	<0.0034	<0.0036	<0.0035	<0.0036
N-Ethyl perfluorooctane sulfonamide (EtFOSA)	NCL	NCL	NCL	NA	NCL	NCL	<0.0035	<0.0035	<0.0035	<0.0036	<0.0035	<0.0035	<0.0035	<0.0037	<0.0035	<0.0034	<0.0036	<0.0035	<0.0036
N-Methyl perfluorooctane sulfonamide (MeFOSA)	NCL	NCL	NCL	NA	NCL	NCL	<0.007	<0.0071	<0.0069	<0.0071	<0.007	<0.0069	<0.007	<0.0074	<0.0071	<0.0069	<0.0073	<0.007	<0.0072
Perfluorobutane sulfonic acid (PFBS)	NCL	NCL	NCL	NA	NCL	1,200	0.39	0.5	0.4	0.57	0.058	0.055	0.033	0.1	<0.0035	<0.0034	<0.0036	0.005	0.0068
Perfluorodecane sulfonic acid (PFDS)	NCL	NCL	NCL	NA	NCL	NCL	<0.0035	<0.0035	<0.0035	<0.0036	<0.0035	<0.0035	<0.0035	<0.0037	<0.0035	<0.0034	<0.0036	<0.0035	<0.0036
Perfluoroheptane sulfonic acid (PFHpS)	NCL	NCL	NCL	NA	NCL	NCL	0.04	0.065	0.056	0.05	0.56	0.46	0.27	0.74	<0.0035	<0.0034	<0.0036	<0.0035	<0.0036
Perfluorononane sulfonic acid (PFNS)	NCL	NCL	NCL	NA	NCL	NCL	<0.007	<0.0071	<0.0069	<0.0071	<0.007	<0.0069	<0.007	<0.0074	<0.0071	<0.0069	<0.0073	<0.007	<0.0072
Perfluorooctane sulfonamide (FOSA)	NCL	NCL	NCL	NA	NCL	NCL	<0.0035	<0.0035	<0.0035	<0.0036	<0.0035	<0.0035	<0.0035	<0.0037	<0.0035	<0.0034	<0.0036	<0.0035	<0.0036
Perfluoropentane sulfonic acid (PFPeS)	NCL	NCL	NCL	NA	NCL	NCL	0.6	0.92	0.71	0.75	0.18	0.19	0.14	0.38	<0.0035	<0.0034	<0.0036	0.0053	0.0077
Perfluorohexane sulfonic acid (PFHxS)	NCL	NCL	NCL	NA	NCL	NCL	1.3	2.1	1.7	1.6	3	2.9	2.1	4.6	<0.0035	<0.0034	0.0058	0.013	0.02
Perfluorobutanoic acid (PFBA)	NCL	NCL	NCL	NA	NCL	NCL	0.09	0.13	0.1	0.14	0.095	0.071	0.047	0.23	<0.0035	<0.0034	<0.0036	<0.0035	<0.0036
Perfluorodecanoic acid (PFDA)	NCL	NCL	NCL	NA	NCL	NCL	<0.0035	<0.0035	<0.0035	<0.0036	<0.0035	<0.0035	<0.0035	<0.0037	<0.0035	<0.0034	<0.0036	<0.0035	<0.0036
Perfluorododecanoic acid (PFDoDA)	NCL	NCL	NCL	NA	NCL	NCL	<0.0035	<0.0035	<0.0035	<0.0036	<0.0035	<0.0035	<0.0035	<0.0037	<0.0035	<0.0034	<0.0036	<0.0035	<0.0036
Perfluoroheptanoic acid (PFHpA)	NCL	NCL	NCL	NA	NCL	NCL	0.15	0.34	0.2	0.24	0.19	0.19	0.15	0.45	<0.0035	<0.0034	<0.0036	<0.0035	<0.0036
Perfluorohexanoic acid (PFHxA)	NCL	NCL	NCL	NA	NCL	NCL	0.33	0.41	0.36	0.51	0.22	0.2	0.12	0.48	<0.0035	<0.0034	<0.0036	<0.0035	<0.0036
Perfluorononanoic acid (PFNA)	NCL	NCL	NCL	NA	NCL	NCL	<0.0035	<0.0035	<0.0035	<0.0036	<0.0035	<0.0035	<0.0035	<0.0037	<0.0035	<0.0034	<0.0036	<0.0035	<0.0036
Perfluorooctanoic acid (PFOA)	0.008	12	ID	NA	NCL	NCL	***0.63***	***0.89***	***0.83***	***0.73***	***1.5***	***1.4***	***0.82***	***2.1***	<0.0018	0.0028	0.0035	0.008	***0.013***
Perfluorooctane sulfonic acid (PFOS)	0.016	0.012	NLV	NA	NCL	NCL	***0.032***	***0.057***	***0.024***	***0.023***	***4.5***	***3.2***	***1.1***	***2.3***	0.0053	0.011	0.0083	0.01	***0.015***
PFOA + PFOS (Calculated)	NCL	NCL	NCL	0.01	NCL	NCL	***0.66***	***0.95***	***0.85***	***0.75***	***6***	***4.6***	***1.9***	***4.4***	0.0053	***0.014***	***0.012***	***0.018***	***0.028***
Perfluoropentanoic acid (PFPeA)	NCL	NCL	NCL	NA	NCL	NCL	0.11	0.14	0.13	0.16	0.094	0.075	0.048	0.21	<0.0035	<0.0034	<0.0036	<0.0035	<0.0036
Perfluorotetradecanoic acid (PFTeDA)	NCL	NCL	NCL	NA	NCL	NCL	<0.0035	<0.0035	<0.0035	<0.0036	<0.0035	<0.0035	<0.0035	<0.0037	<0.0035	<0.0034	<0.0036	<0.0035	<0.0036
Perfluorotridecanoic acid (PFTrDA)	NCL	NCL	NCL	NA	NCL	NCL	<0.0035	<0.0035	<0.0035	<0.0036	<0.0035	<0.0035	<0.0035	<0.0037	<0.0035	<0.0034	<0.0036	<0.0035	<0.0036
Perfluoroundecanoic acid (PFUnDA)	NCL	NCL	NCL	NA	NCL	NCL	<0.0035	<0.0035	<0.0035	<0.0036	<0.0035	<0.0035	<0.0035	<0.0037	<0.0035	<0.0034	<0.0036	<0.0035	<0.0036
Total PFAS (Calculated)	NCL	NCL	NCL	NA	NCL	NCL	3.7	5.6	4.5	4.8	10	8.7	4.8	12	0.0053	0.014	0.018	0.041	0.063

TABLE 6
SUMMARY OF GROUNDWATER SAMPLE ANALYSIS - PFAS (HSDS, 2019)
Area 5
Algoma and Plainfield Townships, Kent County, MI

Sample Location	**Part 201 Generic Residential Groundwater Cleanup Criteria – Drinking Water^2**	**Part 201 Generic Groundwater Cleanup Criteria – Groundwater Surface Water Interface^2**	**Part 201 Generic Residential Groundwater Cleanup Criteria – Groundwater Volatilization to Indoor Air Inhalation^2**	**CD Value^3**	**EGLE Residential Recommended Volatilization to Indoor Air Interim Action Screening Level - Groundwater^4**	**U.S. EPA Residential Tap Water Regional Removal Management Levels^5**	**HS-MW-5S**	**HS-MW-5S**	**HS-MW-5S**	**HS-MW-5S**	**HS-MW-6D**	**HS-MW-6D**	**HS-MW-6D**	**HS-MW-6D**	**HS-MW-6S**	**HS-MW-6S**	**HS-MW-6S**	**HS-MW-6S**	**HS-MW-7S**
Sample Name							**HS-MW-5S**	**HS-GW-MW5S**	**HS-GW-MW5S**	**HS-GW-MW-5S**	**HS-MW-6D**	**HS-GW-MW6D**	**HS-GW-MW6D**	**HS-GW-MW-6D**	**HS-MW-6S**	**HS-GW-MW6S**	**HS-GW-MW6S**	**HS-GW-MW-6S**	**HS-MW-7S**
Well Screen Interval (Feet below ground surface)							**60.3-65**	**60.3-65**	**60.3-65**	**60.3-65**	**157.5-162.5**	**157.5-162.5**	**157.5-162.5**	**157.5-162.5**	**58.2-62.9**	**58.2-62.9**	**58.2-62.9**	**58.2-62.9**	**69.9-74.5**
Laboratory Sample ID(s)							**UC16019-012**	**UE30036-004**	**UI26001-006**	**UL05055-021**	**UC21029-008**	**UE30036-009**	**UI28005-004**	**UL05055-028**	**UC21029-007**	**UE30036-010**	**UI28005-005**	**UL05055-027**	**UC23028-001**
Sample Date							**03/14/2019**	**05/28/2019**	**09/24/2019**	**12/04/2019**	**03/20/2019**	**05/29/2019**	**09/26/2019**	**12/05/2019**	**03/20/2019**	**05/29/2019**	**09/26/2019**	**12/05/2019**	**03/21/2019**
Parameter (µg/L)																			
8:2 Fluorotelomer sulfonic acid (8:2 FTS)	NCL	NCL	NCL	NA	NCL	NCL	<0.078	<0.07	<0.07	<0.071	<0.0035	<0.0036	<0.0036	<0.0036	<0.0036	<0.0035	<0.0036	<0.0036	<0.0035
6:2 Fluorotelomer sulfonic acid (6:2 FTS)	NCL	NCL	NCL	NA	NCL	NCL	<0.078	<0.07	<0.07	<0.071	<0.0035	<0.0036	<0.0036	<0.0036	<0.0036	<0.0035	<0.0036	<0.0036	<0.0035
N-Ethyl perfluorooctane sulfonamide (EtFOSA)	NCL	NCL	NCL	NA	NCL	NCL	<0.078	<0.07	<0.07	<0.071	<0.0035	<0.0036	<0.0036	<0.0036	<0.0036	<0.0035	<0.0036	<0.0036	<0.0035
N-Methyl perfluorooctane sulfonamide (MeFOSA)	NCL	NCL	NCL	NA	NCL	NCL	<0.16	<0.14	<0.14	<0.14	<0.007	<0.0071	<0.0072	<0.0071	<0.0073	<0.0069	<0.0072	<0.0072	<0.0071
Perfluorobutane sulfonic acid (PFBS)	NCL	NCL	NCL	NA	NCL	1,200	1.9	1.6	1.4	1.4	<0.0035	<0.0036	<0.0036	<0.0036	0.047	0.0052	0.034	0.0046	0.0051
Perfluorodecane sulfonic acid (PFDS)	NCL	NCL	NCL	NA	NCL	NCL	<0.078	<0.07	<0.07	<0.071	<0.0035	<0.0036	<0.0036	<0.0036	<0.0036	<0.0035	<0.0036	<0.0036	<0.0035
Perfluoroheptane sulfonic acid (PFHpS)	NCL	NCL	NCL	NA	NCL	NCL	1.7	3.5	2.2	3.4	<0.0035	<0.0036	<0.0036	<0.0036	<0.0036	<0.0035	<0.0036	<0.0036	<0.0035
Perfluorononane sulfonic acid (PFNS)	NCL	NCL	NCL	NA	NCL	NCL	<0.16	<0.14	<0.14	<0.14	<0.007	<0.0071	<0.0072	<0.0071	<0.0073	<0.0069	<0.0072	<0.0072	<0.0071
Perfluorooctane sulfonamide (FOSA)	NCL	NCL	NCL	NA	NCL	NCL	<0.078	<0.07	<0.07	<0.071	<0.0035	<0.0036	<0.0036	<0.0036	<0.0036	<0.0035	<0.0036	<0.0036	<0.0035
Perfluoropentane sulfonic acid (PFPeS)	NCL	NCL	NCL	NA	NCL	NCL	3.1	3.1	2.8	3.5	<0.0035	<0.0036	<0.0036	<0.0036	0.061	0.011	0.036	<0.0036	<0.0035
Perfluorohexane sulfonic acid (PFHxS)	NCL	NCL	NCL	NA	NCL	NCL	7.5	11	9.9	15	<0.0035	<0.0036	<0.0036	<0.0036	0.085	0.039	0.074	0.013	0.011
Perfluorobutanoic acid (PFBA)	NCL	NCL	NCL	NA	NCL	NCL	0.56	0.52	0.47	0.43	<0.0035	<0.0036	<0.0036	<0.0036	0.0046	<0.0035	0.0036	<0.0036	<0.0035
Perfluorodecanoic acid (PFDA)	NCL	NCL	NCL	NA	NCL	NCL	<0.078	<0.07	<0.07	<0.071	<0.0035	<0.0036	<0.0036	<0.0036	<0.0036	<0.0035	<0.0036	<0.0036	<0.0035
Perfluorododecanoic acid (PFDoDA)	NCL	NCL	NCL	NA	NCL	NCL	<0.078	<0.07	<0.07	<0.071	<0.0035	<0.0036	<0.0036	<0.0036	<0.0036	<0.0035	<0.0036	<0.0036	<0.0035
Perfluoroheptanoic acid (PFHpA)	NCL	NCL	NCL	NA	NCL	NCL	1.6	1.8	1.4	2.4	<0.0035	<0.0036	<0.0036	<0.0036	0.015	0.0043	0.012	<0.0036	<0.0035
Perfluorohexanoic acid (PFHxA)	NCL	NCL	NCL	NA	NCL	NCL	1.5	1.6	1.3	1.3	<0.0035	<0.0036	<0.0036	<0.0036	0.031	0.0053	0.021	<0.0036	<0.0035
Perfluorononanoic acid (PFNA)	NCL	NCL	NCL	NA	NCL	NCL	<0.078	<0.07	<0.07	<0.071	<0.0035	<0.0036	<0.0036	<0.0036	<0.0036	<0.0035	<0.0036	<0.0036	<0.0035
Perfluorooctanoic acid (PFOA)	0.008	12	ID	NA	NCL	NCL	***8.5***	***11***	***8.2***	***11***	<0.0018	<0.0018	<0.0018	<0.0018	***0.044***	***0.028***	***0.043***	***0.012***	0.0029
Perfluorooctane sulfonic acid (PFOS)	0.016	0.012	NLV	NA	NCL	NCL	***42***	***100***	***59***	***71***	<0.0035	<0.0036	<0.0036	<0.0036	0.0087	0.0059	0.005	0.0046	<0.0035
PFOA + PFOS (Calculated)	NCL	NCL	NCL	0.01	NCL	NCL	***51***	***110***	***67***	***82***	ND	ND	ND	ND	***0.053***	***0.034***	***0.048***	***0.017***	0.0029
Perfluoropentanoic acid (PFPeA)	NCL	NCL	NCL	NA	NCL	NCL	0.65	0.61	0.54	0.51	<0.0035	<0.0036	<0.0036	<0.0036	0.0078	<0.0035	0.006	<0.0036	<0.0035
Perfluorotetradecanoic acid (PFTeDA)	NCL	NCL	NCL	NA	NCL	NCL	<0.078	<0.07	<0.07	<0.071	<0.0035	<0.0036	<0.0036	<0.0036	<0.0036	<0.0035	<0.0036	<0.0036	<0.0035
Perfluorotridecanoic acid (PFTrDA)	NCL	NCL	NCL	NA	NCL	NCL	<0.078	<0.07	<0.07	<0.071	<0.0035	<0.0036	<0.0036	<0.0036	<0.0036	<0.0035	<0.0036	<0.0036	<0.0035
Perfluoroundecanoic acid (PFUnDA)	NCL	NCL	NCL	NA	NCL	NCL	<0.078	<0.07	<0.07	<0.071	<0.0035	<0.0036	<0.0036	<0.0036	<0.0036	<0.0035	<0.0036	<0.0036	<0.0035
Total PFAS (Calculated)	NCL	NCL	NCL	NA	NCL	NCL	69	130	87	110	ND	ND	ND	ND	0.3	0.099	0.23	0.034	0.019

TABLE 6
SUMMARY OF GROUNDWATER SAMPLE ANALYSIS - PFAS (HSDS, 2019)
Area 5
Algoma and Plainfield Townships, Kent County, MI

Sample Location	Part 201 Generic Residential Groundwater Cleanup Criteria – Drinking Water[2]	Part 201 Generic Groundwater Cleanup Criteria – Groundwater Surface Water Interface[2]	Part 201 Generic Residential Groundwater Cleanup Criteria – Groundwater Volatilization to Indoor Air Inhalation[2]	CD Value[3]	EGLE Residential Recommended Volatilization to Indoor Air Interim Action Screening Level - Groundwater[4]	U.S. EPA Residential Tap Water Regional Removal Management Levels[5]	HS-MW-7S	HS-MW-7S	HS-MW-7S	HS-MW-7S	HS-MW-8	HS-MW-8	HS-MW-8	HS-MW-8	HS-MW-9D	HS-MW-9D	HS-MW-9D	HS-MW-9D	HS-MW-9D
Sample Name							**HS-MW-7S DUP**	**HS-GW-MW7S**	**HS-GW-MW7S**	**HS-GW-MW-7S**	**HS-MW-8**	**HS-GW-MW8**	**HS-GW-MW8**	**HS-GW-MW-8**	**HS-MW-9D**	**HS-GW-MW9D**	**HS-GW-MW9D DUP**	**HS-GW-MW9D**	**HS-GW-MW-9D**
Well Screen Interval (Feet below ground surface)							**69.9-74.5**	**69.9-74.5**	**69.9-74.5**	**69.9-74.5**	**30-35**	**30-35**	**30-35**	**30-35**	**204.3-209.3**	**204.3-209.3**	**204.3-209.3**	**204.3-209.3**	**204.3-209.3**
Laboratory Sample ID(s)							**UC23028-002**	**UE30036-017**	**UI26001-004**	**UL05055-022**	**UC23028-003**	**UE30036-006**	**UI26001-010**	**UL05055-031**	**UC21029-006**	**UE24001-014**	**UE24001-015**	**UI26001-014**	**UL12091-004**
Sample Date							**03/21/2019**	**05/30/2019**	**09/23/2019**	**12/04/2019**	**03/21/2019**	**05/29/2019**	**09/24/2019**	**12/06/2019**	**03/19/2019**	**05/22/2019**	**05/22/2019**	**09/25/2019**	**12/09/2019**
Parameter (µg/L)																			
8:2 Fluorotelomer sulfonic acid (8:2 FTS)	NCL	NCL	NCL	NA	NCL	NCL	<0.0035	<0.0035	<0.0034	<0.0035	<0.0036	<0.0035	<0.0039	<0.0038	<0.0035	<0.0036	<0.0036	<0.0034	<0.0038
6:2 Fluorotelomer sulfonic acid (6:2 FTS)	NCL	NCL	NCL	NA	NCL	NCL	<0.0035	<0.0035	<0.0034	<0.0035	<0.0036	<0.0035	<0.0039	<0.0038	<0.0035	<0.0036	<0.0036	<0.0034	<0.0038
N-Ethyl perfluorooctane sulfonamide (EtFOSA)	NCL	NCL	NCL	NA	NCL	NCL	<0.0035	<0.0035	<0.0034	<0.0035	<0.0036	<0.0035	<0.0039	<0.0038	<0.0035	<0.0036	<0.0036	<0.0034	<0.0038
N-Methyl perfluorooctane sulfonamide (MeFOSA)	NCL	NCL	NCL	NA	NCL	NCL	<0.007	<0.0069	<0.0067	<0.007	<0.0072	<0.0071	<0.0078	<0.0075	<0.007	<0.0072	<0.0071	<0.0068	<0.0076
Perfluorobutane sulfonic acid (PFBS)	NCL	NCL	NCL	NA	NCL	1,200	0.0053	0.006	0.0046	0.0055	0.026	0.028	0.075	0.086	<0.0035	<0.0036	<0.0036	<0.0034	<0.0038
Perfluorodecane sulfonic acid (PFDS)	NCL	NCL	NCL	NA	NCL	NCL	<0.0035	<0.0035	<0.0034	<0.0035	<0.0036	<0.0035	<0.0039	<0.0038	<0.0035	<0.0036	<0.0036	<0.0034	<0.0038
Perfluoroheptane sulfonic acid (PFHpS)	NCL	NCL	NCL	NA	NCL	NCL	<0.0035	<0.0035	<0.0034	<0.0035	0.078	0.033	0.09	0.12	<0.0035	<0.0036	<0.0036	<0.0034	<0.0038
Perfluorononane sulfonic acid (PFNS)	NCL	NCL	NCL	NA	NCL	NCL	<0.007	<0.0069	<0.0067	<0.007	<0.0072	<0.0071	<0.0078	<0.0075	<0.007	<0.0072	<0.0071	<0.0068	<0.0076
Perfluorooctane sulfonamide (FOSA)	NCL	NCL	NCL	NA	NCL	NCL	<0.0035	<0.0035	<0.0034	<0.0035	<0.0036	<0.0035	<0.0039	<0.0038	<0.0035	<0.0036	<0.0036	<0.0034	<0.0038
Perfluoropentane sulfonic acid (PFPeS)	NCL	NCL	NCL	NA	NCL	NCL	<0.0035	<0.0035	<0.0034	<0.0035	0.044	0.035	0.13	0.11	<0.0035	<0.0036	<0.0036	<0.0034	<0.0038
Perfluorohexane sulfonic acid (PFHxS)	NCL	NCL	NCL	NA	NCL	NCL	0.0099	0.0089	0.0089	0.01	0.15	0.085	0.39	0.32	<0.0035	<0.0036	<0.0036	<0.0034	<0.0038
Perfluorobutanoic acid (PFBA)	NCL	NCL	NCL	NA	NCL	NCL	<0.0035	<0.0035	<0.0034	<0.0035	0.0066	0.0066	0.012	0.017	<0.0035	<0.0036	<0.0036	<0.0034	<0.0038
Perfluorodecanoic acid (PFDA)	NCL	NCL	NCL	NA	NCL	NCL	<0.0035	<0.0035	<0.0034	<0.0035	<0.0036	<0.0035	<0.0039	<0.0038	<0.0035	<0.0036	<0.0036	<0.0034	<0.0038
Perfluorododecanoic acid (PFDoDA)	NCL	NCL	NCL	NA	NCL	NCL	<0.0035	<0.0035	<0.0034	<0.0035	<0.0036	<0.0035	<0.0039	<0.0038	<0.0035	<0.0036	<0.0036	<0.0034	<0.0038
Perfluoroheptanoic acid (PFHpA)	NCL	NCL	NCL	NA	NCL	NCL	<0.0035	<0.0035	<0.0034	<0.0035	0.037	0.044	0.06	0.074	<0.0035	<0.0036	<0.0036	<0.0034	<0.0038
Perfluorohexanoic acid (PFHxA)	NCL	NCL	NCL	NA	NCL	NCL	<0.0035	<0.0035	<0.0034	<0.0035	0.016	0.024	0.028	0.031	<0.0035	<0.0036	<0.0036	<0.0034	<0.0038
Perfluorononanoic acid (PFNA)	NCL	NCL	NCL	NA	NCL	NCL	<0.0035	<0.0035	<0.0034	<0.0035	<0.0036	<0.0035	<0.0039	<0.0038	<0.0035	<0.0036	<0.0036	<0.0034	<0.0038
Perfluorooctanoic acid (PFOA)	0.008	12	ID	NA	NCL	NCL	0.003	0.0035	0.0029	0.003	***0.38***	***0.35***	***1.3***	***0.7***	<0.0017	<0.0018	<0.0018	<0.0017	<0.0019
Perfluorooctane sulfonic acid (PFOS)	0.016	0.012	NLV	NA	NCL	NCL	<0.0035	0.0037	0.0047	0.0091	***0.14***	***0.051***	***0.099***	***0.12***	<0.0035	<0.0036	<0.0036	<0.0034	<0.0038
PFOA + PFOS (Calculated)	NCL	NCL	NCL	0.01	NCL	NCL	0.003	0.0072	0.0076	***0.012***	***0.52***	***0.4***	***1.4***	***0.82***	ND	ND	ND	ND	ND
Perfluoropentanoic acid (PFPeA)	NCL	NCL	NCL	NA	NCL	NCL	<0.0035	<0.0035	<0.0034	<0.0035	0.0055	0.0067	0.01	0.011	<0.0035	<0.0036	<0.0036	<0.0034	<0.0038
Perfluorotetradecanoic acid (PFTeDA)	NCL	NCL	NCL	NA	NCL	NCL	<0.0035	<0.0035	<0.0034	<0.0035	<0.0036	<0.0035	<0.0039	<0.0038	<0.0035	<0.0036	<0.0036	<0.0034	<0.0038
Perfluorotridecanoic acid (PFTrDA)	NCL	NCL	NCL	NA	NCL	NCL	<0.0035	<0.0035	<0.0034	<0.0035	<0.0036	<0.0035	<0.0039	<0.0038	<0.0035	<0.0036	<0.0036	<0.0034	<0.0038
Perfluoroundecanoic acid (PFUnDA)	NCL	NCL	NCL	NA	NCL	NCL	<0.0035	<0.0035	<0.0034	<0.0035	<0.0036	<0.0035	<0.0039	<0.0038	<0.0035	<0.0036	<0.0036	<0.0034	<0.0038
Total PFAS (Calculated)	NCL	NCL	NCL	NA	NCL	NCL	0.018	0.022	0.021	0.028	0.88	0.66	2.2	1.6	ND	ND	ND	ND	ND

TABLE 6
SUMMARY OF GROUNDWATER SAMPLE ANALYSIS - PFAS (HSDS, 2019)
Area 5
Algoma and Plainfield Townships, Kent County, MI

Sample Location	**Part 201 Generic Residential Groundwater Cleanup Criteria – Drinking Water^2**	**Part 201 Generic Groundwater Cleanup Criteria – Groundwater Surface Water Interface^2**	**Part 201 Generic Residential Groundwater Cleanup Criteria – Groundwater Volatilization to Indoor Air Inhalation^2**	**CD Value^3**	**EGLE Residential Recommended Volatilization to Indoor Air Interim Action Screening Level - Groundwater^4**	**U.S. EPA Residential Tap Water Regional Removal Management Levels^5**	**HS-MW-9M**	**HS-MW-9M**	**HS-MW-9M**	**HS-MW-9M**	**HS-MW-9S**	**HS-MW-9S**	**HS-MW-9S**	**HS-MW-9S**	**HS-MW-9S**	**HS-MW-10D**	**HS-MW-10D**	**HS-MW-10D**	**HS-MW-10D**
Sample Name							**HS-MW-9M**	**HS-GW-MW9M**	**HS-GW-MW9M**	**HS-GW-MW-9M**	**HS-MW-9S**	**HS-GW-MW9S**	**HS-GW-MW9S**	**HS-GW-MW-9S**	**HS-GW-MW-9S DUP**	**HS-MW-10D**	**HS-GW-MW10D**	**HS-GW-MW10D**	**HS-GW-MW-10D**
Well Screen Interval (Feet below ground surface)							**126.8-131.8**	**126.8-131.8**	**126.8-131.8**	**126.8-131.8**	**26.2-31.2**	**26.2-31.2**	**26.2-31.2**	**26.2-31.2**	**26.2-31.2**	**188.2-193.2**	**188.2-193.2**	**188.2-193.2**	**188.2-193.2**
Laboratory Sample ID(s)							**UC21029-005**	**UE24001-013**	**UI26001-020**	**UL12091-003**	**UC21029-004**	**UE24001-012**	**UI26001-016**	**UL12091-013**	**UL12091-014**	**UC21029-003**	**UE24001-003**	**UI26001-015**	**UL05055-006**
Sample Date							**03/19/2019**	**05/22/2019**	**09/25/2019**	**12/09/2019**	**03/19/2019**	**05/22/2019**	**09/25/2019**	**12/11/2019**	**12/11/2019**	**03/18/2019**	**05/20/2019**	**09/25/2019**	**12/02/2019**
Parameter (µg/L)																			
8:2 Fluorotelomer sulfonic acid (8:2 FTS)	NCL	NCL	NCL	NA	NCL	NCL	<0.0036	<0.0035	<0.0036	<0.0036	<0.0036	<0.0035	<0.0037	<0.0038	<0.0037	<0.0038	<0.0035	<0.0036	<0.0035
6:2 Fluorotelomer sulfonic acid (6:2 FTS)	NCL	NCL	NCL	NA	NCL	NCL	<0.0036	<0.0035	<0.0036	<0.0036	<0.0036	<0.0035	0.0039	<0.0038	<0.0037	<0.0038	<0.0035	<0.0036	<0.0035
N-Ethyl perfluorooctane sulfonamide (EtFOSA)	NCL	NCL	NCL	NA	NCL	NCL	<0.0036	<0.0035	<0.0036	<0.0036	<0.0036	<0.0035	<0.0037	<0.0038	<0.0037	<0.0038	<0.0035	<0.0036	<0.0035
N-Methyl perfluorooctane sulfonamide (MeFOSA)	NCL	NCL	NCL	NA	NCL	NCL	<0.0071	<0.0069	<0.0071	<0.0071	<0.0073	<0.007	<0.0074	<0.0077	<0.0074	<0.0075	<0.007	<0.0072	<0.007
Perfluorobutane sulfonic acid (PFBS)	NCL	NCL	NCL	NA	NCL	1,200	<0.0036	<0.0035	<0.0036	<0.0036	<0.0036	<0.0035	<0.0037	<0.0038	<0.0037	<0.0038	<0.0035	<0.0036	<0.0035
Perfluorodecane sulfonic acid (PFDS)	NCL	NCL	NCL	NA	NCL	NCL	<0.0036	<0.0035	<0.0036	<0.0036	<0.0036	<0.0035	<0.0037	<0.0038	<0.0037	<0.0038	<0.0035	<0.0036	<0.0035
Perfluoroheptane sulfonic acid (PFHpS)	NCL	NCL	NCL	NA	NCL	NCL	<0.0036	<0.0035	<0.0036	<0.0036	<0.0036	<0.0035	<0.0037	<0.0038	<0.0037	<0.0038	<0.0035	<0.0036	<0.0035
Perfluorononane sulfonic acid (PFNS)	NCL	NCL	NCL	NA	NCL	NCL	<0.0071	<0.0069	<0.0071	<0.0071	<0.0073	<0.007	<0.0074	<0.0077	<0.0074	<0.0075	<0.007	<0.0072	<0.007
Perfluorooctane sulfonamide (FOSA)	NCL	NCL	NCL	NA	NCL	NCL	<0.0036	<0.0035	<0.0036	<0.0036	<0.0036	<0.0035	<0.0037	<0.0038	<0.0037	<0.0038	<0.0035	<0.0036	<0.0035
Perfluoropentane sulfonic acid (PFPeS)	NCL	NCL	NCL	NA	NCL	NCL	<0.0036	<0.0035	<0.0036	<0.0036	<0.0036	<0.0035	<0.0037	<0.0038	<0.0037	<0.0038	<0.0035	<0.0036	<0.0035
Perfluorohexane sulfonic acid (PFHxS)	NCL	NCL	NCL	NA	NCL	NCL	<0.0036	<0.0035	<0.0036	<0.0036	<0.0036	<0.0035	<0.0037	<0.0038	<0.0037	<0.0038	<0.0035	<0.0036	<0.0035
Perfluorobutanoic acid (PFBA)	NCL	NCL	NCL	NA	NCL	NCL	<0.0036	<0.0035	<0.0036	<0.0036	<0.0036	<0.0035	<0.0037	0.0049	0.0049	<0.0038	<0.0035	<0.0036	<0.0035
Perfluorodecanoic acid (PFDA)	NCL	NCL	NCL	NA	NCL	NCL	<0.0036	<0.0035	<0.0036	<0.0036	<0.0036	<0.0035	<0.0037	<0.0038	<0.0037	<0.0038	<0.0035	<0.0036	<0.0035
Perfluorododecanoic acid (PFDoDA)	NCL	NCL	NCL	NA	NCL	NCL	<0.0036	<0.0035	<0.0036	<0.0036	<0.0036	<0.0035	<0.0037	<0.0038	<0.0037	<0.0038	<0.0035	<0.0036	<0.0035
Perfluoroheptanoic acid (PFHpA)	NCL	NCL	NCL	NA	NCL	NCL	<0.0036	<0.0035	<0.0036	<0.0036	<0.0036	<0.0035	<0.0037	<0.0038	<0.0037	<0.0038	<0.0035	<0.0036	<0.0035
Perfluorohexanoic acid (PFHxA)	NCL	NCL	NCL	NA	NCL	NCL	<0.0036	<0.0035	<0.0036	<0.0036	<0.0036	<0.0035	<0.0037	<0.0038	<0.0037	<0.0038	<0.0035	<0.0036	<0.0035
Perfluorononanoic acid (PFNA)	NCL	NCL	NCL	NA	NCL	NCL	<0.0036	<0.0035	<0.0036	<0.0036	<0.0036	<0.0035	<0.0037	<0.0038	<0.0037	<0.0038	<0.0035	<0.0036	<0.0035
Perfluorooctanoic acid (PFOA)	0.008	12	ID	NA	NCL	NCL	<0.0018	<0.0017	<0.0018	<0.0018	<0.0018	<0.0017	<0.0018	0.0048	0.0049	<0.0019	<0.0017	<0.0018	<0.0018
Perfluorooctane sulfonic acid (PFOS)	0.016	0.012	NLV	NA	NCL	NCL	<0.0036	<0.0035	<0.0036	<0.0036	<0.0036	0.0049	<0.0037	0.0076	0.0081	<0.0038	<0.0035	<0.0036	<0.0035
PFOA + PFOS (Calculated)	NCL	NCL	NCL	0.01	NCL	NCL	ND	ND	ND	ND	ND	0.0049	ND	***0.012***	***0.013***	ND	ND	ND	ND
Perfluoropentanoic acid (PFPeA)	NCL	NCL	NCL	NA	NCL	NCL	<0.0036	<0.0035	<0.0036	<0.0036	<0.0036	<0.0035	<0.0037	<0.0038	<0.0037	<0.0038	<0.0035	<0.0036	<0.0035
Perfluorotetradecanoic acid (PFTeDA)	NCL	NCL	NCL	NA	NCL	NCL	<0.0036	<0.0035	<0.0036	<0.0036	<0.0036	<0.0035	<0.0037	<0.0038	<0.0037	<0.0038	<0.0035	<0.0036	<0.0035
Perfluorotridecanoic acid (PFTrDA)	NCL	NCL	NCL	NA	NCL	NCL	<0.0036	<0.0035	<0.0036	<0.0036	<0.0036	<0.0035	<0.0037	<0.0038	<0.0037	<0.0038	<0.0035	<0.0036	<0.0035
Perfluoroundecanoic acid (PFUnDA)	NCL	NCL	NCL	NA	NCL	NCL	<0.0036	<0.0035	<0.0036	<0.0036	<0.0036	<0.0035	<0.0037	<0.0038	<0.0037	<0.0038	<0.0035	<0.0036	<0.0035
Total PFAS (Calculated)	NCL	NCL	NCL	NA	NCL	NCL	ND	ND	ND	ND	ND	0.0049	0.0039	0.017	0.018	ND	ND	ND	ND

TABLE 6

SUMMARY OF GROUNDWATER SAMPLE ANALYSIS - PFAS (HSDS, 2019)
Area 5
Algoma and Plainfield Townships, Kent County, MI

Sample Location	**Part 201 Generic Residential Groundwater Cleanup Criteria – Drinking Water[2]**	**Part 201 Generic Groundwater Cleanup Criteria – Groundwater Surface Water Interface[2]**	**Part 201 Generic Residential Groundwater Cleanup Criteria – Groundwater Volatilization to Indoor Air Inhalation[2]**	**CD Value[3]**	**EGLE Residential Recommended Volatilization to Indoor Air Interim Action Screening Level - Groundwater[4]**	**U.S. EPA Residential Tap Water Regional Removal Management Levels[5]**	**HS-MW-10M**	**HS-MW-10M**	**HS-MW-10M**	**HS-MW-10M**	**HS-MW-10M**	**HS-MW-10S**	**HS-MW-10S**	**HS-MW-10S**	**HS-MW-10S**	**HS-MW-11D**	**HS-MW-11D**	**HS-MW-11D**	**HS-MW-11D**
Sample Name							**HS-MW-10M**	**HS-GW-MW10M**	**HS-GW-MW10M**	**HS-GW-MW10M DUP**	**HS-GW-MW-10M**	**HS-MW-10S**	**HS-GW-MW10S**	**HS-GW-MW10S**	**HS-GW-MW-10S**	**HS-MW-11D**	**HS-GW-MW11D**	**HS-GW-MW11D**	**HS-GW-MW-11D**
Well Screen Interval (Feet below ground surface)							**126.4-131.4**	**126.4-131.4**	**126.4-131.4**	**126.4-131.4**	**126.4-131.4**	**48.3-58.3**	**48.3-58.3**	**48.3-58.3**	**48.3-58.3**	**153.6-158.6**	**153.6-158.6**	**153.6-158.6**	**153.6-158.6**
Laboratory Sample ID(s)							**UC21029-002**	**UE24001-002**	**UI26001-017**	**UI26001-018**	**UL05055-010**	**UC21029-001**	**UE24001-001**	**UI26001-019**	**UL05055-001**	**UC16019-011**	**UE24001-016**	**UI28005-003**	**UL05055-013**
Sample Date							**03/18/2019**	**05/20/2019**	**09/25/2019**	**09/25/2019**	**12/03/2019**	**03/18/2019**	**05/20/2019**	**09/25/2019**	**12/02/2019**	**03/14/2019**	**05/22/2019**	**09/26/2019**	**12/03/2019**
Parameter (µg/L)																			
8:2 Fluorotelomer sulfonic acid (8:2 FTS)	NCL	NCL	NCL	NA	NCL	NCL	<0.0035	<0.0035	<0.0036	<0.0035	<0.0036	<0.0035	<0.0039	<0.0036	<0.0035	<0.0038	<0.0037	<0.0036	<0.0038
6:2 Fluorotelomer sulfonic acid (6:2 FTS)	NCL	NCL	NCL	NA	NCL	NCL	<0.0035	<0.0035	<0.0036	<0.0035	<0.0036	<0.0035	<0.0039	<0.0036	<0.0035	<0.0038	<0.0037	<0.0036	<0.0038
N-Ethyl perfluorooctane sulfonamide (EtFOSA)	NCL	NCL	NCL	NA	NCL	NCL	<0.0035	<0.0035	<0.0036	<0.0035	<0.0036	<0.0035	<0.0039	<0.0036	<0.0035	<0.0038	<0.0037	<0.0036	<0.0038
N-Methyl perfluorooctane sulfonamide (MeFOSA)	NCL	NCL	NCL	NA	NCL	NCL	<0.007	<0.007	<0.0072	<0.0071	<0.0071	<0.007	<0.0078	<0.0072	<0.0071	<0.0076	<0.0075	<0.0073	<0.0075
Perfluorobutane sulfonic acid (PFBS)	NCL	NCL	NCL	NA	NCL	1,200	0.0085	0.0063	0.0075	0.0079	0.0089	<0.0035	0.004	<0.0036	0.0037	<0.0038	<0.0037	<0.0036	<0.0038
Perfluorodecane sulfonic acid (PFDS)	NCL	NCL	NCL	NA	NCL	NCL	<0.0035	<0.0035	<0.0036	<0.0035	<0.0036	<0.0035	<0.0039	<0.0036	<0.0035	<0.0038	<0.0037	<0.0036	<0.0038
Perfluoroheptane sulfonic acid (PFHpS)	NCL	NCL	NCL	NA	NCL	NCL	<0.0035	<0.0035	<0.0036	<0.0035	<0.0036	0.0047	0.0049	<0.0036	0.0037	<0.0038	<0.0037	<0.0036	<0.0038
Perfluorononane sulfonic acid (PFNS)	NCL	NCL	NCL	NA	NCL	NCL	<0.007	<0.007	<0.0072	<0.0071	<0.0071	<0.007	<0.0078	<0.0072	<0.0071	<0.0076	<0.0075	<0.0073	<0.0075
Perfluorooctane sulfonamide (FOSA)	NCL	NCL	NCL	NA	NCL	NCL	<0.0035	<0.0035	<0.0036	<0.0035	<0.0036	<0.0035	<0.0039	<0.0036	<0.0035	<0.0038	<0.0037	<0.0036	<0.0038
Perfluoropentane sulfonic acid (PFPeS)	NCL	NCL	NCL	NA	NCL	NCL	<0.0035	<0.0035	<0.0036	<0.0035	<0.0036	<0.0035	<0.0039	<0.0036	<0.0035	<0.0038	<0.0037	<0.0036	<0.0038
Perfluorohexane sulfonic acid (PFHxS)	NCL	NCL	NCL	NA	NCL	NCL	0.0048	0.0036	0.0039	0.0039	0.0039	0.006	0.0084	0.014	0.013	<0.0038	<0.0037	<0.0036	<0.0038
Perfluorobutanoic acid (PFBA)	NCL	NCL	NCL	NA	NCL	NCL	<0.0035	<0.0035	<0.0036	<0.0035	<0.0036	<0.0035	<0.0039	<0.0036	<0.0035	<0.0038	<0.0037	<0.0036	<0.0038
Perfluorodecanoic acid (PFDA)	NCL	NCL	NCL	NA	NCL	NCL	<0.0035	<0.0035	<0.0036	<0.0035	<0.0036	<0.0035	<0.0039	<0.0036	<0.0035	<0.0038	<0.0037	<0.0036	<0.0038
Perfluorododecanoic acid (PFDoDA)	NCL	NCL	NCL	NA	NCL	NCL	<0.0035	<0.0035	<0.0036	<0.0035	<0.0036	<0.0035	<0.0039	<0.0036	<0.0035	<0.0038	<0.0037	<0.0036	<0.0038
Perfluoroheptanoic acid (PFHpA)	NCL	NCL	NCL	NA	NCL	NCL	<0.0035	<0.0035	<0.0036	<0.0035	<0.0036	<0.0035	<0.0039	<0.0036	<0.0035	<0.0038	<0.0037	<0.0036	<0.0038
Perfluorohexanoic acid (PFHxA)	NCL	NCL	NCL	NA	NCL	NCL	<0.0035	<0.0035	<0.0036	<0.0035	<0.0036	<0.0035	<0.0039	<0.0036	<0.0035	<0.0038	<0.0037	<0.0036	<0.0038
Perfluorononanoic acid (PFNA)	NCL	NCL	NCL	NA	NCL	NCL	<0.0035	<0.0035	<0.0036	<0.0035	<0.0036	<0.0035	<0.0039	<0.0036	<0.0035	<0.0038	<0.0037	<0.0036	<0.0038
Perfluorooctanoic acid (PFOA)	0.008	12	ID	NA	NCL	NCL	***0.0084***	0.0072	***0.0096***	***0.0094***	***0.01***	***0.012***	***0.015***	***0.018***	***0.021***	<0.0019	<0.0019	<0.0018	<0.0019
Perfluorooctane sulfonic acid (PFOS)	0.016	0.012	NLV	NA	NCL	NCL	***0.013***	0.012	0.012	0.011	***0.013***	***0.04***	***0.036***	***0.024***	***0.024***	<0.0038	<0.0037	<0.0036	<0.0038
PFOA + PFOS (Calculated)	NCL	NCL	NCL	0.01	NCL	NCL	***0.021***	***0.019***	***0.022***	***0.02***	***0.023***	***0.052***	***0.051***	***0.042***	***0.045***	ND	ND	ND	ND
Perfluoropentanoic acid (PFPeA)	NCL	NCL	NCL	NA	NCL	NCL	<0.0035	<0.0035	<0.0036	<0.0035	<0.0036	<0.0035	<0.0039	<0.0036	<0.0035	<0.0038	<0.0037	<0.0036	<0.0038
Perfluorotetradecanoic acid (PFTeDA)	NCL	NCL	NCL	NA	NCL	NCL	<0.0035	<0.0035	<0.0036	<0.0035	<0.0036	<0.0035	<0.0039	<0.0036	<0.0035	<0.0038	<0.0037	<0.0036	<0.0038
Perfluorotridecanoic acid (PFTrDA)	NCL	NCL	NCL	NA	NCL	NCL	<0.0035	<0.0035	<0.0036	<0.0035	<0.0036	<0.0035	<0.0039	<0.0036	<0.0035	<0.0038	<0.0037	<0.0036	<0.0038
Perfluoroundecanoic acid (PFUnDA)	NCL	NCL	NCL	NA	NCL	NCL	<0.0035	<0.0035	<0.0036	<0.0035	<0.0036	<0.0035	<0.0039	<0.0036	<0.0035	<0.0038	<0.0037	<0.0036	<0.0038
Total PFAS (Calculated)	NCL	NCL	NCL	NA	NCL	NCL	0.035	0.029	0.033	0.032	0.036	0.063	0.068	0.056	0.065	ND	ND	ND	ND

TABLE 6
SUMMARY OF GROUNDWATER SAMPLE ANALYSIS - PFAS (HSDS, 2019)
Area 5
Algoma and Plainfield Townships, Kent County, MI

Sample Location	**Part 201 Generic Residential Groundwater Cleanup Criteria – Drinking Water^{2}**	**Part 201 Generic Groundwater Cleanup Criteria – Groundwater Surface Water Interface^{2}**	**Part 201 Generic Residential Groundwater Cleanup Criteria – Groundwater Volatilization to Indoor Air Inhalation^{2}**	**CD Value^{3}**	**EGLE Residential Recommended Volatilization to Indoor Air Interim Action Screening Level - Groundwater^{4}**	**U.S. EPA Residential Tap Water Regional Removal Management Levels^{5}**	**HS-MW-11M**	**HS-MW-11M**	**HS-MW-11M**	**HS-MW-11M**	**HS-MW-11S**	**HS-MW-11S**	**HS-MW-11S**	**HS-MW-11S**	**HS-MW-12A**	**HS-MW-12B**	**HS-MW-12C**	**HS-MW-12D**	**HS-MW-12E**
Sample Name							**HS-MW-11M**	**HS-GW-MW11M**	**HS-GW-MW11M**	**HS-GW-MW-11M**	**HS-MW-11S**	**HS-GW-MW11S**	**HS-GW-MW11S**	**HS-GW-MW-11S**	**HS-GW-MW-12A**	**HS-GW-MW-12B**	**HS-GW-MW-12C**	**HS-GW-MW-12D**	**HS-GW-MW-12E**
Well Screen Interval (Feet below ground surface)							**96.4-101.4**	**96.4-101.4**	**96.4-101.4**	**96.4-101.4**	**21.2-31.2**	**21.2-31.2**	**21.2-31.2**	**21.2-31.2**	**15.4-20.4**	**51.5-56.5**	**127.7-132.7**	**158.7-163.7**	**187.5-192.5**
Laboratory Sample ID(s)							**UC16019-010**	**UE24001-018**	**UI29005-002**	**UL05055-012**	**UC16019-009**	**UE24001-017**	**UI29005-001**	**UL05055-014**	**UK29008-021**	**UK29008-012**	**UK29008-011**	**UK29008-010**	**UK29008-013**
Sample Date							**03/14/2019**	**05/22/2019**	**09/26/2019**	**12/03/2019**	**03/14/2019**	**05/22/2019**	**09/26/2019**	**12/03/2019**	**11/27/2019**	**11/25/2019**	**11/25/2019**	**11/25/2019**	**11/25/2019**
Parameter (µg/L)																			
8:2 Fluorotelomer sulfonic acid (8:2 FTS)	NCL	NCL	NCL	NA	NCL	NCL	<0.0036	<0.0036	<0.0037	<0.0036	<0.0036	<0.0038	<0.0038	<0.0036	<0.0036	<0.0037	<0.0038	<0.0034	<0.0035
6:2 Fluorotelomer sulfonic acid (6:2 FTS)	NCL	NCL	NCL	NA	NCL	NCL	<0.0036	<0.0036	<0.0037	<0.0036	<0.0036	<0.0038	<0.0038	<0.0036	<0.0036	<0.0037	<0.0038	<0.0034	<0.0035
N-Ethyl perfluorooctane sulfonamide (EtFOSA)	NCL	NCL	NCL	NA	NCL	NCL	<0.0036	<0.0036	<0.0037	<0.0036	<0.0036	<0.0038	<0.0038	<0.0036	<0.0036	<0.0037	<0.0038	<0.0034	<0.0035
N-Methyl perfluorooctane sulfonamide (MeFOSA)	NCL	NCL	NCL	NA	NCL	NCL	<0.0072	<0.0072	<0.0074	<0.0073	<0.0072	<0.0075	<0.0077	<0.0071	<0.0072	<0.0073	<0.0076	<0.0068	<0.007
Perfluorobutane sulfonic acid (PFBS)	NCL	NCL	NCL	NA	NCL	1,200	0.014	0.013	0.046	0.05	<0.0036	<0.0038	<0.0038	<0.0036	<0.0036	<0.0037	0.13	0.14	<0.0035
Perfluorodecane sulfonic acid (PFDS)	NCL	NCL	NCL	NA	NCL	NCL	<0.0036	<0.0036	<0.0037	<0.0036	<0.0036	<0.0038	<0.0038	<0.0036	<0.0036	<0.0037	<0.0038	<0.0034	<0.0035
Perfluoroheptane sulfonic acid (PFHpS)	NCL	NCL	NCL	NA	NCL	NCL	<0.0036	<0.0036	<0.0037	<0.0036	<0.0036	<0.0038	<0.0038	<0.0036	<0.0036	<0.0037	<0.0038	<0.0034	<0.0035
Perfluorononane sulfonic acid (PFNS)	NCL	NCL	NCL	NA	NCL	NCL	<0.0072	<0.0072	<0.0074	<0.0073	<0.0072	<0.0075	<0.0077	<0.0071	<0.0072	<0.0073	<0.0076	<0.0068	<0.007
Perfluorooctane sulfonamide (FOSA)	NCL	NCL	NCL	NA	NCL	NCL	<0.0036	<0.0036	<0.0037	<0.0036	<0.0036	<0.0038	<0.0038	<0.0036	<0.0036	<0.0037	<0.0038	<0.0034	<0.0035
Perfluoropentane sulfonic acid (PFPeS)	NCL	NCL	NCL	NA	NCL	NCL	<0.0036	<0.0036	<0.0037	0.016	<0.0036	<0.0038	<0.0038	<0.0036	<0.0036	<0.0037	0.13	0.12	<0.0035
Perfluorohexane sulfonic acid (PFHxS)	NCL	NCL	NCL	NA	NCL	NCL	<0.0036	<0.0036	<0.0037	0.0045	<0.0036	<0.0038	<0.0038	<0.0036	<0.0036	0.0054	0.12	0.091	<0.0035
Perfluorobutanoic acid (PFBA)	NCL	NCL	NCL	NA	NCL	NCL	<0.0036	<0.0036	<0.0037	<0.0036	<0.0036	<0.0038	<0.0038	<0.0036	<0.0036	<0.0037	0.036	0.037	<0.0035
Perfluorodecanoic acid (PFDA)	NCL	NCL	NCL	NA	NCL	NCL	<0.0036	<0.0036	<0.0037	<0.0036	<0.0036	<0.0038	<0.0038	<0.0036	<0.0036	<0.0037	<0.0038	<0.0034	<0.0035
Perfluorododecanoic acid (PFDoDA)	NCL	NCL	NCL	NA	NCL	NCL	<0.0036	<0.0036	<0.0037	<0.0036	<0.0036	<0.0038	<0.0038	<0.0036	<0.0036	<0.0037	<0.0038	<0.0034	<0.0035
Perfluoroheptanoic acid (PFHpA)	NCL	NCL	NCL	NA	NCL	NCL	<0.0036	<0.0036	<0.0037	<0.0036	<0.0036	<0.0038	<0.0038	<0.0036	<0.0036	<0.0037	0.07	0.072	<0.0035
Perfluorohexanoic acid (PFHxA)	NCL	NCL	NCL	NA	NCL	NCL	<0.0036	<0.0036	<0.0037	<0.0036	<0.0036	<0.0038	<0.0038	<0.0036	<0.0036	<0.0037	0.076	0.09	<0.0035
Perfluorononanoic acid (PFNA)	NCL	NCL	NCL	NA	NCL	NCL	<0.0036	<0.0036	<0.0037	<0.0036	<0.0036	<0.0038	<0.0038	<0.0036	<0.0036	<0.0037	<0.0038	<0.0034	<0.0035
Perfluorooctanoic acid (PFOA)	0.008	12	ID	NA	NCL	NCL	<0.0018	<0.0018	<0.0018	<0.0018	0.0024	0.0028	<0.0019	0.0041	***0.0089***	0.0023	***0.19***	***0.17***	<0.0017
Perfluorooctane sulfonic acid (PFOS)	0.016	0.012	NLV	NA	NCL	NCL	<0.0036	<0.0036	<0.0037	<0.0036	<0.0036	<0.0038	<0.0038	<0.0036	0.0063	<0.0037	<0.0038	<0.0034	<0.0035
PFOA + PFOS (Calculated)	NCL	NCL	NCL	0.01	NCL	NCL	ND	ND	ND	ND	0.0024	0.0028	ND	0.0041	***0.015***	0.0023	***0.19***	***0.17***	ND
Perfluoropentanoic acid (PFPeA)	NCL	NCL	NCL	NA	NCL	NCL	<0.0036	<0.0036	<0.0037	<0.0036	<0.0036	<0.0038	<0.0038	<0.0036	0.0039	<0.0037	0.039	0.038	<0.0035
Perfluorotetradecanoic acid (PFTeDA)	NCL	NCL	NCL	NA	NCL	NCL	<0.0036	<0.0036	<0.0037	<0.0036	<0.0036	<0.0038	<0.0038	<0.0036	<0.0036	<0.0037	<0.0038	<0.0034	<0.0035
Perfluorotridecanoic acid (PFTrDA)	NCL	NCL	NCL	NA	NCL	NCL	<0.0036	<0.0036	<0.0037	<0.0036	<0.0036	<0.0038	<0.0038	<0.0036	<0.0036	<0.0037	<0.0038	<0.0034	<0.0035
Perfluoroundecanoic acid (PFUnDA)	NCL	NCL	NCL	NA	NCL	NCL	<0.0036	<0.0036	<0.0037	<0.0036	<0.0036	<0.0038	<0.0038	<0.0036	<0.0036	<0.0037	<0.0038	<0.0034	<0.0035
Total PFAS (Calculated)	NCL	NCL	NCL	NA	NCL	NCL	0.014	0.013	0.046	0.071	0.0024	0.0028	ND	0.0041	0.019	0.0077	0.79	0.76	ND

TABLE 6

SUMMARY OF GROUNDWATER SAMPLE ANALYSIS - PFAS (HSDS, 2019)
Area 5
Algoma and Plainfield Townships, Kent County, MI

Sample Location	**Part 201 Generic Residential Groundwater Cleanup Criteria – Drinking Water[2]**	**Part 201 Generic Groundwater Cleanup Criteria – Groundwater Surface Water Interface[2]**	**Part 201 Generic Residential Groundwater Cleanup Criteria – Groundwater Volatilization to Indoor Air Inhalation[2]**	**CD Value[3]**	**EGLE Residential Recommended Volatilization to Indoor Air Interim Action Screening Level - Groundwater[4]**	**U.S. EPA Residential Tap Water Regional Removal Management Levels[5]**	**HS-MW-14D**	**HS-MW-14D**	**HS-MW-14D**	**HS-MW-14D**	**HS-MW-14D**	**HS-MW-14M**	**HS-MW-14M**	**HS-MW-14M**	**HS-MW-14M**	**HS-MW-14S**	**HS-MW-14S**	**HS-MW-14S**	**HS-MW-14S**
Sample Name							**HS-MW-14D**	**HS-MW-14D DUP**	**HS-GW-MW14D**	**HS-GW-MW14D**	**HS-GW-MW-14D**	**HS-MW-14M**	**HS-GW-MW14M**	**HS-GW-MW14M**	**HS-GW-MW-14M**	**HS-MW-14S**	**HS-GW-MW14S**	**HS-GW-MW14S**	**HS-GW-MW-14S**
Well Screen Interval (Feet below ground surface)							**109-114**	**109-114**	**109-114**	**109-114**	**109-114**	**68.1-73.1**	**68.1-73.1**	**68.1-73.1**	**68.1-73.1**	**13-23**	**13-23**	**13-23**	**13-23**
Laboratory Sample ID(s)							**UB27031-003**	**UB27031-004**	**UE18016-008**	**UI12010-007**	**UK29008-016**	**UB27031-001**	**UE18016-009**	**UI12010-009**	**UK29008-015**	**UB27031-002**	**UE18016-010**	**UI12010-008**	**UK29008-014**
Sample Date							**02/26/2019**	**02/26/2019**	**05/17/2019**	**09/10/2019**	**11/25/2019**	**02/26/2019**	**05/17/2019**	**09/10/2019**	**11/25/2019**	**02/26/2019**	**05/17/2019**	**09/10/2019**	**11/25/2019**
Parameter (µg/L)																			
8:2 Fluorotelomer sulfonic acid (8:2 FTS)	NCL	NCL	NCL	NA	NCL	NCL	<0.0037	<0.0036	<0.0037	<0.0037	<0.0035	<0.0036	<0.0036	<0.0038	<0.0034	<0.0036	<0.0036	<0.0036	<0.0034
6:2 Fluorotelomer sulfonic acid (6:2 FTS)	NCL	NCL	NCL	NA	NCL	NCL	<0.0037	<0.0036	<0.0037	<0.0037	<0.0035	<0.0036	<0.0036	<0.0038	<0.0034	<0.0036	<0.0036	<0.0036	<0.0034
N-Ethyl perfluorooctane sulfonamide (EtFOSA)	NCL	NCL	NCL	NA	NCL	NCL	<0.0037	<0.0036	<0.0037	<0.0037	<0.0035	<0.0036	<0.0036	<0.0038	<0.0034	<0.0036	<0.0036	<0.0036	<0.0034
N-Methyl perfluorooctane sulfonamide (MeFOSA)	NCL	NCL	NCL	NA	NCL	NCL	<0.0075	<0.0073	<0.0074	<0.0074	<0.007	<0.0071	<0.0073	<0.0075	<0.0069	<0.0071	<0.0072	<0.0072	<0.0069
Perfluorobutane sulfonic acid (PFBS)	NCL	NCL	NCL	NA	NCL	1,200	<0.0037	<0.0036	<0.0037	<0.0037	<0.0035	<0.0036	<0.0036	<0.0038	<0.0034	<0.0036	<0.0036	<0.0036	<0.0034
Perfluorodecane sulfonic acid (PFDS)	NCL	NCL	NCL	NA	NCL	NCL	<0.0037	<0.0036	<0.0037	<0.0037	<0.0035	<0.0036	<0.0036	<0.0038	<0.0034	<0.0036	<0.0036	<0.0036	<0.0034
Perfluoroheptane sulfonic acid (PFHpS)	NCL	NCL	NCL	NA	NCL	NCL	<0.0037	<0.0036	<0.0037	<0.0037	<0.0035	<0.0036	<0.0036	<0.0038	<0.0034	<0.0036	<0.0036	<0.0036	<0.0034
Perfluorononane sulfonic acid (PFNS)	NCL	NCL	NCL	NA	NCL	NCL	<0.0075	<0.0073	<0.0074	<0.0074	<0.007	<0.0071	<0.0073	<0.0075	<0.0069	<0.0071	<0.0072	<0.0072	<0.0069
Perfluorooctane sulfonamide (FOSA)	NCL	NCL	NCL	NA	NCL	NCL	<0.0037	<0.0036	<0.0037	<0.0037	<0.0035	<0.0036	<0.0036	<0.0038	<0.0034	<0.0036	<0.0036	<0.0036	<0.0034
Perfluoropentane sulfonic acid (PFPeS)	NCL	NCL	NCL	NA	NCL	NCL	<0.0037	<0.0036	<0.0037	<0.0037	<0.0035	<0.0036	<0.0036	<0.0038	<0.0034	<0.0036	<0.0036	<0.0036	<0.0034
Perfluorohexane sulfonic acid (PFHxS)	NCL	NCL	NCL	NA	NCL	NCL	<0.0037	<0.0036	<0.0037	<0.0037	<0.0035	<0.0036	<0.0036	<0.0038	<0.0034	<0.0036	<0.0036	<0.0036	<0.0034
Perfluorobutanoic acid (PFBA)	NCL	NCL	NCL	NA	NCL	NCL	<0.0037	<0.0036	<0.0037	<0.0037	<0.0035	<0.0036	<0.0036	<0.0038	<0.0034	<0.0036	0.005	<0.0036	<0.0034
Perfluorodecanoic acid (PFDA)	NCL	NCL	NCL	NA	NCL	NCL	<0.0037	<0.0036	<0.0037	<0.0037	<0.0035	<0.0036	<0.0036	<0.0038	<0.0034	<0.0036	<0.0036	<0.0036	<0.0034
Perfluorododecanoic acid (PFDoDA)	NCL	NCL	NCL	NA	NCL	NCL	<0.0037	<0.0036	<0.0037	<0.0037	<0.0035	<0.0036	<0.0036	<0.0038	<0.0034	<0.0036	<0.0036	<0.0036	<0.0034
Perfluoroheptanoic acid (PFHpA)	NCL	NCL	NCL	NA	NCL	NCL	<0.0037	<0.0036	<0.0037	<0.0037	<0.0035	<0.0036	<0.0036	<0.0038	<0.0034	<0.0036	<0.0036	<0.0036	<0.0034
Perfluorohexanoic acid (PFHxA)	NCL	NCL	NCL	NA	NCL	NCL	<0.0037	<0.0036	<0.0037	<0.0037	<0.0035	<0.0036	<0.0036	<0.0038	<0.0034	<0.0036	0.0065	<0.0036	<0.0034
Perfluorononanoic acid (PFNA)	NCL	NCL	NCL	NA	NCL	NCL	<0.0037	<0.0036	<0.0037	<0.0037	<0.0035	<0.0036	<0.0036	<0.0038	<0.0034	<0.0036	<0.0036	<0.0036	<0.0034
Perfluorooctanoic acid (PFOA)	0.008	12	ID	NA	NCL	NCL	<0.0019	<0.0018	<0.0019	<0.0019	<0.0017	<0.0018	<0.0018	<0.0019	<0.0017	<0.0018	0.0047	0.0023	<0.0017
Perfluorooctane sulfonic acid (PFOS)	0.016	0.012	NLV	NA	NCL	NCL	<0.0037	<0.0036	<0.0037	<0.0037	<0.0035	<0.0036	<0.0036	<0.0038	<0.0034	<0.0036	<0.0036	0.0036	<0.0034
PFOA + PFOS (Calculated)	NCL	NCL	NCL	0.01	NCL	NCL	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.0047	0.0059	ND
Perfluoropentanoic acid (PFPeA)	NCL	NCL	NCL	NA	NCL	NCL	<0.0037	<0.0036	<0.0037	<0.0037	<0.0035	<0.0036	<0.0036	<0.0038	<0.0034	<0.0036	0.0054	<0.0036	<0.0034
Perfluorotetradecanoic acid (PFTeDA)	NCL	NCL	NCL	NA	NCL	NCL	<0.0037	<0.0036	<0.0037	<0.0037	<0.0035	<0.0036	<0.0036	<0.0038	<0.0034	<0.0036	<0.0036	<0.0036	<0.0034
Perfluorotridecanoic acid (PFTrDA)	NCL	NCL	NCL	NA	NCL	NCL	<0.0037	<0.0036	<0.0037	<0.0037	<0.0035	<0.0036	<0.0036	<0.0038	<0.0034	<0.0036	<0.0036	<0.0036	<0.0034
Perfluoroundecanoic acid (PFUnDA)	NCL	NCL	NCL	NA	NCL	NCL	<0.0037	<0.0036	<0.0037	<0.0037	<0.0035	<0.0036	<0.0036	<0.0038	<0.0034	<0.0036	<0.0036	<0.0036	<0.0034
Total PFAS (Calculated)	NCL	NCL	NCL	NA	NCL	NCL	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.022	0.0059	ND

TABLE 6
SUMMARY OF GROUNDWATER SAMPLE ANALYSIS - PFAS (HSDS, 2019)
Area 5
Algoma and Plainfield Townships, Kent County, MI

Sample Location	**Part 201 Generic Residential Groundwater Cleanup Criteria – Drinking Water^2**	**Part 201 Generic Groundwater Cleanup Criteria – Groundwater Surface Water Interface^2**	**Part 201 Generic Residential Groundwater Cleanup Criteria – Groundwater Volatilization to Indoor Air Inhalation^2**	**CD Value^3**	**EGLE Residential Recommended Volatilization to Indoor Air Interim Action Screening Level - Groundwater^4**	**U.S. EPA Residential Tap Water Regional Removal Management Levels^5**	**HS-MW-15D**	**HS-MW-15D**	**HS-MW-15D**	**HS-MW-15D**	**HS-MW-15M**	**HS-MW-15M**	**HS-MW-15M**	**HS-MW-15M**	**HS-MW-15S**	**HS-MW-15S**	**HS-MW-15S**	**HS-MW-15S**	**HS-MW-17D**
Sample Name							**HS-MW-15D**	**HS-GW-MW15D**	**HS-GW-MW15D**	**HS-GW-MW-15D**	**HS-MW-15M**	**HS-GW-MW15M**	**HS-GW-MW15M**	**HS-GW-MW-15M**	**HS-MW-15S**	**HS-GW-MW15S**	**HS-GW-MW15S**	**HS-GW-MW-15S**	**HS-MW-17D**
Well Screen Interval (Feet below ground surface)							**108.6-118.6**	**108.6-118.6**	**108.6-118.6**	**108.6-118.6**	**44.8-49.8**	**44.8-49.8**	**44.8-49.8**	**44.8-49.8**	**6.9-16.9**	**6.9-16.9**	**6.9-16.9**	**6.9-16.9**	**222.1-227.1**
Laboratory Sample ID(s)							**UB28086-006**	**UE18016-005**	**UI21016-005**	**UK19008-012**	**UB28086-005**	**UE18016-006**	**UI21016-004**	**UK21036-009**	**UB28086-004**	**UE18016-007**	**UI21016-003**	**UK21036-010**	**UC09042-006**
Sample Date							**02/27/2019**	**05/16/2019**	**09/19/2019**	**11/20/2019**	**02/27/2019**	**05/16/2019**	**09/19/2019**	**11/19/2019**	**02/27/2019**	**05/16/2019**	**09/19/2019**	**11/19/2019**	**03/07/2019**
Parameter (µg/L)																			
8:2 Fluorotelomer sulfonic acid (8:2 FTS)	NCL	NCL	NCL	NA	NCL	NCL	<0.0037	<0.0037	<0.0036	<0.0034	<0.0037	<0.0038	<0.0037	<0.0036	<0.0037	<0.0036	<0.0038	<0.0034	<0.0035
6:2 Fluorotelomer sulfonic acid (6:2 FTS)	NCL	NCL	NCL	NA	NCL	NCL	<0.0037	<0.0037	<0.0036	<0.0034	<0.0037	<0.0038	<0.0037	<0.0036	<0.0037	<0.0036	<0.0038	<0.0034	<0.0035
N-Ethyl perfluorooctane sulfonamide (EtFOSA)	NCL	NCL	NCL	NA	NCL	NCL	<0.0037	<0.0037	<0.0036	<0.0034	<0.0037	<0.0038	<0.0037	<0.0036	<0.0037	<0.0036	<0.0038	<0.0034	<0.0035
N-Methyl perfluorooctane sulfonamide (MeFOSA)	NCL	NCL	NCL	NA	NCL	NCL	<0.0075	<0.0073	<0.0073	<0.0069	<0.0074	<0.0076	<0.0075	<0.0073	<0.0074	<0.0073	<0.0077	<0.0069	<0.007
Perfluorobutane sulfonic acid (PFBS)	NCL	NCL	NCL	NA	NCL	1,200	<0.0037	<0.0037	<0.0036	<0.0034	<0.0037	<0.0038	<0.0037	<0.0036	0.0073	0.0058	0.0068	0.0073	0.43
Perfluorodecane sulfonic acid (PFDS)	NCL	NCL	NCL	NA	NCL	NCL	<0.0037	<0.0037	<0.0036	<0.0034	<0.0037	<0.0038	<0.0037	<0.0036	<0.0037	<0.0036	<0.0038	<0.0034	<0.0035
Perfluoroheptane sulfonic acid (PFHpS)	NCL	NCL	NCL	NA	NCL	NCL	<0.0037	<0.0037	<0.0036	<0.0034	<0.0037	<0.0038	<0.0037	<0.0036	<0.0037	<0.0036	<0.0038	<0.0034	0.022
Perfluorononane sulfonic acid (PFNS)	NCL	NCL	NCL	NA	NCL	NCL	<0.0075	<0.0073	<0.0073	<0.0069	<0.0074	<0.0076	<0.0075	<0.0073	<0.0074	<0.0073	<0.0077	<0.0069	<0.007
Perfluorooctane sulfonamide (FOSA)	NCL	NCL	NCL	NA	NCL	NCL	<0.0037	<0.0037	<0.0036	<0.0034	<0.0037	<0.0038	<0.0037	<0.0036	<0.0037	<0.0036	<0.0038	<0.0034	<0.0035
Perfluoropentane sulfonic acid (PFPeS)	NCL	NCL	NCL	NA	NCL	NCL	<0.0037	<0.0037	<0.0036	<0.0034	<0.0037	<0.0038	<0.0037	<0.0036	<0.0037	<0.0036	<0.0038	<0.0034	0.56
Perfluorohexane sulfonic acid (PFHxS)	NCL	NCL	NCL	NA	NCL	NCL	<0.0037	<0.0037	<0.0036	<0.0034	<0.0037	<0.0038	<0.0037	<0.0036	<0.0037	<0.0036	<0.0038	0.004	0.96
Perfluorobutanoic acid (PFBA)	NCL	NCL	NCL	NA	NCL	NCL	<0.0037	<0.0037	<0.0036	<0.0034	<0.0037	<0.0038	<0.0037	<0.0036	<0.0037	<0.0036	<0.0038	<0.0034	0.11
Perfluorodecanoic acid (PFDA)	NCL	NCL	NCL	NA	NCL	NCL	<0.0037	<0.0037	<0.0036	<0.0034	<0.0037	<0.0038	<0.0037	<0.0036	<0.0037	<0.0036	<0.0038	<0.0034	<0.0035
Perfluorododecanoic acid (PFDoDA)	NCL	NCL	NCL	NA	NCL	NCL	<0.0037	<0.0037	<0.0036	<0.0034	<0.0037	<0.0038	<0.0037	<0.0036	<0.0037	<0.0036	<0.0038	<0.0034	<0.0035
Perfluoroheptanoic acid (PFHpA)	NCL	NCL	NCL	NA	NCL	NCL	<0.0037	<0.0037	<0.0036	<0.0034	<0.0037	<0.0038	<0.0037	<0.0036	<0.0037	<0.0036	<0.0038	<0.0034	0.3
Perfluorohexanoic acid (PFHxA)	NCL	NCL	NCL	NA	NCL	NCL	<0.0037	<0.0037	<0.0036	<0.0034	<0.0037	<0.0038	<0.0037	<0.0036	<0.0037	<0.0036	<0.0038	<0.0034	0.27
Perfluorononanoic acid (PFNA)	NCL	NCL	NCL	NA	NCL	NCL	<0.0037	<0.0037	<0.0036	<0.0034	<0.0037	<0.0038	<0.0037	<0.0036	<0.0037	<0.0036	<0.0038	<0.0034	<0.0035
Perfluorooctanoic acid (PFOA)	0.008	12	ID	NA	NCL	NCL	<0.0019	<0.0018	<0.0018	<0.0017	<0.0018	<0.0019	<0.0019	<0.0018	<0.0018	<0.0018	<0.0019	0.0018	***1***
Perfluorooctane sulfonic acid (PFOS)	0.016	0.012	NLV	NA	NCL	NCL	<0.0037	<0.0037	<0.0036	<0.0034	<0.0037	<0.0038	<0.0037	<0.0036	<0.0037	<0.0036	<0.0038	<0.0034	***0.06***
PFOA + PFOS (Calculated)	NCL	NCL	NCL	0.01	NCL	NCL	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.0018	***1.1***
Perfluoropentanoic acid (PFPeA)	NCL	NCL	NCL	NA	NCL	NCL	<0.0037	<0.0037	<0.0036	<0.0034	<0.0037	<0.0038	<0.0037	<0.0036	<0.0037	<0.0036	<0.0038	<0.0034	0.12
Perfluorotetradecanoic acid (PFTeDA)	NCL	NCL	NCL	NA	NCL	NCL	<0.0037	<0.0037	<0.0036	<0.0034	<0.0037	<0.0038	<0.0037	<0.0036	<0.0037	<0.0036	<0.0038	<0.0034	<0.0035
Perfluorotridecanoic acid (PFTrDA)	NCL	NCL	NCL	NA	NCL	NCL	<0.0037	<0.0037	<0.0036	<0.0034	<0.0037	<0.0038	<0.0037	<0.0036	<0.0037	<0.0036	<0.0038	<0.0034	<0.0035
Perfluoroundecanoic acid (PFUnDA)	NCL	NCL	NCL	NA	NCL	NCL	<0.0037	<0.0037	<0.0036	<0.0034	<0.0037	<0.0038	<0.0037	<0.0036	<0.0037	<0.0036	<0.0038	<0.0034	<0.0035
Total PFAS (Calculated)	NCL	NCL	NCL	NA	NCL	NCL	ND	ND	ND	ND	ND	ND	ND	ND	0.0073	0.0058	0.0068	0.013	3.8

TABLE 6
SUMMARY OF GROUNDWATER SAMPLE ANALYSIS - PFAS (HSDS, 2019)
Area 5
Algoma and Plainfield Townships, Kent County, MI

Sample Location	**Part 201 Generic Residential Groundwater Cleanup Criteria – Drinking Water^2**	**Part 201 Generic Groundwater Cleanup Criteria – Groundwater Surface Water Interface^2**	**Part 201 Generic Residential Groundwater Cleanup Criteria – Groundwater Volatilization to Indoor Air Inhalation^2**	**CD Value^3**	**EGLE Residential Recommended Volatilization to Indoor Air Interim Action Screening Level - Groundwater^4**	**U.S. EPA Residential Tap Water Regional Removal Management Levels^5**	**HS-MW-17D**	**HS-MW-17D**	**HS-MW-17D**	**HS-MW-17M**	**HS-MW-17M**	**HS-MW-17M**	**HS-MW-17M**	**HS-MW-17S**	**HS-MW-17S**	**HS-MW-17S**	**HS-MW-17S**	**HS-MW-18D**	**HS-MW-18D**
Sample Name							**HS-GW-MW17D**	**HS-GW-MW17D**	**HS-GW-MW-17D**	**HS-MW-17M**	**HS-GW-MW17M**	**HS-GW-MW17M**	**HS-GW-MW-17M**	**HS-MW-17S**	**HS-GW-MW17S**	**HS-GW-MW17S**	**HS-GW-MW-17S**	**HS-MW-18D**	**HS-GW-MW18D**
Well Screen Interval (Feet below ground surface)							**222.1-227.1**	**222.1-227.1**	**222.1-227.1**	**167.3-172.3**	**167.3-172.3**	**167.3-172.3**	**167.3-172.3**	**105.8-110.8**	**105.8-110.8**	**105.8-110.8**	**105.8-110.8**	**140.6-145.6**	**140.6-145.6**
Laboratory Sample ID(s)							**UE25011-001**	**UI19006-002**	**UL12091-010**	**UC09042-005**	**UE25011-003**	**UI12010-016**	**UL12091-012**	**UC09042-003**	**UE25011-002**	**UI12010-014**	**UL12091-007**	**UC02020-006**	**UE24001-004**
Sample Date							**05/23/2019**	**09/16/2019**	**12/10/2019**	**03/07/2019**	**05/23/2019**	**09/11/2019**	**12/11/2019**	**03/06/2019**	**05/23/2019**	**09/11/2019**	**12/10/2019**	**03/01/2019**	**05/21/2019**
Parameter (µg/L)																			
8:2 Fluorotelomer sulfonic acid (8:2 FTS)	NCL	NCL	NCL	NA	NCL	NCL	<0.0035	<0.004	<0.0037	<0.0037	<0.0036	<0.0033	<0.0034	<0.0035	<0.0035	<0.0033	<0.0038	<0.0037	<0.0037
6:2 Fluorotelomer sulfonic acid (6:2 FTS)	NCL	NCL	NCL	NA	NCL	NCL	<0.0035	<0.004	<0.0037	<0.0037	<0.0036	<0.0033	<0.0034	<0.0035	<0.0035	<0.0033	<0.0038	<0.0037	<0.0037
N-Ethyl perfluorooctane sulfonamide (EtFOSA)	NCL	NCL	NCL	NA	NCL	NCL	<0.0035	<0.004	<0.0037	<0.0037	<0.0036	<0.0033	<0.0034	<0.0035	<0.0035	<0.0033	<0.0038	<0.0037	<0.0037
N-Methyl perfluorooctane sulfonamide (MeFOSA)	NCL	NCL	NCL	NA	NCL	NCL	<0.007	<0.007900001	<0.0074	<0.0074	<0.0071	<0.0066	<0.0068	<0.0071	<0.0069	<0.0067	<0.0075	<0.0073	<0.0074
Perfluorobutane sulfonic acid (PFBS)	NCL	NCL	NCL	NA	NCL	1,200	0.41	0.47	0.42	0.004	0.0039	0.0036	0.0038	0.014	0.02	0.014	0.018	0.029	0.031
Perfluorodecane sulfonic acid (PFDS)	NCL	NCL	NCL	NA	NCL	NCL	<0.0035	<0.004	<0.0037	<0.0037	<0.0036	<0.0033	<0.0034	<0.0035	<0.0035	<0.0033	<0.0038	<0.0037	<0.0037
Perfluoroheptane sulfonic acid (PFHpS)	NCL	NCL	NCL	NA	NCL	NCL	0.024	0.028	0.029	<0.0037	<0.0036	<0.0033	<0.0034	<0.0035	<0.0035	<0.0033	<0.0038	<0.0037	<0.0037
Perfluorononane sulfonic acid (PFNS)	NCL	NCL	NCL	NA	NCL	NCL	<0.007	<0.007900001	<0.0074	<0.0074	<0.0071	<0.0066	<0.0068	<0.0071	<0.0069	<0.0067	<0.0075	<0.0073	<0.0074
Perfluorooctane sulfonamide (FOSA)	NCL	NCL	NCL	NA	NCL	NCL	<0.0035	<0.004	<0.0037	<0.0037	<0.0036	<0.0033	<0.0034	<0.0035	<0.0035	<0.0033	<0.0038	<0.0037	<0.0037
Perfluoropentane sulfonic acid (PFPeS)	NCL	NCL	NCL	NA	NCL	NCL	0.5	0.57	0.49	<0.0037	<0.0036	<0.0033	<0.0034	<0.0035	<0.0035	<0.0033	<0.0038	0.015	0.014
Perfluorohexane sulfonic acid (PFHxS)	NCL	NCL	NCL	NA	NCL	NCL	1	1.1	1	<0.0037	<0.0036	<0.0033	<0.0034	<0.0035	<0.0035	<0.0033	<0.0038	0.0074	0.0082
Perfluorobutanoic acid (PFBA)	NCL	NCL	NCL	NA	NCL	NCL	0.11	0.12	0.12	<0.0037	<0.0036	<0.0033	<0.0034	0.0041	0.0058	0.0034	0.0042	0.018	0.02
Perfluorodecanoic acid (PFDA)	NCL	NCL	NCL	NA	NCL	NCL	<0.0035	<0.004	<0.0037	<0.0037	<0.0036	<0.0033	<0.0034	<0.0035	<0.0035	<0.0033	<0.0038	<0.0037	<0.0037
Perfluorododecanoic acid (PFDoDA)	NCL	NCL	NCL	NA	NCL	NCL	<0.0035	<0.004	<0.0037	<0.0037	<0.0036	<0.0033	<0.0034	<0.0035	<0.0035	<0.0033	<0.0038	<0.0037	<0.0037
Perfluoroheptanoic acid (PFHpA)	NCL	NCL	NCL	NA	NCL	NCL	0.3	0.33	0.31	<0.0037	<0.0036	<0.0033	<0.0034	<0.0035	<0.0035	<0.0033	<0.0038	0.011	0.011
Perfluorohexanoic acid (PFHxA)	NCL	NCL	NCL	NA	NCL	NCL	0.31	0.27	0.28	<0.0037	<0.0036	<0.0033	<0.0034	<0.0035	<0.0035	<0.0033	0.0054	0.022	0.024
Perfluorononanoic acid (PFNA)	NCL	NCL	NCL	NA	NCL	NCL	<0.0035	<0.004	<0.0037	<0.0037	<0.0036	<0.0033	<0.0034	<0.0035	<0.0035	<0.0033	<0.0038	<0.0037	<0.0037
Perfluorooctanoic acid (PFOA)	0.008	12	ID	NA	NCL	NCL	***1.2***	***1.2***	***1.1***	<0.0019	<0.0018	<0.0017	<0.0017	<0.0018	<0.0017	<0.0017	<0.0019	***0.014***	***0.015***
Perfluorooctane sulfonic acid (PFOS)	0.016	0.012	NLV	NA	NCL	NCL	***0.058***	***0.072***	***0.076***	<0.0037	<0.0036	<0.0033	<0.0034	<0.0035	<0.0035	<0.0033	<0.0038	<0.0037	<0.0037
PFOA + PFOS (Calculated)	NCL	NCL	NCL	0.01	NCL	NCL	***1.3***	***1.3***	***1.2***	ND	ND	ND	ND	ND	ND	ND	ND	***0.014***	***0.015***
Perfluoropentanoic acid (PFPeA)	NCL	NCL	NCL	NA	NCL	NCL	0.13	0.13	0.14	<0.0037	<0.0036	<0.0033	<0.0034	<0.0035	0.0044	0.0048	0.0073	0.015	0.017
Perfluorotetradecanoic acid (PFTeDA)	NCL	NCL	NCL	NA	NCL	NCL	<0.0035	<0.004	<0.0037	<0.0037	<0.0036	<0.0033	<0.0034	<0.0035	<0.0035	<0.0033	<0.0038	<0.0037	<0.0037
Perfluorotridecanoic acid (PFTrDA)	NCL	NCL	NCL	NA	NCL	NCL	<0.0035	<0.004	<0.0037	<0.0037	<0.0036	<0.0033	<0.0034	<0.0035	<0.0035	<0.0033	<0.0038	<0.0037	<0.0037
Perfluoroundecanoic acid (PFUnDA)	NCL	NCL	NCL	NA	NCL	NCL	<0.0035	<0.004	<0.0037	<0.0037	<0.0036	<0.0033	<0.0034	<0.0035	<0.0035	<0.0033	<0.0038	<0.0037	<0.0037
Total PFAS (Calculated)	NCL	NCL	NCL	NA	NCL	NCL	4	4.3	4	0.004	0.0039	0.0036	0.0038	0.018	0.03	0.022	0.035	0.13	0.14

TABLE 6
SUMMARY OF GROUNDWATER SAMPLE ANALYSIS - PFAS (HSDS, 2019)
Area 5
Algoma and Plainfield Townships, Kent County, MI

Sample Location	**Part 201 Generic Residential Groundwater Cleanup Criteria – Drinking Water^2**	**Part 201 Generic Groundwater Cleanup Criteria – Groundwater Surface Water Interface^2**	**Part 201 Generic Residential Groundwater Cleanup Criteria – Groundwater Volatilization to Indoor Air Inhalation^2**	**CD Value^3**	**EGLE Residential Recommended Volatilization to Indoor Air Interim Action Screening Level - Groundwater^4**	**U.S. EPA Residential Tap Water Regional Removal Management Levels^5**	**HS-MW-18D**	**HS-MW-18D**	**HS-MW-18S**	**HS-MW-18S**	**HS-MW-18S**	**HS-MW-18S**	**HS-MW-19D**	**HS-MW-19D**	**HS-MW-19D**	**HS-MW-19D**	**HS-MW-19S**	**HS-MW-19S**	**HS-MW-19S**
Sample Name							**HS-GW-MW18D**	**HS-GW-MW-18D**	**HS-MW-18S**	**HS-GW-MW18S**	**HS-GW-MW18S**	**HS-GW-MW-18S**	**HS-MW-19D**	**HS-GW-MW19D**	**HS-GW-MW19D**	**HS-GW-MW-19D**	**HS-MW-19S**	**HS-GW-MW19S**	**HS-GW-MW19S**
Well Screen Interval (Feet below ground surface)							**140.6-145.6**	**140.6-145.6**	**12.8-22.8**	**12.8-22.8**	**12.8-22.8**	**12.8-22.8**	**85.9-95.9**	**85.9-95.9**	**85.9-95.9**	**85.9-95.9**	**58.4-61.4**	**58.4-61.4**	**58.4-61.4**
Laboratory Sample ID(s)							**UI12010-006**	**UK19008-015**	**UC02020-007**	**UE24001-005**	**UI12010-010**	**UK21036-020**	**UC02020-005**	**UE24001-007**	**UI26001-003**	**UL12091-019**	**UC02020-004**	**UE24001-006**	**UI26001-002**
Sample Date							**09/10/2019**	**11/20/2019**	**03/01/2019**	**05/21/2019**	**09/10/2019**	**11/21/2019**	**02/28/2019**	**05/21/2019**	**09/23/2019**	**12/12/2019**	**02/28/2019**	**05/21/2019**	**09/23/2019**
Parameter (µg/L)																			
8:2 Fluorotelomer sulfonic acid (8:2 FTS)	NCL	NCL	NCL	NA	NCL	NCL	<0.0034	<0.0037	<0.0037	<0.0036	<0.0034	<0.0035	<0.0035	<0.0035	<0.0034	<0.0036	<0.004	<0.0034	<0.0038
6:2 Fluorotelomer sulfonic acid (6:2 FTS)	NCL	NCL	NCL	NA	NCL	NCL	<0.0034	<0.0037	<0.0037	<0.0036	<0.0034	<0.0035	<0.0035	<0.0035	<0.0034	<0.0036	<0.004	<0.0034	<0.0038
N-Ethyl perfluorooctane sulfonamide (EtFOSA)	NCL	NCL	NCL	NA	NCL	NCL	<0.0034	<0.0037	<0.0037	<0.0036	<0.0034	<0.0035	<0.0035	<0.0035	<0.0034	<0.0036	<0.004	<0.0034	<0.0038
N-Methyl perfluorooctane sulfonamide (MeFOSA)	NCL	NCL	NCL	NA	NCL	NCL	<0.0068	<0.0075	<0.0074	<0.0073	<0.0068	<0.007	<0.007	<0.007	<0.0069	<0.0072	<0.0081	<0.0069	<0.0077
Perfluorobutane sulfonic acid (PFBS)	NCL	NCL	NCL	NA	NCL	1,200	0.025	0.029	0.0037	<0.0036	<0.0034	<0.0035	<0.0035	<0.0035	<0.0034	<0.0036	<0.004	<0.0034	<0.0038
Perfluorodecane sulfonic acid (PFDS)	NCL	NCL	NCL	NA	NCL	NCL	<0.0034	<0.0037	<0.0037	<0.0036	<0.0034	<0.0035	<0.0035	<0.0035	<0.0034	<0.0036	<0.004	<0.0034	<0.0038
Perfluoroheptane sulfonic acid (PFHpS)	NCL	NCL	NCL	NA	NCL	NCL	<0.0034	<0.0037	<0.0037	<0.0036	<0.0034	<0.0035	<0.0035	<0.0035	<0.0034	<0.0036	<0.004	<0.0034	<0.0038
Perfluorononane sulfonic acid (PFNS)	NCL	NCL	NCL	NA	NCL	NCL	<0.0068	<0.0075	<0.0074	<0.0073	<0.0068	<0.007	<0.007	<0.007	<0.0069	<0.0072	<0.0081	<0.0069	<0.0077
Perfluorooctane sulfonamide (FOSA)	NCL	NCL	NCL	NA	NCL	NCL	<0.0034	<0.0037	<0.0037	<0.0036	<0.0034	<0.0035	<0.0035	<0.0035	<0.0034	<0.0036	<0.004	<0.0034	<0.0038
Perfluoropentane sulfonic acid (PFPeS)	NCL	NCL	NCL	NA	NCL	NCL	0.012	0.014	<0.0037	<0.0036	<0.0034	<0.0035	<0.0035	<0.0035	<0.0034	<0.0036	<0.004	<0.0034	<0.0038
Perfluorohexane sulfonic acid (PFHxS)	NCL	NCL	NCL	NA	NCL	NCL	0.0062	0.0072	<0.0037	<0.0036	<0.0034	0.0043	<0.0035	<0.0035	<0.0034	<0.0036	<0.004	<0.0034	<0.0038
Perfluorobutanoic acid (PFBA)	NCL	NCL	NCL	NA	NCL	NCL	0.018	0.02	<0.0037	<0.0036	<0.0034	<0.0035	<0.0035	<0.0035	<0.0034	<0.0036	<0.004	<0.0034	<0.0038
Perfluorodecanoic acid (PFDA)	NCL	NCL	NCL	NA	NCL	NCL	<0.0034	<0.0037	<0.0037	<0.0036	<0.0034	<0.0035	<0.0035	<0.0035	<0.0034	<0.0036	<0.004	<0.0034	<0.0038
Perfluorododecanoic acid (PFDoDA)	NCL	NCL	NCL	NA	NCL	NCL	<0.0034	<0.0037	<0.0037	<0.0036	<0.0034	<0.0035	<0.0035	<0.0035	<0.0034	<0.0036	<0.004	<0.0034	<0.0038
Perfluoroheptanoic acid (PFHpA)	NCL	NCL	NCL	NA	NCL	NCL	0.01	0.011	<0.0037	<0.0036	<0.0034	<0.0035	<0.0035	<0.0035	<0.0034	<0.0036	<0.004	<0.0034	<0.0038
Perfluorohexanoic acid (PFHxA)	NCL	NCL	NCL	NA	NCL	NCL	0.021	0.022	<0.0037	<0.0036	<0.0034	<0.0035	<0.0035	<0.0035	<0.0034	<0.0036	<0.004	<0.0034	<0.0038
Perfluorononanoic acid (PFNA)	NCL	NCL	NCL	NA	NCL	NCL	<0.0034	<0.0037	<0.0037	<0.0036	<0.0034	<0.0035	<0.0035	<0.0035	<0.0034	<0.0036	<0.004	<0.0034	<0.0038
Perfluorooctanoic acid (PFOA)	0.008	12	ID	NA	NCL	NCL	***0.015***	***0.015***	<0.0019	<0.0018	<0.0017	<0.0017	<0.0018	<0.0018	<0.0017	<0.0018	<0.002	<0.0017	<0.0019
Perfluorooctane sulfonic acid (PFOS)	0.016	0.012	NLV	NA	NCL	NCL	<0.0034	<0.0037	<0.0037	<0.0036	<0.0034	<0.0035	<0.0035	<0.0035	<0.0034	<0.0036	<0.004	<0.0034	<0.0038
PFOA + PFOS (Calculated)	NCL	NCL	NCL	0.01	NCL	NCL	***0.015***	***0.015***	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Perfluoropentanoic acid (PFPeA)	NCL	NCL	NCL	NA	NCL	NCL	0.016	0.016	<0.0037	<0.0036	<0.0034	<0.0035	<0.0035	<0.0035	<0.0034	<0.0036	<0.004	<0.0034	<0.0038
Perfluorotetradecanoic acid (PFTeDA)	NCL	NCL	NCL	NA	NCL	NCL	<0.0034	<0.0037	<0.0037	<0.0036	<0.0034	<0.0035	<0.0035	<0.0035	<0.0034	<0.0036	<0.004	<0.0034	<0.0038
Perfluorotridecanoic acid (PFTrDA)	NCL	NCL	NCL	NA	NCL	NCL	<0.0034	<0.0037	<0.0037	<0.0036	<0.0034	<0.0035	<0.0035	<0.0035	<0.0034	<0.0036	<0.004	<0.0034	<0.0038
Perfluoroundecanoic acid (PFUnDA)	NCL	NCL	NCL	NA	NCL	NCL	<0.0034	<0.0037	<0.0037	<0.0036	<0.0034	<0.0035	<0.0035	<0.0035	<0.0034	<0.0036	<0.004	<0.0034	<0.0038
Total PFAS (Calculated)	NCL	NCL	NCL	NA	NCL	NCL	0.12	0.13	0.0037	ND	ND	0.0043	ND	ND	ND	ND	ND	ND	ND

TABLE 6
SUMMARY OF GROUNDWATER SAMPLE ANALYSIS - PFAS (HSDS, 2019)
Area 5
Algoma and Plainfield Townships, Kent County, MI

Sample Location	Part 201 Generic Residential Groundwater Cleanup Criteria – Drinking Water[2]	Part 201 Generic Groundwater Cleanup Criteria – Groundwater Surface Water Interface[2]	Part 201 Generic Residential Groundwater Cleanup Criteria – Groundwater Volatilization to Indoor Air Inhalation[2]	CD Value[3]	EGLE Residential Recommended Volatilization to Indoor Air Interim Action Screening Level - Groundwater[4]	U.S. EPA Residential Tap Water Regional Removal Management Levels[5]	HS-MW-19S	HS-MW-20D	HS-MW-20D	HS-MW-20D	HS-MW-20D	HS-MW-20M	HS-MW-20M	HS-MW-20M	HS-MW-20M	HS-MW-20M	HS-MW-20S	HS-MW-20S	HS-MW-20S
Sample Name							HS-GW-MW-19S	HS-MW-20D	HS-GW-MW20D	HS-GW-MW20D	HS-GW-MW-20D	HS-MW-20M	HS-GW-MW20M	HS-GW-MW20M	HS-GW-MW20M DUP	HS-GW-MW-20M	MW-20S	HS-GW-MW20S	HS-GW-MW20S
Well Screen Interval (Feet below ground surface)							58.4-61.4	126.1-131.1	126.1-131.1	126.1-131.1	126.1-131.1	101.5-106.5	101.5-106.5	101.5-106.5	101.5-106.5	101.5-106.5	61.1-66.1	61.1-66.1	61.1-66.1
Laboratory Sample ID(s)							UL12091-016	UC09042-002	UE30036-003	UI19006-022	UK29008-019	UC09042-001	UE30036-002	UI19006-020	UI19006-021	UK29008-002	UC06036-001	UE30036-001	UI19006-019
Sample Date							12/11/2019	03/06/2019	05/28/2019	09/18/2019	11/27/2019	03/06/2019	05/28/2019	09/18/2019	09/18/2019	11/26/2019	03/04/2019	05/28/2019	09/18/2019
Parameter (µg/L)																			
8:2 Fluorotelomer sulfonic acid (8:2 FTS)	NCL	NCL	NCL	NA	NCL	NCL	<0.0036	<0.0035	<0.0036	<0.0035	<0.0035	<0.0037	<0.0035	<0.0035	<0.0035	<0.0035	<0.0036	<0.0037	<0.0035
6:2 Fluorotelomer sulfonic acid (6:2 FTS)	NCL	NCL	NCL	NA	NCL	NCL	<0.0036	<0.0035	<0.0036	<0.0035	<0.0035	<0.0037	<0.0035	<0.0035	<0.0035	<0.0035	<0.0036	<0.0037	<0.0035
N-Ethyl perfluorooctane sulfonamide (EtFOSA)	NCL	NCL	NCL	NA	NCL	NCL	<0.0036	<0.0035	<0.0036	<0.0035	<0.0035	<0.0037	<0.0035	<0.0035	<0.0035	<0.0035	<0.0036	<0.0037	<0.0035
N-Methyl perfluorooctane sulfonamide (MeFOSA)	NCL	NCL	NCL	NA	NCL	NCL	<0.0072	<0.0071	<0.0073	<0.007	<0.0069	<0.0074	<0.0069	<0.0069	<0.007	<0.0071	<0.0071	<0.0074	<0.0071
Perfluorobutane sulfonic acid (PFBS)	NCL	NCL	NCL	NA	NCL	1,200	<0.0036	0.16	0.17	0.17	0.15	0.071	0.068	0.069	0.07	0.06	0.015	0.016	0.018
Perfluorodecane sulfonic acid (PFDS)	NCL	NCL	NCL	NA	NCL	NCL	<0.0036	<0.0035	<0.0036	<0.0035	<0.0035	<0.0037	<0.0035	<0.0035	<0.0035	<0.0035	<0.0036	<0.0037	<0.0035
Perfluoroheptane sulfonic acid (PFHpS)	NCL	NCL	NCL	NA	NCL	NCL	<0.0036	<0.0035	<0.0036	<0.0035	<0.0035	0.0095	0.0088	0.008	0.0084	0.0077	<0.0036	<0.0037	<0.0035
Perfluorononane sulfonic acid (PFNS)	NCL	NCL	NCL	NA	NCL	NCL	<0.0072	<0.0071	<0.0073	<0.007	<0.0069	<0.0074	<0.0069	<0.0069	<0.007	<0.0071	<0.0071	<0.0074	<0.0071
Perfluorooctane sulfonamide (FOSA)	NCL	NCL	NCL	NA	NCL	NCL	<0.0036	<0.0035	<0.0036	<0.0035	<0.0035	<0.0037	<0.0035	<0.0035	<0.0035	<0.0035	<0.0036	<0.0037	<0.0035
Perfluoropentane sulfonic acid (PFPeS)	NCL	NCL	NCL	NA	NCL	NCL	<0.0036	0.097	0.098	0.11	0.098	0.083	0.079	0.08	0.085	0.062	0.013	0.013	0.016
Perfluorohexane sulfonic acid (PFHxS)	NCL	NCL	NCL	NA	NCL	NCL	<0.0036	0.042	0.042	0.046	0.043	0.16	0.16	0.15	0.14	0.13	0.014	0.017	0.019
Perfluorobutanoic acid (PFBA)	NCL	NCL	NCL	NA	NCL	NCL	<0.0036	0.047	0.052	0.05	0.049	0.015	0.015	0.015	0.014	0.014	0.0042	0.0043	0.0047
Perfluorodecanoic acid (PFDA)	NCL	NCL	NCL	NA	NCL	NCL	<0.0036	<0.0035	<0.0036	<0.0035	<0.0035	<0.0037	<0.0035	<0.0035	<0.0035	<0.0035	<0.0036	<0.0037	<0.0035
Perfluorododecanoic acid (PFDoDA)	NCL	NCL	NCL	NA	NCL	NCL	<0.0036	<0.0035	<0.0036	<0.0035	<0.0035	<0.0037	<0.0035	<0.0035	<0.0035	<0.0035	<0.0036	<0.0037	<0.0035
Perfluoroheptanoic acid (PFHpA)	NCL	NCL	NCL	NA	NCL	NCL	<0.0036	0.07	0.078	0.077	0.076	0.043	0.042	0.039	0.045	0.038	0.0056	0.0082	0.0094
Perfluorohexanoic acid (PFHxA)	NCL	NCL	NCL	NA	NCL	NCL	<0.0036	0.088	0.1	0.1	0.1	0.038	0.038	0.036	0.034	0.034	0.0068	0.0085	0.0093
Perfluorononanoic acid (PFNA)	NCL	NCL	NCL	NA	NCL	NCL	<0.0036	<0.0035	<0.0036	<0.0035	<0.0035	<0.0037	<0.0035	<0.0035	<0.0035	<0.0035	<0.0036	<0.0037	<0.0035
Perfluorooctanoic acid (PFOA)	0.008	12	ID	NA	NCL	NCL	<0.0018	***0.09***	***0.12***	***0.12***	***0.11***	***0.16***	***0.17***	***0.17***	***0.17***	***0.15***	***0.016***	***0.022***	***0.022***
Perfluorooctane sulfonic acid (PFOS)	0.016	0.012	NLV	NA	NCL	NCL	<0.0036	<0.0035	<0.0036	<0.0035	<0.0035	***0.04***	***0.034***	***0.033***	***0.032***	***0.029***	<0.0036	<0.0037	<0.0035
PFOA + PFOS (Calculated)	NCL	NCL	NCL	0.01	NCL	NCL	ND	***0.09***	***0.12***	***0.12***	***0.11***	***0.2***	***0.2***	***0.2***	***0.2***	***0.18***	***0.016***	***0.022***	***0.022***
Perfluoropentanoic acid (PFPeA)	NCL	NCL	NCL	NA	NCL	NCL	<0.0036	0.045	0.054	0.052	0.049	0.017	0.017	0.015	0.016	0.014	<0.0036	0.0039	0.0045
Perfluorotetradecanoic acid (PFTeDA)	NCL	NCL	NCL	NA	NCL	NCL	<0.0036	<0.0035	<0.0036	<0.0035	<0.0035	<0.0037	<0.0035	<0.0035	<0.0035	<0.0035	<0.0036	<0.0037	<0.0035
Perfluorotridecanoic acid (PFTrDA)	NCL	NCL	NCL	NA	NCL	NCL	<0.0036	<0.0035	<0.0036	<0.0035	<0.0035	<0.0037	<0.0035	<0.0035	<0.0035	<0.0035	<0.0036	<0.0037	<0.0035
Perfluoroundecanoic acid (PFUnDA)	NCL	NCL	NCL	NA	NCL	NCL	<0.0036	<0.0035	<0.0036	<0.0035	<0.0035	<0.0037	<0.0035	<0.0035	<0.0035	<0.0035	<0.0036	<0.0037	<0.0035
Total PFAS (Calculated)	NCL	NCL	NCL	NA	NCL	NCL	ND	0.64	0.71	0.73	0.68	0.64	0.63	0.62	0.61	0.54	0.075	0.093	0.1

TABLE 6
SUMMARY OF GROUNDWATER SAMPLE ANALYSIS - PFAS (HSDS, 2019)
Area 5
Algoma and Plainfield Townships, Kent County, MI

Sample Location	**Part 201 Generic Residential Groundwater Cleanup Criteria – Drinking Water^2**	**Part 201 Generic Groundwater Cleanup Criteria – Groundwater Surface Water Interface^2**	**Part 201 Generic Residential Groundwater Cleanup Criteria – Groundwater Volatilization to Indoor Air Inhalation^2**	**CD Value^3**	**EGLE Residential Recommended Volatilization to Indoor Air Interim Action Screening Level - Groundwater^4**	**U.S. EPA Residential Tap Water Regional Removal Management Levels^5**	**HS-MW-20S**	**HS-MW-21D**	**HS-MW-21D**	**HS-MW-21D**	**HS-MW-21D**	**HS-MW-21D**	**HS-MW-21D**	**HS-MW-21M**	**HS-MW-21M**	**HS-MW-21M**	**HS-MW-21M**	**HS-MW-21S**	**HS-MW-21S**
Sample Name							**HS-GW-MW-20S**	**HS-MW-21D**	**HS-GW-MW21D**	**HS-GW-MW21D DUP**	**HS-GW-MW21D**	**HS-GW-MW-21D**	**HS-GW-MW-21D DUP**	**HS-MW-21M**	**HS-GW-MW21M**	**HS-GW-MW21M**	**HS-GW-MW-21M**	**HS-MW-21S**	**HS-GW-MW21S**
Well Screen Interval (Feet below ground surface)							**61.1-66.1**	**76.2-86.2**	**76.2-86.2**	**76.2-86.2**	**76.2-86.2**	**76.2-86.2**	**76.2-86.2**	**59-64**	**59-64**	**59-64**	**59-64**	**9.8-19.8**	**9.8-19.8**
Laboratory Sample ID(s)							**UK29008-001**	**UB28086-003**	**UE18016-001**	**UE18016-002**	**UI19006-003**	**UL12091-001**	**UL12091-002**	**UB28086-002**	**UE18016-003**	**UI19006-004**	**UK29008-020**	**UB28086-001**	**UE18016-004**
Sample Date							**11/26/2019**	**02/27/2019**	**05/16/2019**	**05/16/2019**	**09/16/2019**	**12/09/2019**	**12/09/2019**	**02/27/2019**	**05/16/2019**	**09/16/2019**	**11/27/2019**	**02/27/2019**	**05/16/2019**
Parameter (µg/L)																			
8:2 Fluorotelomer sulfonic acid (8:2 FTS)	NCL	NCL	NCL	NA	NCL	NCL	<0.0035	<0.0036	<0.0036	<0.0036	<0.0036	<0.0036	<0.0035	<0.0037	<0.0036	<0.0036	<0.0037	<0.0037	<0.0037
6:2 Fluorotelomer sulfonic acid (6:2 FTS)	NCL	NCL	NCL	NA	NCL	NCL	<0.0035	<0.0036	<0.0036	<0.0036	0.0058	<0.0036	<0.0035	<0.0037	<0.0036	<0.0036	<0.0037	<0.0037	<0.0037
N-Ethyl perfluorooctane sulfonamide (EtFOSA)	NCL	NCL	NCL	NA	NCL	NCL	<0.0035	<0.0036	<0.0036	<0.0036	<0.0036	<0.0036	<0.0035	<0.0037	<0.0036	<0.0036	<0.0037	<0.0037	<0.0037
N-Methyl perfluorooctane sulfonamide (MeFOSA)	NCL	NCL	NCL	NA	NCL	NCL	<0.007	<0.0072	<0.0073	<0.0073	<0.0072	<0.0072	<0.0071	<0.0075	<0.0073	<0.0071	<0.0074	<0.0073	<0.0074
Perfluorobutane sulfonic acid (PFBS)	NCL	NCL	NCL	NA	NCL	1,200	0.018	<0.0036	<0.0036	<0.0036	<0.0036	<0.0036	<0.0035	<0.0037	<0.0036	<0.0036	<0.0037	<0.0037	<0.0037
Perfluorodecane sulfonic acid (PFDS)	NCL	NCL	NCL	NA	NCL	NCL	<0.0035	<0.0036	<0.0036	<0.0036	<0.0036	<0.0036	<0.0035	<0.0037	<0.0036	<0.0036	<0.0037	<0.0037	<0.0037
Perfluoroheptane sulfonic acid (PFHpS)	NCL	NCL	NCL	NA	NCL	NCL	<0.0035	<0.0036	<0.0036	<0.0036	<0.0036	<0.0036	<0.0035	<0.0037	<0.0036	<0.0036	<0.0037	<0.0037	<0.0037
Perfluorononane sulfonic acid (PFNS)	NCL	NCL	NCL	NA	NCL	NCL	<0.007	<0.0072	<0.0073	<0.0073	<0.0072	<0.0072	<0.0071	<0.0075	<0.0073	<0.0071	<0.0074	<0.0073	<0.0074
Perfluorooctane sulfonamide (FOSA)	NCL	NCL	NCL	NA	NCL	NCL	<0.0035	<0.0036	<0.0036	<0.0036	<0.0036	<0.0036	<0.0035	<0.0037	<0.0036	<0.0036	<0.0037	<0.0037	<0.0037
Perfluoropentane sulfonic acid (PFPeS)	NCL	NCL	NCL	NA	NCL	NCL	0.012	<0.0036	<0.0036	<0.0036	<0.0036	<0.0036	<0.0035	<0.0037	<0.0036	<0.0036	<0.0037	<0.0037	<0.0037
Perfluorohexane sulfonic acid (PFHxS)	NCL	NCL	NCL	NA	NCL	NCL	0.013	<0.0036	<0.0036	<0.0036	<0.0036	<0.0036	<0.0035	<0.0037	<0.0036	<0.0036	<0.0037	<0.0037	<0.0037
Perfluorobutanoic acid (PFBA)	NCL	NCL	NCL	NA	NCL	NCL	0.0067	<0.0036	<0.0036	<0.0036	<0.0036	<0.0036	<0.0035	<0.0037	<0.0036	<0.0036	<0.0037	<0.0037	<0.0037
Perfluorodecanoic acid (PFDA)	NCL	NCL	NCL	NA	NCL	NCL	<0.0035	<0.0036	<0.0036	<0.0036	<0.0036	<0.0036	<0.0035	<0.0037	<0.0036	<0.0036	<0.0037	<0.0037	<0.0037
Perfluorododecanoic acid (PFDoDA)	NCL	NCL	NCL	NA	NCL	NCL	<0.0035	<0.0036	<0.0036	<0.0036	<0.0036	<0.0036	<0.0035	<0.0037	<0.0036	<0.0036	<0.0037	<0.0037	<0.0037
Perfluoroheptanoic acid (PFHpA)	NCL	NCL	NCL	NA	NCL	NCL	0.0092	<0.0036	<0.0036	<0.0036	<0.0036	<0.0036	<0.0035	<0.0037	<0.0036	<0.0036	<0.0037	<0.0037	<0.0037
Perfluorohexanoic acid (PFHxA)	NCL	NCL	NCL	NA	NCL	NCL	0.013	<0.0036	<0.0036	<0.0036	<0.0036	<0.0036	<0.0035	<0.0037	<0.0036	<0.0036	<0.0037	<0.0037	<0.0037
Perfluorononanoic acid (PFNA)	NCL	NCL	NCL	NA	NCL	NCL	<0.0035	<0.0036	<0.0036	<0.0036	<0.0036	<0.0036	<0.0035	<0.0037	<0.0036	<0.0036	<0.0037	<0.0037	<0.0037
Perfluorooctanoic acid (PFOA)	0.008	12	ID	NA	NCL	NCL	***0.023***	<0.0018	<0.0018	<0.0018	<0.0018	<0.0018	<0.0018	<0.0019	<0.0018	<0.0018	<0.0019	0.0028	0.0026
Perfluorooctane sulfonic acid (PFOS)	0.016	0.012	NLV	NA	NCL	NCL	<0.0035	<0.0036	<0.0036	<0.0036	<0.0036	<0.0036	<0.0035	<0.0037	<0.0036	<0.0036	<0.0037	<0.0037	<0.0037
PFOA + PFOS (Calculated)	NCL	NCL	NCL	0.01	NCL	NCL	***0.023***	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.0028	0.0026
Perfluoropentanoic acid (PFPeA)	NCL	NCL	NCL	NA	NCL	NCL	0.0064	<0.0036	<0.0036	<0.0036	<0.0036	<0.0036	<0.0035	<0.0037	<0.0036	<0.0036	<0.0037	<0.0037	<0.0037
Perfluorotetradecanoic acid (PFTeDA)	NCL	NCL	NCL	NA	NCL	NCL	<0.0035	<0.0036	<0.0036	<0.0036	<0.0036	<0.0036	<0.0035	<0.0037	<0.0036	<0.0036	<0.0037	<0.0037	<0.0037
Perfluorotridecanoic acid (PFTrDA)	NCL	NCL	NCL	NA	NCL	NCL	<0.0035	<0.0036	<0.0036	<0.0036	<0.0036	<0.0036	<0.0035	<0.0037	<0.0036	<0.0036	<0.0037	<0.0037	<0.0037
Perfluoroundecanoic acid (PFUnDA)	NCL	NCL	NCL	NA	NCL	NCL	<0.0035	<0.0036	<0.0036	<0.0036	<0.0036	<0.0036	<0.0035	<0.0037	<0.0036	<0.0036	<0.0037	<0.0037	<0.0037
Total PFAS (Calculated)	NCL	NCL	NCL	NA	NCL	NCL	0.1	ND	ND	ND	0.0058	ND	ND	ND	ND	ND	ND	0.0028	0.0026

TABLE 6
SUMMARY OF GROUNDWATER SAMPLE ANALYSIS - PFAS (HSDS, 2019)
Area 5
Algoma and Plainfield Townships, Kent County, MI

Sample Location	**Part 201 Generic Residential Groundwater Cleanup Criteria – Drinking Water^2**	**Part 201 Generic Groundwater Cleanup Criteria – Groundwater Surface Water Interface^2**	**Part 201 Generic Residential Groundwater Cleanup Criteria – Groundwater Volatilization to Indoor Air Inhalation^2**	**CD Value^3**	**EGLE Residential Recommended Volatilization to Indoor Air Interim Action Screening Level - Groundwater^4**	**U.S. EPA Residential Tap Water Regional Removal Management Levels^5**	**HS-MW-21S**	**HS-MW-21S**	**HS-MW-23A**	**HS-MW-23A**	**HS-MW-23B**	**HS-MW-23B**	**HS-MW-23C**	**HS-MW-23C**	**HS-MW-23D**	**HS-MW-23D**	**HS-MW-24A**	**HS-MW-24B**	**HS-MW-25D**
Sample Name							**HS-GW-MW21S**	**HS-GW-MW-21S**	**HS-GW-MW23A**	**HS-GW-MW-23A**	**HS-GW-MW23B**	**HS-GW-MW-23B**	**HS-GW-MW23C**	**HS-GW-MW-23C**	**HS-GW-MW23D**	**HS-GW-MW-23D**	**HS-GW-MW-24A**	**HS-GW-MW-24B**	**HS-MW-25D**
Well Screen Interval (Feet below ground surface)							**9.8-19.8**	**9.8-19.8**	**72.1-77.1**	**72.1-77.1**	**137.9-142.8**	**137.9-142.8**	**210.2-215**	**210.2-215**	**238.9-243.9**	**238.9-243.9**	**55.6-60.4**	**225.2-230**	**65.7-70.7**
Laboratory Sample ID(s)							**UI19006-006**	**UK29008-022**	**UI21016-007**	**UL05055-032**	**UI21016-009**	**UL05055-033**	**UI26001-001**	**UL05055-034**	**UI21016-008**	**UL12091-008**	**UL12091-009**	**UL12091-015**	**UC02020-009**
Sample Date							**09/16/2019**	**11/27/2019**	**09/20/2019**	**12/06/2019**	**09/20/2019**	**12/06/2019**	**09/23/2019**	**12/06/2019**	**09/20/2019**	**12/10/2019**	**12/10/2019**	**12/11/2019**	**03/01/2019**
Parameter (µg/L)																			
8:2 Fluorotelomer sulfonic acid (8:2 FTS)	NCL	NCL	NCL	NA	NCL	NCL	<0.0037	<0.0035	<0.0036	<0.0035	<0.0034	<0.0035	<0.0035	<0.0035	<0.0035	<0.0036	<0.0035	<0.0037	<0.0036
6:2 Fluorotelomer sulfonic acid (6:2 FTS)	NCL	NCL	NCL	NA	NCL	NCL	<0.0037	<0.0035	<0.0036	<0.0035	<0.0034	<0.0035	<0.0035	<0.0035	<0.0035	<0.0036	<0.0035	<0.0037	<0.0036
N-Ethyl perfluorooctane sulfonamide (EtFOSA)	NCL	NCL	NCL	NA	NCL	NCL	<0.0037	<0.0035	<0.0036	<0.0035	<0.0034	<0.0035	<0.0035	<0.0035	<0.0035	<0.0036	<0.0035	<0.0037	<0.0036
N-Methyl perfluorooctane sulfonamide (MeFOSA)	NCL	NCL	NCL	NA	NCL	NCL	<0.0074	<0.007	<0.0072	<0.0071	<0.0068	<0.007	<0.007	<0.0071	<0.0069	<0.0072	<0.007	<0.0074	<0.0072
Perfluorobutane sulfonic acid (PFBS)	NCL	NCL	NCL	NA	NCL	1,200	<0.0037	0.0036	0.02	0.018	0.015	0.014	0.26	0.28	0.23	0.14	<0.0035	<0.0037	0.016
Perfluorodecane sulfonic acid (PFDS)	NCL	NCL	NCL	NA	NCL	NCL	<0.0037	<0.0035	<0.0036	<0.0035	<0.0034	<0.0035	<0.0035	<0.0035	<0.0035	<0.0036	<0.0035	<0.0037	<0.0036
Perfluoroheptane sulfonic acid (PFHpS)	NCL	NCL	NCL	NA	NCL	NCL	<0.0037	<0.0035	<0.0036	<0.0035	<0.0034	<0.0035	<0.0035	<0.0035	<0.0035	<0.0036	<0.0035	<0.0037	<0.0036
Perfluorononane sulfonic acid (PFNS)	NCL	NCL	NCL	NA	NCL	NCL	<0.0074	<0.007	<0.0072	<0.0071	<0.0068	<0.007	<0.007	<0.0071	<0.0069	<0.0072	<0.007	<0.0074	<0.0072
Perfluorooctane sulfonamide (FOSA)	NCL	NCL	NCL	NA	NCL	NCL	<0.0037	<0.0035	<0.0036	<0.0035	<0.0034	<0.0035	<0.0035	<0.0035	<0.0035	<0.0036	<0.0035	<0.0037	<0.0036
Perfluoropentane sulfonic acid (PFPeS)	NCL	NCL	NCL	NA	NCL	NCL	<0.0037	<0.0035	0.011	0.0094	0.0081	0.0071	0.22	0.23	0.15	0.076	<0.0035	<0.0037	<0.0036
Perfluorohexane sulfonic acid (PFHxS)	NCL	NCL	NCL	NA	NCL	NCL	<0.0037	<0.0035	0.02	0.019	0.019	0.015	0.091	0.09	0.016	0.011	<0.0035	<0.0037	0.008
Perfluorobutanoic acid (PFBA)	NCL	NCL	NCL	NA	NCL	NCL	<0.0037	<0.0035	<0.0036	<0.0035	<0.0034	<0.0035	0.064	0.067	0.067	0.043	<0.0035	<0.0037	0.0054
Perfluorodecanoic acid (PFDA)	NCL	NCL	NCL	NA	NCL	NCL	<0.0037	<0.0035	<0.0036	<0.0035	<0.0034	<0.0035	<0.0035	<0.0035	<0.0035	<0.0036	<0.0035	<0.0037	<0.0036
Perfluorododecanoic acid (PFDoDA)	NCL	NCL	NCL	NA	NCL	NCL	<0.0037	<0.0035	<0.0036	<0.0035	<0.0034	<0.0035	<0.0035	<0.0035	<0.0035	<0.0036	<0.0035	<0.0037	<0.0036
Perfluoroheptanoic acid (PFHpA)	NCL	NCL	NCL	NA	NCL	NCL	<0.0037	<0.0035	<0.0036	<0.0035	<0.0034	<0.0035	0.05	0.057	0.037	0.02	<0.0035	<0.0037	0.0056
Perfluorohexanoic acid (PFHxA)	NCL	NCL	NCL	NA	NCL	NCL	<0.0037	<0.0035	0.0047	<0.0035	0.0061	0.0044	0.22	0.26	0.24	0.16	<0.0035	<0.0037	0.011
Perfluorononanoic acid (PFNA)	NCL	NCL	NCL	NA	NCL	NCL	<0.0037	<0.0035	<0.0036	<0.0035	<0.0034	<0.0035	<0.0035	<0.0035	<0.0035	<0.0036	<0.0035	<0.0037	<0.0036
Perfluorooctanoic acid (PFOA)	0.008	12	ID	NA	NCL	NCL	0.0034	0.0031	***0.013***	***0.012***	0.0075	***0.0082***	***0.03***	***0.03***	***0.013***	0.0056	<0.0017	<0.0018	***0.016***
Perfluorooctane sulfonic acid (PFOS)	0.016	0.012	NLV	NA	NCL	NCL	<0.0037	<0.0035	0.0042	***0.015***	<0.0034	<0.0035	<0.0035	<0.0035	<0.0035	<0.0036	<0.0035	<0.0037	***0.072***
PFOA + PFOS (Calculated)	NCL	NCL	NCL	0.01	NCL	NCL	0.0034	0.0031	***0.017***	***0.027***	0.0075	0.0082	***0.03***	***0.03***	***0.013***	0.0056	ND	ND	***0.088***
Perfluoropentanoic acid (PFPeA)	NCL	NCL	NCL	NA	NCL	NCL	<0.0037	<0.0035	<0.0036	<0.0035	<0.0034	<0.0035	0.1	0.11	0.13	0.08	<0.0035	<0.0037	0.0091
Perfluorotetradecanoic acid (PFTeDA)	NCL	NCL	NCL	NA	NCL	NCL	<0.0037	<0.0035	<0.0036	<0.0035	<0.0034	<0.0035	<0.0035	<0.0035	<0.0035	<0.0036	<0.0035	<0.0037	<0.0036
Perfluorotridecanoic acid (PFTrDA)	NCL	NCL	NCL	NA	NCL	NCL	<0.0037	<0.0035	<0.0036	<0.0035	<0.0034	<0.0035	<0.0035	<0.0035	<0.0035	<0.0036	<0.0035	<0.0037	<0.0036
Perfluoroundecanoic acid (PFUnDA)	NCL	NCL	NCL	NA	NCL	NCL	<0.0037	<0.0035	<0.0036	<0.0035	<0.0034	<0.0035	<0.0035	<0.0035	<0.0035	<0.0036	<0.0035	<0.0037	<0.0036
Total PFAS (Calculated)	NCL	NCL	NCL	NA	NCL	NCL	0.0034	0.0067	0.073	0.073	0.056	0.049	1	1.1	0.88	0.54	ND	ND	0.14

TABLE 6
SUMMARY OF GROUNDWATER SAMPLE ANALYSIS - PFAS (HSDS, 2019)
Area 5
Algoma and Plainfield Townships, Kent County, MI

Sample Location	**Part 201 Generic Residential Groundwater Cleanup Criteria – Drinking Water**[2]	**Part 201 Generic Groundwater Cleanup Criteria – Groundwater Surface Water Interface**[2]	**Part 201 Generic Residential Groundwater Cleanup Criteria – Groundwater Volatilization to Indoor Air Inhalation**[2]	**CD Value**[3]	**EGLE Residential Recommended Volatilization to Indoor Air Interim Action Screening Level - Groundwater**[4]	**U.S. EPA Residential Tap Water Regional Removal Management Levels**[5]	**HS-MW-25D**	**HS-MW-25D**	**HS-MW-25D**	**HS-MW-25S**	**HS-MW-25S**	**HS-MW-25S**	**HS-MW-25S**	**HS-MW-26D**	**HS-MW-26D**	**HS-MW-26D**	**HS-MW-26D**	**HS-MW-26M**	**HS-MW-26M**
Sample Name							**HS-GW-MW25D**	**HS-GW-MW25D**	**HS-GW-MW-25D**	**HS-MW-25S**	**HS-GW-MW25S**	**HS-GW-MW25S**	**HS-GW-MW-25S**	**HS-MW-26D**	**HS-GW-MW26D**	**HS-GW-MW26D**	**HS-GW-MW-26D**	**HS-MW-26M**	**HS-GW-MW26M**
Well Screen Interval (Feet below ground surface)							**65.7-70.7**	**65.7-70.7**	**65.7-70.7**	**51.1-56.1**	**51.1-56.1**	**51.1-56.1**	**51.1-56.1**	**79.6-84.6**	**79.6-84.6**	**79.6-84.6**	**79.6-84.6**	**61.7-66.7**	**61.7-66.7**
Laboratory Sample ID(s)							**UE15023-008**	**UI19006-009**	**UL05055-004**	**UC02020-008**	**UE15023-007**	**UI19006-012**	**UL05055-002**	**UC02020-003**	**UE15023-009**	**UI12010-013**	**UK21036-008**	**UC02020-002**	**UE15023-011**
Sample Date							**05/14/2019**	**09/17/2019**	**12/02/2019**	**03/01/2019**	**05/14/2019**	**09/17/2019**	**12/02/2019**	**02/28/2019**	**05/15/2019**	**09/11/2019**	**11/19/2019**	**02/28/2019**	**05/15/2019**
Parameter (µg/L)																			
8:2 Fluorotelomer sulfonic acid (8:2 FTS)	NCL	NCL	NCL	NA	NCL	NCL	<0.0037	<0.0037	<0.0038	<0.0037	<0.0036	<0.0038	<0.0037	<0.0037	<0.0036	<0.0038	<0.0035	<0.0038	<0.0037
6:2 Fluorotelomer sulfonic acid (6:2 FTS)	NCL	NCL	NCL	NA	NCL	NCL	<0.0037	<0.0037	<0.0038	<0.0037	<0.0036	<0.0038	<0.0037	<0.0037	<0.0036	<0.0038	<0.0035	<0.0038	<0.0037
N-Ethyl perfluorooctane sulfonamide (EtFOSA)	NCL	NCL	NCL	NA	NCL	NCL	<0.0037	<0.0037	<0.0038	<0.0037	<0.0036	<0.0038	<0.0037	<0.0037	<0.0036	<0.0038	<0.0035	<0.0038	<0.0037
N-Methyl perfluorooctane sulfonamide (MeFOSA)	NCL	NCL	NCL	NA	NCL	NCL	<0.0074	<0.0073	<0.0077	<0.0073	<0.0072	<0.0076	<0.0074	<0.0074	<0.0071	<0.0077	<0.007	<0.0076	<0.0074
Perfluorobutane sulfonic acid (PFBS)	NCL	NCL	NCL	NA	NCL	1,200	0.012	0.011	0.018	0.017	0.01	0.0082	0.012	<0.0037	<0.0036	<0.0038	<0.0035	0.0044	0.0046
Perfluorodecane sulfonic acid (PFDS)	NCL	NCL	NCL	NA	NCL	NCL	<0.0037	<0.0037	<0.0038	<0.0037	<0.0036	<0.0038	<0.0037	<0.0037	<0.0036	<0.0038	<0.0035	<0.0038	<0.0037
Perfluoroheptane sulfonic acid (PFHpS)	NCL	NCL	NCL	NA	NCL	NCL	<0.0037	<0.0037	<0.0038	<0.0037	<0.0036	<0.0038	<0.0037	<0.0037	<0.0036	<0.0038	<0.0035	<0.0038	<0.0037
Perfluorononane sulfonic acid (PFNS)	NCL	NCL	NCL	NA	NCL	NCL	<0.0074	<0.0073	<0.0077	<0.0073	<0.0072	<0.0076	<0.0074	<0.0074	<0.0071	<0.0077	<0.007	<0.0076	<0.0074
Perfluorooctane sulfonamide (FOSA)	NCL	NCL	NCL	NA	NCL	NCL	<0.0037	<0.0037	<0.0038	<0.0037	<0.0036	<0.0038	<0.0037	<0.0037	<0.0036	<0.0038	<0.0035	<0.0038	<0.0037
Perfluoropentane sulfonic acid (PFPeS)	NCL	NCL	NCL	NA	NCL	NCL	<0.0037	<0.0037	<0.0038	<0.0037	<0.0036	<0.0038	<0.0037	<0.0037	<0.0036	<0.0038	<0.0035	<0.0038	<0.0037
Perfluorohexane sulfonic acid (PFHxS)	NCL	NCL	NCL	NA	NCL	NCL	0.0069	0.007	0.0082	0.0083	0.0045	0.0045	0.0057	<0.0037	<0.0036	<0.0038	<0.0035	<0.0038	<0.0037
Perfluorobutanoic acid (PFBA)	NCL	NCL	NCL	NA	NCL	NCL	0.0047	0.0045	0.0054	0.0046	<0.0036	<0.0038	0.0039	<0.0037	<0.0036	<0.0038	<0.0035	<0.0038	<0.0037
Perfluorodecanoic acid (PFDA)	NCL	NCL	NCL	NA	NCL	NCL	<0.0037	<0.0037	<0.0038	<0.0037	<0.0036	<0.0038	<0.0037	<0.0037	<0.0036	<0.0038	<0.0035	<0.0038	<0.0037
Perfluorododecanoic acid (PFDoDA)	NCL	NCL	NCL	NA	NCL	NCL	<0.0037	<0.0037	<0.0038	<0.0037	<0.0036	<0.0038	<0.0037	<0.0037	<0.0036	<0.0038	<0.0035	<0.0038	<0.0037
Perfluoroheptanoic acid (PFHpA)	NCL	NCL	NCL	NA	NCL	NCL	0.0045	<0.0037	0.005	0.004	<0.0036	<0.0038	0.0049	<0.0037	<0.0036	<0.0038	<0.0035	<0.0038	<0.0037
Perfluorohexanoic acid (PFHxA)	NCL	NCL	NCL	NA	NCL	NCL	0.01	0.0076	0.012	0.0089	0.0056	0.0068	0.0092	<0.0037	<0.0036	<0.0038	<0.0035	<0.0038	<0.0037
Perfluorononanoic acid (PFNA)	NCL	NCL	NCL	NA	NCL	NCL	<0.0037	<0.0037	<0.0038	<0.0037	<0.0036	<0.0038	<0.0037	<0.0037	<0.0036	<0.0038	<0.0035	<0.0038	<0.0037
Perfluorooctanoic acid (PFOA)	0.008	12	ID	NA	NCL	NCL	***0.014***	***0.01***	***0.015***	***0.012***	***0.0091***	***0.011***	***0.014***	0.0022	<0.0018	<0.0019	<0.0017	0.006	0.0055
Perfluorooctane sulfonic acid (PFOS)	0.016	0.012	NLV	NA	NCL	NCL	***0.051***	***0.039***	***0.042***	***0.11***	***0.071***	***0.057***	***0.061***	<0.0037	<0.0036	<0.0038	<0.0035	***0.014***	0.011
PFOA + PFOS (Calculated)	NCL	NCL	NCL	0.01	NCL	NCL	***0.065***	***0.049***	***0.057***	***0.12***	***0.08***	***0.068***	***0.075***	0.0022	ND	ND	ND	***0.02***	***0.017***
Perfluoropentanoic acid (PFPeA)	NCL	NCL	NCL	NA	NCL	NCL	0.0086	0.0061	0.0087	0.007	0.0043	0.0047	0.0067	<0.0037	<0.0036	<0.0038	<0.0035	<0.0038	<0.0037
Perfluorotetradecanoic acid (PFTeDA)	NCL	NCL	NCL	NA	NCL	NCL	<0.0037	<0.0037	<0.0038	<0.0037	<0.0036	<0.0038	<0.0037	<0.0037	<0.0036	<0.0038	<0.0035	<0.0038	<0.0037
Perfluorotridecanoic acid (PFTrDA)	NCL	NCL	NCL	NA	NCL	NCL	<0.0037	<0.0037	<0.0038	<0.0037	<0.0036	<0.0038	<0.0037	<0.0037	<0.0036	<0.0038	<0.0035	<0.0038	<0.0037
Perfluoroundecanoic acid (PFUnDA)	NCL	NCL	NCL	NA	NCL	NCL	<0.0037	<0.0037	<0.0038	<0.0037	<0.0036	<0.0038	<0.0037	<0.0037	<0.0036	<0.0038	<0.0035	<0.0038	<0.0037
Total PFAS (Calculated)	NCL	NCL	NCL	NA	NCL	NCL	0.11	0.085	0.11	0.17	0.1	0.092	0.12	0.0022	ND	ND	ND	0.024	0.021

TABLE 6
SUMMARY OF GROUNDWATER SAMPLE ANALYSIS - PFAS (HSDS, 2019)
Area 5
Algoma and Plainfield Townships, Kent County, MI

Sample Location	Part 201 Generic Residential Groundwater Cleanup Criteria – Drinking Water^2	Part 201 Generic Groundwater Cleanup Criteria – Groundwater Surface Water Interface^2	Part 201 Generic Residential Groundwater Cleanup Criteria – Groundwater Volatilization to Indoor Air Inhalation^2	CD Value^3	EGLE Residential Recommended Volatilization to Indoor Air Interim Action Screening Level - Groundwater^4	U.S. EPA Residential Tap Water Regional Removal Management Levels^5	HS-MW-26M	HS-MW-26M	HS-MW-26S	HS-MW-26S	HS-MW-26S	HS-MW-26S	HS-MW-26S	HS-MW-27A	HS-MW-27B	HS-MW-27B	HS-MW-27C	HS-MW-27C	HS-MW-27D
Sample Name							HS-GW-MW26M	HS-GW-MW-26M	HS-MW-26S	HS-GW-MW26S	HS-GW-MW26S	HS-GW-MW26S DUP	HS-GW-MW-26S	HS-GW-MW-27A	HS-GW-MW27B	HS-GW-MW-27B	HS-GW-MW27C	HS-GW-MW-27C	HS-GW-MW27D
Well Screen Interval (Feet below ground surface)							61.7-66.7	61.7-66.7	25.8-30.8	25.8-30.8	25.8-30.8	25.8-30.8	25.8-30.8	21.6-26.2	35.4-38	35.4-38	41.3-45.9	41.3-45.9	52.4-56.4
Laboratory Sample ID(s)							UI12010-017	UK21036-005	UC02020-001	UE15023-010	UI12010-015	UI12010-018	UK21036-001	UK19008-001	UI12010-002	UK19008-003	UI12010-001	UK19008-002	UI12010-003
Sample Date							09/11/2019	11/19/2019	02/28/2019	05/15/2019	09/11/2019	09/11/2019	11/19/2019	11/18/2019	09/09/2019	11/18/2019	09/09/2019	11/18/2019	09/09/2019
Parameter (µg/L)																			
8:2 Fluorotelomer sulfonic acid (8:2 FTS)	NCL	NCL	NCL	NA	NCL	NCL	<0.0035	<0.0037	<0.0036	<0.0036	<0.0038	<0.0037	<0.0037	<0.0038	<0.0034	<0.0037	<0.0036	<0.0038	<0.0034
6:2 Fluorotelomer sulfonic acid (6:2 FTS)	NCL	NCL	NCL	NA	NCL	NCL	<0.0035	<0.0037	<0.0036	<0.0036	<0.0038	<0.0037	<0.0037	<0.0038	<0.0034	<0.0037	<0.0036	<0.0038	<0.0034
N-Ethyl perfluorooctane sulfonamide (EtFOSA)	NCL	NCL	NCL	NA	NCL	NCL	<0.0035	<0.0037	<0.0036	<0.0036	<0.0038	<0.0037	<0.0037	<0.0038	<0.0034	<0.0037	<0.0036	<0.0038	<0.0034
N-Methyl perfluorooctane sulfonamide (MeFOSA)	NCL	NCL	NCL	NA	NCL	NCL	<0.0071	<0.0073	<0.0073	<0.0073	<0.0076	<0.0073	<0.0073	<0.0077	<0.0068	<0.0075	<0.0072	<0.0075	<0.0068
Perfluorobutane sulfonic acid (PFBS)	NCL	NCL	NCL	NA	NCL	1,200	0.0049	0.0053	<0.0036	<0.0036	<0.0038	<0.0037	<0.0037	0.004	<0.0034	<0.0037	<0.0036	<0.0038	<0.0034
Perfluorodecane sulfonic acid (PFDS)	NCL	NCL	NCL	NA	NCL	NCL	<0.0035	<0.0037	<0.0036	<0.0036	<0.0038	<0.0037	<0.0037	<0.0038	<0.0034	<0.0037	<0.0036	<0.0038	<0.0034
Perfluoroheptane sulfonic acid (PFHpS)	NCL	NCL	NCL	NA	NCL	NCL	<0.0035	<0.0037	<0.0036	<0.0036	<0.0038	<0.0037	<0.0037	<0.0038	<0.0034	<0.0037	<0.0036	<0.0038	<0.0034
Perfluorononane sulfonic acid (PFNS)	NCL	NCL	NCL	NA	NCL	NCL	<0.0071	<0.0073	<0.0073	<0.0073	<0.0076	<0.0073	<0.0073	<0.0077	<0.0068	<0.0075	<0.0072	<0.0075	<0.0068
Perfluorooctane sulfonamide (FOSA)	NCL	NCL	NCL	NA	NCL	NCL	<0.0035	<0.0037	<0.0036	<0.0036	<0.0038	<0.0037	<0.0037	<0.0038	<0.0034	<0.0037	<0.0036	<0.0038	<0.0034
Perfluoropentane sulfonic acid (PFPeS)	NCL	NCL	NCL	NA	NCL	NCL	<0.0035	<0.0037	<0.0036	<0.0036	<0.0038	<0.0037	<0.0037	<0.0038	<0.0034	<0.0037	<0.0036	<0.0038	<0.0034
Perfluorohexane sulfonic acid (PFHxS)	NCL	NCL	NCL	NA	NCL	NCL	<0.0035	<0.0037	<0.0036	<0.0036	<0.0038	<0.0037	<0.0037	0.0056	<0.0034	<0.0037	<0.0036	<0.0038	<0.0034
Perfluorobutanoic acid (PFBA)	NCL	NCL	NCL	NA	NCL	NCL	<0.0035	<0.0037	<0.0036	<0.0036	<0.0038	<0.0037	<0.0037	0.0067	<0.0034	<0.0037	<0.0036	<0.0038	<0.0034
Perfluorodecanoic acid (PFDA)	NCL	NCL	NCL	NA	NCL	NCL	<0.0035	<0.0037	<0.0036	<0.0036	<0.0038	<0.0037	<0.0037	<0.0038	<0.0034	<0.0037	<0.0036	<0.0038	<0.0034
Perfluorododecanoic acid (PFDoDA)	NCL	NCL	NCL	NA	NCL	NCL	<0.0035	<0.0037	<0.0036	<0.0036	<0.0038	<0.0037	<0.0037	<0.0038	<0.0034	<0.0037	<0.0036	<0.0038	<0.0034
Perfluoroheptanoic acid (PFHpA)	NCL	NCL	NCL	NA	NCL	NCL	<0.0035	<0.0037	<0.0036	<0.0036	<0.0038	<0.0037	<0.0037	<0.0038	<0.0034	<0.0037	<0.0036	<0.0038	<0.0034
Perfluorohexanoic acid (PFHxA)	NCL	NCL	NCL	NA	NCL	NCL	<0.0035	<0.0037	<0.0036	<0.0036	<0.0038	<0.0037	<0.0037	0.0069	<0.0034	<0.0037	<0.0036	<0.0038	<0.0034
Perfluorononanoic acid (PFNA)	NCL	NCL	NCL	NA	NCL	NCL	<0.0035	<0.0037	<0.0036	<0.0036	<0.0038	<0.0037	<0.0037	<0.0038	<0.0034	<0.0037	<0.0036	<0.0038	<0.0034
Perfluorooctanoic acid (PFOA)	0.008	12	ID	NA	NCL	NCL	0.0054	0.0052	<0.0018	<0.0018	<0.0019	<0.0018	<0.0018	0.0051	<0.0017	<0.0019	<0.0018	<0.0019	<0.0017
Perfluorooctane sulfonic acid (PFOS)	0.016	0.012	NLV	NA	NCL	NCL	***0.016***	***0.017***	<0.0036	<0.0036	<0.0038	<0.0037	<0.0037	<0.0038	<0.0034	<0.0037	<0.0036	<0.0038	<0.0034
PFOA + PFOS (Calculated)	NCL	NCL	NCL	0.01	NCL	NCL	***0.021***	***0.022***	ND	ND	ND	ND	ND	0.0051	ND	ND	ND	ND	ND
Perfluoropentanoic acid (PFPeA)	NCL	NCL	NCL	NA	NCL	NCL	<0.0035	<0.0037	<0.0036	<0.0036	<0.0038	<0.0037	<0.0037	<0.0038	<0.0034	<0.0037	<0.0036	<0.0038	<0.0034
Perfluorotetradecanoic acid (PFTeDA)	NCL	NCL	NCL	NA	NCL	NCL	<0.0035	<0.0037	<0.0036	<0.0036	<0.0038	<0.0037	<0.0037	<0.0038	<0.0034	<0.0037	<0.0036	<0.0038	<0.0034
Perfluorotridecanoic acid (PFTrDA)	NCL	NCL	NCL	NA	NCL	NCL	<0.0035	<0.0037	<0.0036	<0.0036	<0.0038	<0.0037	<0.0037	<0.0038	<0.0034	<0.0037	<0.0036	<0.0038	<0.0034
Perfluoroundecanoic acid (PFUnDA)	NCL	NCL	NCL	NA	NCL	NCL	<0.0035	<0.0037	<0.0036	<0.0036	<0.0038	<0.0037	<0.0037	<0.0038	<0.0034	<0.0037	<0.0036	<0.0038	<0.0034
Total PFAS (Calculated)	NCL	NCL	NCL	NA	NCL	NCL	0.026	0.028	ND	ND	ND	ND	ND	0.028	ND	ND	ND	ND	ND

TABLE 6

SUMMARY OF GROUNDWATER SAMPLE ANALYSIS - PFAS (HSDS, 2019)

Area 5

Algoma and Plainfield Townships, Kent County, MI

Sample Location	**Part 201 Generic Residential Groundwater Cleanup Criteria – Drinking Water^{2}**	**Part 201 Generic Groundwater Cleanup Criteria – Groundwater Surface Water Interface^{2}**	**Part 201 Generic Residential Groundwater Cleanup Criteria – Groundwater Volatilization to Indoor Air Inhalation^{2}**	**CD Value^{3}**	**EGLE Residential Recommended Volatilization to Indoor Air Interim Action Screening Level - Groundwater^{4}**	**U.S. EPA Residential Tap Water Regional Removal Management Levels^{5}**	**HS-MW-27D**	**HS-MW-27E**	**HS-MW-27E**	**HS-MW-28A**	**HS-MW-28A**	**HS-MW-28B**	**HS-MW-28B**	**HS-MW-28C**	**HS-MW-28C**	**HS-MW-28D**	**HS-MW-28D**	**HS-MW-28D**	**HS-MW-28E**
Sample Name							**HS-GW-MW-27D**	**HS-GW-MW27E**	**HS-GW-MW-27E**	**HS-GW-MW28A**	**HS-GW-MW-28A**	**HS-GW-MW28B**	**HS-GW-MW-28B**	**HS-GW-MW28C**	**HS-GW-MW-28C**	**HS-GW-MW28D**	**HS-GW-MW-28D**	**HS-GW-MW-28D DUP**	**HS-GW-MW28E**
Well Screen Interval (Feet below ground surface)							**52.4-56.4**	**58.5-62.5**	**58.5-62.5**	**39.1-43.7**	**39.1-43.7**	**43.3-47.9**	**43.3-47.9**	**49.2-53.8**	**49.2-53.8**	**62.2-66.8**	**62.2-66.8**	**62.2-66.8**	**82.7-87.3**
Laboratory Sample ID(s)							**UK21036-002**	**UI12010-004**	**UK19008-004**	**UI19006-013**	**UK21036-018**	**UI19006-005**	**UK21036-019**	**UI19006-001**	**UK21036-016**	**UI19006-010**	**UK21036-014**	**UK21036-015**	**UI19006-011**
Sample Date							**11/19/2019**	**09/09/2019**	**11/18/2019**	**09/17/2019**	**11/21/2019**	**09/16/2019**	**11/21/2019**	**09/16/2019**	**11/21/2019**	**09/17/2019**	**11/21/2019**	**11/21/2019**	**09/17/2019**
Parameter (µg/L)																			
8:2 Fluorotelomer sulfonic acid (8:2 FTS)	NCL	NCL	NCL	NA	NCL	NCL	<0.0038	<0.0036	<0.0037	<0.0036	<0.0036	<0.0037	<0.0038	<0.0038	<0.0035	<0.0035	<0.0036	<0.0037	<0.0035
6:2 Fluorotelomer sulfonic acid (6:2 FTS)	NCL	NCL	NCL	NA	NCL	NCL	<0.0038	<0.0036	<0.0037	<0.0036	<0.0036	<0.0037	<0.0038	0.011	<0.0035	<0.0035	<0.0036	<0.0037	<0.0035
N-Ethyl perfluorooctane sulfonamide (EtFOSA)	NCL	NCL	NCL	NA	NCL	NCL	<0.0038	<0.0036	<0.0037	<0.0036	<0.0036	<0.0037	<0.0038	<0.0038	<0.0035	<0.0035	<0.0036	<0.0037	<0.0035
N-Methyl perfluorooctane sulfonamide (MeFOSA)	NCL	NCL	NCL	NA	NCL	NCL	<0.0076	<0.0073	<0.0074	<0.0072	<0.0072	<0.0074	<0.0075	<0.0076	<0.0071	<0.007	<0.0072	<0.0074	<0.007
Perfluorobutane sulfonic acid (PFBS)	NCL	NCL	NCL	NA	NCL	1,200	<0.0038	<0.0036	<0.0037	0.0063	0.0047	0.0083	0.0092	<0.0038	<0.0035	<0.0035	<0.0036	<0.0037	<0.0035
Perfluorodecane sulfonic acid (PFDS)	NCL	NCL	NCL	NA	NCL	NCL	<0.0038	<0.0036	<0.0037	<0.0036	<0.0036	<0.0037	<0.0038	<0.0038	<0.0035	<0.0035	<0.0036	<0.0037	<0.0035
Perfluoroheptane sulfonic acid (PFHpS)	NCL	NCL	NCL	NA	NCL	NCL	<0.0038	<0.0036	<0.0037	<0.0036	<0.0036	<0.0037	<0.0038	<0.0038	<0.0035	<0.0035	<0.0036	<0.0037	<0.0035
Perfluorononane sulfonic acid (PFNS)	NCL	NCL	NCL	NA	NCL	NCL	<0.0076	<0.0073	<0.0074	<0.0072	<0.0072	<0.0074	<0.0075	<0.0076	<0.0071	<0.007	<0.0072	<0.0074	<0.007
Perfluorooctane sulfonamide (FOSA)	NCL	NCL	NCL	NA	NCL	NCL	<0.0038	<0.0036	<0.0037	<0.0036	<0.0036	<0.0037	<0.0038	<0.0038	<0.0035	<0.0035	<0.0036	<0.0037	<0.0035
Perfluoropentane sulfonic acid (PFPeS)	NCL	NCL	NCL	NA	NCL	NCL	<0.0038	<0.0036	<0.0037	<0.0036	<0.0036	<0.0037	<0.0038	<0.0038	<0.0035	<0.0035	<0.0036	<0.0037	<0.0035
Perfluorohexane sulfonic acid (PFHxS)	NCL	NCL	NCL	NA	NCL	NCL	<0.0038	<0.0036	<0.0037	<0.0036	<0.0036	<0.0037	<0.0038	<0.0038	<0.0035	<0.0035	<0.0036	<0.0037	<0.0035
Perfluorobutanoic acid (PFBA)	NCL	NCL	NCL	NA	NCL	NCL	<0.0038	0.01	0.0074	<0.0036	<0.0036	<0.0037	<0.0038	<0.0038	<0.0035	<0.0035	<0.0036	<0.0037	<0.0035
Perfluorodecanoic acid (PFDA)	NCL	NCL	NCL	NA	NCL	NCL	<0.0038	<0.0036	<0.0037	<0.0036	<0.0036	<0.0037	<0.0038	<0.0038	<0.0035	<0.0035	<0.0036	<0.0037	<0.0035
Perfluorododecanoic acid (PFDoDA)	NCL	NCL	NCL	NA	NCL	NCL	<0.0038	<0.0036	<0.0037	<0.0036	<0.0036	<0.0037	<0.0038	<0.0038	<0.0035	<0.0035	<0.0036	<0.0037	<0.0035
Perfluoroheptanoic acid (PFHpA)	NCL	NCL	NCL	NA	NCL	NCL	<0.0038	<0.0036	<0.0037	<0.0036	<0.0036	<0.0037	<0.0038	<0.0038	<0.0035	<0.0035	<0.0036	<0.0037	<0.0035
Perfluorohexanoic acid (PFHxA)	NCL	NCL	NCL	NA	NCL	NCL	<0.0038	0.0037	<0.0037	<0.0036	<0.0036	<0.0037	<0.0038	<0.0038	<0.0035	<0.0035	<0.0036	<0.0037	<0.0035
Perfluorononanoic acid (PFNA)	NCL	NCL	NCL	NA	NCL	NCL	<0.0038	<0.0036	<0.0037	<0.0036	<0.0036	<0.0037	<0.0038	<0.0038	<0.0035	<0.0035	<0.0036	<0.0037	<0.0035
Perfluorooctanoic acid (PFOA)	0.008	12	ID	NA	NCL	NCL	<0.0019	0.0031	0.0025	<0.0018	<0.0018	0.0023	<0.0019	<0.0019	<0.0018	<0.0017	<0.0018	<0.0018	<0.0018
Perfluorooctane sulfonic acid (PFOS)	0.016	0.012	NLV	NA	NCL	NCL	<0.0038	<0.0036	<0.0037	<0.0036	<0.0036	<0.0037	<0.0038	<0.0038	<0.0035	<0.0035	<0.0036	<0.0037	<0.0035
PFOA + PFOS (Calculated)	NCL	NCL	NCL	0.01	NCL	NCL	ND	0.0031	0.0025	ND	ND	0.0023	ND	ND	ND	ND	ND	ND	ND
Perfluoropentanoic acid (PFPeA)	NCL	NCL	NCL	NA	NCL	NCL	<0.0038	<0.0036	<0.0037	<0.0036	<0.0036	<0.0037	<0.0038	<0.0038	<0.0035	<0.0035	<0.0036	<0.0037	<0.0035
Perfluorotetradecanoic acid (PFTeDA)	NCL	NCL	NCL	NA	NCL	NCL	<0.0038	<0.0036	<0.0037	<0.0036	<0.0036	<0.0037	<0.0038	<0.0038	<0.0035	<0.0035	<0.0036	<0.0037	<0.0035
Perfluorotridecanoic acid (PFTrDA)	NCL	NCL	NCL	NA	NCL	NCL	<0.0038	<0.0036	<0.0037	<0.0036	<0.0036	<0.0037	<0.0038	<0.0038	<0.0035	<0.0035	<0.0036	<0.0037	<0.0035
Perfluoroundecanoic acid (PFUnDA)	NCL	NCL	NCL	NA	NCL	NCL	<0.0038	<0.0036	<0.0037	<0.0036	<0.0036	<0.0037	<0.0038	<0.0038	<0.0035	<0.0035	<0.0036	<0.0037	<0.0035
Total PFAS (Calculated)	NCL	NCL	NCL	NA	NCL	NCL	ND	0.017	0.0099	0.0063	0.0047	0.011	0.0092	0.011	ND	ND	ND	ND	ND

See After Table 6 For Notes

TABLE 6
SUMMARY OF GROUNDWATER SAMPLE ANALYSIS - PFAS (HSDS, 2019)
Area 5
Algoma and Plainfield Townships, Kent County, MI

Sample Location	**Part 201 Generic Residential Groundwater Cleanup Criteria – Drinking Water[2]**	**Part 201 Generic Groundwater Cleanup Criteria – Groundwater Surface Water Interface[2]**	**Part 201 Generic Residential Groundwater Cleanup Criteria – Groundwater Volatilization to Indoor Air Inhalation[2]**	**CD Value[3]**	**EGLE Residential Recommended Volatilization to Indoor Air Interim Action Screening Level - Groundwater[4]**	**U.S. EPA Residential Tap Water Regional Removal Management Levels[5]**	**HS-MW-28E**	**HS-MW-29A**	**HS-MW-29B**	**HS-MW-29C**	**HS-MW-29D**	**HS-MW-30A**	**HS-MW-30A**	**HS-MW-30A**	**HS-MW-30A**	**HS-MW-30B**	**HS-MW-30B**	**HS-MW-30B**	**HS-MW-30C**
Sample Name							**HS-GW-MW-28E**	**HS-GW-MW-29A**	**HS-GW-MW-29B**	**HS-GW-MW-29C**	**HS-GW-MW-29D**	**HS-GW-MW30A**	**HS-GW-MW30A**	**HS-GW-MW-30A**	**HS-GW-MW-30A DUP**	**HS-GW-MW30B**	**HS-GW-MW30B**	**HS-GW-MW-30B**	**HS-GW-MW30C**
Well Screen Interval (Feet below ground surface)							**82.7-87.3**	**3.5-13.5**	**16.8-21.8**	**27.2-32.2**	**37.1-42.1**	**46.9-51.5**	**46.9-51.5**	**46.9-51.5**	**46.9-51.5**	**51.5-56.1**	**51.5-56.1**	**51.5-56.1**	**77.4-82**
Laboratory Sample ID(s)							**UK21036-017**	**UK19008-006**	**UK21036-003**	**UK21036-004**	**UK19008-005**	**UG03026-005**	**UI19006-014**	**UK19008-010**	**UK19008-011**	**UG03026-007**	**UI21016-001**	**UK19008-014**	**UG06001-001**
Sample Date							**11/21/2019**	**11/18/2019**	**11/19/2019**	**11/19/2019**	**11/18/2019**	**07/02/2019**	**09/17/2019**	**11/20/2019**	**11/20/2019**	**07/02/2019**	**09/19/2019**	**11/20/2019**	**07/03/2019**
Parameter (µg/L)																			
8:2 Fluorotelomer sulfonic acid (8:2 FTS)	NCL	NCL	NCL	NA	NCL	NCL	<0.0036	<0.0035	<0.0034	<0.0035	<0.0035	<0.0035	<0.0035	<0.0035	<0.0042	<0.0036	<0.0038	<0.0035	<0.0037
6:2 Fluorotelomer sulfonic acid (6:2 FTS)	NCL	NCL	NCL	NA	NCL	NCL	<0.0036	<0.0035	<0.0034	<0.0035	<0.0035	<0.0035	<0.0035	<0.0035	<0.0042	<0.0036	<0.0038	<0.0035	<0.0037
N-Ethyl perfluorooctane sulfonamide (EtFOSA)	NCL	NCL	NCL	NA	NCL	NCL	<0.0036	<0.0035	<0.0034	<0.0035	<0.0035	<0.0035	<0.0035	<0.0035	<0.0042	<0.0036	<0.0038	<0.0035	<0.0037
N-Methyl perfluorooctane sulfonamide (MeFOSA)	NCL	NCL	NCL	NA	NCL	NCL	<0.0072	<0.007	<0.0069	<0.007	<0.007	<0.0071	<0.0069	<0.0071	<0.0084	<0.0072	<0.0075	<0.007	<0.0074
Perfluorobutane sulfonic acid (PFBS)	NCL	NCL	NCL	NA	NCL	1,200	<0.0036	0.018	0.024	0.011	0.0035	0.0061	0.0068	0.0072	0.0069	0.0071	0.0074	0.0073	0.0057
Perfluorodecane sulfonic acid (PFDS)	NCL	NCL	NCL	NA	NCL	NCL	<0.0036	<0.0035	<0.0034	<0.0035	<0.0035	<0.0035	<0.0035	<0.0035	<0.0042	<0.0036	<0.0038	<0.0035	<0.0037
Perfluoroheptane sulfonic acid (PFHpS)	NCL	NCL	NCL	NA	NCL	NCL	<0.0036	0.01	<0.0034	<0.0035	<0.0035	<0.0035	<0.0035	<0.0035	<0.0042	<0.0036	<0.0038	<0.0035	<0.0037
Perfluorononane sulfonic acid (PFNS)	NCL	NCL	NCL	NA	NCL	NCL	<0.0072	<0.007	<0.0069	<0.007	<0.007	<0.0071	<0.0069	<0.0071	<0.0084	<0.0072	<0.0075	<0.007	<0.0074
Perfluorooctane sulfonamide (FOSA)	NCL	NCL	NCL	NA	NCL	NCL	<0.0036	<0.0035	<0.0034	<0.0035	<0.0035	<0.0035	<0.0035	<0.0035	<0.0042	<0.0036	<0.0038	<0.0035	<0.0037
Perfluoropentane sulfonic acid (PFPeS)	NCL	NCL	NCL	NA	NCL	NCL	<0.0036	0.0056	<0.0034	<0.0035	<0.0035	<0.0035	<0.0035	<0.0035	<0.0042	<0.0036	<0.0038	<0.0035	<0.0037
Perfluorohexane sulfonic acid (PFHxS)	NCL	NCL	NCL	NA	NCL	NCL	<0.0036	0.025	<0.0034	<0.0035	<0.0035	0.0038	<0.0035	<0.0035	<0.0042	0.0038	<0.0038	0.0038	<0.0037
Perfluorobutanoic acid (PFBA)	NCL	NCL	NCL	NA	NCL	NCL	<0.0036	0.01	<0.0034	<0.0035	<0.0035	<0.0035	<0.0035	<0.0035	<0.0042	<0.0036	<0.0038	<0.0035	<0.0037
Perfluorodecanoic acid (PFDA)	NCL	NCL	NCL	NA	NCL	NCL	<0.0036	<0.0035	<0.0034	<0.0035	<0.0035	<0.0035	<0.0035	<0.0035	<0.0042	<0.0036	<0.0038	<0.0035	<0.0037
Perfluorododecanoic acid (PFDoDA)	NCL	NCL	NCL	NA	NCL	NCL	<0.0036	<0.0035	<0.0034	<0.0035	<0.0035	<0.0035	<0.0035	<0.0035	<0.0042	<0.0036	<0.0038	<0.0035	<0.0037
Perfluoroheptanoic acid (PFHpA)	NCL	NCL	NCL	NA	NCL	NCL	<0.0036	0.0064	<0.0034	<0.0035	<0.0035	<0.0035	<0.0035	<0.0035	<0.0042	<0.0036	<0.0038	<0.0035	<0.0037
Perfluorohexanoic acid (PFHxA)	NCL	NCL	NCL	NA	NCL	NCL	<0.0036	0.017	<0.0034	<0.0035	<0.0035	<0.0035	<0.0035	<0.0035	<0.0042	<0.0036	<0.0038	<0.0035	<0.0037
Perfluorononanoic acid (PFNA)	NCL	NCL	NCL	NA	NCL	NCL	<0.0036	<0.0035	<0.0034	<0.0035	<0.0035	<0.0035	<0.0035	<0.0035	<0.0042	<0.0036	<0.0038	<0.0035	<0.0037
Perfluorooctanoic acid (PFOA)	0.008	12	ID	NA	NCL	NCL	<0.0018	***0.036***	<0.0017	<0.0018	<0.0018	0.0033	0.0025	0.003	0.0027	0.0064	0.0035	0.0041	<0.0018
Perfluorooctane sulfonic acid (PFOS)	0.016	0.012	NLV	NA	NCL	NCL	<0.0036	***0.32***	0.004	<0.0035	<0.0035	<0.0035	<0.0035	<0.0035	<0.0042	<0.0036	<0.0038	<0.0035	<0.0037
PFOA + PFOS (Calculated)	NCL	NCL	NCL	0.01	NCL	NCL	ND	***0.36***	0.004	ND	ND	0.0033	0.0025	0.003	0.0027	0.0064	0.0035	0.0041	ND
Perfluoropentanoic acid (PFPeA)	NCL	NCL	NCL	NA	NCL	NCL	<0.0036	0.01	<0.0034	<0.0035	<0.0035	<0.0035	<0.0035	<0.0035	<0.0042	<0.0036	<0.0038	<0.0035	<0.0037
Perfluorotetradecanoic acid (PFTeDA)	NCL	NCL	NCL	NA	NCL	NCL	<0.0036	<0.0035	<0.0034	<0.0035	<0.0035	<0.0035	<0.0035	<0.0035	<0.0042	<0.0036	<0.0038	<0.0035	<0.0037
Perfluorotridecanoic acid (PFTrDA)	NCL	NCL	NCL	NA	NCL	NCL	<0.0036	<0.0035	<0.0034	<0.0035	<0.0035	<0.0035	<0.0035	<0.0035	<0.0042	<0.0036	<0.0038	<0.0035	<0.0037
Perfluoroundecanoic acid (PFUnDA)	NCL	NCL	NCL	NA	NCL	NCL	<0.0036	<0.0035	<0.0034	<0.0035	<0.0035	<0.0035	<0.0035	<0.0035	<0.0042	<0.0036	<0.0038	<0.0035	<0.0037
Total PFAS (Calculated)	NCL	NCL	NCL	NA	NCL	NCL	ND	0.46	0.028	0.011	0.0035	0.013	0.0093	0.01	0.0096	0.017	0.011	0.015	0.0057

TABLE 6
SUMMARY OF GROUNDWATER SAMPLE ANALYSIS - PFAS (HSDS, 2019)
Area 5
Algoma and Plainfield Townships, Kent County, MI

Sample Location	**Part 201 Generic Residential Groundwater Cleanup Criteria – Drinking Water^2**	**Part 201 Generic Groundwater Cleanup Criteria – Groundwater Surface Water Interface^2**	**Part 201 Generic Residential Groundwater Cleanup Criteria – Groundwater Volatilization to Indoor Air Inhalation^2**	**CD Value^3**	**EGLE Residential Recommended Volatilization to Indoor Air Interim Action Screening Level - Groundwater^4**	**U.S. EPA Residential Tap Water Regional Removal Management Levels^5**	**HS-MW-30C**	**HS-MW-30C**	**HS-MW-30D**	**HS-MW-30D**	**HS-MW-30D**	**HS-MW-30E**	**HS-MW-30E**	**HS-MW-30E**	**HS-MW-31A**	**HS-MW-31A**	**HS-MW-31A**	**HS-MW-31B**	**HS-MW-31B**
Sample Name							**HS-GW-MW30C**	**HS-GW-MW-30C**	**HS-GW-MW30D**	**HS-GW-MW30D**	**HS-GW-MW-30D**	**HS-GW-MW30E**	**HS-GW-MW30E**	**HS-GW-MW-30E**	**HS-GW-MW31A**	**HS-GW-MW31A**	**HS-GW-MW-31A**	**HS-GW-MW31B**	**HS-GW-MW31B**
Well Screen Interval (Feet below ground surface)							**77.4-82**	**77.4-82**	**112.7-117.3**	**112.7-117.3**	**112.7-117.3**	**123.2-127.7**	**123.2-127.7**	**123.2-127.7**	**17.1-21.6**	**17.1-21.6**	**17.1-21.6**	**26-30.5**	**26-30.5**
Laboratory Sample ID(s)							**UI19006-015**	**UK21036-026**	**UG03026-008**	**UI21016-002**	**UK21036-024**	**UG03026-006**	**UI19006-016**	**UK21036-025**	**UG03026-003**	**UI13033-001**	**UK21036-006**	**UG03026-001**	**UI13033-004**
Sample Date							**09/17/2019**	**11/22/2019**	**07/02/2019**	**09/19/2019**	**11/22/2019**	**07/02/2019**	**09/17/2019**	**11/22/2019**	**07/01/2019**	**09/12/2019**	**11/19/2019**	**07/01/2019**	**09/12/2019**
Parameter (µg/L)																			
8:2 Fluorotelomer sulfonic acid (8:2 FTS)	NCL	NCL	NCL	NA	NCL	NCL	<0.0035	<0.0034	<0.0036	<0.0035	<0.0036	<0.0037	<0.0034	<0.0038	<0.0035	<0.0035	<0.0036	<0.0036	<0.0037
6:2 Fluorotelomer sulfonic acid (6:2 FTS)	NCL	NCL	NCL	NA	NCL	NCL	<0.0035	<0.0034	<0.0036	<0.0035	<0.0036	<0.0037	0.0047	<0.0038	<0.0035	<0.0035	<0.0036	<0.0036	<0.0037
N-Ethyl perfluorooctane sulfonamide (EtFOSA)	NCL	NCL	NCL	NA	NCL	NCL	<0.0035	<0.0034	<0.0036	<0.0035	<0.0036	<0.0037	<0.0034	<0.0038	<0.0035	<0.0035	<0.0036	<0.0036	<0.0037
N-Methyl perfluorooctane sulfonamide (MeFOSA)	NCL	NCL	NCL	NA	NCL	NCL	<0.0069	<0.0069	<0.0071	<0.007	<0.0071	<0.0074	<0.0069	<0.0077	<0.007	<0.007	<0.0073	<0.0073	<0.0075
Perfluorobutane sulfonic acid (PFBS)	NCL	NCL	NCL	NA	NCL	1,200	0.0055	0.0055	0.0048	0.0053	0.0056	0.0055	0.0063	0.0059	0.011	0.0055	0.0068	0.014	0.012
Perfluorodecane sulfonic acid (PFDS)	NCL	NCL	NCL	NA	NCL	NCL	<0.0035	<0.0034	<0.0036	<0.0035	<0.0036	<0.0037	<0.0034	<0.0038	<0.0035	<0.0035	<0.0036	<0.0036	<0.0037
Perfluoroheptane sulfonic acid (PFHpS)	NCL	NCL	NCL	NA	NCL	NCL	<0.0035	<0.0034	<0.0036	<0.0035	<0.0036	<0.0037	<0.0034	<0.0038	<0.0035	<0.0035	<0.0036	<0.0036	<0.0037
Perfluorononane sulfonic acid (PFNS)	NCL	NCL	NCL	NA	NCL	NCL	<0.0069	<0.0069	<0.0071	<0.007	<0.0071	<0.0074	<0.0069	<0.0077	<0.007	<0.007	<0.0073	<0.0073	<0.0075
Perfluorooctane sulfonamide (FOSA)	NCL	NCL	NCL	NA	NCL	NCL	<0.0035	<0.0034	<0.0036	<0.0035	<0.0036	<0.0037	<0.0034	<0.0038	<0.0035	<0.0035	<0.0036	<0.0036	<0.0037
Perfluoropentane sulfonic acid (PFPeS)	NCL	NCL	NCL	NA	NCL	NCL	<0.0035	<0.0034	<0.0036	<0.0035	<0.0036	<0.0037	<0.0034	<0.0038	<0.0035	<0.0035	<0.0036	0.0041	0.0049
Perfluorohexane sulfonic acid (PFHxS)	NCL	NCL	NCL	NA	NCL	NCL	<0.0035	<0.0034	<0.0036	<0.0035	<0.0036	<0.0037	<0.0034	<0.0038	0.0071	0.0075	0.0053	0.011	0.011
Perfluorobutanoic acid (PFBA)	NCL	NCL	NCL	NA	NCL	NCL	<0.0035	<0.0034	<0.0036	<0.0035	<0.0036	<0.0037	<0.0034	<0.0038	<0.0035	<0.0035	<0.0036	0.006	0.0042
Perfluorodecanoic acid (PFDA)	NCL	NCL	NCL	NA	NCL	NCL	<0.0035	<0.0034	<0.0036	<0.0035	<0.0036	<0.0037	<0.0034	<0.0038	<0.0035	<0.0035	<0.0036	<0.0036	<0.0037
Perfluorododecanoic acid (PFDoDA)	NCL	NCL	NCL	NA	NCL	NCL	<0.0035	<0.0034	<0.0036	<0.0035	<0.0036	<0.0037	<0.0034	<0.0038	<0.0035	<0.0035	<0.0036	<0.0036	<0.0037
Perfluoroheptanoic acid (PFHpA)	NCL	NCL	NCL	NA	NCL	NCL	<0.0035	<0.0034	<0.0036	<0.0035	<0.0036	<0.0037	<0.0034	<0.0038	<0.0035	<0.0035	<0.0036	0.0038	<0.0037
Perfluorohexanoic acid (PFHxA)	NCL	NCL	NCL	NA	NCL	NCL	<0.0035	<0.0034	<0.0036	<0.0035	<0.0036	<0.0037	<0.0034	<0.0038	<0.0035	<0.0035	0.0043	0.0056	0.0082
Perfluorononanoic acid (PFNA)	NCL	NCL	NCL	NA	NCL	NCL	<0.0035	<0.0034	<0.0036	<0.0035	<0.0036	<0.0037	<0.0034	<0.0038	<0.0035	<0.0035	<0.0036	<0.0036	<0.0037
Perfluorooctanoic acid (PFOA)	0.008	12	ID	NA	NCL	NCL	<0.0017	<0.0017	<0.0018	<0.0018	<0.0018	<0.0018	<0.0017	<0.0019	0.0035	0.0038	0.0032	***0.022***	***0.012***
Perfluorooctane sulfonic acid (PFOS)	0.016	0.012	NLV	NA	NCL	NCL	<0.0035	<0.0034	<0.0036	<0.0035	<0.0036	<0.0037	<0.0034	<0.0038	<0.0035	<0.0035	<0.0036	0.0059	0.005
PFOA + PFOS (Calculated)	NCL	NCL	NCL	0.01	NCL	NCL	ND	ND	ND	ND	ND	ND	ND	ND	0.0035	0.0038	0.0032	***0.028***	***0.017***
Perfluoropentanoic acid (PFPeA)	NCL	NCL	NCL	NA	NCL	NCL	<0.0035	<0.0034	<0.0036	<0.0035	<0.0036	<0.0037	<0.0034	<0.0038	<0.0035	<0.0035	<0.0036	0.0051	0.0059
Perfluorotetradecanoic acid (PFTeDA)	NCL	NCL	NCL	NA	NCL	NCL	<0.0035	<0.0034	<0.0036	<0.0035	<0.0036	<0.0037	<0.0034	<0.0038	<0.0035	<0.0035	<0.0036	<0.0036	<0.0037
Perfluorotridecanoic acid (PFTrDA)	NCL	NCL	NCL	NA	NCL	NCL	<0.0035	<0.0034	<0.0036	<0.0035	<0.0036	<0.0037	<0.0034	<0.0038	<0.0035	<0.0035	<0.0036	<0.0036	<0.0037
Perfluoroundecanoic acid (PFUnDA)	NCL	NCL	NCL	NA	NCL	NCL	<0.0035	<0.0034	<0.0036	<0.0035	<0.0036	<0.0037	<0.0034	<0.0038	<0.0035	<0.0035	<0.0036	<0.0036	<0.0037
Total PFAS (Calculated)	NCL	NCL	NCL	NA	NCL	NCL	0.0055	0.0055	0.0048	0.0053	0.0056	0.0055	0.011	0.0059	0.022	0.017	0.02	0.078	0.063

TABLE 6
SUMMARY OF GROUNDWATER SAMPLE ANALYSIS - PFAS (HSDS, 2019)
Area 5
Algoma and Plainfield Townships, Kent County, MI

Sample Location	Part 201 Generic Residential Groundwater Cleanup Criteria – Drinking Water[2]	Part 201 Generic Groundwater Cleanup Criteria – Groundwater Surface Water Interface[2]	Part 201 Generic Residential Groundwater Cleanup Criteria – Groundwater Volatilization to Indoor Air Inhalation[2]	CD Value[3]	EGLE Residential Recommended Volatilization to Indoor Air Interim Action Screening Level - Groundwater[4]	U.S. EPA Residential Tap Water Regional Removal Management Levels[5]	**HS-MW-31B**	**HS-MW-31C**	**HS-MW-31C**	**HS-MW-31C**	**HS-MW-31D**	**HS-MW-31D**	**HS-MW-31D**	**HS-MW-31E**	**HS-MW-31E**	**HS-MW-31E**	**HS-MW-31E**	**HS-MW-32A**	**HS-MW-32A**
Sample Name							**HS-GW-MW-31B**	**HS-GW-MW31C**	**HS-GW-MW31C**	**HS-GW-MW-31C**	**HS-GW-MW31D**	**HS-GW-MW31D**	**HS-GW-MW-31D**	**HS-GW-MW31E**	**HS-GW-MW31E DUP**	**HS-GW-MW31E**	**HS-GW-MW-31E**	**HS-GW-MW32A**	**HS-GW-MW32A**
Well Screen Interval (Feet below ground surface)							**26-30.5**	**41.3-45.8**	**41.3-45.8**	**41.3-45.8**	**48.8-53.4**	**48.8-53.4**	**48.8-53.4**	**64.1-68.7**	**64.1-68.7**	**64.1-68.7**	**64.1-68.7**	**60.9-65.5**	**60.9-65.5**
Laboratory Sample ID(s)							**UK19008-013**	**UG03026-004**	**UI13033-003**	**UK21036-007**	**UG03026-002**	**UI13033-002**	**UK21036-027**	**UG06001-002**	**UG06001-003**	**UI13033-005**	**UK19008-009**	**UE25011-005**	**UI07020-001**
Sample Date							**11/20/2019**	**07/01/2019**	**09/12/2019**	**11/19/2019**	**07/01/2019**	**09/12/2019**	**11/22/2019**	**07/03/2019**	**07/03/2019**	**09/12/2019**	**11/20/2019**	**05/24/2019**	**09/06/2019**
Parameter (µg/L)																			
8:2 Fluorotelomer sulfonic acid (8:2 FTS)	NCL	NCL	NCL	NA	NCL	NCL	<0.0037	<0.0037	<0.0035	<0.0036	<0.0036	<0.0034	<0.0037	<0.0037	<0.0036	<0.0034	<0.0035	<0.0036	<0.0037
6:2 Fluorotelomer sulfonic acid (6:2 FTS)	NCL	NCL	NCL	NA	NCL	NCL	<0.0037	<0.0037	<0.0035	<0.0036	<0.0036	<0.0034	<0.0037	<0.0037	<0.0036	<0.0034	<0.0035	<0.0036	<0.0037
N-Ethyl perfluorooctane sulfonamide (EtFOSA)	NCL	NCL	NCL	NA	NCL	NCL	<0.0037	<0.0037	<0.0035	<0.0036	<0.0036	<0.0034	<0.0037	<0.0037	<0.0036	<0.0034	<0.0035	<0.0036	<0.0037
N-Methyl perfluorooctane sulfonamide (MeFOSA)	NCL	NCL	NCL	NA	NCL	NCL	<0.0073	<0.0075	<0.007	<0.0073	<0.0072	<0.0069	<0.0075	<0.0075	<0.0072	<0.0068	<0.007	<0.0073	<0.0074
Perfluorobutane sulfonic acid (PFBS)	NCL	NCL	NCL	NA	NCL	1,200	0.012	0.018	0.016	0.015	0.012	0.011	0.0076	<0.0037	<0.0036	<0.0034	<0.0035	<0.0036	<0.0037
Perfluorodecane sulfonic acid (PFDS)	NCL	NCL	NCL	NA	NCL	NCL	<0.0037	<0.0037	<0.0035	<0.0036	<0.0036	<0.0034	<0.0037	<0.0037	<0.0036	<0.0034	<0.0035	<0.0036	<0.0037
Perfluoroheptane sulfonic acid (PFHpS)	NCL	NCL	NCL	NA	NCL	NCL	<0.0037	<0.0037	<0.0035	<0.0036	<0.0036	<0.0034	<0.0037	<0.0037	<0.0036	<0.0034	<0.0035	<0.0036	<0.0037
Perfluorononane sulfonic acid (PFNS)	NCL	NCL	NCL	NA	NCL	NCL	<0.0073	<0.0075	<0.007	<0.0073	<0.0072	<0.0069	<0.0075	<0.0075	<0.0072	<0.0068	<0.007	<0.0073	<0.0074
Perfluorooctane sulfonamide (FOSA)	NCL	NCL	NCL	NA	NCL	NCL	<0.0037	<0.0037	<0.0035	<0.0036	<0.0036	<0.0034	<0.0037	<0.0037	<0.0036	<0.0034	<0.0035	<0.0036	<0.0037
Perfluoropentane sulfonic acid (PFPeS)	NCL	NCL	NCL	NA	NCL	NCL	0.0043	0.005	0.0052	0.0048	<0.0036	0.0035	<0.0037	<0.0037	<0.0036	<0.0034	<0.0035	<0.0036	<0.0037
Perfluorohexane sulfonic acid (PFHxS)	NCL	NCL	NCL	NA	NCL	NCL	0.013	0.011	0.0095	0.01	0.0082	0.0069	0.0053	<0.0037	<0.0036	<0.0034	<0.0035	<0.0036	<0.0037
Perfluorobutanoic acid (PFBA)	NCL	NCL	NCL	NA	NCL	NCL	0.0072	0.0051	0.0048	0.0047	0.0042	0.0035	<0.0037	<0.0037	<0.0036	<0.0034	<0.0035	<0.0036	<0.0037
Perfluorodecanoic acid (PFDA)	NCL	NCL	NCL	NA	NCL	NCL	<0.0037	<0.0037	<0.0035	<0.0036	<0.0036	<0.0034	<0.0037	<0.0037	<0.0036	<0.0034	<0.0035	<0.0036	<0.0037
Perfluorododecanoic acid (PFDoDA)	NCL	NCL	NCL	NA	NCL	NCL	<0.0037	<0.0037	<0.0035	<0.0036	<0.0036	<0.0034	<0.0037	<0.0037	<0.0036	<0.0034	<0.0035	<0.0036	<0.0037
Perfluoroheptanoic acid (PFHpA)	NCL	NCL	NCL	NA	NCL	NCL	0.018	<0.0037	<0.0035	<0.0036	0.0037	0.0038	<0.0037	<0.0037	<0.0036	<0.0034	<0.0035	<0.0036	<0.0037
Perfluorohexanoic acid (PFHxA)	NCL	NCL	NCL	NA	NCL	NCL	0.017	0.006	0.0063	0.0073	0.0074	0.0064	0.0041	<0.0037	<0.0036	<0.0034	<0.0035	<0.0036	<0.0037
Perfluorononanoic acid (PFNA)	NCL	NCL	NCL	NA	NCL	NCL	<0.0037	<0.0037	<0.0035	<0.0036	<0.0036	<0.0034	<0.0037	<0.0037	<0.0036	<0.0034	<0.0035	<0.0036	<0.0037
Perfluorooctanoic acid (PFOA)	0.008	12	ID	NA	NCL	NCL	***0.052***	***0.01***	***0.0086***	0.0079	0.0073	0.0075	0.0074	<0.0019	<0.0018	<0.0017	<0.0018	<0.0018	<0.0019
Perfluorooctane sulfonic acid (PFOS)	0.016	0.012	NLV	NA	NCL	NCL	***0.014***	0.0077	0.0059	0.0052	0.0044	0.0053	0.007	<0.0037	<0.0036	<0.0034	<0.0035	<0.0036	<0.0037
PFOA + PFOS (Calculated)	NCL	NCL	NCL	0.01	NCL	NCL	***0.066***	***0.018***	***0.015***	***0.013***	***0.012***	***0.013***	***0.014***	ND	ND	ND	ND	ND	ND
Perfluoropentanoic acid (PFPeA)	NCL	NCL	NCL	NA	NCL	NCL	0.014	0.004	0.0045	0.0057	0.006	0.0048	<0.0037	<0.0037	<0.0036	<0.0034	<0.0035	<0.0036	<0.0037
Perfluorotetradecanoic acid (PFTeDA)	NCL	NCL	NCL	NA	NCL	NCL	<0.0037	<0.0037	<0.0035	<0.0036	<0.0036	<0.0034	<0.0037	<0.0037	<0.0036	<0.0034	<0.0035	<0.0036	<0.0037
Perfluorotridecanoic acid (PFTrDA)	NCL	NCL	NCL	NA	NCL	NCL	<0.0037	<0.0037	<0.0035	<0.0036	<0.0036	<0.0034	<0.0037	<0.0037	<0.0036	<0.0034	<0.0035	<0.0036	<0.0037
Perfluoroundecanoic acid (PFUnDA)	NCL	NCL	NCL	NA	NCL	NCL	<0.0037	<0.0037	<0.0035	<0.0036	<0.0036	<0.0034	<0.0037	<0.0037	<0.0036	<0.0034	<0.0035	<0.0036	<0.0037
Total PFAS (Calculated)	NCL	NCL	NCL	NA	NCL	NCL	0.15	0.067	0.061	0.061	0.053	0.053	0.031	ND	ND	ND	ND	ND	ND

TABLE 6
SUMMARY OF GROUNDWATER SAMPLE ANALYSIS - PFAS (HSDS, 2019)
Area 5
Algoma and Plainfield Townships, Kent County, MI

Sample Location	**Part 201 Generic Residential Groundwater Cleanup Criteria – Drinking Water[2]**	**Part 201 Generic Groundwater Cleanup Criteria – Groundwater Surface Water Interface[2]**	**Part 201 Generic Residential Groundwater Cleanup Criteria – Groundwater Volatilization to Indoor Air Inhalation[2]**	**CD Value[3]**	**EGLE Residential Recommended Volatilization to Indoor Air Interim Action Screening Level - Groundwater[4]**	**U.S. EPA Residential Tap Water Regional Removal Management Levels[5]**	**HS-MW-32A**	**HS-MW-32B**	**HS-MW-32B**	**HS-MW-32B**	**HS-MW-32C**	**HS-MW-32C**	**HS-MW-32C**	**HS-MW-32D**	**HS-MW-32D**	**HS-MW-32D**
Sample Name							**HS-GW-MW-32A**	**HS-GW-MW32B**	**HS-GW-MW32B**	**HS-GW-MW-32B**	**HS-GW-MW32C**	**HS-GW-MW32C**	**HS-GW-MW-32C**	**HS-GW-MW32D**	**HS-GW-MW32D**	**HS-GW-MW-32D**
Well Screen Interval (Feet below ground surface)							**60.9-65.5**	**79.1-83.7**	**79.1-83.7**	**79.1-83.7**	**108.8-113.4**	**108.8-113.4**	**108.8-113.4**	**142.3-146.9**	**142.3-146.9**	**142.3-146.9**
Laboratory Sample ID(s)							**UK29008-003**	**UE25011-006**	**UI07020-003**	**UK29008-004**	**UE25011-007**	**UI07020-002**	**UK29008-005**	**UE25011-008**	**UI07020-004**	**UK29008-006**
Sample Date							**11/26/2019**	**05/24/2019**	**09/06/2019**	**11/26/2019**	**05/24/2019**	**09/06/2019**	**11/26/2019**	**05/24/2019**	**09/06/2019**	**11/26/2019**
Parameter (µg/L)																
8:2 Fluorotelomer sulfonic acid (8:2 FTS)	NCL	NCL	NCL	NA	NCL	NCL	<0.0034	<0.0037	<0.0035	<0.0035	<0.0038	<0.0036	<0.0037	<0.0037	<0.0035	<0.0035
6:2 Fluorotelomer sulfonic acid (6:2 FTS)	NCL	NCL	NCL	NA	NCL	NCL	<0.0034	<0.0037	<0.0035	<0.0035	<0.0038	<0.0036	<0.0037	<0.0037	<0.0035	<0.0035
N-Ethyl perfluorooctane sulfonamide (EtFOSA)	NCL	NCL	NCL	NA	NCL	NCL	<0.0034	<0.0037	<0.0035	<0.0035	<0.0038	<0.0036	<0.0037	<0.0037	<0.0035	<0.0035
N-Methyl perfluorooctane sulfonamide (MeFOSA)	NCL	NCL	NCL	NA	NCL	NCL	<0.0068	<0.0074	<0.0069	<0.0069	<0.0076	<0.0071	<0.0074	<0.0074	<0.0069	<0.0071
Perfluorobutane sulfonic acid (PFBS)	NCL	NCL	NCL	NA	NCL	1,200	<0.0034	<0.0037	<0.0035	<0.0035	<0.0038	<0.0036	<0.0037	<0.0037	<0.0035	<0.0035
Perfluorodecane sulfonic acid (PFDS)	NCL	NCL	NCL	NA	NCL	NCL	<0.0034	<0.0037	<0.0035	<0.0035	<0.0038	<0.0036	<0.0037	<0.0037	<0.0035	<0.0035
Perfluoroheptane sulfonic acid (PFHpS)	NCL	NCL	NCL	NA	NCL	NCL	<0.0034	<0.0037	<0.0035	<0.0035	<0.0038	<0.0036	<0.0037	<0.0037	<0.0035	<0.0035
Perfluorononane sulfonic acid (PFNS)	NCL	NCL	NCL	NA	NCL	NCL	<0.0068	<0.0074	<0.0069	<0.0069	<0.0076	<0.0071	<0.0074	<0.0074	<0.0069	<0.0071
Perfluorooctane sulfonamide (FOSA)	NCL	NCL	NCL	NA	NCL	NCL	<0.0034	<0.0037	<0.0035	<0.0035	<0.0038	<0.0036	<0.0037	<0.0037	<0.0035	<0.0035
Perfluoropentane sulfonic acid (PFPeS)	NCL	NCL	NCL	NA	NCL	NCL	<0.0034	<0.0037	<0.0035	<0.0035	<0.0038	<0.0036	<0.0037	<0.0037	<0.0035	<0.0035
Perfluorohexane sulfonic acid (PFHxS)	NCL	NCL	NCL	NA	NCL	NCL	<0.0034	<0.0037	<0.0035	<0.0035	<0.0038	<0.0036	<0.0037	<0.0037	<0.0035	<0.0035
Perfluorobutanoic acid (PFBA)	NCL	NCL	NCL	NA	NCL	NCL	<0.0034	<0.0037	<0.0035	<0.0035	<0.0038	<0.0036	<0.0037	<0.0037	0.0044	<0.0035
Perfluorodecanoic acid (PFDA)	NCL	NCL	NCL	NA	NCL	NCL	<0.0034	<0.0037	<0.0035	<0.0035	<0.0038	<0.0036	<0.0037	<0.0037	<0.0035	<0.0035
Perfluorododecanoic acid (PFDoDA)	NCL	NCL	NCL	NA	NCL	NCL	<0.0034	<0.0037	<0.0035	<0.0035	<0.0038	<0.0036	<0.0037	<0.0037	<0.0035	<0.0035
Perfluoroheptanoic acid (PFHpA)	NCL	NCL	NCL	NA	NCL	NCL	<0.0034	<0.0037	<0.0035	<0.0035	<0.0038	<0.0036	<0.0037	<0.0037	<0.0035	<0.0035
Perfluorohexanoic acid (PFHxA)	NCL	NCL	NCL	NA	NCL	NCL	<0.0034	<0.0037	<0.0035	<0.0035	<0.0038	<0.0036	<0.0037	<0.0037	<0.0035	<0.0035
Perfluorononanoic acid (PFNA)	NCL	NCL	NCL	NA	NCL	NCL	<0.0034	<0.0037	<0.0035	<0.0035	<0.0038	<0.0036	<0.0037	<0.0037	<0.0035	<0.0035
Perfluorooctanoic acid (PFOA)	0.008	12	ID	NA	NCL	NCL	<0.0017	<0.0018	<0.0017	<0.0017	<0.0019	<0.0018	<0.0019	<0.0018	<0.0017	<0.0018
Perfluorooctane sulfonic acid (PFOS)	0.016	0.012	NLV	NA	NCL	NCL	<0.0034	<0.0037	<0.0035	<0.0035	<0.0038	<0.0036	<0.0037	<0.0037	<0.0035	<0.0035
PFOA + PFOS (Calculated)	NCL	NCL	NCL	0.01	NCL	NCL	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Perfluoropentanoic acid (PFPeA)	NCL	NCL	NCL	NA	NCL	NCL	<0.0034	<0.0037	<0.0035	<0.0035	<0.0038	<0.0036	<0.0037	<0.0037	<0.0035	<0.0035
Perfluorotetradecanoic acid (PFTeDA)	NCL	NCL	NCL	NA	NCL	NCL	<0.0034	<0.0037	<0.0035	<0.0035	<0.0038	<0.0036	<0.0037	<0.0037	<0.0035	<0.0035
Perfluorotridecanoic acid (PFTrDA)	NCL	NCL	NCL	NA	NCL	NCL	<0.0034	<0.0037	<0.0035	<0.0035	<0.0038	<0.0036	<0.0037	<0.0037	<0.0035	<0.0035
Perfluoroundecanoic acid (PFUnDA)	NCL	NCL	NCL	NA	NCL	NCL	<0.0034	<0.0037	<0.0035	<0.0035	<0.0038	<0.0036	<0.0037	<0.0037	<0.0035	<0.0035
Total PFAS (Calculated)	NCL	NCL	NCL	NA	NCL	NCL	ND	ND	ND	ND	ND	ND	ND	ND	0.0044	ND

TABLE 6 NOTES

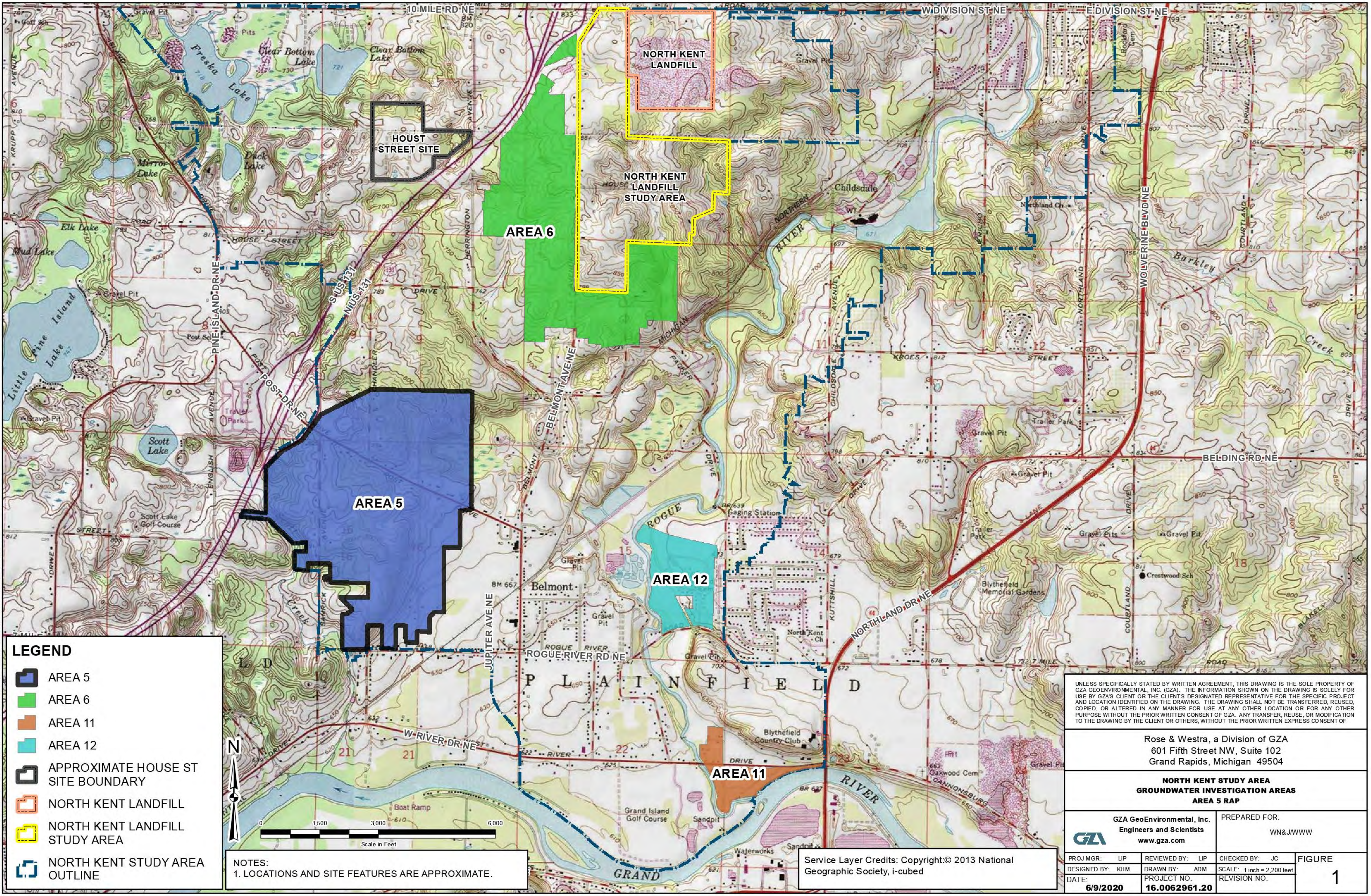
Area 5

Algoma and Plainfield Townships, Kent County, MI

NOTES:

1. Concentration and criteria units are micrograms per Liter (µg/L) or parts per billion (ppb). Calculated criteria and concentrations are rounded to two significant digits. "ND" indicates the parameters used in the calculation were not detected.
   "NC" indicates not calculated.
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 revised August 3, 2020.
   Abbreviations Include:
   "ID" indicates insufficient data to develop criterion.
   "NCL" indicates no criterion listed in EGLE Table 1.
3. "CD Value" refers to the PFOA+PFOS value of 0.01 µg/L in the Consent Decree.
4. EGLE Residential Groundwater Recommended Volatilization to Indoor Air Interim Action Screening Levels (RIASLs) for were based on EGLE's Toxics Steering Group's "Media-Specific Interim Action Screening Levels," published in August 2017.
   The EGLE published the RIASLs in August 2017, and recently removed the RIASLs from the EGLE website. The EGLE is reportedly evaluating the RIASLs for appropriate use and applicability. These are included for reference.
   Abbreviations Include:
   "NCL" indicates no value listed in the Media-Specific Interim Action Screening Levels table.
5. U.S. EPA Residential Tap Water Regional Removal Management Levels (RMLs) were based on "Generic RML Tables," updated November 2018.
6. Bold, italic number with thick line border or italic parameter name indicates that parameter was detected above the Michigan Part 201 Groundwater Cleanup Criteria, Media-Specific Interim Action Screening Levels, MCL, or CD Value.
   U.S. EPA RMLs are provided for reference only and results detected above the EPA RMLs are not bolded or italicized.
7. Abbreviations include:
   "< RL" indicates the parameter was analyzed for but not detected above the method detection limit; RL = Reporting Limit.
   "DUP" indicates a duplicate sample.
8. Sample names presented are from Shealy Environmental Services, Inc. laboratory reports. Sample names presented in ALS Environmental lab reports may have minor differences based on laboratory interpretation of the chains of custody.
9. Well screen interval presented is the top of the well screen to the bottom of the well screen in feet below ground surface.

FIGURES



LEGEND

🟦 AREA 5

🟩 AREA 6

🟧 AREA 11

🟦 AREA 12

☐ APPROXIMATE HOUSE ST SITE BOUNDARY

☐ NORTH KENT LANDFILL

☐ NORTH KENT LANDFILL STUDY AREA

☐ NORTH KENT STUDY AREA OUTLINE

NOTES:
1. LOCATIONS AND SITE FEATURES ARE APPROXIMATE.

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NORTH KENT STUDY AREA
GROUNDWATER INVESTIGATION AREAS
AREA 5 RAP

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Engineers and Scientists
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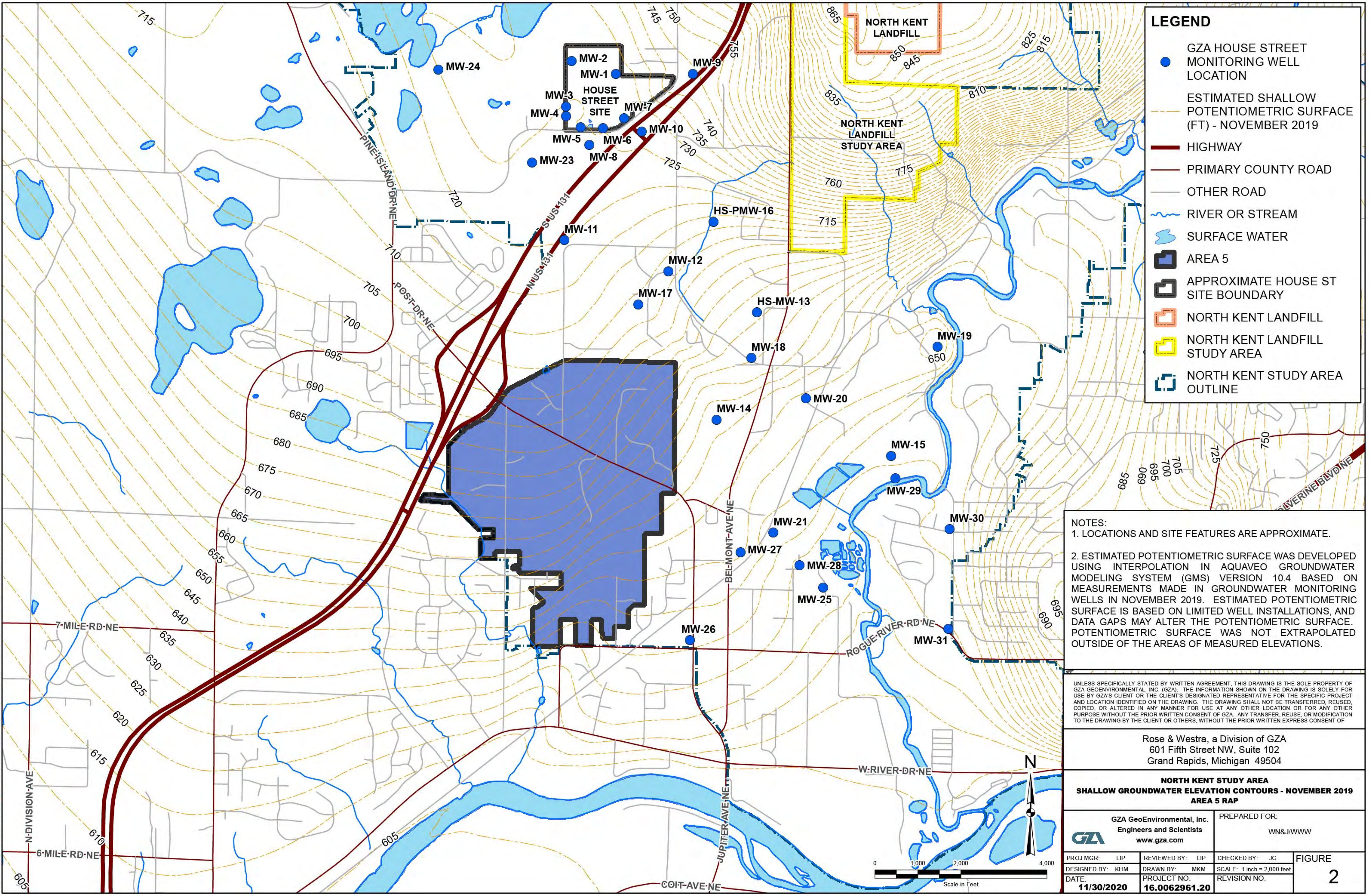
PREPARED FOR:
WN&J/WWW

PROJ MGR: LIP	REVIEWED BY: LIP	CHECKED BY: JC	FIGURE
DESIGNED BY: KHM	DRAWN BY: ADM	SCALE: 1 inch = 2,200 feet	1
DATE: 6/9/2020	PROJECT NO. 16.0062961.20	REVISION NO.	



LEGEND

●	GZA HOUSE STREET MONITORING WELL LOCATION
- - -	ESTIMATED SHALLOW POTENTIOMETRIC SURFACE (FT) - NOVEMBER 2019
━	HIGHWAY
─	PRIMARY COUNTY ROAD
─	OTHER ROAD
~	RIVER OR STREAM
▨	SURFACE WATER
■	AREA 5
☐	APPROXIMATE HOUSE ST SITE BOUNDARY
☐	NORTH KENT LANDFILL
☐	NORTH KENT LANDFILL STUDY AREA
☐	NORTH KENT STUDY AREA OUTLINE

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.

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SHALLOW GROUNDWATER ELEVATION CONTOURS - NOVEMBER 2019
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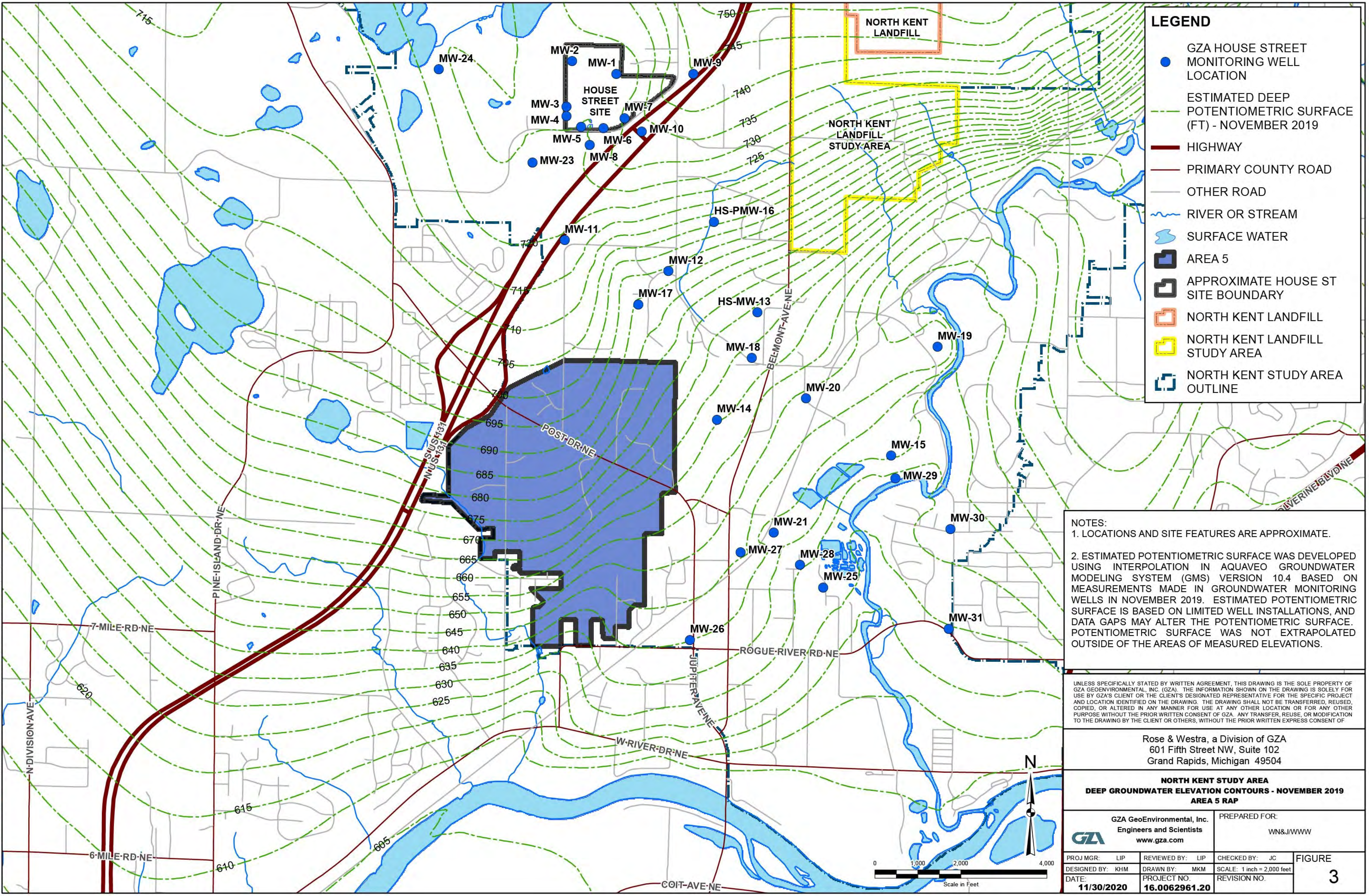
PROJ MGR: LIP
REVIEWED BY: LIP
CHECKED BY: JC
DESIGNED BY: KHM
DRAWN BY: MKM
SCALE: 1 inch = 2,000 feet
DATE: **11/30/2020**
PROJECT NO. **16.0062961.20**
REVISION NO.
FIGURE 2



LEGEND

- ● GZA HOUSE STREET MONITORING WELL LOCATION
- ESTIMATED DEEP POTENTIOMETRIC SURFACE (FT) - NOVEMBER 2019
- HIGHWAY
- PRIMARY COUNTY ROAD
- OTHER ROAD
- RIVER OR STREAM
- SURFACE WATER
- AREA 5
- APPROXIMATE HOUSE ST SITE BOUNDARY
- NORTH KENT LANDFILL
- NORTH KENT LANDFILL STUDY AREA
- NORTH KENT STUDY AREA OUTLINE

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.

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NORTH KENT STUDY AREA
DEEP GROUNDWATER ELEVATION CONTOURS - NOVEMBER 2019
AREA 5 RAP

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PROJ MGR: LIP	REVIEWED BY: LIP	CHECKED BY: JC	FIGURE 3
DESIGNED BY: KHM	DRAWN BY: MKM	SCALE: 1 inch = 2,000 feet	
DATE: **11/30/2020**	PROJECT NO. **16.0062961.20**	REVISION NO.	

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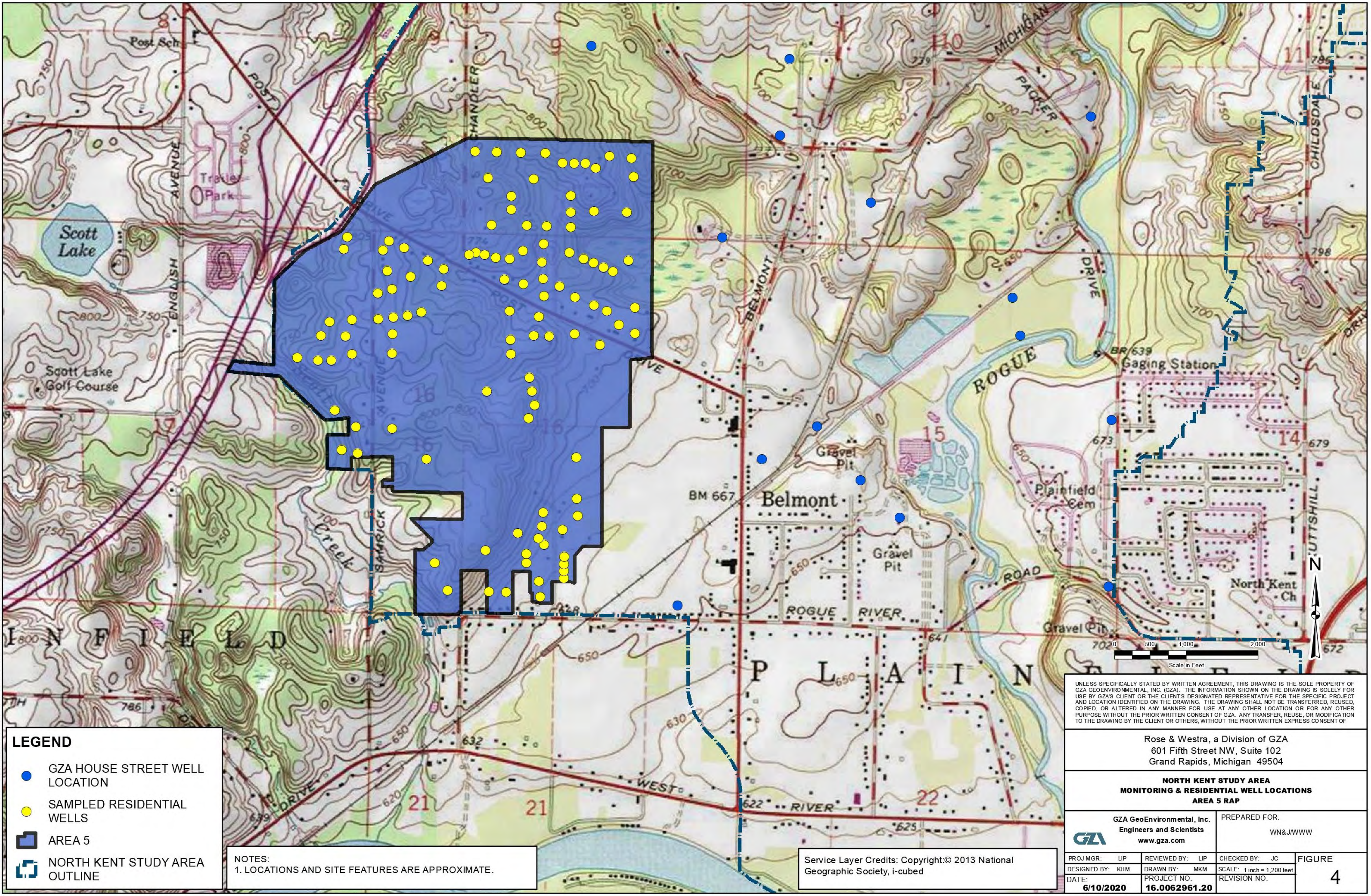

LEGEND

- ● GZA HOUSE STREET WELL LOCATION
- ● SAMPLED RESIDENTIAL WELLS
- ▨ AREA 5
- ⌜⌟ NORTH KENT STUDY AREA OUTLINE

NOTES:
1. LOCATIONS AND SITE FEATURES ARE APPROXIMATE.

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MONITORING & RESIDENTIAL WELL LOCATIONS
AREA 5 RAP

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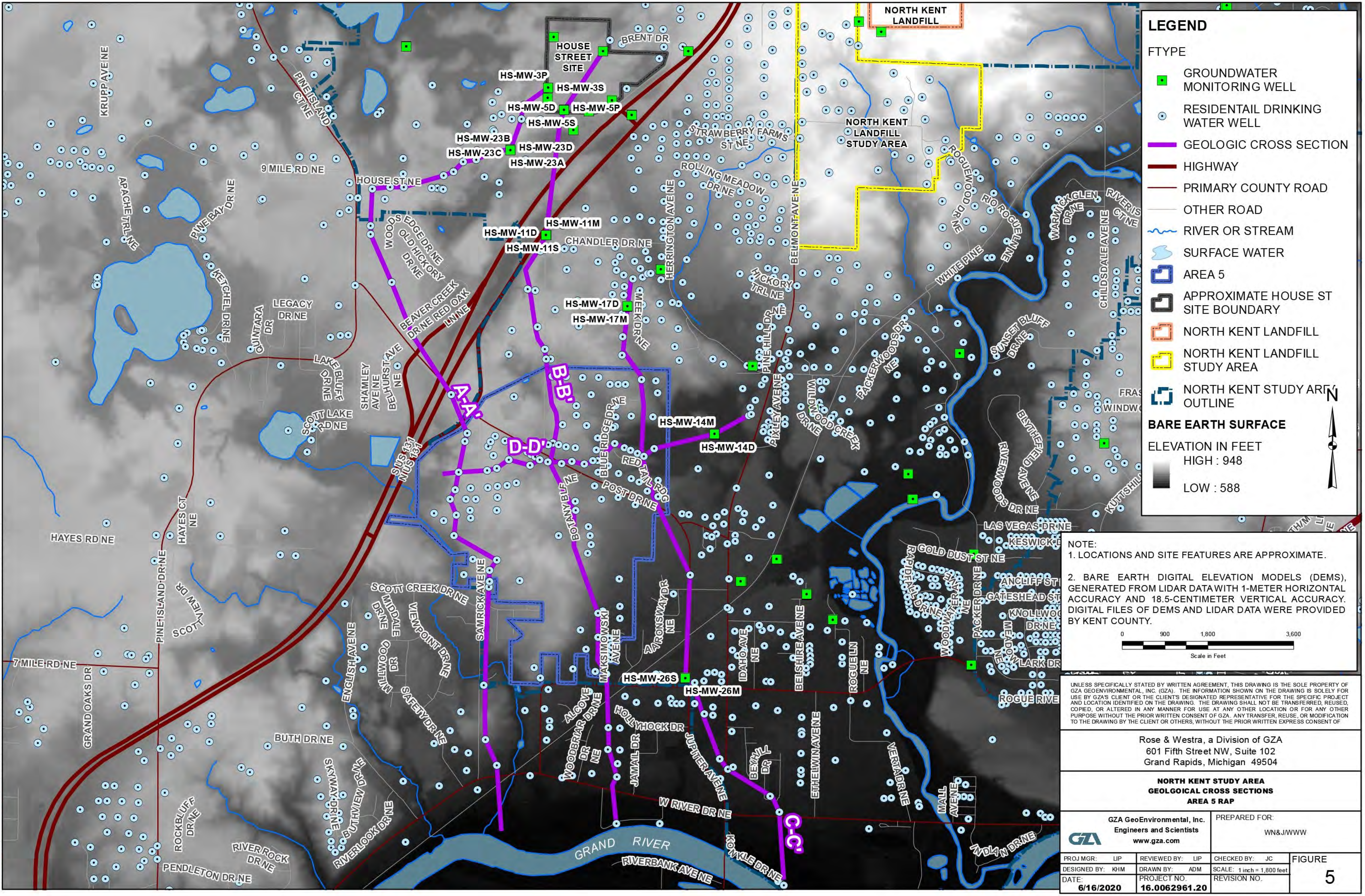
PROJ MGR: LIP	REVIEWED BY: LIP	CHECKED BY: JC	FIGURE
DESIGNED BY: KHM	DRAWN BY: MKM	SCALE: 1 inch = 1,200 feet	4
DATE: **6/10/2020**	PROJECT NO. **16.0062961.20**	REVISION NO.	



NOTE:
1. LOCATIONS AND SITE FEATURES ARE APPROXIMATE.

2. 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.

0 900 1,800 3,600

Scale in Feet

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NORTH KENT STUDY AREA
GEOLGOICAL CROSS SECTIONS
AREA 5 RAP

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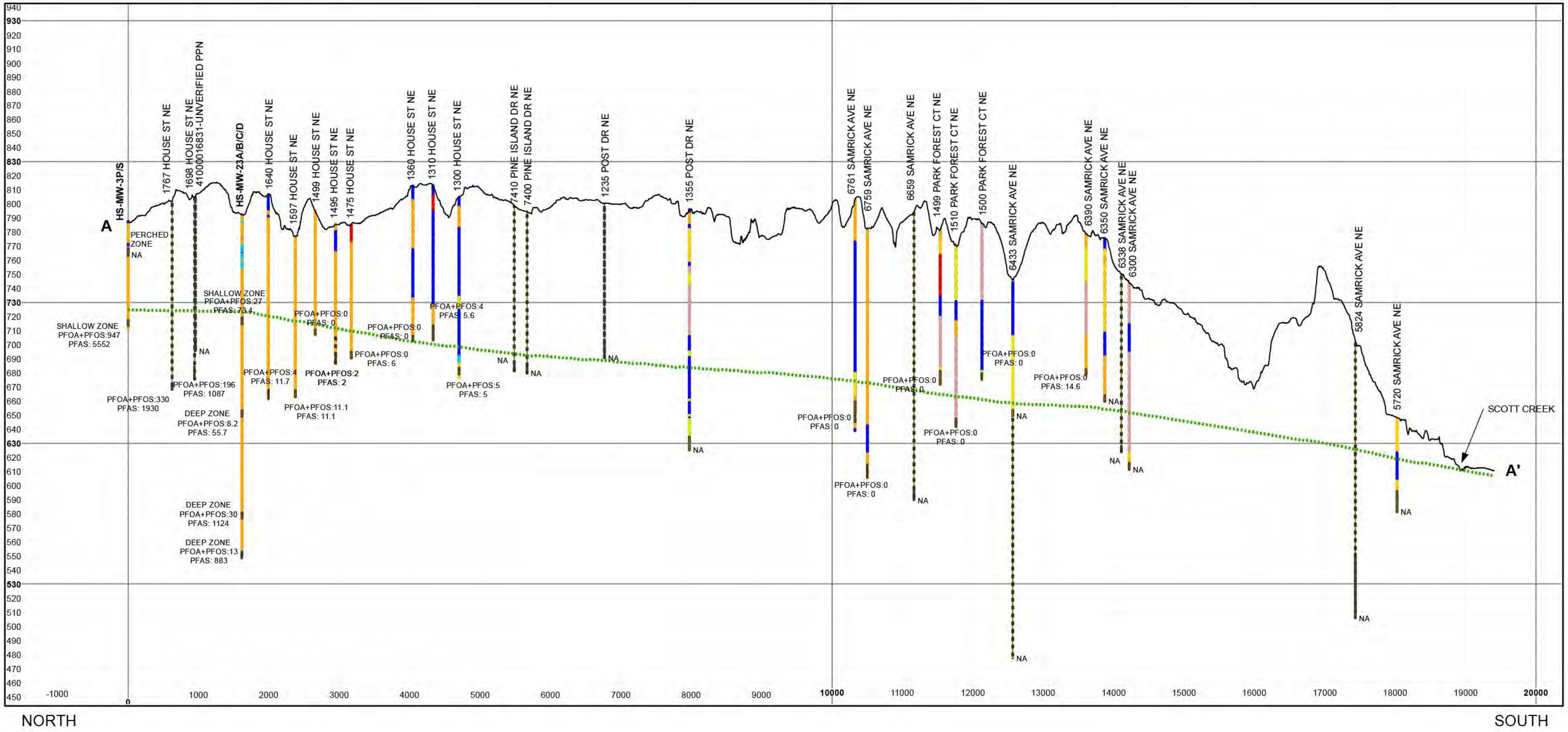
PROJ MGR: LIP	REVIEWED BY: LIP	CHECKED BY: JC	FIGURE
DESIGNED BY: KHM	DRAWN BY: ADM	SCALE: 1 inch = 1,800 feet	5
DATE: **6/16/2020**	PROJECT NO. **16.0062961.20**	REVISION NO.	



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
▪ ▪ ▪ NOT

OVERVIEW MAP LEGEND

■ PROPOSED PERIMETER MONITORING WELL
⊕ PROPOSED INVESTIGATION MONITORING WELL
▲ PROPOSED INVESTIGATION / PERIMETER MONITORING WELL
● RESIDENTIAL WATER WELL
● MONITORING WELL
— CROSS SECTION LINE
— HIGHWAY
— PRIMARY COUNTY ROAD
— OTHER ROAD
〰 RIVER OR STREAM
SURFACE WATER
▢ AREA 5
▢ APPROXIMATE HOUSE ST SITE BOUNDARY
▢ NORTH KENT LANDFILL
▢ NORTH KENT LANDFILL STUDY AREA

NOTES:

1. LOCATIONS AND SITE FEATURES ARE APPROXIMATE.

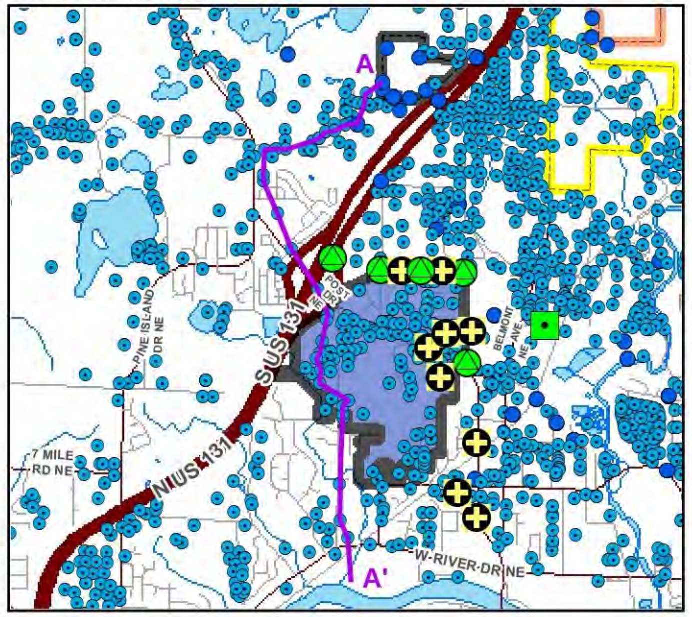
2. GROUND SURFACE ELEVATIONS ARE BASED ON DIGITAL RASTER FILES OF BARE EARTH DIGITAL ELEVATION MODELS (DEMS), GENERATED FROM LIDAR DATA WITH 1-METER HORIZONTAL ACCURACY AND 18.5-CENTIMETER VERTICAL ACCURACY. DIGITAL FILES OF DEMS AND LIDAR DATA WERE PROVIDED BY KENT COUNTY.

3. ESTIMATED POTENTIOMETRIC SURFACE WAS DEVELOPED BASED ON MEASUREMENTS MADE IN GROUNDWATER MONITORING WELLS IN NOVEMBER 2019. 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. 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



N

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SCALE IN FEET

ROSE & WESTRA, A DIVISION OF GZA
601 FIFTH STREET NW, SUITE 102
GRAND RAPIDS, MICHIGAN 49504

NORTH KENT STUDY AREA
GEOLOGICAL CROSS SECTION A-A'
AREA 5 RAP

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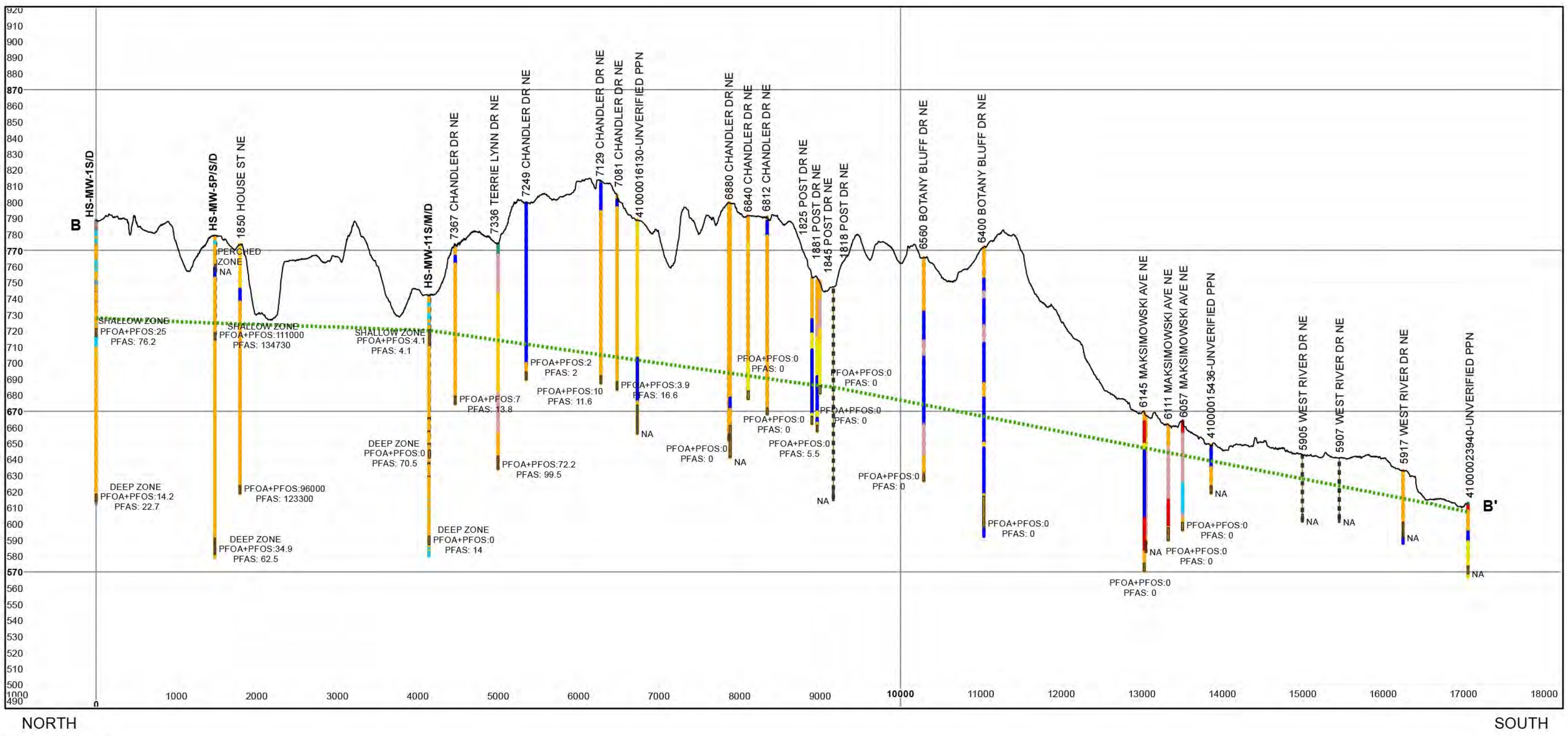
Engineers and Scientists
www.gza.com

PREPARED FOR:
WN&J/WWW

PROJ MGR: LJP	REVIEWED BY: MW	CHECKED BY: LMN	FIGURE
DESIGNED BY: JC	DRAWN BY: JC	SCALE: 1:72,000	
DATE: 11/30/2020	PROJECT NO: 16.0062961.20	REVISION NO:	6



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
- ■ ■ ■ NOT

OVERVIEW MAP LEGEND

- ■ PROPOSED PERIMETER MONITORING WELL
- ⊕ PROPOSED INVESTIGATION MONITORING WELL
- ▲ PROPOSED INVESTIGATION / PERIMETER MONITORING WELL
- ● RESIDENTIAL WATER WELL
- ● MONITORING WELL
- CROSS SECTION LINE
- HIGHWAY
- PRIMARY COUNTY ROAD
- OTHER ROAD
- RIVER OR STREAM
- SURFACE WATER
- AREA 5
- APPROXIMATE HOUSE ST SITE BOUNDARY
- NORTH KENT LANDFILL
- NORTH KENT LANDFILL STUDY AREA

NOTES:

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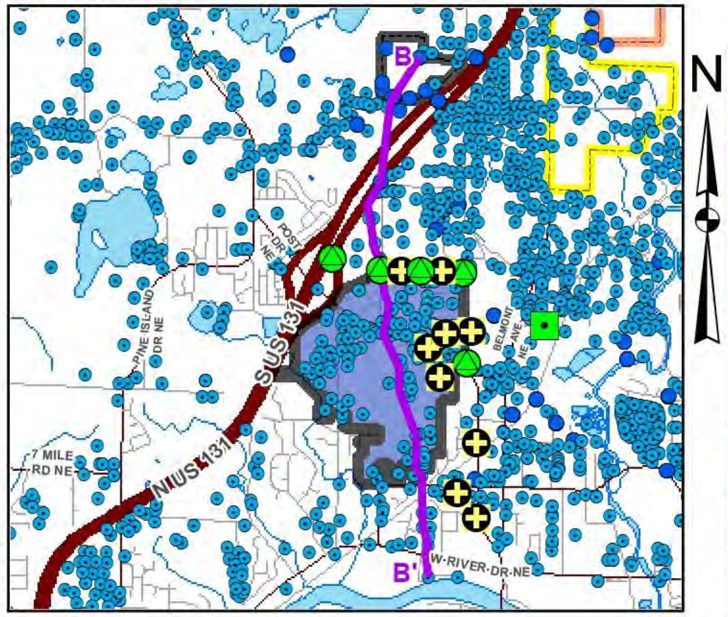
OVERVIEW MAP



0 3,000 6,000 12,000
SCALE IN FEET

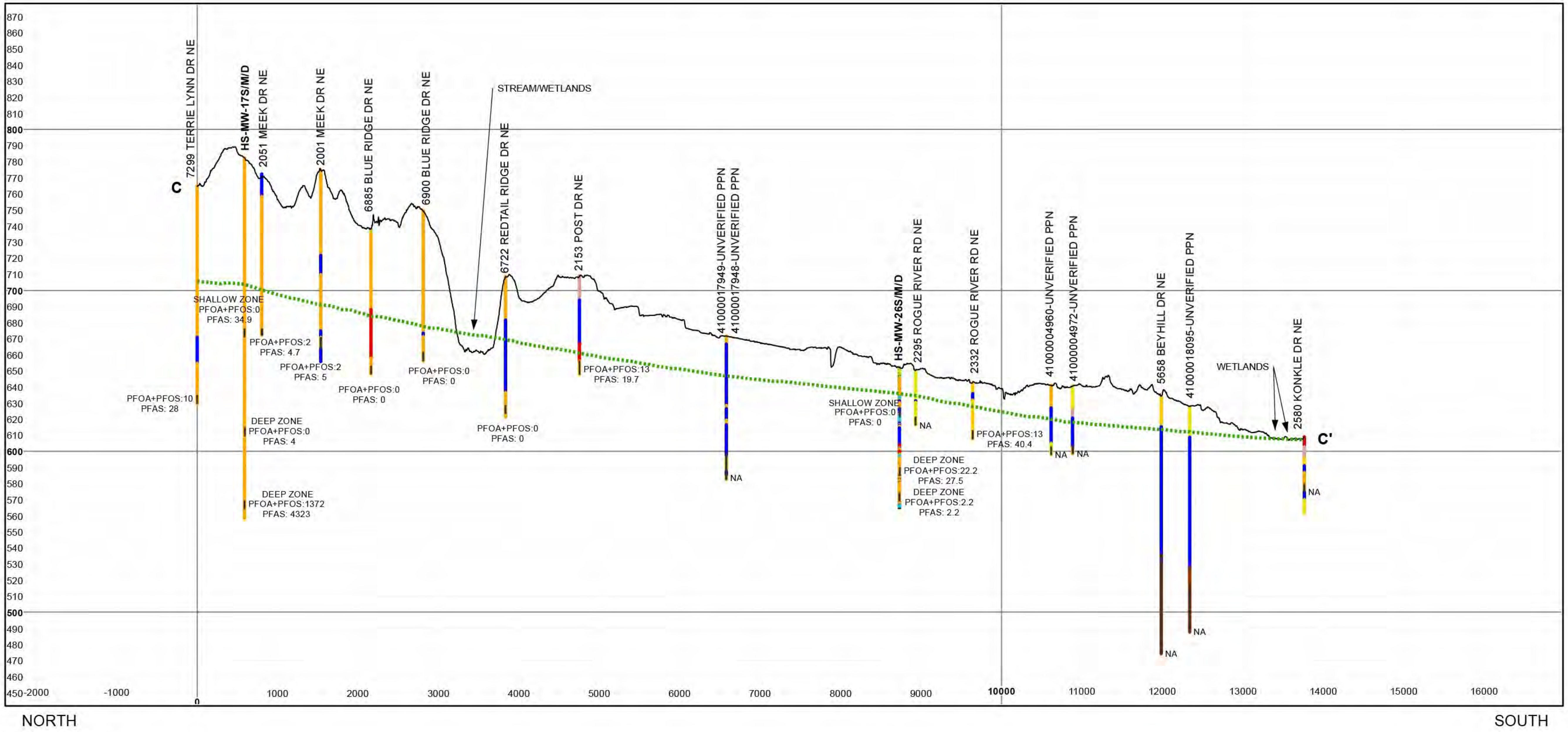
ROSE & WESTRA, A DIVISION OF GZA
601 FIFTH STREET NW, SUITE 102
GRAND RAPIDS, MICHIGAN 49504

NORTH KENT STUDY AREA
GEOLOGICAL CROSS SECTION B-B'
AREA 5 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: JC	SCALE: 1:72,000	
DATE: 11/30/2020	PROJECT NO: 16.0062961.20	REVISION NO:	7



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
- ▬ BEDROCK
- ■ ■ ■ NOT

OVERVIEW MAP LEGEND

- 🟩 PROPOSED PERIMETER MONITORING WELL
- ⊕ PROPOSED INVESTIGATION MONITORING WELL
- △ PROPOSED INVESTIGATION / PERIMETER MONITORING WELL
- ● RESIDENTIAL WATER WELL
- ● MONITORING WELL
- — CROSS SECTION LINE
- ▬ HIGHWAY
- — PRIMARY COUNTY ROAD
- — OTHER ROAD
- ~ RIVER OR STREAM
- ▨ SURFACE WATER
- ▨ AREA 5
- ▢ APPROXIMATE HOUSE ST SITE BOUNDARY
- ▢ NORTH KENT LANDFILL STUDY AREA

NOTES:

1. LOCATIONS AND SITE FEATURES ARE APPROXIMATE.

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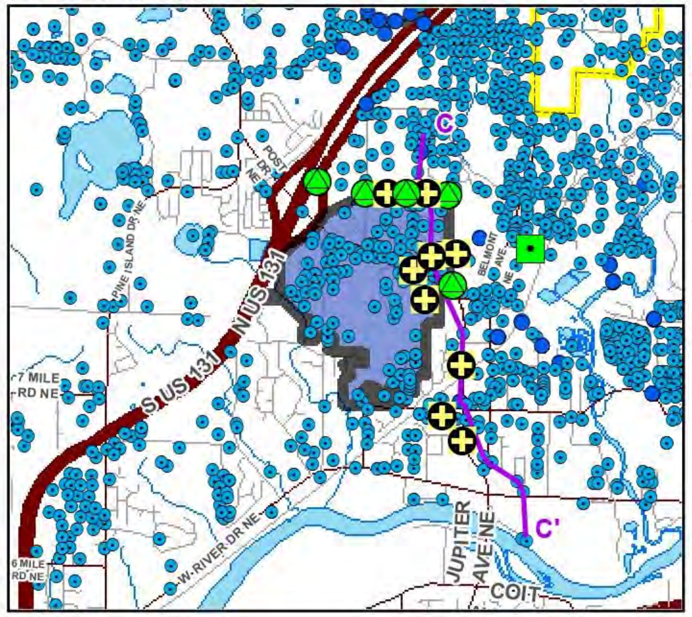
OVERVIEW MAP



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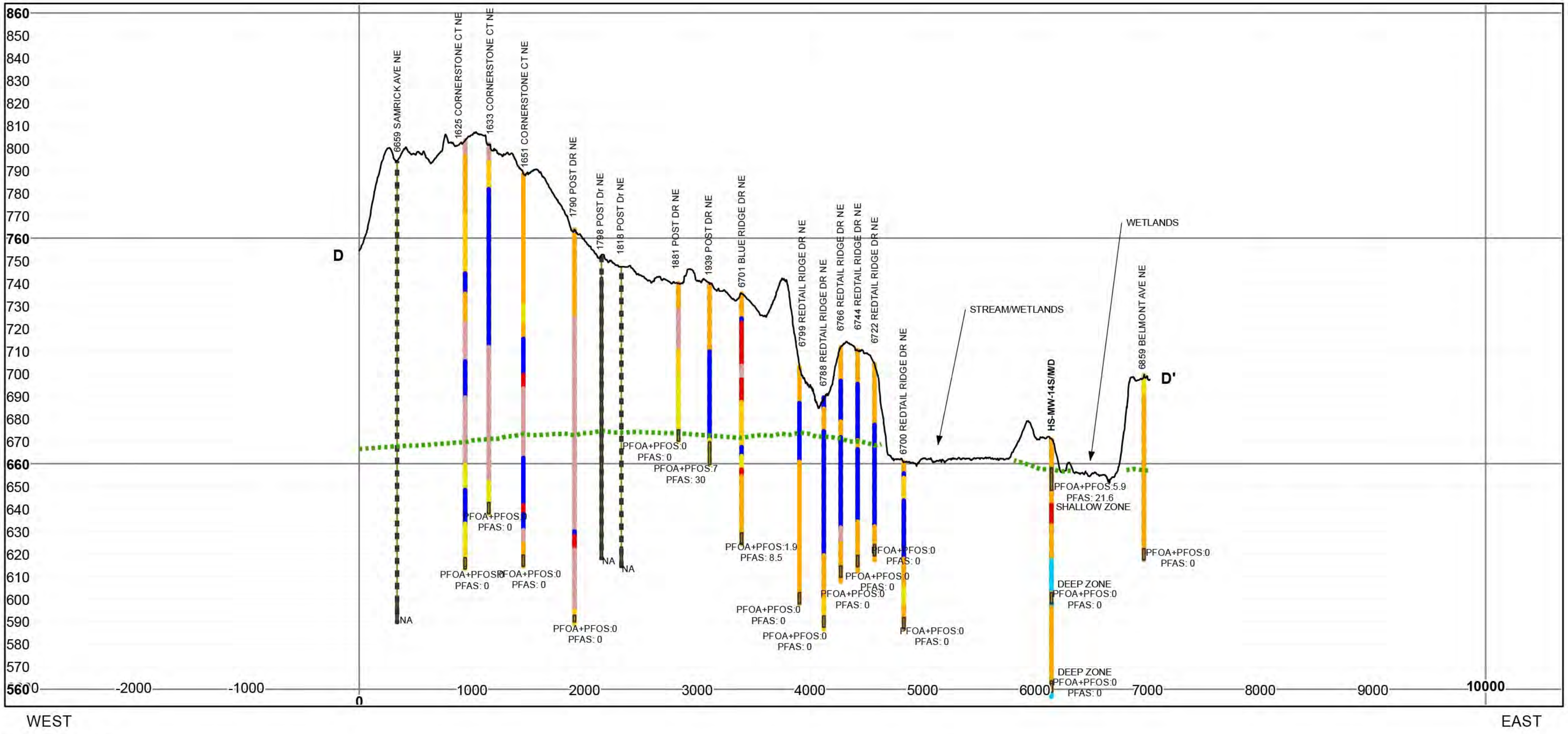
SCALE IN FEET

ROSE & WESTRA, A DIVISION OF GZA
601 FIFTH STREET NW, SUITE 102
GRAND RAPIDS, MICHIGAN 49504

NORTH KENT STUDY AREA
GEOLOGICAL CROSS SECTION C-C'
AREA 5 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: JC	SCALE: 1:72,000	8
DATE: 11/30/2020	PROJECT NO: 16.0062961.20	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 GRAVEL
- 🟧 SAND
- 🟥 SAND/GRAVEL WITH CLAY/SILT
- ▬ CLAY/SILT WITH SAND/GRAVEL
- 🟦 CLAY AND SILT
- 🟦 CLAY
- ■ ■ ■ NOT AVAILABLE

OVERVIEW MAP LEGEND

- 🟩 PROPOSED PERIMETER MONITORING WELL
- ⊕ PROPOSED INVESTIGATION MONITORING WELL
- △ PROPOSED INVESTIGATION / PERIMETER MONITORING WELL
- ● RESIDENTIAL WATER WELL
- ● MONITORING WELL
- — CROSS SECTION LINE
- — HIGHWAY
- — PRIMARY COUNTY ROAD
- — OTHER ROAD
- 〰 RIVER OR STREAM
- ▨ SURFACE WATER
- ▨ AREA 5
- ▭ APPROXIMATE HOUSE ST SITE BOUNDARY
- ▭ NORTH KENT LANDFILL STUDY AREA

NOTES:

1. LOCATIONS AND SITE FEATURES ARE APPROXIMATE.

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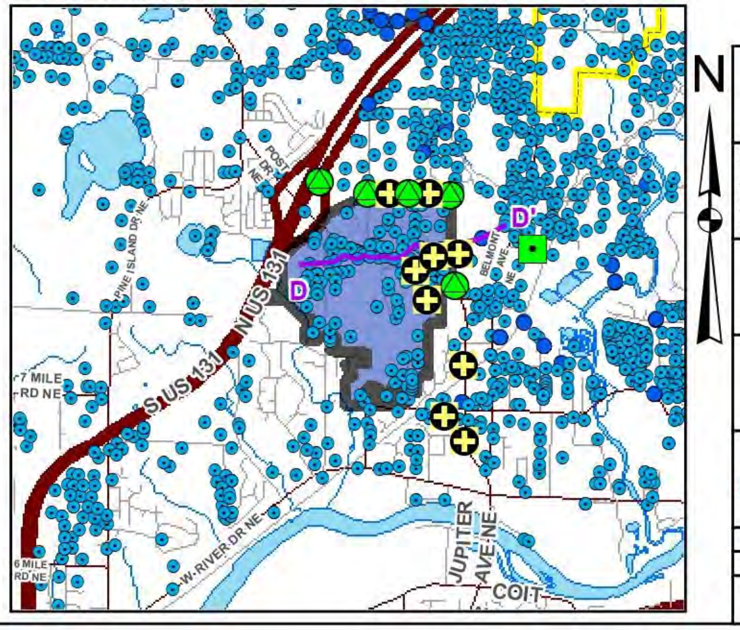
OVERVIEW MAP



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SCALE IN FEET

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GRAND RAPIDS, MICHIGAN 49504

NORTH KENT STUDY AREA
GEOLOGICAL CROSS SECTION D-D'
AREA 5 RAP

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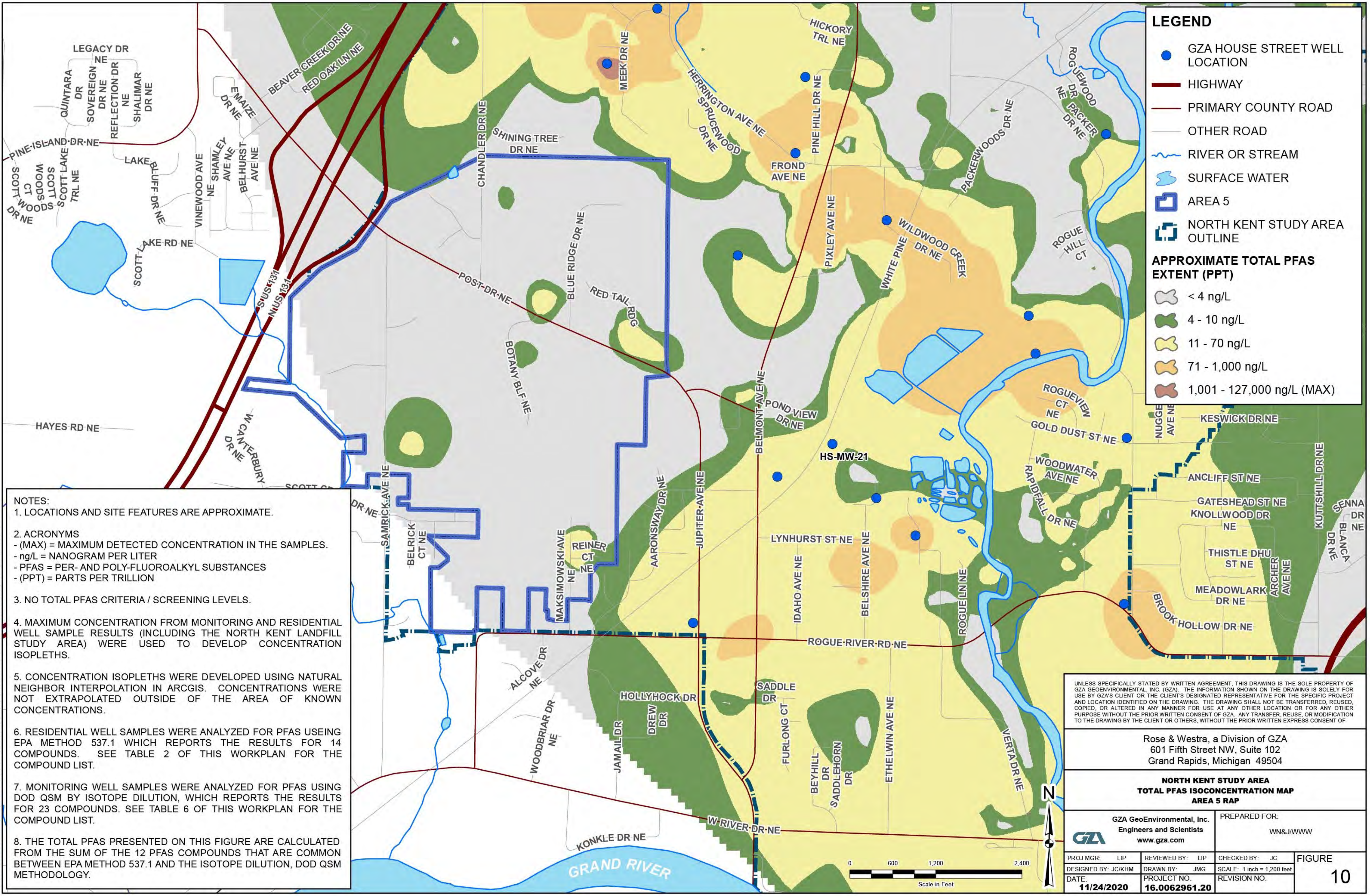
PREPARED FOR:
WN&J/WWW

PROJ MGR: LJP	REVIEWED BY: MW	CHECKED BY: LMN	FIGURE	
DESIGNED BY: JC	DRAWN BY: JC	SCALE: 1:72,000		
DATE: 11/30/2020	PROJECT NO: 16.0062961.20	REVISION NO:	9	



LEGEND

- ● GZA HOUSE STREET WELL LOCATION
- HIGHWAY
- PRIMARY COUNTY ROAD
- OTHER ROAD
- RIVER OR STREAM
- SURFACE WATER
- AREA 5
- 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
AREA 5 RAP

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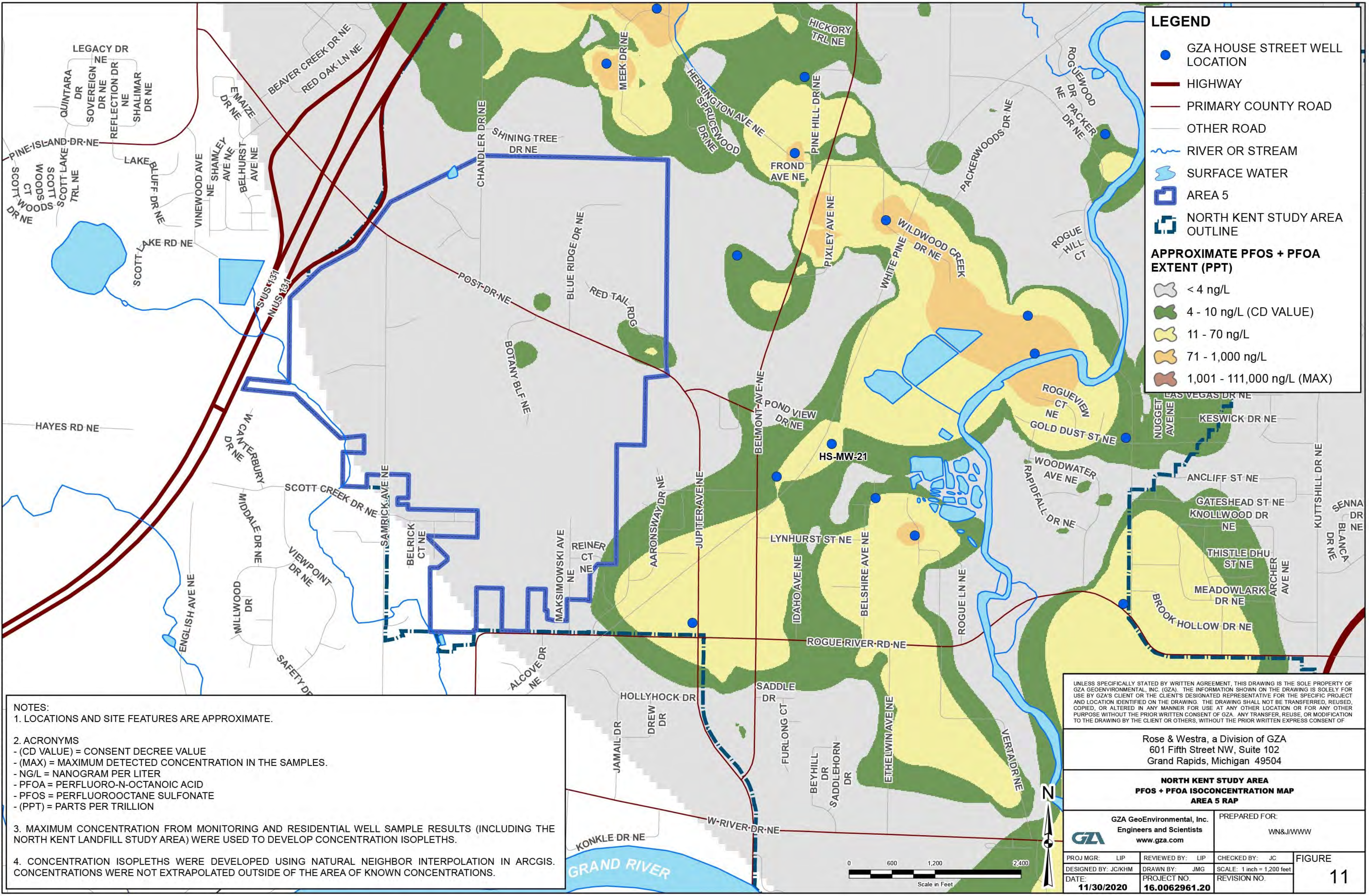
PREPARED FOR:
WN&J/WWW

PROJ MGR: LIP	REVIEWED BY: LIP	CHECKED BY: JC	FIGURE 10
DESIGNED BY: JC/KHM	DRAWN BY: JMG	SCALE: 1 inch = 1,200 feet	
DATE: 11/24/2020	PROJECT NO. 16.0062961.20	REVISION NO.	



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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Grand Rapids, Michigan 49504

NORTH KENT STUDY AREA
PFOS + PFOA ISOCONCENTRATION MAP
AREA 5 RAP

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PREPARED FOR:
WN&J/WWW

PROJ MGR: LIP	REVIEWED BY: LIP	CHECKED BY: JC	FIGURE 11
DESIGNED BY: JC/KHM	DRAWN BY: JMG	SCALE: 1 inch = 1,200 feet	
DATE: **11/30/2020**	PROJECT NO. **16.0062961.20**	REVISION NO.	

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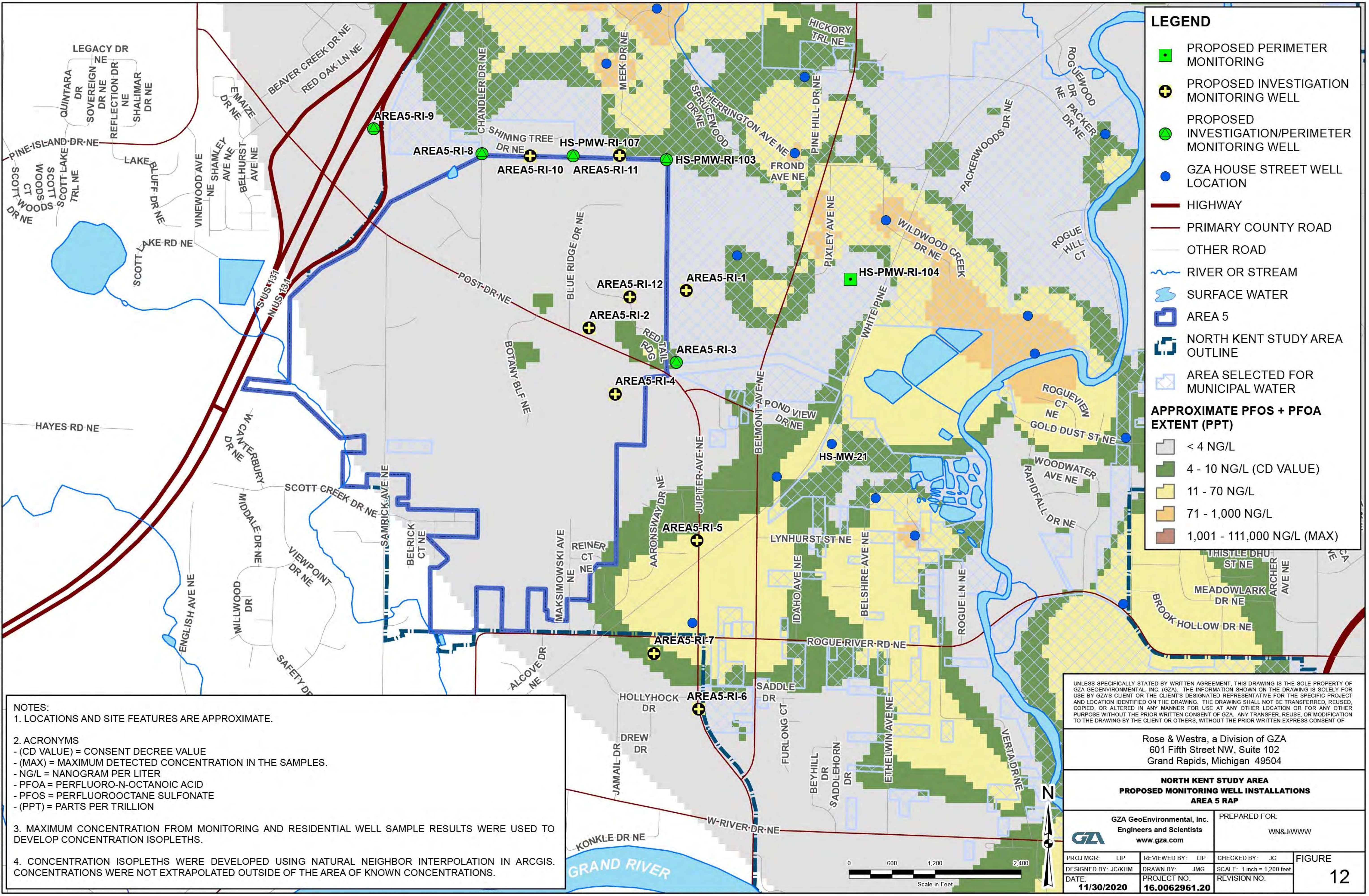

LEGEND

- 🟩 PROPOSED PERIMETER MONITORING
- ⊕ PROPOSED INVESTIGATION MONITORING WELL
- ▲ PROPOSED INVESTIGATION/PERIMETER MONITORING WELL
- ● GZA HOUSE STREET WELL LOCATION
- HIGHWAY
- PRIMARY COUNTY ROAD
- OTHER ROAD
- RIVER OR STREAM
- SURFACE WATER
- AREA 5
- NORTH KENT STUDY AREA OUTLINE
- ▨ AREA SELECTED FOR MUNICIPAL 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
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- (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 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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Grand Rapids, Michigan 49504

NORTH KENT STUDY AREA
PROPOSED MONITORING WELL INSTALLATIONS
AREA 5 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
DESIGNED BY: JC/KHM	DRAWN BY: JMG	SCALE: 1 inch = 1,200 feet	12
DATE: **11/30/2020**	PROJECT NO. **16.0062961.20**	REVISION NO.	

GZA GeoEnvironmental, Inc.

APPENDIX A – 2019 GROUNDWATER SAMPLING SUPPLEMENTAL MEMO

Rose & Westra
A Division of GZA

GEOTECHNICAL
ENVIRONMENTAL
ECOLOGICAL
WATER
CONSTRUCTION MANAGEMENT

The Widdicomb Building
601 Fifth Street NW
Suite 102
Grand Rapids, MI 49504
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www.gza.com

APPENDIX A
2019 GROUNDWATER SAMPLING SUPPLEMENTAL MEMORANDUM

June 18, 2020
File No. 16.0062961.20

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

30 Offices Nationwide
www.gza.com

1.0 INTRODUCTION

Since April 2017, Wolverine has voluntarily and proactively worked with EGLE, the Kent County Health Department (KCHD), and Michigan Department of Health and Human Services (MDHHS) to establish zones for drinking water well testing, provided alternate (bottled) water service, point of use (faucet) water filters, and point of entry (whole house) filter systems. As of December 2019, R&W/GZA has installed monitoring wells at twenty-nine (29) locations totaling eighty-four (84) wells within the House Street Study Area as shown on **Figure 4** of the Draft Area 5 Response Activity Plan, North Kent Study Area, submitted to EGLE on June 18, 2020 (Draft Area 5 RAP [R&W/GZA, 2020]). Of the 29 locations, seven (7) are located on the HSDS property, one (1) is on the adjoining Michigan Department of Transportation (MDOT) parcel, three (3) are located on the US-131 right of way (ROW), and the remaining eighteen (18) are placed within or surrounding the PFAS plume.

2.0 INVESTIGATION METHODOLOGY

2.1 GROUNDWATER INVESTIGATIONS

R&W/GZA retained drilling contractors to perform subsurface exploration and monitoring well installation to continue delineation of the extent of PFOA and PFOS both vertically and laterally in the NKSA. Since 2017, R&W/GZA oversaw the installation of eighty-four (84) groundwater monitoring wells at 29 locations in the HSDS study area. At most of the locations, multi-depth cluster wells were installed. The borings were drilled using either hollow stem auguring or rotosonic techniques. Soil samples were collected and logged every 5 feet. At certain locations VAP groundwater samples were collected every 10 feet in the saturated zone and submitted to an independent laboratory for the PFAS analysis using isotope dilution methodology in accordance with the most recent version of the DoD QSM procedures.

Monitoring well screen intervals were selected based on PFAS VAP sampling results and geological conditions. Each monitoring well was constructed of factory-slotted, 0.010-inch, 5-foot long PVC screen (in a few cases, 10-foot), and flush-threaded well casing. The annular space surrounding the well screen was filled with sand filter pack to approximately 3 feet above the top of the well screen, followed by a one- to one-and-one-half-foot-thick hydrated bentonite seal. The remaining annulus was filled with cement and bentonite grout to approximately 1 foot below ground surface. The wells were finished with a steel protective casing set in a concrete pad. A locking expansion cap was placed in the top of the PVC casing. The NKSA-wide soil boring logs and well installation logs were included in the GSI RAP (R&W/GZA 2020). Static water level measurements are provided on **Table 4** of the Draft Area 5 RAP. See **Figure 4** of the Draft Area 5 RAP for the groundwater monitoring well and residential groundwater sampling locations.

Following installation, the newly installed wells were developed to remove sediment from the sand filter pack and well casing. The wells were developed using a 12-volt Mini-Typhoon® submersible pump equipped with dedicated tubing for each well. The pump was decontaminated between wells using a water and Alconox® wash with a water rinse. The wells were developed until the water ran clear. The development water was containerized and staged prior to proper disposal. The tubing and other disposable materials used during the well development were placed in a separate drum and stored for proper disposal.

In addition, surface water level measurement gauges were installed in the following locations in the Rogue River:

- Rockford Dam Seawall;
- East Bridge Street Bridge;

- Rogue River Road Bridge; and
- Jericho Avenue Bridge

The water levels measured from these locations were used in combination with available gaging height data at USGS gaging station, USGS04118500, to evaluate surface water levels in the Rogue River.

2.2 GROUNDWATER SAMPLING METHODS

Groundwater sampling followed the low-flow purging and sampling procedures identified in the project QAPP approved by EGLE in December 2018 (R&W/GZA, 2018). The wells were purged using either a GeoTech Peristaltic Pump or a GeoTech Bladder Pump and control box. Static water levels in the monitoring wells were measured to maintain stabilized drawdowns during purging. Field indicator parameters, temperature, pH, dissolved oxygen, specific conductance, ORP and turbidity, were monitored using a YSI PRO and field turbidity meters in accordance with the low-flow sampling SOP in the project QAPP. Once the field parameters stabilized, a groundwater sample was collected by disconnecting the tubing from the flow-through cell and collecting the sample directly from the tubing.

Groundwater samples were collected in laboratory-supplied sample containers labeled with the well ID, sample time and date, and analytes. The samples were packed in coolers with ice and shipped to the laboratory under chain-of-custody control via overnight express shipping.

As the subsurface exploration and monitoring well installation progressed, the newly installed wells were added to the sampling list in the quarter following their installation and development.

Groundwater sampling was conducted quarterly throughout 2019. See the **Table 1** below for sampling dates. The objective of the groundwater sampling was to provide data to evaluate water quality in the newly installed wells relative to historic, spatial, and temporal concentration trends.

Table 1 – Quarterly Groundwater Sampling Event Dates

Quarter	**Dates Sampled**
Quarter 1	February 26 – March 31
Quarter 2	May 14 – May 30[1]
Quarter 3	September 6 – September 27
Quarter 4	November 18 – December 12

Note:
1. Newly-installed well series 30 and 31 sampled from July 1 through July 3, 2019.

Due to the well installation schedule all 84 wells were not sampled all four quarters. **Table 2**, below, lists the wells that were sampled during Quarter 1 and those that were added during subsequent sampling rounds. Well construction information is provided **Table 3** of the Draft Area 5 RAP.

Table 2: House Street Study Area Well Additions

Quarter	Wells Sampled
Quarter 1	HS-MW-1S, HS-MW-1D, HS-MW-2S, HS-MW-3S, HS-MW-4S, HS-MW-5D, HS-MW-5S, HS-MW-6D, HS-MW-6S, HS-MW-7S, HS-MW-8, HS-MW-9D, HS-MW-9M, HS-MW-9S, HS-MW-10D, HS-MW-10M, HS-MW-10S, HS-MW-11D, HS-MW-11M, HS-MW-11S, HS-MW-15D, HS-MW-15M, HS-MW-15S, HS-MW-17D, HS-MW-17M, HS-MW-17S, HS-MW-18D, HS-MW-18S, HS-MW-19D, HS-MW-19S, HS-MW-20D, HS-MW-20M, HS-MW-20S, HS-MW-21D, HS-MW-21M, HS-MW-21S, HS-MW-25D, HS-MW-25S, HS-MW-26D, HS-MW-26M, HS-MW-26S
Quarter 2	Quarter 1 wells plus: HS-MW-30A, HS-MW-30B, HS-MW-30C, HS-MW-30D, HS-MW-30E, HS-MW-31A, HS-MW-31B, HS-MW-31C, HS-MW-31D, HS-MW-31E, HS-MW-32A, HS-MW-32B, HS-MW-32C, HS-MW-32D
Quarter 3	Quarter 1 and Quarter 2 wells plus: HS-MW-23A, HS-MW-23B, HS-MW-23C, HS-MW-23D, HS-MW-27A, HS-MW-27B, HS-MW-27C, HS-MW-27D, HS-MW-27E, HS-MW-28A, HS-MW-28B, HS-MW-28C, HS-MW-28D, HS-MW-28E
Quarter 4	Quarter 1, Quarter 2, and Quarter 3 wells plus: HS-MW-12A, HS-MW-12B, HS-MW-12C, HS-MW-12D, HS-MW-12E, HS-MW-24A, HS-MW-24B, HS-MW-29A, HS-MW-29B, HS-MW-29C, HS-MW-29D

3.0 STUDY AREA SAMPLING RESULTS

Groundwater analytical results for PFAS are provided on **Table 6** of the Draft Area 5 RAP, and analytical reports are included as **Attachment 1**.

4.0 QA/QC

Investigative QA/QC procedures are outlined in the project QAPP approved by EGLE in December 2018 and subsequently revised. Selected data have or will be validated according to performance requirements and the QA/QC limits in Table D.1.1 of the project 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 methods to assess data usability.

In R&W/GZA's opinion, the field and laboratory quality control results indicate that the sampling and analyses performed in generating the data described in this Report were generally consistent with the analytical methods and the project QAPP requirements. The project data are acceptable and suitable for site characterization purposes and consequently can be used for decision-making purposes. The limitations identified by the applied qualifiers should be considered when using the data.

5.0 REFERENCES

R&W/GZA. (2018). Quality Assurance Project Plan, Former Wolverine Tannery, House Street Disposal Area, and Wolven/Jewell Area, Per- and Polyfluoroalkyl Substances Investigation Program. Grand Rapids, MI: R&W/GZA.

R&W/GZA. (2020). Area 5 Response Activity Plan, North Kent Study Area. Submitted to EGLE June 18, 2020.

Attachment 1 – Laboratory Analytical Data

SHEALY ENVIRONMENTAL SERVICES, INC.

Report of Analysis

GZA GeoEnvironmental, Inc.
601 Fifth Street N.W., Suite 102
Grand Rapids, MI 49504
Attention: Loretta J. Powers

Project Name: 16.0062335.52 T2

Project Number: 16.0062335.52 T2

Lot Number:**UC21029**

Date Completed:04/04/2019

N. Saikaly

04/05/2019 5:42 PM
Approved and released by:
Project Manager: Nisreen Saikaly

Shealy Environmental Services, Inc.
106 Vantage Point Drive West Columbia, SC 29172 (803) 791-9700 Fax (803) 791-9111 www.shealylab.com

Case Narrative
GZA GeoEnvironmental, Inc.
Lot Number: UC21029

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 Shealy Environmental Services, Inc. ("Shealy") Quality Assurance Management Plan (QAMP), applicable Shealy standard operating procedures (SOPs), the 2003 NELAC standard, and Shealy policies. Additionally, the DoD QSM version 5.1 has been followed for these samples, and specifically Table B-15 was followed for all PFAS samples. Any exceptions to the QAMP, SOPs, NELAC standards, the DoD QSM, or policies are qualified on the results page or discussed below.

All QC associated with these samples was in compliance with DOD QSM 5.1 table B-15 and our PFAS SOP. DoD reporting conventions and qualifiers are not utilized in this data package.

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

CF = DF * FV / Vo

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

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

$$\mathrm{Cs} = \left(\frac{A_s}{A_{is}} - b\right) * \left(\frac{C_{is}}{a}\right)$$

Where:

A_s is peak response of target analyte in the sample
A_{is} is peak response of internal standard in the sample
C_s is concentration of target analyte in the sample
C_{is} is concentration of internal standard in the sample (1ng/mL)
a is the slope from the ICAL linear regression
b is the y-intercept from the ICAL linear regression

Semivolatile Organic Compounds

The laboratory control spike (LCS) recovery for bis(2-Chloroethyl)ether exceeded method control limits in batch11166; however, all other QC criteria for the LCS were within acceptance criteria and method control limits. The associated sample results (all samples in this report) were non-detect, therefore the results were reported and no corrective action was required.

The matrix spike and matrix spike duplicate (MS/MSD) recoveries in batch 11166 were outside acceptance criteria. All other QC criteria for the batch was within acceptance criteria and method control limits. The MS/MSD recovery results are attributed to matrix interference. The associated sample results were reported and no corrective action was required.

Nitrate-Nitrite

The MS/MSD recoveries in batch 11110 were outside acceptance criteria. All other QC criteria for the batch was within acceptance criteria and method control limits. The MS/MSD recovery results are attributed to matrix interference. The associated sample results were reported and no corrective action was required.

Sample Summary

GZA GeoEnvironmental, Inc.

Lot Number: UC21029

Sample Number	Sample ID	Matrix	Date Sampled	Date Received
001	HS-MW-10S	Aqueous	03/18/2019 1505	03/21/2019
002	HS-MW-10M	Aqueous	03/18/2019 1235	03/21/2019
003	HS-MW-10D	Aqueous	03/18/2019 1210	03/21/2019
004	HS-MW-9S	Aqueous	03/19/2019 1500	03/21/2019
005	HS-MW-9M	Aqueous	03/19/2019 1345	03/21/2019
006	HS-MW-9D	Aqueous	03/19/2019 1350	03/21/2019
007	HS-MW-6S	Aqueous	03/20/2019 1415	03/21/2019
008	HS-MW-6D	Aqueous	03/20/2019 1600	03/21/2019
009	FB-3/20	Aqueous	03/20/2019 1610	03/21/2019

(9 samples)

Detection Summary

GZA GeoEnvironmental, Inc.

Lot Number: UC21029

Sample	Sample ID	Matrix	Parameter	Method	Result	Q	Units	Page
001	HS-MW-10S	Aqueous	Chloride	300.0	38		mg/L	8
001	HS-MW-10S	Aqueous	Hardness (total)	SM 2340C-	320		mg/L	8
001	HS-MW-10S	Aqueous	Nitrate-Nitrite - N	353.2	1.6	B	mg/L	8
001	HS-MW-10S	Aqueous	Phosphorus	365.1	0.0057	J	mg/L	8
001	HS-MW-10S	Aqueous	Sulfate	300.0	5.4		mg/L	8
001	HS-MW-10S	Aqueous	Acetone	8260B	3.2	J	ug/L	9
001	HS-MW-10S	Aqueous	Aluminum	200.8	13	J	ug/L	14
001	HS-MW-10S	Aqueous	Barium	200.8	60		ug/L	14
001	HS-MW-10S	Aqueous	Boron	200.8	28	J	ug/L	14
001	HS-MW-10S	Aqueous	Iron	200.8	380		ug/L	14
001	HS-MW-10S	Aqueous	Magnesium	200.8	24000		ug/L	14
001	HS-MW-10S	Aqueous	Nickel	200.8	1.3	J	ug/L	14
001	HS-MW-10S	Aqueous	Sodium	200.8	15000		ug/L	14
001	HS-MW-10S	Aqueous	Titanium	200.8	1.4	J	ug/L	14
001	HS-MW-10S	Aqueous	PFHpS	537 Modified-	4.7		ng/L	15
001	HS-MW-10S	Aqueous	PFHxS	537 Modified-	6.0		ng/L	15
001	HS-MW-10S	Aqueous	PFOA	537 Modified-	12		ng/L	15
001	HS-MW-10S	Aqueous	PFOS	537 Modified-	40		ng/L	15
002	HS-MW-10M	Aqueous	Chloride	300.0	440		mg/L	16
002	HS-MW-10M	Aqueous	Cyanide - Total	SM 4500-CN	0.012		mg/L	16
002	HS-MW-10M	Aqueous	Hardness (total)	SM 2340C-	440		mg/L	16
002	HS-MW-10M	Aqueous	Nitrate-Nitrite - N	353.2	1.1	B	mg/L	16
002	HS-MW-10M	Aqueous	Phosphorus	365.1	0.019	J	mg/L	16
002	HS-MW-10M	Aqueous	Sulfate	300.0	25		mg/L	16
002	HS-MW-10M	Aqueous	Acetone	8260B	3.0	J	ug/L	17
002	HS-MW-10M	Aqueous	Aluminum	200.8	16	J	ug/L	22
002	HS-MW-10M	Aqueous	Barium	200.8	120		ug/L	22
002	HS-MW-10M	Aqueous	Boron	200.8	25	J	ug/L	22
002	HS-MW-10M	Aqueous	Chromium	200.8	1.6	BJ	ug/L	22
002	HS-MW-10M	Aqueous	Iron	200.8	560		ug/L	22
002	HS-MW-10M	Aqueous	Magnesium	200.8	30000		ug/L	22
002	HS-MW-10M	Aqueous	Nickel	200.8	1.8	J	ug/L	22
002	HS-MW-10M	Aqueous	Sodium	200.8	240000		ug/L	22
002	HS-MW-10M	Aqueous	Titanium	200.8	1.7	J	ug/L	22
002	HS-MW-10M	Aqueous	PFBS	537 Modified-	8.5		ng/L	23
002	HS-MW-10M	Aqueous	PFHxS	537 Modified-	4.8		ng/L	23
002	HS-MW-10M	Aqueous	PFOA	537 Modified-	8.4		ng/L	23
002	HS-MW-10M	Aqueous	PFOS	537 Modified-	13		ng/L	23
003	HS-MW-10D	Aqueous	Ammonia - N (gas	350.1	0.35		mg/L	24
003	HS-MW-10D	Aqueous	Chloride	300.0	3.9		mg/L	24
003	HS-MW-10D	Aqueous	Cyanide - Total	SM 4500-CN	0.011		mg/L	24
003	HS-MW-10D	Aqueous	Hardness (total)	SM 2340C-	520		mg/L	24
003	HS-MW-10D	Aqueous	Nitrate-Nitrite - N	353.2	0.014	BJ	mg/L	24
003	HS-MW-10D	Aqueous	Phosphorus	365.1	0.055		mg/L	24
003	HS-MW-10D	Aqueous	Sulfate	300.0	270		mg/L	24

Detection Summary (Continued)

Lot Number: UC21029

Sample	Sample ID	Matrix	Parameter	Method	Result	Q	Units	Page
003	HS-MW-10D	Aqueous	Acetone	8260B	2.7	J	ug/L	25
003	HS-MW-10D	Aqueous	Aluminum	200.8	940		ug/L	30
003	HS-MW-10D	Aqueous	Arsenic	200.8	1.7	J	ug/L	30
003	HS-MW-10D	Aqueous	Barium	200.8	35		ug/L	30
003	HS-MW-10D	Aqueous	Boron	200.8	80		ug/L	30
003	HS-MW-10D	Aqueous	Chromium	200.8	3.8	BJ	ug/L	30
003	HS-MW-10D	Aqueous	Copper	200.8	2.0	J	ug/L	30
003	HS-MW-10D	Aqueous	Iron	200.8	4700		ug/L	30
003	HS-MW-10D	Aqueous	Lead	200.8	0.78	J	ug/L	30
003	HS-MW-10D	Aqueous	Magnesium	200.8	25000		ug/L	30
003	HS-MW-10D	Aqueous	Nickel	200.8	3.3	J	ug/L	30
003	HS-MW-10D	Aqueous	Sodium	200.8	8000		ug/L	30
003	HS-MW-10D	Aqueous	Titanium	200.8	43		ug/L	30
003	HS-MW-10D	Aqueous	Zinc	200.8	4.4	J	ug/L	30
004	HS-MW-9S	Aqueous	Chloride	300.0	71		mg/L	32
004	HS-MW-9S	Aqueous	Hardness (total)	SM 2340C-	350		mg/L	32
004	HS-MW-9S	Aqueous	Nitrate-Nitrite - N	353.2	2.4	B	mg/L	32
004	HS-MW-9S	Aqueous	Phosphorus	365.1	0.022	J	mg/L	32
004	HS-MW-9S	Aqueous	Sulfate	300.0	15		mg/L	32
004	HS-MW-9S	Aqueous	Acetone	8260B	2.7	J	ug/L	33
004	HS-MW-9S	Aqueous	Barium	200.8	32		ug/L	38
004	HS-MW-9S	Aqueous	Boron	200.8	22	J	ug/L	38
004	HS-MW-9S	Aqueous	Chromium	200.8	1.6	BJ	ug/L	38
004	HS-MW-9S	Aqueous	Iron	200.8	330		ug/L	38
004	HS-MW-9S	Aqueous	Magnesium	200.8	29000		ug/L	38
004	HS-MW-9S	Aqueous	Sodium	200.8	33000		ug/L	38
005	HS-MW-9M	Aqueous	Ammonia - N (gas	350.1	0.15		mg/L	40
005	HS-MW-9M	Aqueous	Chloride	300.0	23		mg/L	40
005	HS-MW-9M	Aqueous	Hardness (total)	SM 2340C-	320		mg/L	40
005	HS-MW-9M	Aqueous	Nitrate-Nitrite - N	353.2	0.014	BJ	mg/L	40
005	HS-MW-9M	Aqueous	Phosphorus	365.1	0.019	J	mg/L	40
005	HS-MW-9M	Aqueous	Sulfate	300.0	24		mg/L	40
005	HS-MW-9M	Aqueous	Acetone	8260B	2.4	J	ug/L	41
005	HS-MW-9M	Aqueous	Aluminum	200.8	28	J	ug/L	46
005	HS-MW-9M	Aqueous	Barium	200.8	82		ug/L	46
005	HS-MW-9M	Aqueous	Boron	200.8	18	J	ug/L	46
005	HS-MW-9M	Aqueous	Iron	200.8	720		ug/L	46
005	HS-MW-9M	Aqueous	Magnesium	200.8	27000		ug/L	46
005	HS-MW-9M	Aqueous	Nickel	200.8	1.3	J	ug/L	46
005	HS-MW-9M	Aqueous	Sodium	200.8	5100		ug/L	46
005	HS-MW-9M	Aqueous	Titanium	200.8	2.0	J	ug/L	46
006	HS-MW-9D	Aqueous	Ammonia - N (gas	350.1	0.43		mg/L	48
006	HS-MW-9D	Aqueous	Chloride	300.0	69		mg/L	48
006	HS-MW-9D	Aqueous	Cyanide - Total	SM 4500-CN	0.011		mg/L	48
006	HS-MW-9D	Aqueous	Hardness (total)	SM 2340C-	340		mg/L	48
006	HS-MW-9D	Aqueous	Nitrate-Nitrite - N	353.2	0.0024	BJ	mg/L	48
006	HS-MW-9D	Aqueous	Phosphorus	365.1	0.055		mg/L	48
006	HS-MW-9D	Aqueous	Sulfate	300.0	45		mg/L	48

Detection Summary (Continued)

Lot Number: UC21029

Sample	Sample ID	Matrix	Parameter	Method	Result	Q	Units	Page
006	HS-MW-9D	Aqueous	Acetone	8260B	2.6	J	ug/L	49
006	HS-MW-9D	Aqueous	Carbon disulfide	8260B	0.44	J	ug/L	49
006	HS-MW-9D	Aqueous	Aluminum	200.8	130		ug/L	54
006	HS-MW-9D	Aqueous	Barium	200.8	99		ug/L	54
006	HS-MW-9D	Aqueous	Boron	200.8	29	J	ug/L	54
006	HS-MW-9D	Aqueous	Chromium	200.8	1.5	BJ	ug/L	54
006	HS-MW-9D	Aqueous	Iron	200.8	930		ug/L	54
006	HS-MW-9D	Aqueous	Magnesium	200.8	26000		ug/L	54
006	HS-MW-9D	Aqueous	Nickel	200.8	1.5	J	ug/L	54
006	HS-MW-9D	Aqueous	Sodium	200.8	13000		ug/L	54
006	HS-MW-9D	Aqueous	Titanium	200.8	5.6		ug/L	54
006	HS-MW-9D	Aqueous	Zinc	200.8	6.2	J	ug/L	54
007	HS-MW-6S	Aqueous	Chloride	300.0	47		mg/L	56
007	HS-MW-6S	Aqueous	Hardness (total)	SM 2340C-	390		mg/L	56
007	HS-MW-6S	Aqueous	Nitrate-Nitrite - N	353.2	0.98	B	mg/L	56
007	HS-MW-6S	Aqueous	Phosphorus	365.1	0.0068	J	mg/L	56
007	HS-MW-6S	Aqueous	Sulfate	300.0	21		mg/L	56
007	HS-MW-6S	Aqueous	Chloroform	8260B	0.54	J	ug/L	57
007	HS-MW-6S	Aqueous	Aluminum	200.8	28	J	ug/L	62
007	HS-MW-6S	Aqueous	Barium	200.8	79		ug/L	62
007	HS-MW-6S	Aqueous	Boron	200.8	25	J	ug/L	62
007	HS-MW-6S	Aqueous	Chromium	200.8	2.6	BJ	ug/L	62
007	HS-MW-6S	Aqueous	Copper	200.8	1.9	J	ug/L	62
007	HS-MW-6S	Aqueous	Iron	200.8	450		ug/L	62
007	HS-MW-6S	Aqueous	Magnesium	200.8	31000		ug/L	62
007	HS-MW-6S	Aqueous	Nickel	200.8	1.6	J	ug/L	62
007	HS-MW-6S	Aqueous	Sodium	200.8	15000		ug/L	62
007	HS-MW-6S	Aqueous	Titanium	200.8	1.7	J	ug/L	62
007	HS-MW-6S	Aqueous	Zinc	200.8	33		ug/L	62
007	HS-MW-6S	Aqueous	PFBS	537 Modified-	47		ng/L	63
007	HS-MW-6S	Aqueous	PFPeS	537 Modified-	61		ng/L	63
007	HS-MW-6S	Aqueous	PFHxS	537 Modified-	85		ng/L	63
007	HS-MW-6S	Aqueous	PFBA	537 Modified-	4.6		ng/L	63
007	HS-MW-6S	Aqueous	PFHpA	537 Modified-	15		ng/L	63
007	HS-MW-6S	Aqueous	PFHxA	537 Modified-	31		ng/L	63
007	HS-MW-6S	Aqueous	PFOA	537 Modified-	44		ng/L	63
007	HS-MW-6S	Aqueous	PFPeA	537 Modified-	7.8		ng/L	63
007	HS-MW-6S	Aqueous	PFOS	537 Modified-	8.7		ng/L	63
008	HS-MW-6D	Aqueous	Ammonia - N (gas	350.1	0.14		mg/L	64
008	HS-MW-6D	Aqueous	Chloride	300.0	66		mg/L	64
008	HS-MW-6D	Aqueous	Hardness (total)	SM 2340C-	490		mg/L	64
008	HS-MW-6D	Aqueous	Nitrate-Nitrite - N	353.2	0.012	BJ	mg/L	64
008	HS-MW-6D	Aqueous	Phosphorus	365.1	0.033	J	mg/L	64
008	HS-MW-6D	Aqueous	Sulfate	300.0	230		mg/L	64
008	HS-MW-6D	Aqueous	Acetone	8260B	3.4	J	ug/L	65
008	HS-MW-6D	Aqueous	Aluminum	200.8	62		ug/L	70
008	HS-MW-6D	Aqueous	Arsenic	200.8	3.5		ug/L	70
008	HS-MW-6D	Aqueous	Barium	200.8	28		ug/L	70

Detection Summary (Continued)

Lot Number: UC21029

Sample	Sample ID	Matrix	Parameter	Method	Result	Q	Units	Page
008	HS-MW-6D	Aqueous	Boron	200.8	55		ug/L	70
008	HS-MW-6D	Aqueous	Chromium	200.8	1.8	BJ	ug/L	70
008	HS-MW-6D	Aqueous	Iron	200.8	1500		ug/L	70
008	HS-MW-6D	Aqueous	Magnesium	200.8	23000		ug/L	70
008	HS-MW-6D	Aqueous	Nickel	200.8	2.3	J	ug/L	70
008	HS-MW-6D	Aqueous	Sodium	200.8	20000		ug/L	70
008	HS-MW-6D	Aqueous	Titanium	200.8	3.7	J	ug/L	70
008	HS-MW-6D	Aqueous	Zinc	200.8	4.9	J	ug/L	70

(149 detections)

Inorganic non-metals

Client: **GZA GeoEnvironmental, Inc.**

Laboratory ID: **UC21029-001**

Description: **HS-MW-10S**

Matrix: **Aqueous**

Date Sampled: **03/18/2019 1505**

Date Received: **03/21/2019**

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	350.1	(Ammonia - N) 350.1	1	03/28/2019 1454	MSG		11537
1		(Chloride) 300.0	1	04/02/2019 1407	SLU		12073
1	10-204-00-1-X	(Cyanide - To) SM 4500-CN E-	1	03/27/2019 1525	MSG	03/27/2019 1140	11401
1		(Hardness (to) SM 2340C-2011	1	03/27/2019 1719	KFE		11494
1		(Nitrate-Nitr) 353.2	1	03/23/2019 1728	MDD		11110
1		(Phosphorus) 365.1	1	03/26/2019 1413	DMA	03/25/2019 1335	11197
1		(Sulfate) 300.0	1	04/02/2019 1407	SLU		12072
1		(Sulfide) SM 4500-S2 F-2011	1	03/21/2019 2027	HET		10988

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
Ammonia - N (gas diffusion)		350.1	ND		0.10	0.020	mg/L	1
Chloride		**300.0**	**38**		**1.0**	**0.20**	**mg/L**	**1**
Cyanide - Total	57-12-5	SM 4500-CN E-	ND		0.010	0.010	mg/L	1
Hardness (total)		**SM 2340C-**	**320**		**10**	**2.0**	**mg/L**	**1**
Nitrate-Nitrite - N		**353.2**	**1.6**	**B**	**0.020**	**0.0015**	**mg/L**	**1**
Phosphorus	**7723-14-0**	**365.1**	**0.0057**	**J**	**0.050**	**0.0050**	**mg/L**	**1**
Sulfate		**300.0**	**5.4**		**1.0**	**0.20**	**mg/L**	**1**
Sulfide	18496-25-8	SM 4500-S2 F-	ND		1.0	1.0	mg/L	1

LOQ = Limit of Quantitation	B = Detected in the method blank	E = Quantitation of compound exceeded the calibration range
ND = Not detected at or above the LOQ	N = Recovery is out of criteria	P = The RPD between two GC columns exceeds 40%
H = Out of holding time	W = Reported on wet weight basis	

Volatile Organic Compounds by GC/MS

Client: **GZA GeoEnvironmental, Inc.**
Laboratory ID: **UC21029-001**
Description: **HS-MW-10S**
Matrix: **Aqueous**
Date Sampled: **03/18/2019 1505**
Date Received: **03/21/2019**

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	5030B	8260B	1	03/29/2019 1136	BWS		11689

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
Acetone	**67-64-1**	**8260B**	**3.2**	**J**	**20**	**2.0**	**ug/L**	**1**
Benzene	71-43-2	8260B	ND		1.0	0.40	ug/L	1
Bromodichloromethane	75-27-4	8260B	ND		1.0	0.40	ug/L	1
Bromoform	75-25-2	8260B	ND		1.0	0.40	ug/L	1
Bromomethane (Methyl bromide)	74-83-9	8260B	ND		2.0	0.40	ug/L	1
2-Butanone (MEK)	78-93-3	8260B	ND		10	2.0	ug/L	1
Carbon disulfide	75-15-0	8260B	ND		1.0	0.40	ug/L	1
Carbon tetrachloride	56-23-5	8260B	ND		1.0	0.40	ug/L	1
Chlorobenzene	108-90-7	8260B	ND		1.0	0.40	ug/L	1
Chloroethane	75-00-3	8260B	ND		2.0	0.40	ug/L	1
Chloroform	67-66-3	8260B	ND		1.0	0.40	ug/L	1
Chloromethane (Methyl chloride)	74-87-3	8260B	ND		1.0	0.50	ug/L	1
Cyclohexane	110-82-7	8260B	ND		1.0	0.40	ug/L	1
1,2-Dibromo-3-chloropropane (DBCP)	96-12-8	8260B	ND		1.0	0.40	ug/L	1
Dibromochloromethane	124-48-1	8260B	ND		1.0	0.40	ug/L	1
1,2-Dibromoethane (EDB)	106-93-4	8260B	ND		1.0	0.40	ug/L	1
1,2-Dichlorobenzene	95-50-1	8260B	ND		1.0	0.40	ug/L	1
1,3-Dichlorobenzene	541-73-1	8260B	ND		1.0	0.40	ug/L	1
1,4-Dichlorobenzene	106-46-7	8260B	ND		1.0	0.40	ug/L	1
Dichlorodifluoromethane	75-71-8	8260B	ND		2.0	0.60	ug/L	1
1,1-Dichloroethane	75-34-3	8260B	ND		1.0	0.40	ug/L	1
1,2-Dichloroethane	107-06-2	8260B	ND		1.0	0.40	ug/L	1
1,1-Dichloroethene	75-35-4	8260B	ND		1.0	0.40	ug/L	1
cis-1,2-Dichloroethene	156-59-2	8260B	ND		1.0	0.40	ug/L	1
trans-1,2-Dichloroethene	156-60-5	8260B	ND		1.0	0.40	ug/L	1
1,2-Dichloropropane	78-87-5	8260B	ND		1.0	0.40	ug/L	1
cis-1,3-Dichloropropene	10061-01-5	8260B	ND		1.0	0.40	ug/L	1
trans-1,3-Dichloropropene	10061-02-6	8260B	ND		1.0	0.40	ug/L	1
Ethylbenzene	100-41-4	8260B	ND		1.0	0.40	ug/L	1
2-Hexanone	591-78-6	8260B	ND		10	2.0	ug/L	1
Isopropylbenzene	98-82-8	8260B	ND		1.0	0.40	ug/L	1
Methyl acetate	79-20-9	8260B	ND		1.0	0.40	ug/L	1
Methyl tertiary butyl ether (MTBE)	1634-04-4	8260B	ND		1.0	0.40	ug/L	1
4-Methyl-2-pentanone	108-10-1	8260B	ND		10	2.0	ug/L	1
Methylcyclohexane	108-87-2	8260B	ND		5.0	0.40	ug/L	1
Methylene chloride	75-09-2	8260B	ND		1.0	0.40	ug/L	1
Styrene	100-42-5	8260B	ND		1.0	0.41	ug/L	1
1,1,2,2-Tetrachloroethane	79-34-5	8260B	ND		1.0	0.40	ug/L	1
Tetrachloroethene	127-18-4	8260B	ND		1.0	0.40	ug/L	1
Toluene	108-88-3	8260B	ND		1.0	0.40	ug/L	1
1,1,2-Trichloro-1,2,2-Trifluoroethane	76-13-1	8260B	ND		1.0	0.42	ug/L	1
1,2,4-Trichlorobenzene	120-82-1	8260B	ND		1.0	0.40	ug/L	1
1,1,1-Trichloroethane	71-55-6	8260B	ND		1.0	0.40	ug/L	1
1,1,2-Trichloroethane	79-00-5	8260B	ND		1.0	0.40	ug/L	1

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%

Volatile Organic Compounds by GC/MS

Client:	**GZA GeoEnvironmental, Inc.**	Laboratory ID:	**UC21029-001**
Description:	**HS-MW-10S**	Matrix:	**Aqueous**
Date Sampled:	**03/18/2019 1505**		
Date Received:	**03/21/2019**		

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	5030B	8260B	1	03/29/2019 1136	BWS		11689

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
Trichloroethene	79-01-6	8260B	ND		1.0	0.40	ug/L	1
Trichlorofluoromethane	75-69-4	8260B	ND		1.0	0.40	ug/L	1
Vinyl chloride	75-01-4	8260B	ND		1.0	0.40	ug/L	1
Xylenes (total)	1330-20-7	8260B	ND		1.0	0.40	ug/L	1
m+p - Xylenes	179601-23-1	8260B	ND		1.0	0.40	ug/L	1
o - Xylenes	95-47-6	8260B	ND		1.0	0.40	ug/L	1

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
1,2-Dichloroethane-d4		100	70-130
Bromofluorobenzene		91	70-130
Toluene-d8		97	70-130

LOQ = Limit of Quantitation	B = Detected in the method blank	E = Quantitation of compound exceeded the calibration range
ND = Not detected at or above the LOQ	N = Recovery is out of criteria	P = The RPD between two GC columns exceeds 40%
H = Out of holding time	W = Reported on wet weight basis	

Semivolatile Organic Compounds by GC/MS

Client: **GZA GeoEnvironmental, Inc.**
Laboratory ID: **UC21029-001**
Description: **HS-MW-10S**
Matrix: **Aqueous**
Date Sampled: **03/18/2019 1505**
Date Received: **03/21/2019**

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	3520C	8270D	1	04/03/2019 2004	SCD	03/25/2019 1939	11166

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
Acenaphthene	83-32-9	8270D	ND		0.20	0.040	ug/L	1
Acenaphthylene	208-96-8	8270D	ND		0.20	0.040	ug/L	1
Acetophenone	98-86-2	8270D	ND		0.80	0.50	ug/L	1
Anthracene	120-12-7	8270D	ND		0.20	0.060	ug/L	1
Atrazine	1912-24-9	8270D	ND		0.80	0.50	ug/L	1
Benzidine	92-87-5	8270D	ND		20	1.0	ug/L	1
Benzo(a)anthracene	56-55-3	8270D	ND		0.20	0.040	ug/L	1
Benzo(a)pyrene	50-32-8	8270D	ND		0.20	0.070	ug/L	1
Benzo(b)fluoranthene	205-99-2	8270D	ND		0.20	0.040	ug/L	1
Benzo(g,h,i)perylene	191-24-2	8270D	ND		0.20	0.040	ug/L	1
Benzo(k)fluoranthene	207-08-9	8270D	ND		0.20	0.040	ug/L	1
Butyl benzyl phthalate	85-68-7	8270D	ND		0.80	0.50	ug/L	1
Caprolactam	105-60-2	8270D	ND		1.6	1.0	ug/L	1
Carbazole	86-74-8	8270D	ND		0.80	0.50	ug/L	1
4-Chloro-3-methyl phenol	59-50-7	8270D	ND		0.80	0.50	ug/L	1
bis(2-Chloroethyl)ether	111-44-4	8270D	ND		0.80	0.50	ug/L	1
2-Chloronaphthalene	91-58-7	8270D	ND		0.80	0.50	ug/L	1
2-Chlorophenol	95-57-8	8270D	ND		0.80	0.50	ug/L	1
Chrysene	218-01-9	8270D	ND		0.20	0.030	ug/L	1
Dibenzo(a,h)anthracene	53-70-3	8270D	ND		0.20	0.030	ug/L	1
Dibenzofuran	132-64-9	8270D	ND		0.80	0.50	ug/L	1
3,3'-Dichlorobenzidine	91-94-1	8270D	ND		4.0	1.8	ug/L	1
2,4-Dichlorophenol	120-83-2	8270D	ND		1.6	1.0	ug/L	1
Diethylphthalate	84-66-2	8270D	ND		0.80	0.50	ug/L	1
Dimethyl phthalate	131-11-3	8270D	ND		0.80	0.50	ug/L	1
2,4-Dimethylphenol	105-67-9	8270D	ND		0.80	0.48	ug/L	1
Di-n-butyl phthalate	84-74-2	8270D	ND		0.80	0.50	ug/L	1
4,6-Dinitro-2-methylphenol	534-52-1	8270D	ND		4.0	1.0	ug/L	1
2,4-Dinitrotoluene	121-14-2	8270D	ND		1.6	0.50	ug/L	1
Di-n-octylphthalate	117-84-0	8270D	ND		0.80	0.50	ug/L	1
1,2-Diphenylhydrazine(as azobenzene)	103-33-3	8270D	ND		0.80	0.50	ug/L	1
bis(2-Ethylhexyl)phthalate	117-81-7	8270D	ND		4.0	0.50	ug/L	1
Fluoranthene	206-44-0	8270D	ND		0.20	0.10	ug/L	1
Fluorene	86-73-7	8270D	ND		0.20	0.030	ug/L	1
Hexachlorobenzene	118-74-1	8270D	ND		0.80	0.50	ug/L	1
Hexachlorobutadiene	87-68-3	8270D	ND		0.80	0.50	ug/L	1
Hexachlorocyclopentadiene	77-47-4	8270D	ND		4.0	2.0	ug/L	1
Hexachloroethane	67-72-1	8270D	ND		0.80	0.31	ug/L	1
Indeno(1,2,3-c,d)pyrene	193-39-5	8270D	ND		0.20	0.040	ug/L	1
Isophorone	78-59-1	8270D	ND		0.80	0.50	ug/L	1
2-Methylnaphthalene	91-57-6	8270D	ND		0.20	0.040	ug/L	1
2-Methylphenol	95-48-7	8270D	ND		0.80	0.21	ug/L	1
3+4-Methylphenol	106-44-5	8270D	ND		1.6	1.5	ug/L	1
Naphthalene	91-20-3	8270D	ND		0.20	0.050	ug/L	1

LOQ = Limit of Quantitation
ND = Not detected at or above the LOQ
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B = Detected in the method blank
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W = Reported on wet weight basis
E = Quantitation of compound exceeded the calibration range
P = The RPD between two GC columns exceeds 40%

Semivolatile Organic Compounds by GC/MS

Client: **GZA GeoEnvironmental, Inc.**
Laboratory ID: **UC21029-001**
Description: **HS-MW-10S**
Matrix: **Aqueous**
Date Sampled: **03/18/2019 1505**
Date Received: **03/21/2019**

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	3520C	8270D	1	04/03/2019 2004	SCD	03/25/2019 1939	11166

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
Nitrobenzene	98-95-3	8270D	ND		0.80	0.55	ug/L	1
2-Nitrophenol	88-75-5	8270D	ND		1.6	1.0	ug/L	1
N-Nitrosodi-n-propylamine	621-64-7	8270D	ND		0.80	0.50	ug/L	1
N-Nitrosodiphenylamine (Diphenylamine)	86-30-6	8270D	ND		0.80	0.50	ug/L	1
Pentachlorophenol	87-86-5	8270D	ND		4.0	2.0	ug/L	1
Phenanthrene	85-01-8	8270D	ND		0.20	0.060	ug/L	1
Phenol	108-95-2	8270D	ND		0.80	0.50	ug/L	1
Pyrene	129-00-0	8270D	ND		0.20	0.10	ug/L	1
2,4,5-Trichlorophenol	95-95-4	8270D	ND		0.80	0.50	ug/L	1
2,4,6-Trichlorophenol	88-06-2	8270D	ND		0.80	0.50	ug/L	1

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
2-Fluorobiphenyl		59	37-129
2-Fluorophenol		38	24-127
Nitrobenzene-d5		76	38-127
Phenol-d5		53	28-128
Terphenyl-d14		93	10-148
2,4,6-Tribromophenol		60	35-144

LOQ = Limit of Quantitation
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W = Reported on wet weight basis
E = Quantitation of compound exceeded the calibration range
P = The RPD between two GC columns exceeds 40%

CVAA

Client: **GZA GeoEnvironmental, Inc.**	Laboratory ID: **UC21029-001**
Description: **HS-MW-10S**	Matrix: **Aqueous**
Date Sampled: **03/18/2019 1505**	
Date Received: **03/21/2019**	

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1		7470A	1	03/28/2019 1217	JMH	03/27/2019 1341	11405

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
Mercury	7439-97-6	7470A	ND		0.00020	0.000091	mg/L	1

LOQ = Limit of Quantitation	B = Detected in the method blank	E = Quantitation of compound exceeded the calibration range
ND = Not detected at or above the LOQ	N = Recovery is out of criteria	P = The RPD between two GC columns exceeds 40%
H = Out of holding time	W = Reported on wet weight basis	

ICP-MS

Client: **GZA GeoEnvironmental, Inc.** Laboratory ID: **UC21029-001**

Description: **HS-MW-10S** Matrix: **Aqueous**

Date Sampled: **03/18/2019 1505**

Date Received: **03/21/2019**

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	200.2	200.8	1	03/28/2019 0021	BNW	03/23/2019 0847	11022

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
Aluminum	**7429-90-5**	**200.8**	**13**	**J**	**40**	**10**	**ug/L**	**1**
Antimony	7440-36-0	200.8	ND		2.0	0.50	ug/L	1
Arsenic	7440-38-2	200.8	ND		2.0	1.3	ug/L	1
Barium	**7440-39-3**	**200.8**	**60**		**5.0**	**1.3**	**ug/L**	**1**
Beryllium	7440-41-7	200.8	ND		0.40	0.15	ug/L	1
Boron	**7440-42-8**	**200.8**	**28**	**J**	**50**	**6.3**	**ug/L**	**1**
Cadmium	7440-43-9	200.8	ND		0.50	0.13	ug/L	1
Chromium	7440-47-3	200.8	ND		5.0	1.3	ug/L	1
Cobalt	7440-48-4	200.8	ND		5.0	1.3	ug/L	1
Copper	7440-50-8	200.8	ND		5.0	1.3	ug/L	1
Iron	**7439-89-6**	**200.8**	**380**		**50**	**13**	**ug/L**	**1**
Lead	7439-92-1	200.8	ND		1.0	0.25	ug/L	1
Magnesium	**7439-95-4**	**200.8**	**24000**		**400**	**50**	**ug/L**	**1**
Molybdenum	7439-98-7	200.8	ND		10	2.5	ug/L	1
Nickel	**7440-02-0**	**200.8**	**1.3**	**J**	**5.0**	**1.3**	**ug/L**	**1**
Selenium	7782-49-2	200.8	ND		5.0	1.3	ug/L	1
Silver	7440-22-4	200.8	ND		1.0	0.25	ug/L	1
Sodium	**7440-23-5**	**200.8**	**15000**		**400**	**150**	**ug/L**	**1**
Thallium	7440-28-0	200.8	ND		0.50	0.15	ug/L	1
Titanium	**7440-32-6**	**200.8**	**1.4**	**J**	**5.0**	**1.3**	**ug/L**	**1**
Vanadium	7440-62-2	200.8	ND		5.0	2.5	ug/L	1
Zinc	7440-66-6	200.8	ND		10	2.5	ug/L	1

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E = Quantitation of compound exceeded the calibration range
P = The RPD between two GC columns exceeds 40%

PFAS by LC/MS/MS

Client: **GZA GeoEnvironmental, Inc.**
Laboratory ID: **UC21029-001**
Description: **HS-MW-10S**
Matrix: **Aqueous**
Date Sampled: **03/18/2019 1505**
Date Received: **03/21/2019**

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	537 MOD	537 Modified-ID	1	03/27/2019 2232	SES	03/26/2019 1814	11294

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	Units	Run
1H, 1H, 2H, 2H-perfluorodecane sulfonic acid (8:2 FTS)	39108-34-4	537 Modified-	ND		3.5	ng/L	1
1H, 1H, 2H, 2H-perfluorooctane sulfonic acid (6:2 FTS)	27619-97-2	537 Modified-	ND		3.5	ng/L	1
N-ethylperfluoro-1-octanesulfonamide (EtFOSA)	4151-50-2	537 Modified-	ND		3.5	ng/L	1
N-methylperfluoro-1-octanesulfonamide (MeFOSA)	31506-32-8	537 Modified-	ND		7.0	ng/L	1
Perfluoro-1-butanesulfonic acid (PFBS)	375-73-5	537 Modified-	ND		3.5	ng/L	1
Perfluoro-1-decanesulfonic acid (PFDS)	335-77-3	537 Modified-	ND		3.5	ng/L	1
Perfluoro-1-heptanesulfonic acid (PFHpS)	**375-92-8**	**537 Modified-**	**4.7**		**3.5**	**ng/L**	**1**
Perfluoro-1-nonanesulfonic acid (PFNS)	68259-12-1	537 Modified-	ND		7.0	ng/L	1
Perfluoro-1-octanesulfonamide (PFOSA)	754-91-6	537 Modified-	ND		3.5	ng/L	1
Perfluoro-1-pentanesulfonic acid (PFPeS)	2706-91-4	537 Modified-	ND		3.5	ng/L	1
Perfluorohexanesulfonic acid (PFHxS)	**355-46-4**	**537 Modified-**	**6.0**		**3.5**	**ng/L**	**1**
Perfluoro-n-butanoic acid (PFBA)	375-22-4	537 Modified-	ND		3.5	ng/L	1
Perfluoro-n-decanoic acid (PFDA)	335-76-2	537 Modified-	ND		3.5	ng/L	1
Perfluoro-n-dodecanoic acid (PFDoA)	307-55-1	537 Modified-	ND		3.5	ng/L	1
Perfluoro-n-heptanoic acid (PFHpA)	375-85-9	537 Modified-	ND		3.5	ng/L	1
Perfluoro-n-hexanoic acid (PFHxA)	307-24-4	537 Modified-	ND		3.5	ng/L	1
Perfluoro-n-nonanoic acid (PFNA)	375-95-1	537 Modified-	ND		3.5	ng/L	1
Perfluoro-n-octanoic acid (PFOA)	**335-67-1**	**537 Modified-**	**12**		**1.8**	**ng/L**	**1**
Perfluoro-n-pentanoic acid (PFPeA)	2706-90-3	537 Modified-	ND		3.5	ng/L	1
Perfluoro-n-tetradecanoic acid (PFTeDA)	376-06-7	537 Modified-	ND		3.5	ng/L	1
Perfluoro-n-tridecanoic acid (PFTrDA)	72629-94-8	537 Modified-	ND		3.5	ng/L	1
Perfluoro-n-undecanoic acid (PFUdA)	2058-94-8	537 Modified-	ND		3.5	ng/L	1
Perfluorooctanesulfonic acid (PFOS)	**1763-23-1**	**537 Modified-**	**40**		**3.5**	**ng/L**	**1**

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
13C2_6:2FTS		104	50-150
13C2_8:2FTS		117	50-150
13C2_PFDoA		110	50-150
13C2_PFTeDA		118	50-150
13C3_PFBS		113	50-150
13C3_PFHxS		117	50-150
13C4_PFBA		110	50-150
13C4_PFHpA		107	50-150
13C5_PFHxA		112	50-150
13C5_PFPeA		114	50-150
13C6_PFDA		114	50-150
13C7_PFUdA		114	50-150
13C8_PFOA		115	50-150
13C8_PFOS		115	50-150
13C8_PFOSA		114	50-150
13C9_PFNA		109	50-150
d-EtFOSA		80	50-150
d-MeFOSA		76	50-150

LOQ = Limit of Quantitation
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W = Reported on wet weight basis
E = Quantitation of compound exceeded the calibration range
P = The RPD between two GC columns exceeds 40%

Inorganic non-metals

Client: **GZA GeoEnvironmental, Inc.**
Description: **HS-MW-10M**
Date Sampled: **03/18/2019 1235**
Date Received: **03/21/2019**

Laboratory ID: **UC21029-002**
Matrix: **Aqueous**

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	350.1	(Ammonia - N) 350.1	1	03/28/2019 1456	MSG		11537
1		(Chloride) 300.0	5	03/30/2019 0924	SLU		11833
1	10-204-00-1-X	(Cyanide - To) SM 4500-CN E-	1	03/28/2019 1227	MSG	03/28/2019 1101	11519
1		(Hardness (to) SM 2340C-2011	1	03/27/2019 1719	KFE		11494
1		(Nitrate-Nitr) 353.2	1	03/23/2019 1729	MDD		11110
1		(Phosphorus) 365.1	1	03/28/2019 1625	MSG	03/28/2019 1218	11531
1		(Sulfate) 300.0	1	03/30/2019 0858	SLU		11830
1		(Sulfide) SM 4500-S2 F-2011	1	03/21/2019 2027	HET		10988

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
Ammonia - N (gas diffusion)		350.1	ND		0.10	0.020	mg/L	1
Chloride		**300.0**	**440**		**5.0**	**1.0**	**mg/L**	**1**
Cyanide - Total	**57-12-5**	**SM 4500-CN**	**0.012**		**0.010**	**0.010**	**mg/L**	**1**
Hardness (total)		**SM 2340C-**	**440**		**10**	**2.0**	**mg/L**	**1**
Nitrate-Nitrite - N		**353.2**	**1.1**	**B**	**0.020**	**0.0015**	**mg/L**	**1**
Phosphorus	**7723-14-0**	**365.1**	**0.019**	**J**	**0.050**	**0.0050**	**mg/L**	**1**
Sulfate		**300.0**	**25**		**1.0**	**0.20**	**mg/L**	**1**
Sulfide	18496-25-8	SM 4500-S2 F-	ND		1.0	1.0	mg/L	1

LOQ = Limit of Quantitation
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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%

Volatile Organic Compounds by GC/MS

Client: **GZA GeoEnvironmental, Inc.**
Laboratory ID: **UC21029-002**
Description: **HS-MW-10M**
Matrix: **Aqueous**
Date Sampled: **03/18/2019 1235**
Date Received: **03/21/2019**

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	5030B	8260B	1	03/29/2019 1200	BWS		11689

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
Acetone	**67-64-1**	**8260B**	**3.0**	**J**	**20**	**2.0**	**ug/L**	**1**
Benzene	71-43-2	8260B	ND		1.0	0.40	ug/L	1
Bromodichloromethane	75-27-4	8260B	ND		1.0	0.40	ug/L	1
Bromoform	75-25-2	8260B	ND		1.0	0.40	ug/L	1
Bromomethane (Methyl bromide)	74-83-9	8260B	ND		2.0	0.40	ug/L	1
2-Butanone (MEK)	78-93-3	8260B	ND		10	2.0	ug/L	1
Carbon disulfide	75-15-0	8260B	ND		1.0	0.40	ug/L	1
Carbon tetrachloride	56-23-5	8260B	ND		1.0	0.40	ug/L	1
Chlorobenzene	108-90-7	8260B	ND		1.0	0.40	ug/L	1
Chloroethane	75-00-3	8260B	ND		2.0	0.40	ug/L	1
Chloroform	67-66-3	8260B	ND		1.0	0.40	ug/L	1
Chloromethane (Methyl chloride)	74-87-3	8260B	ND		1.0	0.50	ug/L	1
Cyclohexane	110-82-7	8260B	ND		1.0	0.40	ug/L	1
1,2-Dibromo-3-chloropropane (DBCP)	96-12-8	8260B	ND		1.0	0.40	ug/L	1
Dibromochloromethane	124-48-1	8260B	ND		1.0	0.40	ug/L	1
1,2-Dibromoethane (EDB)	106-93-4	8260B	ND		1.0	0.40	ug/L	1
1,2-Dichlorobenzene	95-50-1	8260B	ND		1.0	0.40	ug/L	1
1,3-Dichlorobenzene	541-73-1	8260B	ND		1.0	0.40	ug/L	1
1,4-Dichlorobenzene	106-46-7	8260B	ND		1.0	0.40	ug/L	1
Dichlorodifluoromethane	75-71-8	8260B	ND		2.0	0.60	ug/L	1
1,1-Dichloroethane	75-34-3	8260B	ND		1.0	0.40	ug/L	1
1,2-Dichloroethane	107-06-2	8260B	ND		1.0	0.40	ug/L	1
1,1-Dichloroethene	75-35-4	8260B	ND		1.0	0.40	ug/L	1
cis-1,2-Dichloroethene	156-59-2	8260B	ND		1.0	0.40	ug/L	1
trans-1,2-Dichloroethene	156-60-5	8260B	ND		1.0	0.40	ug/L	1
1,2-Dichloropropane	78-87-5	8260B	ND		1.0	0.40	ug/L	1
cis-1,3-Dichloropropene	10061-01-5	8260B	ND		1.0	0.40	ug/L	1
trans-1,3-Dichloropropene	10061-02-6	8260B	ND		1.0	0.40	ug/L	1
Ethylbenzene	100-41-4	8260B	ND		1.0	0.40	ug/L	1
2-Hexanone	591-78-6	8260B	ND		10	2.0	ug/L	1
Isopropylbenzene	98-82-8	8260B	ND		1.0	0.40	ug/L	1
Methyl acetate	79-20-9	8260B	ND		1.0	0.40	ug/L	1
Methyl tertiary butyl ether (MTBE)	1634-04-4	8260B	ND		1.0	0.40	ug/L	1
4-Methyl-2-pentanone	108-10-1	8260B	ND		10	2.0	ug/L	1
Methylcyclohexane	108-87-2	8260B	ND		5.0	0.40	ug/L	1
Methylene chloride	75-09-2	8260B	ND		1.0	0.40	ug/L	1
Styrene	100-42-5	8260B	ND		1.0	0.41	ug/L	1
1,1,2,2-Tetrachloroethane	79-34-5	8260B	ND		1.0	0.40	ug/L	1
Tetrachloroethene	127-18-4	8260B	ND		1.0	0.40	ug/L	1
Toluene	108-88-3	8260B	ND		1.0	0.40	ug/L	1
1,1,2-Trichloro-1,2,2-Trifluoroethane	76-13-1	8260B	ND		1.0	0.42	ug/L	1
1,2,4-Trichlorobenzene	120-82-1	8260B	ND		1.0	0.40	ug/L	1
1,1,1-Trichloroethane	71-55-6	8260B	ND		1.0	0.40	ug/L	1
1,1,2-Trichloroethane	79-00-5	8260B	ND		1.0	0.40	ug/L	1

LOQ = Limit of Quantitation
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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%

Volatile Organic Compounds by GC/MS

Client: **GZA GeoEnvironmental, Inc.**
Laboratory ID: **UC21029-002**
Description: **HS-MW-10M**
Matrix: **Aqueous**
Date Sampled: **03/18/2019 1235**
Date Received: **03/21/2019**

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	5030B	8260B	1	03/29/2019 1200	BWS		11689

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
Trichloroethene	79-01-6	8260B	ND		1.0	0.40	ug/L	1
Trichlorofluoromethane	75-69-4	8260B	ND		1.0	0.40	ug/L	1
Vinyl chloride	75-01-4	8260B	ND		1.0	0.40	ug/L	1
Xylenes (total)	1330-20-7	8260B	ND		1.0	0.40	ug/L	1
m+p - Xylenes	179601-23-1	8260B	ND		1.0	0.40	ug/L	1
o - Xylenes	95-47-6	8260B	ND		1.0	0.40	ug/L	1

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
1,2-Dichloroethane-d4		102	70-130
Bromofluorobenzene		96	70-130
Toluene-d8		98	70-130

LOQ = Limit of Quantitation	B = Detected in the method blank	E = Quantitation of compound exceeded the calibration range
ND = Not detected at or above the LOQ	N = Recovery is out of criteria	P = The RPD between two GC columns exceeds 40%
H = Out of holding time	W = Reported on wet weight basis	

Semivolatile Organic Compounds by GC/MS

Client: **GZA GeoEnvironmental, Inc.** Laboratory ID: **UC21029-002**
Description: **HS-MW-10M** Matrix: **Aqueous**
Date Sampled: **03/18/2019 1235**
Date Received: **03/21/2019**

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	3520C	8270D	1	04/03/2019 1600	SCD	03/25/2019 1939	11166

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
Acenaphthene	83-32-9	8270D	ND		0.20	0.040	ug/L	1
Acenaphthylene	208-96-8	8270D	ND		0.20	0.040	ug/L	1
Acetophenone	98-86-2	8270D	ND		0.80	0.50	ug/L	1
Anthracene	120-12-7	8270D	ND		0.20	0.060	ug/L	1
Atrazine	1912-24-9	8270D	ND		0.80	0.50	ug/L	1
Benzidine	92-87-5	8270D	ND		20	1.0	ug/L	1
Benzo(a)anthracene	56-55-3	8270D	ND		0.20	0.040	ug/L	1
Benzo(a)pyrene	50-32-8	8270D	ND		0.20	0.070	ug/L	1
Benzo(b)fluoranthene	205-99-2	8270D	ND		0.20	0.040	ug/L	1
Benzo(g,h,i)perylene	191-24-2	8270D	ND		0.20	0.040	ug/L	1
Benzo(k)fluoranthene	207-08-9	8270D	ND		0.20	0.040	ug/L	1
Butyl benzyl phthalate	85-68-7	8270D	ND		0.80	0.50	ug/L	1
Caprolactam	105-60-2	8270D	ND		1.6	1.0	ug/L	1
Carbazole	86-74-8	8270D	ND		0.80	0.50	ug/L	1
4-Chloro-3-methyl phenol	59-50-7	8270D	ND		0.80	0.50	ug/L	1
bis(2-Chloroethyl)ether	111-44-4	8270D	ND		0.80	0.50	ug/L	1
2-Chloronaphthalene	91-58-7	8270D	ND		0.80	0.50	ug/L	1
2-Chlorophenol	95-57-8	8270D	ND		0.80	0.50	ug/L	1
Chrysene	218-01-9	8270D	ND		0.20	0.030	ug/L	1
Dibenzo(a,h)anthracene	53-70-3	8270D	ND		0.20	0.030	ug/L	1
Dibenzofuran	132-64-9	8270D	ND		0.80	0.50	ug/L	1
3,3'-Dichlorobenzidine	91-94-1	8270D	ND		4.0	1.8	ug/L	1
2,4-Dichlorophenol	120-83-2	8270D	ND		1.6	1.0	ug/L	1
Diethylphthalate	84-66-2	8270D	ND		0.80	0.50	ug/L	1
Dimethyl phthalate	131-11-3	8270D	ND		0.80	0.50	ug/L	1
2,4-Dimethylphenol	105-67-9	8270D	ND		0.80	0.48	ug/L	1
Di-n-butyl phthalate	84-74-2	8270D	ND		0.80	0.50	ug/L	1
4,6-Dinitro-2-methylphenol	534-52-1	8270D	ND		4.0	1.0	ug/L	1
2,4-Dinitrotoluene	121-14-2	8270D	ND		1.6	0.50	ug/L	1
Di-n-octylphthalate	117-84-0	8270D	ND		0.80	0.50	ug/L	1
1,2-Diphenylhydrazine(as azobenzene)	103-33-3	8270D	ND		0.80	0.50	ug/L	1
bis(2-Ethylhexyl)phthalate	117-81-7	8270D	ND		4.0	0.50	ug/L	1
Fluoranthene	206-44-0	8270D	ND		0.20	0.10	ug/L	1
Fluorene	86-73-7	8270D	ND		0.20	0.030	ug/L	1
Hexachlorobenzene	118-74-1	8270D	ND		0.80	0.50	ug/L	1
Hexachlorobutadiene	87-68-3	8270D	ND		0.80	0.50	ug/L	1
Hexachlorocyclopentadiene	77-47-4	8270D	ND		4.0	2.0	ug/L	1
Hexachloroethane	67-72-1	8270D	ND		0.80	0.31	ug/L	1
Indeno(1,2,3-c,d)pyrene	193-39-5	8270D	ND		0.20	0.040	ug/L	1
Isophorone	78-59-1	8270D	ND		0.80	0.50	ug/L	1
2-Methylnaphthalene	91-57-6	8270D	ND		0.20	0.040	ug/L	1
2-Methylphenol	95-48-7	8270D	ND		0.80	0.21	ug/L	1
3+4-Methylphenol	106-44-5	8270D	ND		1.6	1.5	ug/L	1
Naphthalene	91-20-3	8270D	ND		0.20	0.050	ug/L	1

LOQ = Limit of Quantitation
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E = Quantitation of compound exceeded the calibration range
P = The RPD between two GC columns exceeds 40%

Semivolatile Organic Compounds by GC/MS

Client: **GZA GeoEnvironmental, Inc.**
Laboratory ID: **UC21029-002**
Description: **HS-MW-10M**
Matrix: **Aqueous**
Date Sampled: **03/18/2019 1235**
Date Received: **03/21/2019**

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	3520C	8270D	1	04/03/2019 1600	SCD	03/25/2019 1939	11166

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
Nitrobenzene	98-95-3	8270D	ND		0.80	0.55	ug/L	1
2-Nitrophenol	88-75-5	8270D	ND		1.6	1.0	ug/L	1
N-Nitrosodi-n-propylamine	621-64-7	8270D	ND		0.80	0.50	ug/L	1
N-Nitrosodiphenylamine (Diphenylamine)	86-30-6	8270D	ND		0.80	0.50	ug/L	1
Pentachlorophenol	87-86-5	8270D	ND		4.0	2.0	ug/L	1
Phenanthrene	85-01-8	8270D	ND		0.20	0.060	ug/L	1
Phenol	108-95-2	8270D	ND		0.80	0.50	ug/L	1
Pyrene	129-00-0	8270D	ND		0.20	0.10	ug/L	1
2,4,5-Trichlorophenol	95-95-4	8270D	ND		0.80	0.50	ug/L	1
2,4,6-Trichlorophenol	88-06-2	8270D	ND		0.80	0.50	ug/L	1

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
2-Fluorobiphenyl		59	37-129
2-Fluorophenol		38	24-127
Nitrobenzene-d5		75	38-127
Phenol-d5		50	28-128
Terphenyl-d14		79	10-148
2,4,6-Tribromophenol		59	35-144

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CVAA

Client: **GZA GeoEnvironmental, Inc.**
Laboratory ID: **UC21029-002**
Description: **HS-MW-10M**
Matrix: **Aqueous**
Date Sampled: **03/18/2019 1235**
Date Received: **03/21/2019**

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1		7470A	1	03/28/2019 1225	JMH	03/27/2019 1341	11405

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
Mercury	7439-97-6	7470A	ND		0.00020	0.000091	mg/L	1

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ICP-MS

Client: **GZA GeoEnvironmental, Inc.**
Laboratory ID: **UC21029-002**
Description: **HS-MW-10M**
Matrix: **Aqueous**
Date Sampled: **03/18/2019 1235**
Date Received: **03/21/2019**

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	200.2	200.8	1	03/28/2019 0026	BNW	03/23/2019 0847	11022
2	200.2	200.8	5	03/28/2019 1648	BNW	03/23/2019 0847	11022

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
Aluminum	**7429-90-5**	**200.8**	**16**	**J**	**40**	**10**	**ug/L**	**1**
Antimony	7440-36-0	200.8	ND		2.0	0.50	ug/L	1
Arsenic	7440-38-2	200.8	ND		2.0	1.3	ug/L	1
Barium	**7440-39-3**	**200.8**	**120**		**5.0**	**1.3**	**ug/L**	**1**
Beryllium	7440-41-7	200.8	ND		0.40	0.15	ug/L	1
Boron	**7440-42-8**	**200.8**	**25**	**J**	**50**	**6.3**	**ug/L**	**1**
Cadmium	7440-43-9	200.8	ND		0.50	0.13	ug/L	1
Chromium	**7440-47-3**	**200.8**	**1.6**	**BJ**	**5.0**	**1.3**	**ug/L**	**1**
Cobalt	7440-48-4	200.8	ND		5.0	1.3	ug/L	1
Copper	7440-50-8	200.8	ND		5.0	1.3	ug/L	1
Iron	**7439-89-6**	**200.8**	**560**		**50**	**13**	**ug/L**	**1**
Lead	7439-92-1	200.8	ND		1.0	0.25	ug/L	1
Magnesium	**7439-95-4**	**200.8**	**30000**		**400**	**50**	**ug/L**	**1**
Molybdenum	7439-98-7	200.8	ND		10	2.5	ug/L	1
Nickel	**7440-02-0**	**200.8**	**1.8**	**J**	**5.0**	**1.3**	**ug/L**	**1**
Selenium	7782-49-2	200.8	ND		5.0	1.3	ug/L	1
Silver	7440-22-4	200.8	ND		1.0	0.25	ug/L	1
Sodium	**7440-23-5**	**200.8**	**240000**		**2000**	**750**	**ug/L**	**2**
Thallium	7440-28-0	200.8	ND		0.50	0.15	ug/L	1
Titanium	**7440-32-6**	**200.8**	**1.7**	**J**	**5.0**	**1.3**	**ug/L**	**1**
Vanadium	7440-62-2	200.8	ND		5.0	2.5	ug/L	1
Zinc	7440-66-6	200.8	ND		10	2.5	ug/L	1

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PFAS by LC/MS/MS

Client: **GZA GeoEnvironmental, Inc.** Laboratory ID: **UC21029-002**
Description: **HS-MW-10M** Matrix: **Aqueous**
Date Sampled: **03/18/2019 1235**
Date Received: **03/21/2019**

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	537 MOD	537 Modified-ID	1	03/27/2019 2245	SES	03/26/2019 1814	11294

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	Units	Run
1H, 1H, 2H, 2H-perfluorodecane sulfonic acid (8:2 FTS)	39108-34-4	537 Modified-	ND		3.5	ng/L	1
1H, 1H, 2H, 2H-perfluorooctane sulfonic acid (6:2 FTS)	27619-97-2	537 Modified-	ND		3.5	ng/L	1
N-ethylperfluoro-1-octanesulfonamide (EtFOSA)	4151-50-2	537 Modified-	ND		3.5	ng/L	1
N-methylperfluoro-1-octanesulfonamide (MeFOSA)	31506-32-8	537 Modified-	ND		7.0	ng/L	1
Perfluoro-1-butanesulfonic acid (PFBS)	**375-73-5**	**537 Modified-**	**8.5**		**3.5**	**ng/L**	**1**
Perfluoro-1-decanesulfonic acid (PFDS)	335-77-3	537 Modified-	ND		3.5	ng/L	1
Perfluoro-1-heptanesulfonic acid (PFHpS)	375-92-8	537 Modified-	ND		3.5	ng/L	1
Perfluoro-1-nonanesulfonic acid (PFNS)	68259-12-1	537 Modified-	ND		7.0	ng/L	1
Perfluoro-1-octanesulfonamide (PFOSA)	754-91-6	537 Modified-	ND		3.5	ng/L	1
Perfluoro-1-pentanesulfonic acid (PFPeS)	2706-91-4	537 Modified-	ND		3.5	ng/L	1
Perfluorohexanesulfonic acid (PFHxS)	**355-46-4**	**537 Modified-**	**4.8**		**3.5**	**ng/L**	**1**
Perfluoro-n-butanoic acid (PFBA)	375-22-4	537 Modified-	ND		3.5	ng/L	1
Perfluoro-n-decanoic acid (PFDA)	335-76-2	537 Modified-	ND		3.5	ng/L	1
Perfluoro-n-dodecanoic acid (PFDoA)	307-55-1	537 Modified-	ND		3.5	ng/L	1
Perfluoro-n-heptanoic acid (PFHpA)	375-85-9	537 Modified-	ND		3.5	ng/L	1
Perfluoro-n-hexanoic acid (PFHxA)	307-24-4	537 Modified-	ND		3.5	ng/L	1
Perfluoro-n-nonanoic acid (PFNA)	375-95-1	537 Modified-	ND		3.5	ng/L	1
Perfluoro-n-octanoic acid (PFOA)	**335-67-1**	**537 Modified-**	**8.4**		**1.8**	**ng/L**	**1**
Perfluoro-n-pentanoic acid (PFPeA)	2706-90-3	537 Modified-	ND		3.5	ng/L	1
Perfluoro-n-tetradecanoic acid (PFTeDA)	376-06-7	537 Modified-	ND		3.5	ng/L	1
Perfluoro-n-tridecanoic acid (PFTrDA)	72629-94-8	537 Modified-	ND		3.5	ng/L	1
Perfluoro-n-undecanoic acid (PFUdA)	2058-94-8	537 Modified-	ND		3.5	ng/L	1
Perfluorooctanesulfonic acid (PFOS)	**1763-23-1**	**537 Modified-**	**13**		**3.5**	**ng/L**	**1**

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
13C2_6:2FTS		94	50-150
13C2_8:2FTS		104	50-150
13C2_PFDoA		104	50-150
13C2_PFTeDA		107	50-150
13C3_PFBS		109	50-150
13C3_PFHxS		106	50-150
13C4_PFBA		105	50-150
13C4_PFHpA		104	50-150
13C5_PFHxA		109	50-150
13C5_PFPeA		109	50-150
13C6_PFDA		103	50-150
13C7_PFUdA		110	50-150
13C8_PFOA		109	50-150
13C8_PFOS		106	50-150
13C8_PFOSA		104	50-150
13C9_PFNA		104	50-150
d-EtFOSA		79	50-150
d-MeFOSA		72	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%

Inorganic non-metals

Client: **GZA GeoEnvironmental, Inc.**
Laboratory ID: **UC21029-003**
Description: **HS-MW-10D**
Matrix: **Aqueous**
Date Sampled: **03/18/2019 1210**
Date Received: **03/21/2019**

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	350.1	(Ammonia - N) 350.1	1	03/29/2019 1417	DMA		11687
1		(Chloride) 300.0	1	03/30/2019 0950	SLU		11833
1	10-204-00-1-X	(Cyanide - To) SM 4500-CN E-	1	03/28/2019 1228	MSG	03/28/2019 1101	11519
1		(Hardness (to) SM 2340C-2011	1	03/27/2019 1719	KFE		11494
1		(Nitrate-Nitr) 353.2	1	03/23/2019 1701	MDD		11110
1		(Phosphorus) 365.1	1	03/28/2019 1625	MSG	03/28/2019 1218	11531
2		(Sulfate) 300.0	5	04/02/2019 1423	SLU		12072
1		(Sulfide) SM 4500-S2 F-2011	1	03/21/2019 2027	HET		10988

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
Ammonia - N (gas diffusion)		**350.1**	**0.35**		**0.10**	**0.020**	**mg/L**	**1**
Chloride		**300.0**	**3.9**		**1.0**	**0.20**	**mg/L**	**1**
Cyanide - Total	**57-12-5**	**SM 4500-CN**	**0.011**		**0.010**	**0.010**	**mg/L**	**1**
Hardness (total)		**SM 2340C-**	**520**		**10**	**2.0**	**mg/L**	**1**
Nitrate-Nitrite - N		**353.2**	**0.014**	**BJ**	**0.020**	**0.0015**	**mg/L**	**1**
Phosphorus	**7723-14-0**	**365.1**	**0.055**		**0.050**	**0.0050**	**mg/L**	**1**
Sulfate		**300.0**	**270**		**5.0**	**1.0**	**mg/L**	**2**
Sulfide	18496-25-8	SM 4500-S2 F-	ND		1.0	1.0	mg/L	1

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ND = Not detected at or above the LOQ
N = Recovery is out of criteria
P = The RPD between two GC columns exceeds 40%
H = Out of holding time
W = Reported on wet weight basis

Volatile Organic Compounds by GC/MS

Client: **GZA GeoEnvironmental, Inc.**
Laboratory ID: **UC21029-003**
Description: **HS-MW-10D**
Matrix: **Aqueous**
Date Sampled: **03/18/2019 1210**
Date Received: **03/21/2019**

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	5030B	8260B	1	03/29/2019 1222	BWS		11689

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
Acetone	**67-64-1**	**8260B**	**2.7**	**J**	**20**	**2.0**	**ug/L**	**1**
Benzene	71-43-2	8260B	ND		1.0	0.40	ug/L	1
Bromodichloromethane	75-27-4	8260B	ND		1.0	0.40	ug/L	1
Bromoform	75-25-2	8260B	ND		1.0	0.40	ug/L	1
Bromomethane (Methyl bromide)	74-83-9	8260B	ND		2.0	0.40	ug/L	1
2-Butanone (MEK)	78-93-3	8260B	ND		10	2.0	ug/L	1
Carbon disulfide	75-15-0	8260B	ND		1.0	0.40	ug/L	1
Carbon tetrachloride	56-23-5	8260B	ND		1.0	0.40	ug/L	1
Chlorobenzene	108-90-7	8260B	ND		1.0	0.40	ug/L	1
Chloroethane	75-00-3	8260B	ND		2.0	0.40	ug/L	1
Chloroform	67-66-3	8260B	ND		1.0	0.40	ug/L	1
Chloromethane (Methyl chloride)	74-87-3	8260B	ND		1.0	0.50	ug/L	1
Cyclohexane	110-82-7	8260B	ND		1.0	0.40	ug/L	1
1,2-Dibromo-3-chloropropane (DBCP)	96-12-8	8260B	ND		1.0	0.40	ug/L	1
Dibromochloromethane	124-48-1	8260B	ND		1.0	0.40	ug/L	1
1,2-Dibromoethane (EDB)	106-93-4	8260B	ND		1.0	0.40	ug/L	1
1,2-Dichlorobenzene	95-50-1	8260B	ND		1.0	0.40	ug/L	1
1,3-Dichlorobenzene	541-73-1	8260B	ND		1.0	0.40	ug/L	1
1,4-Dichlorobenzene	106-46-7	8260B	ND		1.0	0.40	ug/L	1
Dichlorodifluoromethane	75-71-8	8260B	ND		2.0	0.60	ug/L	1
1,1-Dichloroethane	75-34-3	8260B	ND		1.0	0.40	ug/L	1
1,2-Dichloroethane	107-06-2	8260B	ND		1.0	0.40	ug/L	1
1,1-Dichloroethene	75-35-4	8260B	ND		1.0	0.40	ug/L	1
cis-1,2-Dichloroethene	156-59-2	8260B	ND		1.0	0.40	ug/L	1
trans-1,2-Dichloroethene	156-60-5	8260B	ND		1.0	0.40	ug/L	1
1,2-Dichloropropane	78-87-5	8260B	ND		1.0	0.40	ug/L	1
cis-1,3-Dichloropropene	10061-01-5	8260B	ND		1.0	0.40	ug/L	1
trans-1,3-Dichloropropene	10061-02-6	8260B	ND		1.0	0.40	ug/L	1
Ethylbenzene	100-41-4	8260B	ND		1.0	0.40	ug/L	1
2-Hexanone	591-78-6	8260B	ND		10	2.0	ug/L	1
Isopropylbenzene	98-82-8	8260B	ND		1.0	0.40	ug/L	1
Methyl acetate	79-20-9	8260B	ND		1.0	0.40	ug/L	1
Methyl tertiary butyl ether (MTBE)	1634-04-4	8260B	ND		1.0	0.40	ug/L	1
4-Methyl-2-pentanone	108-10-1	8260B	ND		10	2.0	ug/L	1
Methylcyclohexane	108-87-2	8260B	ND		5.0	0.40	ug/L	1
Methylene chloride	75-09-2	8260B	ND		1.0	0.40	ug/L	1
Styrene	100-42-5	8260B	ND		1.0	0.41	ug/L	1
1,1,2,2-Tetrachloroethane	79-34-5	8260B	ND		1.0	0.40	ug/L	1
Tetrachloroethene	127-18-4	8260B	ND		1.0	0.40	ug/L	1
Toluene	108-88-3	8260B	ND		1.0	0.40	ug/L	1
1,1,2-Trichloro-1,2,2-Trifluoroethane	76-13-1	8260B	ND		1.0	0.42	ug/L	1
1,2,4-Trichlorobenzene	120-82-1	8260B	ND		1.0	0.40	ug/L	1
1,1,1-Trichloroethane	71-55-6	8260B	ND		1.0	0.40	ug/L	1
1,1,2-Trichloroethane	79-00-5	8260B	ND		1.0	0.40	ug/L	1

LOQ = Limit of Quantitation
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E = Quantitation of compound exceeded the calibration range
ND = Not detected at or above the LOQ
N = Recovery is out of criteria
P = The RPD between two GC columns exceeds 40%
H = Out of holding time
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Volatile Organic Compounds by GC/MS

Client: **GZA GeoEnvironmental, Inc.**
Laboratory ID: **UC21029-003**
Description: **HS-MW-10D**
Matrix: **Aqueous**
Date Sampled: **03/18/2019 1210**
Date Received: **03/21/2019**

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	5030B	8260B	1	03/29/2019 1222	BWS		11689

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
Trichloroethene	79-01-6	8260B	ND		1.0	0.40	ug/L	1
Trichlorofluoromethane	75-69-4	8260B	ND		1.0	0.40	ug/L	1
Vinyl chloride	75-01-4	8260B	ND		1.0	0.40	ug/L	1
Xylenes (total)	1330-20-7	8260B	ND		1.0	0.40	ug/L	1
m+p - Xylenes	179601-23-1	8260B	ND		1.0	0.40	ug/L	1
o - Xylenes	95-47-6	8260B	ND		1.0	0.40	ug/L	1

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
1,2-Dichloroethane-d4		104	70-130
Bromofluorobenzene		93	70-130
Toluene-d8		101	70-130

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%

Semivolatile Organic Compounds by GC/MS

Client: **GZA GeoEnvironmental, Inc.**
Laboratory ID: **UC21029-003**
Description: **HS-MW-10D**
Matrix: **Aqueous**
Date Sampled: **03/18/2019 1210**
Date Received: **03/21/2019**

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	3520C	8270D	1	04/03/2019 1624	SCD	03/25/2019 1939	11166

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
Acenaphthene	83-32-9	8270D	ND		0.20	0.040	ug/L	1
Acenaphthylene	208-96-8	8270D	ND		0.20	0.040	ug/L	1
Acetophenone	98-86-2	8270D	ND		0.80	0.50	ug/L	1
Anthracene	120-12-7	8270D	ND		0.20	0.060	ug/L	1
Atrazine	1912-24-9	8270D	ND		0.80	0.50	ug/L	1
Benzidine	92-87-5	8270D	ND		20	1.0	ug/L	1
Benzo(a)anthracene	56-55-3	8270D	ND		0.20	0.040	ug/L	1
Benzo(a)pyrene	50-32-8	8270D	ND		0.20	0.070	ug/L	1
Benzo(b)fluoranthene	205-99-2	8270D	ND		0.20	0.040	ug/L	1
Benzo(g,h,i)perylene	191-24-2	8270D	ND		0.20	0.040	ug/L	1
Benzo(k)fluoranthene	207-08-9	8270D	ND		0.20	0.040	ug/L	1
Butyl benzyl phthalate	85-68-7	8270D	ND		0.80	0.50	ug/L	1
Caprolactam	105-60-2	8270D	ND		1.6	1.0	ug/L	1
Carbazole	86-74-8	8270D	ND		0.80	0.50	ug/L	1
4-Chloro-3-methyl phenol	59-50-7	8270D	ND		0.80	0.50	ug/L	1
bis(2-Chloroethyl)ether	111-44-4	8270D	ND		0.80	0.50	ug/L	1
2-Chloronaphthalene	91-58-7	8270D	ND		0.80	0.50	ug/L	1
2-Chlorophenol	95-57-8	8270D	ND		0.80	0.50	ug/L	1
Chrysene	218-01-9	8270D	ND		0.20	0.030	ug/L	1
Dibenzo(a,h)anthracene	53-70-3	8270D	ND		0.20	0.030	ug/L	1
Dibenzofuran	132-64-9	8270D	ND		0.80	0.50	ug/L	1
3,3'-Dichlorobenzidine	91-94-1	8270D	ND		4.0	1.8	ug/L	1
2,4-Dichlorophenol	120-83-2	8270D	ND		1.6	1.0	ug/L	1
Diethylphthalate	84-66-2	8270D	ND		0.80	0.50	ug/L	1
Dimethyl phthalate	131-11-3	8270D	ND		0.80	0.50	ug/L	1
2,4-Dimethylphenol	105-67-9	8270D	ND		0.80	0.48	ug/L	1
Di-n-butyl phthalate	84-74-2	8270D	ND		0.80	0.50	ug/L	1
4,6-Dinitro-2-methylphenol	534-52-1	8270D	ND		4.0	1.0	ug/L	1
2,4-Dinitrotoluene	121-14-2	8270D	ND		1.6	0.50	ug/L	1
Di-n-octylphthalate	117-84-0	8270D	ND		0.80	0.50	ug/L	1
1,2-Diphenylhydrazine(as azobenzene)	103-33-3	8270D	ND		0.80	0.50	ug/L	1
bis(2-Ethylhexyl)phthalate	117-81-7	8270D	ND		4.0	0.50	ug/L	1
Fluoranthene	206-44-0	8270D	ND		0.20	0.10	ug/L	1
Fluorene	86-73-7	8270D	ND		0.20	0.030	ug/L	1
Hexachlorobenzene	118-74-1	8270D	ND		0.80	0.50	ug/L	1
Hexachlorobutadiene	87-68-3	8270D	ND		0.80	0.50	ug/L	1
Hexachlorocyclopentadiene	77-47-4	8270D	ND		4.0	2.0	ug/L	1
Hexachloroethane	67-72-1	8270D	ND		0.80	0.31	ug/L	1
Indeno(1,2,3-c,d)pyrene	193-39-5	8270D	ND		0.20	0.040	ug/L	1
Isophorone	78-59-1	8270D	ND		0.80	0.50	ug/L	1
2-Methylnaphthalene	91-57-6	8270D	ND		0.20	0.040	ug/L	1
2-Methylphenol	95-48-7	8270D	ND		0.80	0.21	ug/L	1
3+4-Methylphenol	106-44-5	8270D	ND		1.6	1.5	ug/L	1
Naphthalene	91-20-3	8270D	ND		0.20	0.050	ug/L	1

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W = Reported on wet weight basis
E = Quantitation of compound exceeded the calibration range
P = The RPD between two GC columns exceeds 40%

Semivolatile Organic Compounds by GC/MS

Client: **GZA GeoEnvironmental, Inc.**
Laboratory ID: **UC21029-003**
Description: **HS-MW-10D**
Matrix: **Aqueous**
Date Sampled: **03/18/2019 1210**
Date Received: **03/21/2019**

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	3520C	8270D	1	04/03/2019 1624	SCD	03/25/2019 1939	11166

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
Nitrobenzene	98-95-3	8270D	ND		0.80	0.55	ug/L	1
2-Nitrophenol	88-75-5	8270D	ND		1.6	1.0	ug/L	1
N-Nitrosodi-n-propylamine	621-64-7	8270D	ND		0.80	0.50	ug/L	1
N-Nitrosodiphenylamine (Diphenylamine)	86-30-6	8270D	ND		0.80	0.50	ug/L	1
Pentachlorophenol	87-86-5	8270D	ND		4.0	2.0	ug/L	1
Phenanthrene	85-01-8	8270D	ND		0.20	0.060	ug/L	1
Phenol	108-95-2	8270D	ND		0.80	0.50	ug/L	1
Pyrene	129-00-0	8270D	ND		0.20	0.10	ug/L	1
2,4,5-Trichlorophenol	95-95-4	8270D	ND		0.80	0.50	ug/L	1
2,4,6-Trichlorophenol	88-06-2	8270D	ND		0.80	0.50	ug/L	1

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
2-Fluorobiphenyl		68	37-129
2-Fluorophenol		46	24-127
Nitrobenzene-d5		82	38-127
Phenol-d5		68	28-128
Terphenyl-d14		100	10-148
2,4,6-Tribromophenol		74	35-144

CVAA

Client:	**GZA GeoEnvironmental, Inc.**	Laboratory ID:	**UC21029-003**
Description:	**HS-MW-10D**	Matrix:	**Aqueous**
Date Sampled:	**03/18/2019 1210**		
Date Received:	**03/21/2019**		

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1		7470A	1	03/28/2019 1227	JMH	03/27/2019 1341	11405

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
Mercury	7439-97-6	7470A	ND		0.00020	0.000091	mg/L	1

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ND = Not detected at or above the LOQ
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E = Quantitation of compound exceeded the calibration range
P = The RPD between two GC columns exceeds 40%

ICP-MS

Client: **GZA GeoEnvironmental, Inc.**
Laboratory ID: **UC21029-003**
Description: **HS-MW-10D**
Matrix: **Aqueous**
Date Sampled: **03/18/2019 1210**
Date Received: **03/21/2019**

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	200.2	200.8	1	03/28/2019 0032	BNW	03/23/2019 0847	11022

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
Aluminum	**7429-90-5**	**200.8**	**940**		**40**	**10**	**ug/L**	**1**
Antimony	7440-36-0	200.8	ND		2.0	0.50	ug/L	1
Arsenic	**7440-38-2**	**200.8**	**1.7**	**J**	**2.0**	**1.3**	**ug/L**	**1**
Barium	**7440-39-3**	**200.8**	**35**		**5.0**	**1.3**	**ug/L**	**1**
Beryllium	7440-41-7	200.8	ND		0.40	0.15	ug/L	1
Boron	**7440-42-8**	**200.8**	**80**		**50**	**6.3**	**ug/L**	**1**
Cadmium	7440-43-9	200.8	ND		0.50	0.13	ug/L	1
Chromium	**7440-47-3**	**200.8**	**3.8**	**BJ**	**5.0**	**1.3**	**ug/L**	**1**
Cobalt	7440-48-4	200.8	ND		5.0	1.3	ug/L	1
Copper	**7440-50-8**	**200.8**	**2.0**	**J**	**5.0**	**1.3**	**ug/L**	**1**
Iron	**7439-89-6**	**200.8**	**4700**		**50**	**13**	**ug/L**	**1**
Lead	**7439-92-1**	**200.8**	**0.78**	**J**	**1.0**	**0.25**	**ug/L**	**1**
Magnesium	**7439-95-4**	**200.8**	**25000**		**400**	**50**	**ug/L**	**1**
Molybdenum	7439-98-7	200.8	ND		10	2.5	ug/L	1
Nickel	**7440-02-0**	**200.8**	**3.3**	**J**	**5.0**	**1.3**	**ug/L**	**1**
Selenium	7782-49-2	200.8	ND		5.0	1.3	ug/L	1
Silver	7440-22-4	200.8	ND		1.0	0.25	ug/L	1
Sodium	**7440-23-5**	**200.8**	**8000**		**400**	**150**	**ug/L**	**1**
Thallium	7440-28-0	200.8	ND		0.50	0.15	ug/L	1
Titanium	**7440-32-6**	**200.8**	**43**		**5.0**	**1.3**	**ug/L**	**1**
Vanadium	7440-62-2	200.8	ND		5.0	2.5	ug/L	1
Zinc	**7440-66-6**	**200.8**	**4.4**	**J**	**10**	**2.5**	**ug/L**	**1**

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%

PFAS by LC/MS/MS

Client: **GZA GeoEnvironmental, Inc.** Laboratory ID: **UC21029-003**

Description: **HS-MW-10D** Matrix: **Aqueous**

Date Sampled: **03/18/2019 1210**

Date Received: **03/21/2019**

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	537 MOD	537 Modified-ID	1	03/27/2019 2257	SES	03/26/2019 1814	11294

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	Units	Run
1H, 1H, 2H, 2H-perfluorodecane sulfonic acid (8:2 FTS)	39108-34-4	537 Modified-	ND		3.8	ng/L	1
1H, 1H, 2H, 2H-perfluorooctane sulfonic acid (6:2 FTS)	27619-97-2	537 Modified-	ND		3.8	ng/L	1
N-ethylperfluoro-1-octanesulfonamide (EtFOSA)	4151-50-2	537 Modified-	ND		3.8	ng/L	1
N-methylperfluoro-1-octanesulfonamide (MeFOSA)	31506-32-8	537 Modified-	ND		7.5	ng/L	1
Perfluoro-1-butanesulfonic acid (PFBS)	375-73-5	537 Modified-	ND		3.8	ng/L	1
Perfluoro-1-decanesulfonic acid (PFDS)	335-77-3	537 Modified-	ND		3.8	ng/L	1
Perfluoro-1-heptanesulfonic acid (PFHpS)	375-92-8	537 Modified-	ND		3.8	ng/L	1
Perfluoro-1-nonanesulfonic acid (PFNS)	68259-12-1	537 Modified-	ND		7.5	ng/L	1
Perfluoro-1-octanesulfonamide (PFOSA)	754-91-6	537 Modified-	ND		3.8	ng/L	1
Perfluoro-1-pentanesulfonic acid (PFPeS)	2706-91-4	537 Modified-	ND		3.8	ng/L	1
Perfluorohexanesulfonic acid (PFHxS)	355-46-4	537 Modified-	ND		3.8	ng/L	1
Perfluoro-n-butanoic acid (PFBA)	375-22-4	537 Modified-	ND		3.8	ng/L	1
Perfluoro-n-decanoic acid (PFDA)	335-76-2	537 Modified-	ND		3.8	ng/L	1
Perfluoro-n-dodecanoic acid (PFDoA)	307-55-1	537 Modified-	ND		3.8	ng/L	1
Perfluoro-n-heptanoic acid (PFHpA)	375-85-9	537 Modified-	ND		3.8	ng/L	1
Perfluoro-n-hexanoic acid (PFHxA)	307-24-4	537 Modified-	ND		3.8	ng/L	1
Perfluoro-n-nonanoic acid (PFNA)	375-95-1	537 Modified-	ND		3.8	ng/L	1
Perfluoro-n-octanoic acid (PFOA)	335-67-1	537 Modified-	ND		1.9	ng/L	1
Perfluoro-n-pentanoic acid (PFPeA)	2706-90-3	537 Modified-	ND		3.8	ng/L	1
Perfluoro-n-tetradecanoic acid (PFTeDA)	376-06-7	537 Modified-	ND		3.8	ng/L	1
Perfluoro-n-tridecanoic acid (PFTrDA)	72629-94-8	537 Modified-	ND		3.8	ng/L	1
Perfluoro-n-undecanoic acid (PFUdA)	2058-94-8	537 Modified-	ND		3.8	ng/L	1
Perfluorooctanesulfonic acid (PFOS)	1763-23-1	537 Modified-	ND		3.8	ng/L	1

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
13C2_6:2FTS		99	50-150
13C2_8:2FTS		114	50-150
13C2_PFDoA		103	50-150
13C2_PFTeDA		112	50-150
13C3_PFBS		113	50-150
13C3_PFHxS		107	50-150
13C4_PFBA		110	50-150
13C4_PFHpA		105	50-150
13C5_PFHxA		110	50-150
13C5_PFPeA		110	50-150
13C6_PFDA		104	50-150
13C7_PFUdA		114	50-150
13C8_PFOA		106	50-150
13C8_PFOS		110	50-150
13C8_PFOSA		101	50-150
13C9_PFNA		111	50-150
d-EtFOSA		79	50-150
d-MeFOSA		79	50-150

LOQ = Limit of Quantitation	B = Detected in the method blank	E = Quantitation of compound exceeded the calibration range
ND = Not detected at or above the LOQ	N = Recovery is out of criteria	P = The RPD between two GC columns exceeds 40%
H = Out of holding time	W = Reported on wet weight basis	

Inorganic non-metals

Client: **GZA GeoEnvironmental, Inc.**
Laboratory ID: **UC21029-004**
Description: **HS-MW-9S**
Matrix: **Aqueous**
Date Sampled: **03/19/2019 1500**
Date Received: **03/21/2019**

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	350.1	(Ammonia - N) 350.1	1	03/29/2019 1419	DMA		11687
1		(Chloride) 300.0	1	03/30/2019 1109	SLU		11833
1	10-204-00-1-X	(Cyanide - To) SM 4500-CN E-	1	03/28/2019 1229	MSG	03/28/2019 1101	11519
1		(Hardness (to) SM 2340C-2011	1	03/27/2019 1719	KFE		11494
1		(Nitrate-Nitr) 353.2	5	03/23/2019 1705	MDD		11110
1		(Phosphorus) 365.1	1	03/28/2019 1630	MSG	03/28/2019 1218	11531
2		(Sulfate) 300.0	1	04/02/2019 1439	SLU		12072
1		(Sulfide) SM 4500-S2 F-2011	1	03/21/2019 2027	HET		10988

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
Ammonia - N (gas diffusion)		350.1	ND		0.10	0.020	mg/L	1
Chloride		**300.0**	**71**		**1.0**	**0.20**	**mg/L**	**1**
Cyanide - Total	57-12-5	SM 4500-CN E-	ND		0.010	0.010	mg/L	1
Hardness (total)		**SM 2340C-**	**350**		**10**	**2.0**	**mg/L**	**1**
Nitrate-Nitrite - N		**353.2**	**2.4**	**B**	**0.10**	**0.0075**	**mg/L**	**1**
Phosphorus	**7723-14-0**	**365.1**	**0.022**	**J**	**0.050**	**0.0050**	**mg/L**	**1**
Sulfate		**300.0**	**15**		**1.0**	**0.20**	**mg/L**	**2**
Sulfide	18496-25-8	SM 4500-S2 F-	ND		1.0	1.0	mg/L	1

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ND = Not detected at or above the LOQ
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E = Quantitation of compound exceeded the calibration range
P = The RPD between two GC columns exceeds 40%

Volatile Organic Compounds by GC/MS

Client: **GZA GeoEnvironmental, Inc.** Laboratory ID: **UC21029-004**
Description: **HS-MW-9S** Matrix: **Aqueous**
Date Sampled: **03/19/2019 1500**
Date Received: **03/21/2019**

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	5030B	8260B	1	03/29/2019 1245	BWS		11689

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
Acetone	**67-64-1**	**8260B**	**2.7**	**J**	**20**	**2.0**	**ug/L**	**1**
Benzene	71-43-2	8260B	ND		1.0	0.40	ug/L	1
Bromodichloromethane	75-27-4	8260B	ND		1.0	0.40	ug/L	1
Bromoform	75-25-2	8260B	ND		1.0	0.40	ug/L	1
Bromomethane (Methyl bromide)	74-83-9	8260B	ND		2.0	0.40	ug/L	1
2-Butanone (MEK)	78-93-3	8260B	ND		10	2.0	ug/L	1
Carbon disulfide	75-15-0	8260B	ND		1.0	0.40	ug/L	1
Carbon tetrachloride	56-23-5	8260B	ND		1.0	0.40	ug/L	1
Chlorobenzene	108-90-7	8260B	ND		1.0	0.40	ug/L	1
Chloroethane	75-00-3	8260B	ND		2.0	0.40	ug/L	1
Chloroform	67-66-3	8260B	ND		1.0	0.40	ug/L	1
Chloromethane (Methyl chloride)	74-87-3	8260B	ND		1.0	0.50	ug/L	1
Cyclohexane	110-82-7	8260B	ND		1.0	0.40	ug/L	1
1,2-Dibromo-3-chloropropane (DBCP)	96-12-8	8260B	ND		1.0	0.40	ug/L	1
Dibromochloromethane	124-48-1	8260B	ND		1.0	0.40	ug/L	1
1,2-Dibromoethane (EDB)	106-93-4	8260B	ND		1.0	0.40	ug/L	1
1,2-Dichlorobenzene	95-50-1	8260B	ND		1.0	0.40	ug/L	1
1,3-Dichlorobenzene	541-73-1	8260B	ND		1.0	0.40	ug/L	1
1,4-Dichlorobenzene	106-46-7	8260B	ND		1.0	0.40	ug/L	1
Dichlorodifluoromethane	75-71-8	8260B	ND		2.0	0.60	ug/L	1
1,1-Dichloroethane	75-34-3	8260B	ND		1.0	0.40	ug/L	1
1,2-Dichloroethane	107-06-2	8260B	ND		1.0	0.40	ug/L	1
1,1-Dichloroethene	75-35-4	8260B	ND		1.0	0.40	ug/L	1
cis-1,2-Dichloroethene	156-59-2	8260B	ND		1.0	0.40	ug/L	1
trans-1,2-Dichloroethene	156-60-5	8260B	ND		1.0	0.40	ug/L	1
1,2-Dichloropropane	78-87-5	8260B	ND		1.0	0.40	ug/L	1
cis-1,3-Dichloropropene	10061-01-5	8260B	ND		1.0	0.40	ug/L	1
trans-1,3-Dichloropropene	10061-02-6	8260B	ND		1.0	0.40	ug/L	1
Ethylbenzene	100-41-4	8260B	ND		1.0	0.40	ug/L	1
2-Hexanone	591-78-6	8260B	ND		10	2.0	ug/L	1
Isopropylbenzene	98-82-8	8260B	ND		1.0	0.40	ug/L	1
Methyl acetate	79-20-9	8260B	ND		1.0	0.40	ug/L	1
Methyl tertiary butyl ether (MTBE)	1634-04-4	8260B	ND		1.0	0.40	ug/L	1
4-Methyl-2-pentanone	108-10-1	8260B	ND		10	2.0	ug/L	1
Methylcyclohexane	108-87-2	8260B	ND		5.0	0.40	ug/L	1
Methylene chloride	75-09-2	8260B	ND		1.0	0.40	ug/L	1
Styrene	100-42-5	8260B	ND		1.0	0.41	ug/L	1
1,1,2,2-Tetrachloroethane	79-34-5	8260B	ND		1.0	0.40	ug/L	1
Tetrachloroethene	127-18-4	8260B	ND		1.0	0.40	ug/L	1
Toluene	108-88-3	8260B	ND		1.0	0.40	ug/L	1
1,1,2-Trichloro-1,2,2-Trifluoroethane	76-13-1	8260B	ND		1.0	0.42	ug/L	1
1,2,4-Trichlorobenzene	120-82-1	8260B	ND		1.0	0.40	ug/L	1
1,1,1-Trichloroethane	71-55-6	8260B	ND		1.0	0.40	ug/L	1
1,1,2-Trichloroethane	79-00-5	8260B	ND		1.0	0.40	ug/L	1

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W = Reported on wet weight basis
E = Quantitation of compound exceeded the calibration range
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Volatile Organic Compounds by GC/MS

Client: **GZA GeoEnvironmental, Inc.**
Laboratory ID: **UC21029-004**
Description: **HS-MW-9S**
Matrix: **Aqueous**
Date Sampled: **03/19/2019 1500**
Date Received: **03/21/2019**

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	5030B	8260B	1	03/29/2019 1245	BWS		11689

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
Trichloroethene	79-01-6	8260B	ND		1.0	0.40	ug/L	1
Trichlorofluoromethane	75-69-4	8260B	ND		1.0	0.40	ug/L	1
Vinyl chloride	75-01-4	8260B	ND		1.0	0.40	ug/L	1
Xylenes (total)	1330-20-7	8260B	ND		1.0	0.40	ug/L	1
m+p - Xylenes	179601-23-1	8260B	ND		1.0	0.40	ug/L	1
o - Xylenes	95-47-6	8260B	ND		1.0	0.40	ug/L	1

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
1,2-Dichloroethane-d4		99	70-130
Bromofluorobenzene		81	70-130
Toluene-d8		92	70-130

LOQ = Limit of Quantitation
ND = Not detected at or above the LOQ
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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%

Semivolatile Organic Compounds by GC/MS

Client: **GZA GeoEnvironmental, Inc.**
Laboratory ID: **UC21029-004**
Description: **HS-MW-9S**
Matrix: **Aqueous**
Date Sampled: **03/19/2019 1500**
Date Received: **03/21/2019**

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	3520C	8270D	1	04/03/2019 1648	SCD	03/25/2019 1939	11166

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
Acenaphthene	83-32-9	8270D	ND		0.20	0.040	ug/L	1
Acenaphthylene	208-96-8	8270D	ND		0.20	0.040	ug/L	1
Acetophenone	98-86-2	8270D	ND		0.80	0.50	ug/L	1
Anthracene	120-12-7	8270D	ND		0.20	0.060	ug/L	1
Atrazine	1912-24-9	8270D	ND		0.80	0.50	ug/L	1
Benzidine	92-87-5	8270D	ND		20	1.0	ug/L	1
Benzo(a)anthracene	56-55-3	8270D	ND		0.20	0.040	ug/L	1
Benzo(a)pyrene	50-32-8	8270D	ND		0.20	0.070	ug/L	1
Benzo(b)fluoranthene	205-99-2	8270D	ND		0.20	0.040	ug/L	1
Benzo(g,h,i)perylene	191-24-2	8270D	ND		0.20	0.040	ug/L	1
Benzo(k)fluoranthene	207-08-9	8270D	ND		0.20	0.040	ug/L	1
Butyl benzyl phthalate	85-68-7	8270D	ND		0.80	0.50	ug/L	1
Caprolactam	105-60-2	8270D	ND		1.6	1.0	ug/L	1
Carbazole	86-74-8	8270D	ND		0.80	0.50	ug/L	1
4-Chloro-3-methyl phenol	59-50-7	8270D	ND		0.80	0.50	ug/L	1
bis(2-Chloroethyl)ether	111-44-4	8270D	ND		0.80	0.50	ug/L	1
2-Chloronaphthalene	91-58-7	8270D	ND		0.80	0.50	ug/L	1
2-Chlorophenol	95-57-8	8270D	ND		0.80	0.50	ug/L	1
Chrysene	218-01-9	8270D	ND		0.20	0.030	ug/L	1
Dibenzo(a,h)anthracene	53-70-3	8270D	ND		0.20	0.030	ug/L	1
Dibenzofuran	132-64-9	8270D	ND		0.80	0.50	ug/L	1
3,3'-Dichlorobenzidine	91-94-1	8270D	ND		4.0	1.8	ug/L	1
2,4-Dichlorophenol	120-83-2	8270D	ND		1.6	1.0	ug/L	1
Diethylphthalate	84-66-2	8270D	ND		0.80	0.50	ug/L	1
Dimethyl phthalate	131-11-3	8270D	ND		0.80	0.50	ug/L	1
2,4-Dimethylphenol	105-67-9	8270D	ND		0.80	0.48	ug/L	1
Di-n-butyl phthalate	84-74-2	8270D	ND		0.80	0.50	ug/L	1
4,6-Dinitro-2-methylphenol	534-52-1	8270D	ND		4.0	1.0	ug/L	1
2,4-Dinitrotoluene	121-14-2	8270D	ND		1.6	0.50	ug/L	1
Di-n-octylphthalate	117-84-0	8270D	ND		0.80	0.50	ug/L	1
1,2-Diphenylhydrazine(as azobenzene)	103-33-3	8270D	ND		0.80	0.50	ug/L	1
bis(2-Ethylhexyl)phthalate	117-81-7	8270D	ND		4.0	0.50	ug/L	1
Fluoranthene	206-44-0	8270D	ND		0.20	0.10	ug/L	1
Fluorene	86-73-7	8270D	ND		0.20	0.030	ug/L	1
Hexachlorobenzene	118-74-1	8270D	ND		0.80	0.50	ug/L	1
Hexachlorobutadiene	87-68-3	8270D	ND		0.80	0.50	ug/L	1
Hexachlorocyclopentadiene	77-47-4	8270D	ND		4.0	2.0	ug/L	1
Hexachloroethane	67-72-1	8270D	ND		0.80	0.31	ug/L	1
Indeno(1,2,3-c,d)pyrene	193-39-5	8270D	ND		0.20	0.040	ug/L	1
Isophorone	78-59-1	8270D	ND		0.80	0.50	ug/L	1
2-Methylnaphthalene	91-57-6	8270D	ND		0.20	0.040	ug/L	1
2-Methylphenol	95-48-7	8270D	ND		0.80	0.21	ug/L	1
3+4-Methylphenol	106-44-5	8270D	ND		1.6	1.5	ug/L	1
Naphthalene	91-20-3	8270D	ND		0.20	0.050	ug/L	1

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E = Quantitation of compound exceeded the calibration range
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Semivolatile Organic Compounds by GC/MS

Client: **GZA GeoEnvironmental, Inc.**
Laboratory ID: **UC21029-004**
Description: **HS-MW-9S**
Matrix: **Aqueous**
Date Sampled: **03/19/2019 1500**
Date Received: **03/21/2019**

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	3520C	8270D	1	04/03/2019 1648	SCD	03/25/2019 1939	11166

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
Nitrobenzene	98-95-3	8270D	ND		0.80	0.55	ug/L	1
2-Nitrophenol	88-75-5	8270D	ND		1.6	1.0	ug/L	1
N-Nitrosodi-n-propylamine	621-64-7	8270D	ND		0.80	0.50	ug/L	1
N-Nitrosodiphenylamine (Diphenylamine)	86-30-6	8270D	ND		0.80	0.50	ug/L	1
Pentachlorophenol	87-86-5	8270D	ND		4.0	2.0	ug/L	1
Phenanthrene	85-01-8	8270D	ND		0.20	0.060	ug/L	1
Phenol	108-95-2	8270D	ND		0.80	0.50	ug/L	1
Pyrene	129-00-0	8270D	ND		0.20	0.10	ug/L	1
2,4,5-Trichlorophenol	95-95-4	8270D	ND		0.80	0.50	ug/L	1
2,4,6-Trichlorophenol	88-06-2	8270D	ND		0.80	0.50	ug/L	1

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
2-Fluorobiphenyl		54	37-129
2-Fluorophenol		48	24-127
Nitrobenzene-d5		70	38-127
Phenol-d5		66	28-128
Terphenyl-d14		92	10-148
2,4,6-Tribromophenol		62	35-144

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P = The RPD between two GC columns exceeds 40%
H = Out of holding time
W = Reported on wet weight basis

CVAA

Client: **GZA GeoEnvironmental, Inc.**
Laboratory ID: **UC21029-004**
Description: **HS-MW-9S**
Matrix: **Aqueous**
Date Sampled: **03/19/2019 1500**
Date Received: **03/21/2019**

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1		7470A	1	03/28/2019 1230	JMH	03/27/2019 1341	11405

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
Mercury	7439-97-6	7470A	ND		0.00020	0.000091	mg/L	1

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ND = Not detected at or above the LOQ
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E = Quantitation of compound exceeded the calibration range
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ICP-MS

Client: **GZA GeoEnvironmental, Inc.**
Laboratory ID: **UC21029-004**
Description: **HS-MW-9S**
Matrix: **Aqueous**
Date Sampled: **03/19/2019 1500**
Date Received: **03/21/2019**

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	200.2	200.8	1	03/28/2019 0038	BNW	03/23/2019 0847	11022

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
Aluminum	7429-90-5	200.8	ND		40	10	ug/L	1
Antimony	7440-36-0	200.8	ND		2.0	0.50	ug/L	1
Arsenic	7440-38-2	200.8	ND		2.0	1.3	ug/L	1
Barium	**7440-39-3**	**200.8**	**32**		**5.0**	**1.3**	**ug/L**	**1**
Beryllium	7440-41-7	200.8	ND		0.40	0.15	ug/L	1
Boron	**7440-42-8**	**200.8**	**22**	**J**	**50**	**6.3**	**ug/L**	**1**
Cadmium	7440-43-9	200.8	ND		0.50	0.13	ug/L	1
Chromium	**7440-47-3**	**200.8**	**1.6**	**BJ**	**5.0**	**1.3**	**ug/L**	**1**
Cobalt	7440-48-4	200.8	ND		5.0	1.3	ug/L	1
Copper	7440-50-8	200.8	ND		5.0	1.3	ug/L	1
Iron	**7439-89-6**	**200.8**	**330**		**50**	**13**	**ug/L**	**1**
Lead	7439-92-1	200.8	ND		1.0	0.25	ug/L	1
Magnesium	**7439-95-4**	**200.8**	**29000**		**400**	**50**	**ug/L**	**1**
Molybdenum	7439-98-7	200.8	ND		10	2.5	ug/L	1
Nickel	7440-02-0	200.8	ND		5.0	1.3	ug/L	1
Selenium	7782-49-2	200.8	ND		5.0	1.3	ug/L	1
Silver	7440-22-4	200.8	ND		1.0	0.25	ug/L	1
Sodium	**7440-23-5**	**200.8**	**33000**		**400**	**150**	**ug/L**	**1**
Thallium	7440-28-0	200.8	ND		0.50	0.15	ug/L	1
Titanium	7440-32-6	200.8	ND		5.0	1.3	ug/L	1
Vanadium	7440-62-2	200.8	ND		5.0	2.5	ug/L	1
Zinc	7440-66-6	200.8	ND		10	2.5	ug/L	1

LOQ = Limit of Quantitation
B = Detected in the method blank
E = Quantitation of compound exceeded the calibration range
ND = Not detected at or above the LOQ
N = Recovery is out of criteria
P = The RPD between two GC columns exceeds 40%
H = Out of holding time
W = Reported on wet weight basis

PFAS by LC/MS/MS

Client: **GZA GeoEnvironmental, Inc.**
Laboratory ID: **UC21029-004**
Description: **HS-MW-9S**
Matrix: **Aqueous**
Date Sampled: **03/19/2019 1500**
Date Received: **03/21/2019**

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	537 MOD	537 Modified-ID	1	03/27/2019 2310	SES	03/26/2019 1814	11294

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	Units	Run
1H, 1H, 2H, 2H-perfluorodecane sulfonic acid (8:2 FTS)	39108-34-4	537 Modified-	ND		3.6	ng/L	1
1H, 1H, 2H, 2H-perfluorooctane sulfonic acid (6:2 FTS)	27619-97-2	537 Modified-	ND		3.6	ng/L	1
N-ethylperfluoro-1-octanesulfonamide (EtFOSA)	4151-50-2	537 Modified-	ND		3.6	ng/L	1
N-methylperfluoro-1-octanesulfonamide (MeFOSA)	31506-32-8	537 Modified-	ND		7.3	ng/L	1
Perfluoro-1-butanesulfonic acid (PFBS)	375-73-5	537 Modified-	ND		3.6	ng/L	1
Perfluoro-1-decanesulfonic acid (PFDS)	335-77-3	537 Modified-	ND		3.6	ng/L	1
Perfluoro-1-heptanesulfonic acid (PFHpS)	375-92-8	537 Modified-	ND		3.6	ng/L	1
Perfluoro-1-nonanesulfonic acid (PFNS)	68259-12-1	537 Modified-	ND		7.3	ng/L	1
Perfluoro-1-octanesulfonamide (PFOSA)	754-91-6	537 Modified-	ND		3.6	ng/L	1
Perfluoro-1-pentanesulfonic acid (PFPeS)	2706-91-4	537 Modified-	ND		3.6	ng/L	1
Perfluorohexanesulfonic acid (PFHxS)	355-46-4	537 Modified-	ND		3.6	ng/L	1
Perfluoro-n-butanoic acid (PFBA)	375-22-4	537 Modified-	ND		3.6	ng/L	1
Perfluoro-n-decanoic acid (PFDA)	335-76-2	537 Modified-	ND		3.6	ng/L	1
Perfluoro-n-dodecanoic acid (PFDoA)	307-55-1	537 Modified-	ND		3.6	ng/L	1
Perfluoro-n-heptanoic acid (PFHpA)	375-85-9	537 Modified-	ND		3.6	ng/L	1
Perfluoro-n-hexanoic acid (PFHxA)	307-24-4	537 Modified-	ND		3.6	ng/L	1
Perfluoro-n-nonanoic acid (PFNA)	375-95-1	537 Modified-	ND		3.6	ng/L	1
Perfluoro-n-octanoic acid (PFOA)	335-67-1	537 Modified-	ND		1.8	ng/L	1
Perfluoro-n-pentanoic acid (PFPeA)	2706-90-3	537 Modified-	ND		3.6	ng/L	1
Perfluoro-n-tetradecanoic acid (PFTeDA)	376-06-7	537 Modified-	ND		3.6	ng/L	1
Perfluoro-n-tridecanoic acid (PFTrDA)	72629-94-8	537 Modified-	ND		3.6	ng/L	1
Perfluoro-n-undecanoic acid (PFUdA)	2058-94-8	537 Modified-	ND		3.6	ng/L	1
Perfluorooctanesulfonic acid (PFOS)	1763-23-1	537 Modified-	ND		3.6	ng/L	1

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
13C2_6:2FTS		91	50-150
13C2_8:2FTS		96	50-150
13C2_PFDoA		99	50-150
13C2_PFTeDA		102	50-150
13C3_PFBS		104	50-150
13C3_PFHxS		102	50-150
13C4_PFBA		98	50-150
13C4_PFHpA		102	50-150
13C5_PFHxA		103	50-150
13C5_PFPeA		106	50-150
13C6_PFDA		98	50-150
13C7_PFUdA		104	50-150
13C8_PFOA		102	50-150
13C8_PFOS		104	50-150
13C8_PFOSA		97	50-150
13C9_PFNA		100	50-150
d-EtFOSA		72	50-150
d-MeFOSA		69	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%

Inorganic non-metals

Client: **GZA GeoEnvironmental, Inc.**
Laboratory ID: **UC21029-005**
Description: **HS-MW-9M**
Matrix: **Aqueous**
Date Sampled: **03/19/2019 1345**
Date Received: **03/21/2019**

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	350.1	(Ammonia - N) 350.1	1	03/29/2019 1421	DMA		11687
1		(Chloride) 300.0	1	04/02/2019 1455	SLU		12073
1	10-204-00-1-X	(Cyanide - To) SM 4500-CN E-	1	03/28/2019 1231	MSG	03/28/2019 1101	11519
1		(Hardness (to) SM 2340C-2011	1	03/27/2019 1719	KFE		11494
1		(Nitrate-Nitr) 353.2	1	03/23/2019 1706	MDD		11110
1		(Phosphorus) 365.1	1	03/28/2019 1630	MSG	03/28/2019 1218	11531
1		(Sulfate) 300.0	1	04/02/2019 1455	SLU		12072
1		(Sulfide) SM 4500-S2 F-2011	1	03/21/2019 2027	HET		10988

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
Ammonia - N (gas diffusion)		**350.1**	**0.15**		**0.10**	**0.020**	**mg/L**	**1**
Chloride		**300.0**	**23**		**1.0**	**0.20**	**mg/L**	**1**
Cyanide - Total	57-12-5	SM 4500-CN E-	ND		0.010	0.010	mg/L	1
Hardness (total)		**SM 2340C-**	**320**		**10**	**2.0**	**mg/L**	**1**
Nitrate-Nitrite - N		**353.2**	**0.014**	**BJ**	**0.020**	**0.0015**	**mg/L**	**1**
Phosphorus	**7723-14-0**	**365.1**	**0.019**	**J**	**0.050**	**0.0050**	**mg/L**	**1**
Sulfate		**300.0**	**24**		**1.0**	**0.20**	**mg/L**	**1**
Sulfide	18496-25-8	SM 4500-S2 F-	ND		1.0	1.0	mg/L	1

LOQ = Limit of Quantitation	B = Detected in the method blank	E = Quantitation of compound exceeded the calibration range
ND = Not detected at or above the LOQ	N = Recovery is out of criteria	P = The RPD between two GC columns exceeds 40%
H = Out of holding time	W = Reported on wet weight basis	

Volatile Organic Compounds by GC/MS

Client: **GZA GeoEnvironmental, Inc.**
Laboratory ID: **UC21029-005**
Description: **HS-MW-9M**
Matrix: **Aqueous**
Date Sampled: **03/19/2019 1345**
Date Received: **03/21/2019**

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	5030B	8260B	1	03/29/2019 1308	BWS		11689

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
Acetone	**67-64-1**	**8260B**	**2.4**	**J**	**20**	**2.0**	**ug/L**	**1**
Benzene	71-43-2	8260B	ND		1.0	0.40	ug/L	1
Bromodichloromethane	75-27-4	8260B	ND		1.0	0.40	ug/L	1
Bromoform	75-25-2	8260B	ND		1.0	0.40	ug/L	1
Bromomethane (Methyl bromide)	74-83-9	8260B	ND		2.0	0.40	ug/L	1
2-Butanone (MEK)	78-93-3	8260B	ND		10	2.0	ug/L	1
Carbon disulfide	75-15-0	8260B	ND		1.0	0.40	ug/L	1
Carbon tetrachloride	56-23-5	8260B	ND		1.0	0.40	ug/L	1
Chlorobenzene	108-90-7	8260B	ND		1.0	0.40	ug/L	1
Chloroethane	75-00-3	8260B	ND		2.0	0.40	ug/L	1
Chloroform	67-66-3	8260B	ND		1.0	0.40	ug/L	1
Chloromethane (Methyl chloride)	74-87-3	8260B	ND		1.0	0.50	ug/L	1
Cyclohexane	110-82-7	8260B	ND		1.0	0.40	ug/L	1
1,2-Dibromo-3-chloropropane (DBCP)	96-12-8	8260B	ND		1.0	0.40	ug/L	1
Dibromochloromethane	124-48-1	8260B	ND		1.0	0.40	ug/L	1
1,2-Dibromoethane (EDB)	106-93-4	8260B	ND		1.0	0.40	ug/L	1
1,2-Dichlorobenzene	95-50-1	8260B	ND		1.0	0.40	ug/L	1
1,3-Dichlorobenzene	541-73-1	8260B	ND		1.0	0.40	ug/L	1
1,4-Dichlorobenzene	106-46-7	8260B	ND		1.0	0.40	ug/L	1
Dichlorodifluoromethane	75-71-8	8260B	ND		2.0	0.60	ug/L	1
1,1-Dichloroethane	75-34-3	8260B	ND		1.0	0.40	ug/L	1
1,2-Dichloroethane	107-06-2	8260B	ND		1.0	0.40	ug/L	1
1,1-Dichloroethene	75-35-4	8260B	ND		1.0	0.40	ug/L	1
cis-1,2-Dichloroethene	156-59-2	8260B	ND		1.0	0.40	ug/L	1
trans-1,2-Dichloroethene	156-60-5	8260B	ND		1.0	0.40	ug/L	1
1,2-Dichloropropane	78-87-5	8260B	ND		1.0	0.40	ug/L	1
cis-1,3-Dichloropropene	10061-01-5	8260B	ND		1.0	0.40	ug/L	1
trans-1,3-Dichloropropene	10061-02-6	8260B	ND		1.0	0.40	ug/L	1
Ethylbenzene	100-41-4	8260B	ND		1.0	0.40	ug/L	1
2-Hexanone	591-78-6	8260B	ND		10	2.0	ug/L	1
Isopropylbenzene	98-82-8	8260B	ND		1.0	0.40	ug/L	1
Methyl acetate	79-20-9	8260B	ND		1.0	0.40	ug/L	1
Methyl tertiary butyl ether (MTBE)	1634-04-4	8260B	ND		1.0	0.40	ug/L	1
4-Methyl-2-pentanone	108-10-1	8260B	ND		10	2.0	ug/L	1
Methylcyclohexane	108-87-2	8260B	ND		5.0	0.40	ug/L	1
Methylene chloride	75-09-2	8260B	ND		1.0	0.40	ug/L	1
Styrene	100-42-5	8260B	ND		1.0	0.41	ug/L	1
1,1,2,2-Tetrachloroethane	79-34-5	8260B	ND		1.0	0.40	ug/L	1
Tetrachloroethene	127-18-4	8260B	ND		1.0	0.40	ug/L	1
Toluene	108-88-3	8260B	ND		1.0	0.40	ug/L	1
1,1,2-Trichloro-1,2,2-Trifluoroethane	76-13-1	8260B	ND		1.0	0.42	ug/L	1
1,2,4-Trichlorobenzene	120-82-1	8260B	ND		1.0	0.40	ug/L	1
1,1,1-Trichloroethane	71-55-6	8260B	ND		1.0	0.40	ug/L	1
1,1,2-Trichloroethane	79-00-5	8260B	ND		1.0	0.40	ug/L	1

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%

Volatile Organic Compounds by GC/MS

Client: **GZA GeoEnvironmental, Inc.**
Laboratory ID: **UC21029-005**
Description: **HS-MW-9M**
Matrix: **Aqueous**
Date Sampled: **03/19/2019 1345**
Date Received: **03/21/2019**

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	5030B	8260B	1	03/29/2019 1308	BWS		11689

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
Trichloroethene	79-01-6	8260B	ND		1.0	0.40	ug/L	1
Trichlorofluoromethane	75-69-4	8260B	ND		1.0	0.40	ug/L	1
Vinyl chloride	75-01-4	8260B	ND		1.0	0.40	ug/L	1
Xylenes (total)	1330-20-7	8260B	ND		1.0	0.40	ug/L	1
m+p - Xylenes	179601-23-1	8260B	ND		1.0	0.40	ug/L	1
o - Xylenes	95-47-6	8260B	ND		1.0	0.40	ug/L	1

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
1,2-Dichloroethane-d4		103	70-130
Bromofluorobenzene		92	70-130
Toluene-d8		99	70-130

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%

Semivolatile Organic Compounds by GC/MS

Client: **GZA GeoEnvironmental, Inc.**
Laboratory ID: **UC21029-005**
Description: **HS-MW-9M**
Matrix: **Aqueous**
Date Sampled: **03/19/2019 1345**
Date Received: **03/21/2019**

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	3520C	8270D	1	04/03/2019 1713	SCD	03/25/2019 1939	11166

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
Acenaphthene	83-32-9	8270D	ND		0.20	0.040	ug/L	1
Acenaphthylene	208-96-8	8270D	ND		0.20	0.040	ug/L	1
Acetophenone	98-86-2	8270D	ND		0.80	0.50	ug/L	1
Anthracene	120-12-7	8270D	ND		0.20	0.060	ug/L	1
Atrazine	1912-24-9	8270D	ND		0.80	0.50	ug/L	1
Benzidine	92-87-5	8270D	ND		20	1.0	ug/L	1
Benzo(a)anthracene	56-55-3	8270D	ND		0.20	0.040	ug/L	1
Benzo(a)pyrene	50-32-8	8270D	ND		0.20	0.070	ug/L	1
Benzo(b)fluoranthene	205-99-2	8270D	ND		0.20	0.040	ug/L	1
Benzo(g,h,i)perylene	191-24-2	8270D	ND		0.20	0.040	ug/L	1
Benzo(k)fluoranthene	207-08-9	8270D	ND		0.20	0.040	ug/L	1
Butyl benzyl phthalate	85-68-7	8270D	ND		0.80	0.50	ug/L	1
Caprolactam	105-60-2	8270D	ND		1.6	1.0	ug/L	1
Carbazole	86-74-8	8270D	ND		0.80	0.50	ug/L	1
4-Chloro-3-methyl phenol	59-50-7	8270D	ND		0.80	0.50	ug/L	1
bis(2-Chloroethyl)ether	111-44-4	8270D	ND		0.80	0.50	ug/L	1
2-Chloronaphthalene	91-58-7	8270D	ND		0.80	0.50	ug/L	1
2-Chlorophenol	95-57-8	8270D	ND		0.80	0.50	ug/L	1
Chrysene	218-01-9	8270D	ND		0.20	0.030	ug/L	1
Dibenzo(a,h)anthracene	53-70-3	8270D	ND		0.20	0.030	ug/L	1
Dibenzofuran	132-64-9	8270D	ND		0.80	0.50	ug/L	1
3,3'-Dichlorobenzidine	91-94-1	8270D	ND		4.0	1.8	ug/L	1
2,4-Dichlorophenol	120-83-2	8270D	ND		1.6	1.0	ug/L	1
Diethylphthalate	84-66-2	8270D	ND		0.80	0.50	ug/L	1
Dimethyl phthalate	131-11-3	8270D	ND		0.80	0.50	ug/L	1
2,4-Dimethylphenol	105-67-9	8270D	ND		0.80	0.48	ug/L	1
Di-n-butyl phthalate	84-74-2	8270D	ND		0.80	0.50	ug/L	1
4,6-Dinitro-2-methylphenol	534-52-1	8270D	ND		4.0	1.0	ug/L	1
2,4-Dinitrotoluene	121-14-2	8270D	ND		1.6	0.50	ug/L	1
Di-n-octylphthalate	117-84-0	8270D	ND		0.80	0.50	ug/L	1
1,2-Diphenylhydrazine(as azobenzene)	103-33-3	8270D	ND		0.80	0.50	ug/L	1
bis(2-Ethylhexyl)phthalate	117-81-7	8270D	ND		4.0	0.50	ug/L	1
Fluoranthene	206-44-0	8270D	ND		0.20	0.10	ug/L	1
Fluorene	86-73-7	8270D	ND		0.20	0.030	ug/L	1
Hexachlorobenzene	118-74-1	8270D	ND		0.80	0.50	ug/L	1
Hexachlorobutadiene	87-68-3	8270D	ND		0.80	0.50	ug/L	1
Hexachlorocyclopentadiene	77-47-4	8270D	ND		4.0	2.0	ug/L	1
Hexachloroethane	67-72-1	8270D	ND		0.80	0.31	ug/L	1
Indeno(1,2,3-c,d)pyrene	193-39-5	8270D	ND		0.20	0.040	ug/L	1
Isophorone	78-59-1	8270D	ND		0.80	0.50	ug/L	1
2-Methylnaphthalene	91-57-6	8270D	ND		0.20	0.040	ug/L	1
2-Methylphenol	95-48-7	8270D	ND		0.80	0.21	ug/L	1
3+4-Methylphenol	106-44-5	8270D	ND		1.6	1.5	ug/L	1
Naphthalene	91-20-3	8270D	ND		0.20	0.050	ug/L	1

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%

Semivolatile Organic Compounds by GC/MS

Client: **GZA GeoEnvironmental, Inc.**
Laboratory ID: **UC21029-005**
Description: **HS-MW-9M**
Matrix: **Aqueous**
Date Sampled: **03/19/2019 1345**
Date Received: **03/21/2019**

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	3520C	8270D	1	04/03/2019 1713	SCD	03/25/2019 1939	11166

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
Nitrobenzene	98-95-3	8270D	ND		0.80	0.55	ug/L	1
2-Nitrophenol	88-75-5	8270D	ND		1.6	1.0	ug/L	1
N-Nitrosodi-n-propylamine	621-64-7	8270D	ND		0.80	0.50	ug/L	1
N-Nitrosodiphenylamine (Diphenylamine)	86-30-6	8270D	ND		0.80	0.50	ug/L	1
Pentachlorophenol	87-86-5	8270D	ND		4.0	2.0	ug/L	1
Phenanthrene	85-01-8	8270D	ND		0.20	0.060	ug/L	1
Phenol	108-95-2	8270D	ND		0.80	0.50	ug/L	1
Pyrene	129-00-0	8270D	ND		0.20	0.10	ug/L	1
2,4,5-Trichlorophenol	95-95-4	8270D	ND		0.80	0.50	ug/L	1
2,4,6-Trichlorophenol	88-06-2	8270D	ND		0.80	0.50	ug/L	1

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
2-Fluorobiphenyl		71	37-129
2-Fluorophenol		75	24-127
Nitrobenzene-d5		89	38-127
Phenol-d5		86	28-128
Terphenyl-d14		103	10-148
2,4,6-Tribromophenol		84	35-144

LOQ = Limit of Quantitation
B = Detected in the method blank
E = Quantitation of compound exceeded the calibration range
ND = Not detected at or above the LOQ
N = Recovery is out of criteria
P = The RPD between two GC columns exceeds 40%
H = Out of holding time
W = Reported on wet weight basis

CVAA

Client:	**GZA GeoEnvironmental, Inc.**	Laboratory ID:	**UC21029-005**
Description:	**HS-MW-9M**	Matrix:	**Aqueous**
Date Sampled:	**03/19/2019 1345**		
Date Received:	**03/21/2019**		

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1		7470A	1	03/28/2019 1232	JMH	03/27/2019 1341	11405

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
Mercury	7439-97-6	7470A	ND		0.00020	0.000091	mg/L	1

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%

ICP-MS

Client: **GZA GeoEnvironmental, Inc.**
Laboratory ID: **UC21029-005**
Description: **HS-MW-9M**
Matrix: **Aqueous**
Date Sampled: **03/19/2019 1345**
Date Received: **03/21/2019**

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	200.2	200.8	1	03/28/2019 0044	BNW	03/23/2019 0847	11022

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
Aluminum	**7429-90-5**	**200.8**	**28**	**J**	**40**	**10**	**ug/L**	**1**
Antimony	7440-36-0	200.8	ND		2.0	0.50	ug/L	1
Arsenic	7440-38-2	200.8	ND		2.0	1.3	ug/L	1
Barium	**7440-39-3**	**200.8**	**82**		**5.0**	**1.3**	**ug/L**	**1**
Beryllium	7440-41-7	200.8	ND		0.40	0.15	ug/L	1
Boron	**7440-42-8**	**200.8**	**18**	**J**	**50**	**6.3**	**ug/L**	**1**
Cadmium	7440-43-9	200.8	ND		0.50	0.13	ug/L	1
Chromium	7440-47-3	200.8	ND		5.0	1.3	ug/L	1
Cobalt	7440-48-4	200.8	ND		5.0	1.3	ug/L	1
Copper	7440-50-8	200.8	ND		5.0	1.3	ug/L	1
Iron	**7439-89-6**	**200.8**	**720**		**50**	**13**	**ug/L**	**1**
Lead	7439-92-1	200.8	ND		1.0	0.25	ug/L	1
Magnesium	**7439-95-4**	**200.8**	**27000**		**400**	**50**	**ug/L**	**1**
Molybdenum	7439-98-7	200.8	ND		10	2.5	ug/L	1
Nickel	**7440-02-0**	**200.8**	**1.3**	**J**	**5.0**	**1.3**	**ug/L**	**1**
Selenium	7782-49-2	200.8	ND		5.0	1.3	ug/L	1
Silver	7440-22-4	200.8	ND		1.0	0.25	ug/L	1
Sodium	**7440-23-5**	**200.8**	**5100**		**400**	**150**	**ug/L**	**1**
Thallium	7440-28-0	200.8	ND		0.50	0.15	ug/L	1
Titanium	**7440-32-6**	**200.8**	**2.0**	**J**	**5.0**	**1.3**	**ug/L**	**1**
Vanadium	7440-62-2	200.8	ND		5.0	2.5	ug/L	1
Zinc	7440-66-6	200.8	ND		10	2.5	ug/L	1

LOQ = Limit of Quantitation
B = Detected in the method blank
E = Quantitation of compound exceeded the calibration range
ND = Not detected at or above the LOQ
N = Recovery is out of criteria
P = The RPD between two GC columns exceeds 40%
H = Out of holding time
W = Reported on wet weight basis

PFAS by LC/MS/MS

Client: **GZA GeoEnvironmental, Inc.**
Laboratory ID: **UC21029-005**
Description: **HS-MW-9M**
Matrix: **Aqueous**
Date Sampled: **03/19/2019 1345**
Date Received: **03/21/2019**

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	537 MOD	537 Modified-ID	1	03/27/2019 2323	SES	03/26/2019 1814	11294

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	Units	Run
1H, 1H, 2H, 2H-perfluorodecane sulfonic acid (8:2 FTS)	39108-34-4	537 Modified-	ND		3.6	ng/L	1
1H, 1H, 2H, 2H-perfluorooctane sulfonic acid (6:2 FTS)	27619-97-2	537 Modified-	ND		3.6	ng/L	1
N-ethylperfluoro-1-octanesulfonamide (EtFOSA)	4151-50-2	537 Modified-	ND		3.6	ng/L	1
N-methylperfluoro-1-octanesulfonamide (MeFOSA)	31506-32-8	537 Modified-	ND		7.1	ng/L	1
Perfluoro-1-butanesulfonic acid (PFBS)	375-73-5	537 Modified-	ND		3.6	ng/L	1
Perfluoro-1-decanesulfonic acid (PFDS)	335-77-3	537 Modified-	ND		3.6	ng/L	1
Perfluoro-1-heptanesulfonic acid (PFHpS)	375-92-8	537 Modified-	ND		3.6	ng/L	1
Perfluoro-1-nonanesulfonic acid (PFNS)	68259-12-1	537 Modified-	ND		7.1	ng/L	1
Perfluoro-1-octanesulfonamide (PFOSA)	754-91-6	537 Modified-	ND		3.6	ng/L	1
Perfluoro-1-pentanesulfonic acid (PFPeS)	2706-91-4	537 Modified-	ND		3.6	ng/L	1
Perfluorohexanesulfonic acid (PFHxS)	355-46-4	537 Modified-	ND		3.6	ng/L	1
Perfluoro-n-butanoic acid (PFBA)	375-22-4	537 Modified-	ND		3.6	ng/L	1
Perfluoro-n-decanoic acid (PFDA)	335-76-2	537 Modified-	ND		3.6	ng/L	1
Perfluoro-n-dodecanoic acid (PFDoA)	307-55-1	537 Modified-	ND		3.6	ng/L	1
Perfluoro-n-heptanoic acid (PFHpA)	375-85-9	537 Modified-	ND		3.6	ng/L	1
Perfluoro-n-hexanoic acid (PFHxA)	307-24-4	537 Modified-	ND		3.6	ng/L	1
Perfluoro-n-nonanoic acid (PFNA)	375-95-1	537 Modified-	ND		3.6	ng/L	1
Perfluoro-n-octanoic acid (PFOA)	335-67-1	537 Modified-	ND		1.8	ng/L	1
Perfluoro-n-pentanoic acid (PFPeA)	2706-90-3	537 Modified-	ND		3.6	ng/L	1
Perfluoro-n-tetradecanoic acid (PFTeDA)	376-06-7	537 Modified-	ND		3.6	ng/L	1
Perfluoro-n-tridecanoic acid (PFTrDA)	72629-94-8	537 Modified-	ND		3.6	ng/L	1
Perfluoro-n-undecanoic acid (PFUdA)	2058-94-8	537 Modified-	ND		3.6	ng/L	1
Perfluorooctanesulfonic acid (PFOS)	1763-23-1	537 Modified-	ND		3.6	ng/L	1

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
13C2_6:2FTS		96	50-150
13C2_8:2FTS		112	50-150
13C2_PFDoA		108	50-150
13C2_PFTeDA		116	50-150
13C3_PFBS		114	50-150
13C3_PFHxS		107	50-150
13C4_PFBA		107	50-150
13C4_PFHpA		108	50-150
13C5_PFHxA		112	50-150
13C5_PFPeA		111	50-150
13C6_PFDA		108	50-150
13C7_PFUdA		113	50-150
13C8_PFOA		111	50-150
13C8_PFOS		118	50-150
13C8_PFOSA		106	50-150
13C9_PFNA		107	50-150
d-EtFOSA		81	50-150
d-MeFOSA		79	50-150

LOQ = Limit of Quantitation	B = Detected in the method blank	E = Quantitation of compound exceeded the calibration range
ND = Not detected at or above the LOQ	N = Recovery is out of criteria	P = The RPD between two GC columns exceeds 40%
H = Out of holding time	W = Reported on wet weight basis	

Inorganic non-metals

Client: **GZA GeoEnvironmental, Inc.**
Laboratory ID: **UC21029-006**
Description: **HS-MW-9D**
Matrix: **Aqueous**
Date Sampled: **03/19/2019 1350**
Date Received: **03/21/2019**

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	350.1	(Ammonia - N) 350.1	1	03/29/2019 1423	DMA		11687
1		(Chloride) 300.0	1	04/02/2019 1544	SLU		12073
1	10-204-00-1-X	(Cyanide - To) SM 4500-CN E-	1	03/28/2019 1232	MSG	03/28/2019 1101	11519
1		(Hardness (to) SM 2340C-2011	1	03/27/2019 1719	KFE		11494
1		(Nitrate-Nitr) 353.2	1	03/23/2019 1714	MDD		11110
1		(Phosphorus) 365.1	1	03/28/2019 1630	MSG	03/28/2019 1218	11531
1		(Sulfate) 300.0	1	04/02/2019 1544	SLU		12072
1		(Sulfide) SM 4500-S2 F-2011	1	03/21/2019 2027	HET		10988

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
Ammonia - N (gas diffusion)		**350.1**	**0.43**		**0.10**	**0.020**	**mg/L**	**1**
Chloride		**300.0**	**69**		**1.0**	**0.20**	**mg/L**	**1**
Cyanide - Total	**57-12-5**	**SM 4500-CN**	**0.011**		**0.010**	**0.010**	**mg/L**	**1**
Hardness (total)		**SM 2340C-**	**340**		**10**	**2.0**	**mg/L**	**1**
Nitrate-Nitrite - N		**353.2**	**0.0024**	**BJ**	**0.020**	**0.0015**	**mg/L**	**1**
Phosphorus	**7723-14-0**	**365.1**	**0.055**		**0.050**	**0.0050**	**mg/L**	**1**
Sulfate		**300.0**	**45**		**1.0**	**0.20**	**mg/L**	**1**
Sulfide	18496-25-8	SM 4500-S2 F-	ND		1.0	1.0	mg/L	1

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%

Volatile Organic Compounds by GC/MS

Client: **GZA GeoEnvironmental, Inc.**
Laboratory ID: **UC21029-006**
Description: **HS-MW-9D**
Matrix: **Aqueous**
Date Sampled: **03/19/2019 1350**
Date Received: **03/21/2019**

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	5030B	8260B	1	03/29/2019 1333	BWS		11689

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
Acetone	**67-64-1**	**8260B**	**2.6**	**J**	**20**	**2.0**	**ug/L**	**1**
Benzene	71-43-2	8260B	ND		1.0	0.40	ug/L	1
Bromodichloromethane	75-27-4	8260B	ND		1.0	0.40	ug/L	1
Bromoform	75-25-2	8260B	ND		1.0	0.40	ug/L	1
Bromomethane (Methyl bromide)	74-83-9	8260B	ND		2.0	0.40	ug/L	1
2-Butanone (MEK)	78-93-3	8260B	ND		10	2.0	ug/L	1
Carbon disulfide	**75-15-0**	**8260B**	**0.44**	**J**	**1.0**	**0.40**	**ug/L**	**1**
Carbon tetrachloride	56-23-5	8260B	ND		1.0	0.40	ug/L	1
Chlorobenzene	108-90-7	8260B	ND		1.0	0.40	ug/L	1
Chloroethane	75-00-3	8260B	ND		2.0	0.40	ug/L	1
Chloroform	67-66-3	8260B	ND		1.0	0.40	ug/L	1
Chloromethane (Methyl chloride)	74-87-3	8260B	ND		1.0	0.50	ug/L	1
Cyclohexane	110-82-7	8260B	ND		1.0	0.40	ug/L	1
1,2-Dibromo-3-chloropropane (DBCP)	96-12-8	8260B	ND		1.0	0.40	ug/L	1
Dibromochloromethane	124-48-1	8260B	ND		1.0	0.40	ug/L	1
1,2-Dibromoethane (EDB)	106-93-4	8260B	ND		1.0	0.40	ug/L	1
1,2-Dichlorobenzene	95-50-1	8260B	ND		1.0	0.40	ug/L	1
1,3-Dichlorobenzene	541-73-1	8260B	ND		1.0	0.40	ug/L	1
1,4-Dichlorobenzene	106-46-7	8260B	ND		1.0	0.40	ug/L	1
Dichlorodifluoromethane	75-71-8	8260B	ND		2.0	0.60	ug/L	1
1,1-Dichloroethane	75-34-3	8260B	ND		1.0	0.40	ug/L	1
1,2-Dichloroethane	107-06-2	8260B	ND		1.0	0.40	ug/L	1
1,1-Dichloroethene	75-35-4	8260B	ND		1.0	0.40	ug/L	1
cis-1,2-Dichloroethene	156-59-2	8260B	ND		1.0	0.40	ug/L	1
trans-1,2-Dichloroethene	156-60-5	8260B	ND		1.0	0.40	ug/L	1
1,2-Dichloropropane	78-87-5	8260B	ND		1.0	0.40	ug/L	1
cis-1,3-Dichloropropene	10061-01-5	8260B	ND		1.0	0.40	ug/L	1
trans-1,3-Dichloropropene	10061-02-6	8260B	ND		1.0	0.40	ug/L	1
Ethylbenzene	100-41-4	8260B	ND		1.0	0.40	ug/L	1
2-Hexanone	591-78-6	8260B	ND		10	2.0	ug/L	1
Isopropylbenzene	98-82-8	8260B	ND		1.0	0.40	ug/L	1
Methyl acetate	79-20-9	8260B	ND		1.0	0.40	ug/L	1
Methyl tertiary butyl ether (MTBE)	1634-04-4	8260B	ND		1.0	0.40	ug/L	1
4-Methyl-2-pentanone	108-10-1	8260B	ND		10	2.0	ug/L	1
Methylcyclohexane	108-87-2	8260B	ND		5.0	0.40	ug/L	1
Methylene chloride	75-09-2	8260B	ND		1.0	0.40	ug/L	1
Styrene	100-42-5	8260B	ND		1.0	0.41	ug/L	1
1,1,2,2-Tetrachloroethane	79-34-5	8260B	ND		1.0	0.40	ug/L	1
Tetrachloroethene	127-18-4	8260B	ND		1.0	0.40	ug/L	1
Toluene	108-88-3	8260B	ND		1.0	0.40	ug/L	1
1,1,2-Trichloro-1,2,2-Trifluoroethane	76-13-1	8260B	ND		1.0	0.42	ug/L	1
1,2,4-Trichlorobenzene	120-82-1	8260B	ND		1.0	0.40	ug/L	1
1,1,1-Trichloroethane	71-55-6	8260B	ND		1.0	0.40	ug/L	1
1,1,2-Trichloroethane	79-00-5	8260B	ND		1.0	0.40	ug/L	1

LOQ = Limit of Quantitation
B = Detected in the method blank
E = Quantitation of compound exceeded the calibration range
ND = Not detected at or above the LOQ
N = Recovery is out of criteria
P = The RPD between two GC columns exceeds 40%
H = Out of holding time
W = Reported on wet weight basis

Volatile Organic Compounds by GC/MS

Client: **GZA GeoEnvironmental, Inc.**
Laboratory ID: **UC21029-006**
Description: **HS-MW-9D**
Matrix: **Aqueous**
Date Sampled: **03/19/2019 1350**
Date Received: **03/21/2019**

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	5030B	8260B	1	03/29/2019 1333	BWS		11689

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
Trichloroethene	79-01-6	8260B	ND		1.0	0.40	ug/L	1
Trichlorofluoromethane	75-69-4	8260B	ND		1.0	0.40	ug/L	1
Vinyl chloride	75-01-4	8260B	ND		1.0	0.40	ug/L	1
Xylenes (total)	1330-20-7	8260B	ND		1.0	0.40	ug/L	1
m+p - Xylenes	179601-23-1	8260B	ND		1.0	0.40	ug/L	1
o - Xylenes	95-47-6	8260B	ND		1.0	0.40	ug/L	1

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
1,2-Dichloroethane-d4		104	70-130
Bromofluorobenzene		94	70-130
Toluene-d8		101	70-130

LOQ = Limit of Quantitation	B = Detected in the method blank	E = Quantitation of compound exceeded the calibration range
ND = Not detected at or above the LOQ	N = Recovery is out of criteria	P = The RPD between two GC columns exceeds 40%
H = Out of holding time	W = Reported on wet weight basis	

Semivolatile Organic Compounds by GC/MS

Client: **GZA GeoEnvironmental, Inc.**
Laboratory ID: **UC21029-006**
Description: **HS-MW-9D**
Matrix: **Aqueous**
Date Sampled: **03/19/2019 1350**
Date Received: **03/21/2019**

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	3520C	8270D	1	04/03/2019 1737	SCD	03/25/2019 1939	11166

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
Acenaphthene	83-32-9	8270D	ND		0.20	0.040	ug/L	1
Acenaphthylene	208-96-8	8270D	ND		0.20	0.040	ug/L	1
Acetophenone	98-86-2	8270D	ND		0.80	0.50	ug/L	1
Anthracene	120-12-7	8270D	ND		0.20	0.060	ug/L	1
Atrazine	1912-24-9	8270D	ND		0.80	0.50	ug/L	1
Benzidine	92-87-5	8270D	ND		20	1.0	ug/L	1
Benzo(a)anthracene	56-55-3	8270D	ND		0.20	0.040	ug/L	1
Benzo(a)pyrene	50-32-8	8270D	ND		0.20	0.070	ug/L	1
Benzo(b)fluoranthene	205-99-2	8270D	ND		0.20	0.040	ug/L	1
Benzo(g,h,i)perylene	191-24-2	8270D	ND		0.20	0.040	ug/L	1
Benzo(k)fluoranthene	207-08-9	8270D	ND		0.20	0.040	ug/L	1
Butyl benzyl phthalate	85-68-7	8270D	ND		0.80	0.50	ug/L	1
Caprolactam	105-60-2	8270D	ND		1.6	1.0	ug/L	1
Carbazole	86-74-8	8270D	ND		0.80	0.50	ug/L	1
4-Chloro-3-methyl phenol	59-50-7	8270D	ND		0.80	0.50	ug/L	1
bis(2-Chloroethyl)ether	111-44-4	8270D	ND		0.80	0.50	ug/L	1
2-Chloronaphthalene	91-58-7	8270D	ND		0.80	0.50	ug/L	1
2-Chlorophenol	95-57-8	8270D	ND		0.80	0.50	ug/L	1
Chrysene	218-01-9	8270D	ND		0.20	0.030	ug/L	1
Dibenzo(a,h)anthracene	53-70-3	8270D	ND		0.20	0.030	ug/L	1
Dibenzofuran	132-64-9	8270D	ND		0.80	0.50	ug/L	1
3,3'-Dichlorobenzidine	91-94-1	8270D	ND		4.0	1.8	ug/L	1
2,4-Dichlorophenol	120-83-2	8270D	ND		1.6	1.0	ug/L	1
Diethylphthalate	84-66-2	8270D	ND		0.80	0.50	ug/L	1
Dimethyl phthalate	131-11-3	8270D	ND		0.80	0.50	ug/L	1
2,4-Dimethylphenol	105-67-9	8270D	ND		0.80	0.48	ug/L	1
Di-n-butyl phthalate	84-74-2	8270D	ND		0.80	0.50	ug/L	1
4,6-Dinitro-2-methylphenol	534-52-1	8270D	ND		4.0	1.0	ug/L	1
2,4-Dinitrotoluene	121-14-2	8270D	ND		1.6	0.50	ug/L	1
Di-n-octylphthalate	117-84-0	8270D	ND		0.80	0.50	ug/L	1
1,2-Diphenylhydrazine(as azobenzene)	103-33-3	8270D	ND		0.80	0.50	ug/L	1
bis(2-Ethylhexyl)phthalate	117-81-7	8270D	ND		4.0	0.50	ug/L	1
Fluoranthene	206-44-0	8270D	ND		0.20	0.10	ug/L	1
Fluorene	86-73-7	8270D	ND		0.20	0.030	ug/L	1
Hexachlorobenzene	118-74-1	8270D	ND		0.80	0.50	ug/L	1
Hexachlorobutadiene	87-68-3	8270D	ND		0.80	0.50	ug/L	1
Hexachlorocyclopentadiene	77-47-4	8270D	ND		4.0	2.0	ug/L	1
Hexachloroethane	67-72-1	8270D	ND		0.80	0.31	ug/L	1
Indeno(1,2,3-c,d)pyrene	193-39-5	8270D	ND		0.20	0.040	ug/L	1
Isophorone	78-59-1	8270D	ND		0.80	0.50	ug/L	1
2-Methylnaphthalene	91-57-6	8270D	ND		0.20	0.040	ug/L	1
2-Methylphenol	95-48-7	8270D	ND		0.80	0.21	ug/L	1
3+4-Methylphenol	106-44-5	8270D	ND		1.6	1.5	ug/L	1
Naphthalene	91-20-3	8270D	ND		0.20	0.050	ug/L	1

LOQ = Limit of Quantitation
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E = Quantitation of compound exceeded the calibration range
P = The RPD between two GC columns exceeds 40%

Semivolatile Organic Compounds by GC/MS

Client: **GZA GeoEnvironmental, Inc.**
Laboratory ID: **UC21029-006**
Description: **HS-MW-9D**
Matrix: **Aqueous**
Date Sampled: **03/19/2019 1350**
Date Received: **03/21/2019**

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	3520C	8270D	1	04/03/2019 1737	SCD	03/25/2019 1939	11166

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
Nitrobenzene	98-95-3	8270D	ND		0.80	0.55	ug/L	1
2-Nitrophenol	88-75-5	8270D	ND		1.6	1.0	ug/L	1
N-Nitrosodi-n-propylamine	621-64-7	8270D	ND		0.80	0.50	ug/L	1
N-Nitrosodiphenylamine (Diphenylamine)	86-30-6	8270D	ND		0.80	0.50	ug/L	1
Pentachlorophenol	87-86-5	8270D	ND		4.0	2.0	ug/L	1
Phenanthrene	85-01-8	8270D	ND		0.20	0.060	ug/L	1
Phenol	108-95-2	8270D	ND		0.80	0.50	ug/L	1
Pyrene	129-00-0	8270D	ND		0.20	0.10	ug/L	1
2,4,5-Trichlorophenol	95-95-4	8270D	ND		0.80	0.50	ug/L	1
2,4,6-Trichlorophenol	88-06-2	8270D	ND		0.80	0.50	ug/L	1

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
2-Fluorobiphenyl		59	37-129
2-Fluorophenol		37	24-127
Nitrobenzene-d5		74	38-127
Phenol-d5		80	28-128
Terphenyl-d14		98	10-148
2,4,6-Tribromophenol		63	35-144

LOQ = Limit of Quantitation
B = Detected in the method blank
E = Quantitation of compound exceeded the calibration range
ND = Not detected at or above the LOQ
N = Recovery is out of criteria
P = The RPD between two GC columns exceeds 40%
H = Out of holding time
W = Reported on wet weight basis

CVAA

Client: **GZA GeoEnvironmental, Inc.**
Description: **HS-MW-9D**
Date Sampled: **03/19/2019 1350**
Date Received: **03/21/2019**
Laboratory ID: **UC21029-006**
Matrix: **Aqueous**

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1		7470A	1	03/28/2019 1235	JMH	03/27/2019 1341	11405

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
Mercury	7439-97-6	7470A	ND		0.00020	0.000091	mg/L	1

LOQ = Limit of Quantitation
B = Detected in the method blank
E = Quantitation of compound exceeded the calibration range
ND = Not detected at or above the LOQ
N = Recovery is out of criteria
P = The RPD between two GC columns exceeds 40%
H = Out of holding time
W = Reported on wet weight basis

ICP-MS

Client: **GZA GeoEnvironmental, Inc.**
Laboratory ID: **UC21029-006**
Description: **HS-MW-9D**
Matrix: **Aqueous**
Date Sampled: **03/19/2019 1350**
Date Received: **03/21/2019**

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	200.2	200.8	1	03/28/2019 0050	BNW	03/23/2019 0847	11022

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
Aluminum	**7429-90-5**	**200.8**	**130**		**40**	**10**	**ug/L**	**1**
Antimony	7440-36-0	200.8	ND		2.0	0.50	ug/L	1
Arsenic	7440-38-2	200.8	ND		2.0	1.3	ug/L	1
Barium	**7440-39-3**	**200.8**	**99**		**5.0**	**1.3**	**ug/L**	**1**
Beryllium	7440-41-7	200.8	ND		0.40	0.15	ug/L	1
Boron	**7440-42-8**	**200.8**	**29**	**J**	**50**	**6.3**	**ug/L**	**1**
Cadmium	7440-43-9	200.8	ND		0.50	0.13	ug/L	1
Chromium	**7440-47-3**	**200.8**	**1.5**	**BJ**	**5.0**	**1.3**	**ug/L**	**1**
Cobalt	7440-48-4	200.8	ND		5.0	1.3	ug/L	1
Copper	7440-50-8	200.8	ND		5.0	1.3	ug/L	1
Iron	**7439-89-6**	**200.8**	**930**		**50**	**13**	**ug/L**	**1**
Lead	7439-92-1	200.8	ND		1.0	0.25	ug/L	1
Magnesium	**7439-95-4**	**200.8**	**26000**		**400**	**50**	**ug/L**	**1**
Molybdenum	7439-98-7	200.8	ND		10	2.5	ug/L	1
Nickel	**7440-02-0**	**200.8**	**1.5**	**J**	**5.0**	**1.3**	**ug/L**	**1**
Selenium	7782-49-2	200.8	ND		5.0	1.3	ug/L	1
Silver	7440-22-4	200.8	ND		1.0	0.25	ug/L	1
Sodium	**7440-23-5**	**200.8**	**13000**		**400**	**150**	**ug/L**	**1**
Thallium	7440-28-0	200.8	ND		0.50	0.15	ug/L	1
Titanium	**7440-32-6**	**200.8**	**5.6**		**5.0**	**1.3**	**ug/L**	**1**
Vanadium	7440-62-2	200.8	ND		5.0	2.5	ug/L	1
Zinc	**7440-66-6**	**200.8**	**6.2**	**J**	**10**	**2.5**	**ug/L**	**1**

LOQ = Limit of Quantitation
B = Detected in the method blank
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ND = Not detected at or above the LOQ
N = Recovery is out of criteria
P = The RPD between two GC columns exceeds 40%
H = Out of holding time
W = Reported on wet weight basis

PFAS by LC/MS/MS

Client: **GZA GeoEnvironmental, Inc.**
Laboratory ID: **UC21029-006**
Description: **HS-MW-9D**
Matrix: **Aqueous**
Date Sampled: **03/19/2019 1350**
Date Received: **03/21/2019**

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	537 MOD	537 Modified-ID	1	04/02/2019 1714	SES	03/27/2019 1140	11382

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	Units	Run
1H, 1H, 2H, 2H-perfluorodecane sulfonic acid (8:2 FTS)	39108-34-4	537 Modified-	ND		3.5	ng/L	1
1H, 1H, 2H, 2H-perfluorooctane sulfonic acid (6:2 FTS)	27619-97-2	537 Modified-	ND		3.5	ng/L	1
N-ethylperfluoro-1-octanesulfonamide (EtFOSA)	4151-50-2	537 Modified-	ND		3.5	ng/L	1
N-methylperfluoro-1-octanesulfonamide (MeFOSA)	31506-32-8	537 Modified-	ND		7.0	ng/L	1
Perfluoro-1-butanesulfonic acid (PFBS)	375-73-5	537 Modified-	ND		3.5	ng/L	1
Perfluoro-1-decanesulfonic acid (PFDS)	335-77-3	537 Modified-	ND		3.5	ng/L	1
Perfluoro-1-heptanesulfonic acid (PFHpS)	375-92-8	537 Modified-	ND		3.5	ng/L	1
Perfluoro-1-nonanesulfonic acid (PFNS)	68259-12-1	537 Modified-	ND		7.0	ng/L	1
Perfluoro-1-octanesulfonamide (PFOSA)	754-91-6	537 Modified-	ND		3.5	ng/L	1
Perfluoro-1-pentanesulfonic acid (PFPeS)	2706-91-4	537 Modified-	ND		3.5	ng/L	1
Perfluorohexanesulfonic acid (PFHxS)	355-46-4	537 Modified-	ND		3.5	ng/L	1
Perfluoro-n-butanoic acid (PFBA)	375-22-4	537 Modified-	ND		3.5	ng/L	1
Perfluoro-n-decanoic acid (PFDA)	335-76-2	537 Modified-	ND		3.5	ng/L	1
Perfluoro-n-dodecanoic acid (PFDoA)	307-55-1	537 Modified-	ND		3.5	ng/L	1
Perfluoro-n-heptanoic acid (PFHpA)	375-85-9	537 Modified-	ND		3.5	ng/L	1
Perfluoro-n-hexanoic acid (PFHxA)	307-24-4	537 Modified-	ND		3.5	ng/L	1
Perfluoro-n-nonanoic acid (PFNA)	375-95-1	537 Modified-	ND		3.5	ng/L	1
Perfluoro-n-octanoic acid (PFOA)	335-67-1	537 Modified-	ND		1.7	ng/L	1
Perfluoro-n-pentanoic acid (PFPeA)	2706-90-3	537 Modified-	ND		3.5	ng/L	1
Perfluoro-n-tetradecanoic acid (PFTeDA)	376-06-7	537 Modified-	ND		3.5	ng/L	1
Perfluoro-n-tridecanoic acid (PFTrDA)	72629-94-8	537 Modified-	ND		3.5	ng/L	1
Perfluoro-n-undecanoic acid (PFUdA)	2058-94-8	537 Modified-	ND		3.5	ng/L	1
Perfluorooctanesulfonic acid (PFOS)	1763-23-1	537 Modified-	ND		3.5	ng/L	1

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
13C2_6:2FTS		119	50-150
13C2_8:2FTS		113	50-150
13C2_PFDoA		115	50-150
13C2_PFTeDA		117	50-150
13C3_PFBS		122	50-150
13C3_PFHxS		131	50-150
13C4_PFBA		124	50-150
13C4_PFHpA		124	50-150
13C5_PFHxA		124	50-150
13C5_PFPeA		126	50-150
13C6_PFDA		114	50-150
13C7_PFUdA		118	50-150
13C8_PFOA		129	50-150
13C8_PFOS		125	50-150
13C8_PFOSA		114	50-150
13C9_PFNA		135	50-150
d-EtFOSA		90	50-150
d-MeFOSA		86	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%

Inorganic non-metals

Client: **GZA GeoEnvironmental, Inc.**
Description: **HS-MW-6S**
Date Sampled: **03/20/2019 1415**
Date Received: **03/21/2019**

Laboratory ID: **UC21029-007**
Matrix: **Aqueous**

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	350.1	(Ammonia - N) 350.1	1	03/29/2019 1435	DMA		11687
1		(Chloride) 300.0	1	04/02/2019 1632	SLU		12073
1	10-204-00-1-X	(Cyanide - To) SM 4500-CN E-	1	03/28/2019 1233	MSG	03/28/2019 1101	11519
1		(Hardness (to) SM 2340C-2011	1	03/27/2019 1719	KFE		11494
1		(Nitrate-Nitr) 353.2	1	03/23/2019 1716	MDD		11110
1		(Phosphorus) 365.1	1	03/28/2019 1630	MSG	03/28/2019 1218	11531
1		(Sulfate) 300.0	1	04/02/2019 1632	SLU		12072
1		(Sulfide) SM 4500-S2 F-2011	1	03/21/2019 2027	HET		10988

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
Ammonia - N (gas diffusion)		350.1	ND		0.10	0.020	mg/L	1
Chloride		**300.0**	**47**		**1.0**	**0.20**	**mg/L**	**1**
Cyanide - Total	57-12-5	SM 4500-CN E-	ND		0.010	0.010	mg/L	1
Hardness (total)		**SM 2340C-**	**390**		**10**	**2.0**	**mg/L**	**1**
Nitrate-Nitrite - N		**353.2**	**0.98**	**B**	**0.020**	**0.0015**	**mg/L**	**1**
Phosphorus	**7723-14-0**	**365.1**	**0.0068**	**J**	**0.050**	**0.0050**	**mg/L**	**1**
Sulfate		**300.0**	**21**		**1.0**	**0.20**	**mg/L**	**1**
Sulfide	18496-25-8	SM 4500-S2 F-	ND		1.0	1.0	mg/L	1

LOQ = Limit of Quantitation
ND = Not detected at or above the LOQ
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W = Reported on wet weight basis
E = Quantitation of compound exceeded the calibration range
P = The RPD between two GC columns exceeds 40%

Volatile Organic Compounds by GC/MS

Client: **GZA GeoEnvironmental, Inc.**
Laboratory ID: **UC21029-007**
Description: **HS-MW-6S**
Matrix: **Aqueous**
Date Sampled: **03/20/2019 1415**
Date Received: **03/21/2019**

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	5030B	8260B	1	03/29/2019 1356	BWS		11689

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
Acetone	67-64-1	8260B	ND		20	2.0	ug/L	1
Benzene	71-43-2	8260B	ND		1.0	0.40	ug/L	1
Bromodichloromethane	75-27-4	8260B	ND		1.0	0.40	ug/L	1
Bromoform	75-25-2	8260B	ND		1.0	0.40	ug/L	1
Bromomethane (Methyl bromide)	74-83-9	8260B	ND		2.0	0.40	ug/L	1
2-Butanone (MEK)	78-93-3	8260B	ND		10	2.0	ug/L	1
Carbon disulfide	75-15-0	8260B	ND		1.0	0.40	ug/L	1
Carbon tetrachloride	56-23-5	8260B	ND		1.0	0.40	ug/L	1
Chlorobenzene	108-90-7	8260B	ND		1.0	0.40	ug/L	1
Chloroethane	75-00-3	8260B	ND		2.0	0.40	ug/L	1
Chloroform	**67-66-3**	**8260B**	**0.54**	**J**	**1.0**	**0.40**	**ug/L**	**1**
Chloromethane (Methyl chloride)	74-87-3	8260B	ND		1.0	0.50	ug/L	1
Cyclohexane	110-82-7	8260B	ND		1.0	0.40	ug/L	1
1,2-Dibromo-3-chloropropane (DBCP)	96-12-8	8260B	ND		1.0	0.40	ug/L	1
Dibromochloromethane	124-48-1	8260B	ND		1.0	0.40	ug/L	1
1,2-Dibromoethane (EDB)	106-93-4	8260B	ND		1.0	0.40	ug/L	1
1,2-Dichlorobenzene	95-50-1	8260B	ND		1.0	0.40	ug/L	1
1,3-Dichlorobenzene	541-73-1	8260B	ND		1.0	0.40	ug/L	1
1,4-Dichlorobenzene	106-46-7	8260B	ND		1.0	0.40	ug/L	1
Dichlorodifluoromethane	75-71-8	8260B	ND		2.0	0.60	ug/L	1
1,1-Dichloroethane	75-34-3	8260B	ND		1.0	0.40	ug/L	1
1,2-Dichloroethane	107-06-2	8260B	ND		1.0	0.40	ug/L	1
1,1-Dichloroethene	75-35-4	8260B	ND		1.0	0.40	ug/L	1
cis-1,2-Dichloroethene	156-59-2	8260B	ND		1.0	0.40	ug/L	1
trans-1,2-Dichloroethene	156-60-5	8260B	ND		1.0	0.40	ug/L	1
1,2-Dichloropropane	78-87-5	8260B	ND		1.0	0.40	ug/L	1
cis-1,3-Dichloropropene	10061-01-5	8260B	ND		1.0	0.40	ug/L	1
trans-1,3-Dichloropropene	10061-02-6	8260B	ND		1.0	0.40	ug/L	1
Ethylbenzene	100-41-4	8260B	ND		1.0	0.40	ug/L	1
2-Hexanone	591-78-6	8260B	ND		10	2.0	ug/L	1
Isopropylbenzene	98-82-8	8260B	ND		1.0	0.40	ug/L	1
Methyl acetate	79-20-9	8260B	ND		1.0	0.40	ug/L	1
Methyl tertiary butyl ether (MTBE)	1634-04-4	8260B	ND		1.0	0.40	ug/L	1
4-Methyl-2-pentanone	108-10-1	8260B	ND		10	2.0	ug/L	1
Methylcyclohexane	108-87-2	8260B	ND		5.0	0.40	ug/L	1
Methylene chloride	75-09-2	8260B	ND		1.0	0.40	ug/L	1
Styrene	100-42-5	8260B	ND		1.0	0.41	ug/L	1
1,1,2,2-Tetrachloroethane	79-34-5	8260B	ND		1.0	0.40	ug/L	1
Tetrachloroethene	127-18-4	8260B	ND		1.0	0.40	ug/L	1
Toluene	108-88-3	8260B	ND		1.0	0.40	ug/L	1
1,1,2-Trichloro-1,2,2-Trifluoroethane	76-13-1	8260B	ND		1.0	0.42	ug/L	1
1,2,4-Trichlorobenzene	120-82-1	8260B	ND		1.0	0.40	ug/L	1
1,1,1-Trichloroethane	71-55-6	8260B	ND		1.0	0.40	ug/L	1
1,1,2-Trichloroethane	79-00-5	8260B	ND		1.0	0.40	ug/L	1

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%

Volatile Organic Compounds by GC/MS

Client: **GZA GeoEnvironmental, Inc.**
Description: **HS-MW-6S**
Date Sampled: **03/20/2019 1415**
Date Received: **03/21/2019**

Laboratory ID: **UC21029-007**
Matrix: **Aqueous**

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	5030B	8260B	1	03/29/2019 1356	BWS		11689

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
Trichloroethene	79-01-6	8260B	ND		1.0	0.40	ug/L	1
Trichlorofluoromethane	75-69-4	8260B	ND		1.0	0.40	ug/L	1
Vinyl chloride	75-01-4	8260B	ND		1.0	0.40	ug/L	1
Xylenes (total)	1330-20-7	8260B	ND		1.0	0.40	ug/L	1
m+p - Xylenes	179601-23-1	8260B	ND		1.0	0.40	ug/L	1
o - Xylenes	95-47-6	8260B	ND		1.0	0.40	ug/L	1

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
1,2-Dichloroethane-d4		103	70-130
Bromofluorobenzene		97	70-130
Toluene-d8		100	70-130

LOQ = Limit of Quantitation	B = Detected in the method blank	E = Quantitation of compound exceeded the calibration range
ND = Not detected at or above the LOQ	N = Recovery is out of criteria	P = The RPD between two GC columns exceeds 40%
H = Out of holding time	W = Reported on wet weight basis	

Semivolatile Organic Compounds by GC/MS

Client: **GZA GeoEnvironmental, Inc.**
Laboratory ID: **UC21029-007**
Description: **HS-MW-6S**
Matrix: **Aqueous**
Date Sampled: **03/20/2019 1415**
Date Received: **03/21/2019**

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	3520C	8270D	1	04/03/2019 1802	SCD	03/25/2019 1939	11166

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
Acenaphthene	83-32-9	8270D	ND		0.20	0.040	ug/L	1
Acenaphthylene	208-96-8	8270D	ND		0.20	0.040	ug/L	1
Acetophenone	98-86-2	8270D	ND		0.80	0.50	ug/L	1
Anthracene	120-12-7	8270D	ND		0.20	0.060	ug/L	1
Atrazine	1912-24-9	8270D	ND		0.80	0.50	ug/L	1
Benzidine	92-87-5	8270D	ND		20	1.0	ug/L	1
Benzo(a)anthracene	56-55-3	8270D	ND		0.20	0.040	ug/L	1
Benzo(a)pyrene	50-32-8	8270D	ND		0.20	0.070	ug/L	1
Benzo(b)fluoranthene	205-99-2	8270D	ND		0.20	0.040	ug/L	1
Benzo(g,h,i)perylene	191-24-2	8270D	ND		0.20	0.040	ug/L	1
Benzo(k)fluoranthene	207-08-9	8270D	ND		0.20	0.040	ug/L	1
Butyl benzyl phthalate	85-68-7	8270D	ND		0.80	0.50	ug/L	1
Caprolactam	105-60-2	8270D	ND		1.6	1.0	ug/L	1
Carbazole	86-74-8	8270D	ND		0.80	0.50	ug/L	1
4-Chloro-3-methyl phenol	59-50-7	8270D	ND		0.80	0.50	ug/L	1
bis(2-Chloroethyl)ether	111-44-4	8270D	ND		0.80	0.50	ug/L	1
2-Chloronaphthalene	91-58-7	8270D	ND		0.80	0.50	ug/L	1
2-Chlorophenol	95-57-8	8270D	ND		0.80	0.50	ug/L	1
Chrysene	218-01-9	8270D	ND		0.20	0.030	ug/L	1
Dibenzo(a,h)anthracene	53-70-3	8270D	ND		0.20	0.030	ug/L	1
Dibenzofuran	132-64-9	8270D	ND		0.80	0.50	ug/L	1
3,3'-Dichlorobenzidine	91-94-1	8270D	ND		4.0	1.8	ug/L	1
2,4-Dichlorophenol	120-83-2	8270D	ND		1.6	1.0	ug/L	1
Diethylphthalate	84-66-2	8270D	ND		0.80	0.50	ug/L	1
Dimethyl phthalate	131-11-3	8270D	ND		0.80	0.50	ug/L	1
2,4-Dimethylphenol	105-67-9	8270D	ND		0.80	0.48	ug/L	1
Di-n-butyl phthalate	84-74-2	8270D	ND		0.80	0.50	ug/L	1
4,6-Dinitro-2-methylphenol	534-52-1	8270D	ND		4.0	1.0	ug/L	1
2,4-Dinitrotoluene	121-14-2	8270D	ND		1.6	0.50	ug/L	1
Di-n-octylphthalate	117-84-0	8270D	ND		0.80	0.50	ug/L	1
1,2-Diphenylhydrazine(as azobenzene)	103-33-3	8270D	ND		0.80	0.50	ug/L	1
bis(2-Ethylhexyl)phthalate	117-81-7	8270D	ND		4.0	0.50	ug/L	1
Fluoranthene	206-44-0	8270D	ND		0.20	0.10	ug/L	1
Fluorene	86-73-7	8270D	ND		0.20	0.030	ug/L	1
Hexachlorobenzene	118-74-1	8270D	ND		0.80	0.50	ug/L	1
Hexachlorobutadiene	87-68-3	8270D	ND		0.80	0.50	ug/L	1
Hexachlorocyclopentadiene	77-47-4	8270D	ND		4.0	2.0	ug/L	1
Hexachloroethane	67-72-1	8270D	ND		0.80	0.31	ug/L	1
Indeno(1,2,3-c,d)pyrene	193-39-5	8270D	ND		0.20	0.040	ug/L	1
Isophorone	78-59-1	8270D	ND		0.80	0.50	ug/L	1
2-Methylnaphthalene	91-57-6	8270D	ND		0.20	0.040	ug/L	1
2-Methylphenol	95-48-7	8270D	ND		0.80	0.21	ug/L	1
3+4-Methylphenol	106-44-5	8270D	ND		1.6	1.5	ug/L	1
Naphthalene	91-20-3	8270D	ND		0.20	0.050	ug/L	1

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%

Semivolatile Organic Compounds by GC/MS

Client: **GZA GeoEnvironmental, Inc.**

Laboratory ID: **UC21029-007**

Description: **HS-MW-6S**

Matrix: **Aqueous**

Date Sampled: **03/20/2019 1415**

Date Received: **03/21/2019**

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	3520C	8270D	1	04/03/2019 1802	SCD	03/25/2019 1939	11166

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
Nitrobenzene	98-95-3	8270D	ND		0.80	0.55	ug/L	1
2-Nitrophenol	88-75-5	8270D	ND		1.6	1.0	ug/L	1
N-Nitrosodi-n-propylamine	621-64-7	8270D	ND		0.80	0.50	ug/L	1
N-Nitrosodiphenylamine (Diphenylamine)	86-30-6	8270D	ND		0.80	0.50	ug/L	1
Pentachlorophenol	87-86-5	8270D	ND		4.0	2.0	ug/L	1
Phenanthrene	85-01-8	8270D	ND		0.20	0.060	ug/L	1
Phenol	108-95-2	8270D	ND		0.80	0.50	ug/L	1
Pyrene	129-00-0	8270D	ND		0.20	0.10	ug/L	1
2,4,5-Trichlorophenol	95-95-4	8270D	ND		0.80	0.50	ug/L	1
2,4,6-Trichlorophenol	88-06-2	8270D	ND		0.80	0.50	ug/L	1

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
2-Fluorobiphenyl		58	37-129
2-Fluorophenol		43	24-127
Nitrobenzene-d5		75	38-127
Phenol-d5		50	28-128
Terphenyl-d14		92	10-148
2,4,6-Tribromophenol		63	35-144

LOQ = Limit of Quantitation
B = Detected in the method blank
E = Quantitation of compound exceeded the calibration range
ND = Not detected at or above the LOQ
N = Recovery is out of criteria
P = The RPD between two GC columns exceeds 40%
H = Out of holding time
W = Reported on wet weight basis

CVAA

Client: **GZA GeoEnvironmental, Inc.**	Laboratory ID: **UC21029-007**
Description: **HS-MW-6S**	Matrix: **Aqueous**
Date Sampled: **03/20/2019 1415**	
Date Received: **03/21/2019**	

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1		7470A	1	03/28/2019 1237	JMH	03/27/2019 1341	11405

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
Mercury	7439-97-6	7470A	ND		0.00020	0.000091	mg/L	1

LOQ = Limit of Quantitation	B = Detected in the method blank	E = Quantitation of compound exceeded the calibration range
ND = Not detected at or above the LOQ	N = Recovery is out of criteria	P = The RPD between two GC columns exceeds 40%
H = Out of holding time	W = Reported on wet weight basis	

ICP-MS

Client: **GZA GeoEnvironmental, Inc.** Laboratory ID: **UC21029-007**

Description: **HS-MW-6S** Matrix: **Aqueous**

Date Sampled: **03/20/2019 1415**

Date Received: **03/21/2019**

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	200.2	200.8	1	03/28/2019 0056	BNW	03/23/2019 0847	11022

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
Aluminum	**7429-90-5**	**200.8**	**28**	**J**	**40**	**10**	**ug/L**	**1**
Antimony	7440-36-0	200.8	ND		2.0	0.50	ug/L	1
Arsenic	7440-38-2	200.8	ND		2.0	1.3	ug/L	1
Barium	**7440-39-3**	**200.8**	**79**		**5.0**	**1.3**	**ug/L**	**1**
Beryllium	7440-41-7	200.8	ND		0.40	0.15	ug/L	1
Boron	**7440-42-8**	**200.8**	**25**	**J**	**50**	**6.3**	**ug/L**	**1**
Cadmium	7440-43-9	200.8	ND		0.50	0.13	ug/L	1
Chromium	**7440-47-3**	**200.8**	**2.6**	**BJ**	**5.0**	**1.3**	**ug/L**	**1**
Cobalt	7440-48-4	200.8	ND		5.0	1.3	ug/L	1
Copper	**7440-50-8**	**200.8**	**1.9**	**J**	**5.0**	**1.3**	**ug/L**	**1**
Iron	**7439-89-6**	**200.8**	**450**		**50**	**13**	**ug/L**	**1**
Lead	7439-92-1	200.8	ND		1.0	0.25	ug/L	1
Magnesium	**7439-95-4**	**200.8**	**31000**		**400**	**50**	**ug/L**	**1**
Molybdenum	7439-98-7	200.8	ND		10	2.5	ug/L	1
Nickel	**7440-02-0**	**200.8**	**1.6**	**J**	**5.0**	**1.3**	**ug/L**	**1**
Selenium	7782-49-2	200.8	ND		5.0	1.3	ug/L	1
Silver	7440-22-4	200.8	ND		1.0	0.25	ug/L	1
Sodium	**7440-23-5**	**200.8**	**15000**		**400**	**150**	**ug/L**	**1**
Thallium	7440-28-0	200.8	ND		0.50	0.15	ug/L	1
Titanium	**7440-32-6**	**200.8**	**1.7**	**J**	**5.0**	**1.3**	**ug/L**	**1**
Vanadium	7440-62-2	200.8	ND		5.0	2.5	ug/L	1
Zinc	**7440-66-6**	**200.8**	**33**		**10**	**2.5**	**ug/L**	**1**

LOQ = Limit of Quantitation
B = Detected in the method blank
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ND = Not detected at or above the LOQ
N = Recovery is out of criteria
P = The RPD between two GC columns exceeds 40%
H = Out of holding time
W = Reported on wet weight basis

PFAS by LC/MS/MS

Client: **GZA GeoEnvironmental, Inc.**
Laboratory ID: **UC21029-007**
Description: **HS-MW-6S**
Matrix: **Aqueous**
Date Sampled: **03/20/2019 1415**
Date Received: **03/21/2019**

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	537 MOD	537 Modified-ID	1	04/01/2019 1522	SES	03/27/2019 1140	11382

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	Units	Run
1H, 1H, 2H, 2H-perfluorodecane sulfonic acid (8:2 FTS)	39108-34-4	537 Modified-	ND		3.6	ng/L	1
1H, 1H, 2H, 2H-perfluorooctane sulfonic acid (6:2 FTS)	27619-97-2	537 Modified-	ND		3.6	ng/L	1
N-ethylperfluoro-1-octanesulfonamide (EtFOSA)	4151-50-2	537 Modified-	ND		3.6	ng/L	1
N-methylperfluoro-1-octanesulfonamide (MeFOSA)	31506-32-8	537 Modified-	ND		7.3	ng/L	1
Perfluoro-1-butanesulfonic acid (PFBS)	**375-73-5**	**537 Modified-**	**47**		**3.6**	**ng/L**	**1**
Perfluoro-1-decanesulfonic acid (PFDS)	335-77-3	537 Modified-	ND		3.6	ng/L	1
Perfluoro-1-heptanesulfonic acid (PFHpS)	375-92-8	537 Modified-	ND		3.6	ng/L	1
Perfluoro-1-nonanesulfonic acid (PFNS)	68259-12-1	537 Modified-	ND		7.3	ng/L	1
Perfluoro-1-octanesulfonamide (PFOSA)	754-91-6	537 Modified-	ND		3.6	ng/L	1
Perfluoro-1-pentanesulfonic acid (PFPeS)	**2706-91-4**	**537 Modified-**	**61**		**3.6**	**ng/L**	**1**
Perfluorohexanesulfonic acid (PFHxS)	**355-46-4**	**537 Modified-**	**85**		**3.6**	**ng/L**	**1**
Perfluoro-n-butanoic acid (PFBA)	**375-22-4**	**537 Modified-**	**4.6**		**3.6**	**ng/L**	**1**
Perfluoro-n-decanoic acid (PFDA)	335-76-2	537 Modified-	ND		3.6	ng/L	1
Perfluoro-n-dodecanoic acid (PFDoA)	307-55-1	537 Modified-	ND		3.6	ng/L	1
Perfluoro-n-heptanoic acid (PFHpA)	**375-85-9**	**537 Modified-**	**15**		**3.6**	**ng/L**	**1**
Perfluoro-n-hexanoic acid (PFHxA)	**307-24-4**	**537 Modified-**	**31**		**3.6**	**ng/L**	**1**
Perfluoro-n-nonanoic acid (PFNA)	375-95-1	537 Modified-	ND		3.6	ng/L	1
Perfluoro-n-octanoic acid (PFOA)	**335-67-1**	**537 Modified-**	**44**		**1.8**	**ng/L**	**1**
Perfluoro-n-pentanoic acid (PFPeA)	**2706-90-3**	**537 Modified-**	**7.8**		**3.6**	**ng/L**	**1**
Perfluoro-n-tetradecanoic acid (PFTeDA)	376-06-7	537 Modified-	ND		3.6	ng/L	1
Perfluoro-n-tridecanoic acid (PFTrDA)	72629-94-8	537 Modified-	ND		3.6	ng/L	1
Perfluoro-n-undecanoic acid (PFUdA)	2058-94-8	537 Modified-	ND		3.6	ng/L	1
Perfluorooctanesulfonic acid (PFOS)	**1763-23-1**	**537 Modified-**	**8.7**		**3.6**	**ng/L**	**1**

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
13C2_6:2FTS		87	50-150
13C2_8:2FTS		110	50-150
13C2_PFDoA		100	50-150
13C2_PFTeDA		107	50-150
13C3_PFBS		103	50-150
13C3_PFHxS		92	50-150
13C4_PFBA		103	50-150
13C4_PFHpA		98	50-150
13C5_PFHxA		101	50-150
13C5_PFPeA		112	50-150
13C6_PFDA		99	50-150
13C7_PFUdA		108	50-150
13C8_PFOA		99	50-150
13C8_PFOS		96	50-150
13C8_PFOSA		94	50-150
13C9_PFNA		102	50-150
d-EtFOSA		64	50-150
d-MeFOSA		61	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%

Inorganic non-metals

Client: **GZA GeoEnvironmental, Inc.**
Laboratory ID: **UC21029-008**
Description: **HS-MW-6D**
Matrix: **Aqueous**
Date Sampled: **03/20/2019 1600**
Date Received: **03/21/2019**

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	350.1	(Ammonia - N) 350.1	1	03/29/2019 1437	DMA		11687
1		(Chloride) 300.0	1	04/02/2019 1649	SLU		12073
1	10-204-00-1-X	(Cyanide - To) SM 4500-CN E-	1	03/28/2019 1236	MSG	03/28/2019 1101	11519
1		(Hardness (to) SM 2340C-2011	1	03/27/2019 1719	KFE		11494
1		(Nitrate-Nitr) 353.2	1	03/23/2019 1717	MDD		11110
1		(Phosphorus) 365.1	1	03/28/2019 1630	MSG	03/28/2019 1218	11531
2		(Sulfate) 300.0	5	04/03/2019 0337	SLU		12072
1		(Sulfide) SM 4500-S2 F-2011	1	03/21/2019 2027	HET		10988

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
Ammonia - N (gas diffusion)		**350.1**	**0.14**		**0.10**	**0.020**	**mg/L**	**1**
Chloride		**300.0**	**66**		**1.0**	**0.20**	**mg/L**	**1**
Cyanide - Total	57-12-5	SM 4500-CN E-	ND		0.010	0.010	mg/L	1
Hardness (total)		**SM 2340C-**	**490**		**10**	**2.0**	**mg/L**	**1**
Nitrate-Nitrite - N		**353.2**	**0.012**	**BJ**	**0.020**	**0.0015**	**mg/L**	**1**
Phosphorus	**7723-14-0**	**365.1**	**0.033**	**J**	**0.050**	**0.0050**	**mg/L**	**1**
Sulfate		**300.0**	**230**		**5.0**	**1.0**	**mg/L**	**2**
Sulfide	18496-25-8	SM 4500-S2 F-	ND		1.0	1.0	mg/L	1

LOQ = Limit of Quantitation	B = Detected in the method blank	E = Quantitation of compound exceeded the calibration range
ND = Not detected at or above the LOQ	N = Recovery is out of criteria	P = The RPD between two GC columns exceeds 40%
H = Out of holding time	W = Reported on wet weight basis	

Volatile Organic Compounds by GC/MS

Client: **GZA GeoEnvironmental, Inc.**
Laboratory ID: **UC21029-008**
Description: **HS-MW-6D**
Matrix: **Aqueous**
Date Sampled: **03/20/2019 1600**
Date Received: **03/21/2019**

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	5030B	8260B	1	03/29/2019 1419	BWS		11689

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
Acetone	**67-64-1**	**8260B**	**3.4**	**J**	**20**	**2.0**	**ug/L**	**1**
Benzene	71-43-2	8260B	ND		1.0	0.40	ug/L	1
Bromodichloromethane	75-27-4	8260B	ND		1.0	0.40	ug/L	1
Bromoform	75-25-2	8260B	ND		1.0	0.40	ug/L	1
Bromomethane (Methyl bromide)	74-83-9	8260B	ND		2.0	0.40	ug/L	1
2-Butanone (MEK)	78-93-3	8260B	ND		10	2.0	ug/L	1
Carbon disulfide	75-15-0	8260B	ND		1.0	0.40	ug/L	1
Carbon tetrachloride	56-23-5	8260B	ND		1.0	0.40	ug/L	1
Chlorobenzene	108-90-7	8260B	ND		1.0	0.40	ug/L	1
Chloroethane	75-00-3	8260B	ND		2.0	0.40	ug/L	1
Chloroform	67-66-3	8260B	ND		1.0	0.40	ug/L	1
Chloromethane (Methyl chloride)	74-87-3	8260B	ND		1.0	0.50	ug/L	1
Cyclohexane	110-82-7	8260B	ND		1.0	0.40	ug/L	1
1,2-Dibromo-3-chloropropane (DBCP)	96-12-8	8260B	ND		1.0	0.40	ug/L	1
Dibromochloromethane	124-48-1	8260B	ND		1.0	0.40	ug/L	1
1,2-Dibromoethane (EDB)	106-93-4	8260B	ND		1.0	0.40	ug/L	1
1,2-Dichlorobenzene	95-50-1	8260B	ND		1.0	0.40	ug/L	1
1,3-Dichlorobenzene	541-73-1	8260B	ND		1.0	0.40	ug/L	1
1,4-Dichlorobenzene	106-46-7	8260B	ND		1.0	0.40	ug/L	1
Dichlorodifluoromethane	75-71-8	8260B	ND		2.0	0.60	ug/L	1
1,1-Dichloroethane	75-34-3	8260B	ND		1.0	0.40	ug/L	1
1,2-Dichloroethane	107-06-2	8260B	ND		1.0	0.40	ug/L	1
1,1-Dichloroethene	75-35-4	8260B	ND		1.0	0.40	ug/L	1
cis-1,2-Dichloroethene	156-59-2	8260B	ND		1.0	0.40	ug/L	1
trans-1,2-Dichloroethene	156-60-5	8260B	ND		1.0	0.40	ug/L	1
1,2-Dichloropropane	78-87-5	8260B	ND		1.0	0.40	ug/L	1
cis-1,3-Dichloropropene	10061-01-5	8260B	ND		1.0	0.40	ug/L	1
trans-1,3-Dichloropropene	10061-02-6	8260B	ND		1.0	0.40	ug/L	1
Ethylbenzene	100-41-4	8260B	ND		1.0	0.40	ug/L	1
2-Hexanone	591-78-6	8260B	ND		10	2.0	ug/L	1
Isopropylbenzene	98-82-8	8260B	ND		1.0	0.40	ug/L	1
Methyl acetate	79-20-9	8260B	ND		1.0	0.40	ug/L	1
Methyl tertiary butyl ether (MTBE)	1634-04-4	8260B	ND		1.0	0.40	ug/L	1
4-Methyl-2-pentanone	108-10-1	8260B	ND		10	2.0	ug/L	1
Methylcyclohexane	108-87-2	8260B	ND		5.0	0.40	ug/L	1
Methylene chloride	75-09-2	8260B	ND		1.0	0.40	ug/L	1
Styrene	100-42-5	8260B	ND		1.0	0.41	ug/L	1
1,1,2,2-Tetrachloroethane	79-34-5	8260B	ND		1.0	0.40	ug/L	1
Tetrachloroethene	127-18-4	8260B	ND		1.0	0.40	ug/L	1
Toluene	108-88-3	8260B	ND		1.0	0.40	ug/L	1
1,1,2-Trichloro-1,2,2-Trifluoroethane	76-13-1	8260B	ND		1.0	0.42	ug/L	1
1,2,4-Trichlorobenzene	120-82-1	8260B	ND		1.0	0.40	ug/L	1
1,1,1-Trichloroethane	71-55-6	8260B	ND		1.0	0.40	ug/L	1
1,1,2-Trichloroethane	79-00-5	8260B	ND		1.0	0.40	ug/L	1

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%

Volatile Organic Compounds by GC/MS

Client: **GZA GeoEnvironmental, Inc.** Laboratory ID: **UC21029-008**

Description: **HS-MW-6D** Matrix: **Aqueous**

Date Sampled: **03/20/2019 1600**

Date Received: **03/21/2019**

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	5030B	8260B	1	03/29/2019 1419	BWS		11689

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
Trichloroethene	79-01-6	8260B	ND		1.0	0.40	ug/L	1
Trichlorofluoromethane	75-69-4	8260B	ND		1.0	0.40	ug/L	1
Vinyl chloride	75-01-4	8260B	ND		1.0	0.40	ug/L	1
Xylenes (total)	1330-20-7	8260B	ND		1.0	0.40	ug/L	1
m+p - Xylenes	179601-23-1	8260B	ND		1.0	0.40	ug/L	1
o - Xylenes	95-47-6	8260B	ND		1.0	0.40	ug/L	1

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
1,2-Dichloroethane-d4		103	70-130
Bromofluorobenzene		95	70-130
Toluene-d8		97	70-130

LOQ = Limit of Quantitation	B = Detected in the method blank	E = Quantitation of compound exceeded the calibration range
ND = Not detected at or above the LOQ	N = Recovery is out of criteria	P = The RPD between two GC columns exceeds 40%
H = Out of holding time	W = Reported on wet weight basis	

Semivolatile Organic Compounds by GC/MS

Client: **GZA GeoEnvironmental, Inc.**
Laboratory ID: **UC21029-008**
Description: **HS-MW-6D**
Matrix: **Aqueous**
Date Sampled: **03/20/2019 1600**
Date Received: **03/21/2019**

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	3520C	8270D	1	04/03/2019 1826	SCD	03/25/2019 1939	11166

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
Acenaphthene	83-32-9	8270D	ND		0.20	0.040	ug/L	1
Acenaphthylene	208-96-8	8270D	ND		0.20	0.040	ug/L	1
Acetophenone	98-86-2	8270D	ND		0.80	0.50	ug/L	1
Anthracene	120-12-7	8270D	ND		0.20	0.060	ug/L	1
Atrazine	1912-24-9	8270D	ND		0.80	0.50	ug/L	1
Benzidine	92-87-5	8270D	ND		20	1.0	ug/L	1
Benzo(a)anthracene	56-55-3	8270D	ND		0.20	0.040	ug/L	1
Benzo(a)pyrene	50-32-8	8270D	ND		0.20	0.070	ug/L	1
Benzo(b)fluoranthene	205-99-2	8270D	ND		0.20	0.040	ug/L	1
Benzo(g,h,i)perylene	191-24-2	8270D	ND		0.20	0.040	ug/L	1
Benzo(k)fluoranthene	207-08-9	8270D	ND		0.20	0.040	ug/L	1
Butyl benzyl phthalate	85-68-7	8270D	ND		0.80	0.50	ug/L	1
Caprolactam	105-60-2	8270D	ND		1.6	1.0	ug/L	1
Carbazole	86-74-8	8270D	ND		0.80	0.50	ug/L	1
4-Chloro-3-methyl phenol	59-50-7	8270D	ND		0.80	0.50	ug/L	1
bis(2-Chloroethyl)ether	111-44-4	8270D	ND		0.80	0.50	ug/L	1
2-Chloronaphthalene	91-58-7	8270D	ND		0.80	0.50	ug/L	1
2-Chlorophenol	95-57-8	8270D	ND		0.80	0.50	ug/L	1
Chrysene	218-01-9	8270D	ND		0.20	0.030	ug/L	1
Dibenzo(a,h)anthracene	53-70-3	8270D	ND		0.20	0.030	ug/L	1
Dibenzofuran	132-64-9	8270D	ND		0.80	0.50	ug/L	1
3,3'-Dichlorobenzidine	91-94-1	8270D	ND		4.0	1.8	ug/L	1
2,4-Dichlorophenol	120-83-2	8270D	ND		1.6	1.0	ug/L	1
Diethylphthalate	84-66-2	8270D	ND		0.80	0.50	ug/L	1
Dimethyl phthalate	131-11-3	8270D	ND		0.80	0.50	ug/L	1
2,4-Dimethylphenol	105-67-9	8270D	ND		0.80	0.48	ug/L	1
Di-n-butyl phthalate	84-74-2	8270D	ND		0.80	0.50	ug/L	1
4,6-Dinitro-2-methylphenol	534-52-1	8270D	ND		4.0	1.0	ug/L	1
2,4-Dinitrotoluene	121-14-2	8270D	ND		1.6	0.50	ug/L	1
Di-n-octylphthalate	117-84-0	8270D	ND		0.80	0.50	ug/L	1
1,2-Diphenylhydrazine(as azobenzene)	103-33-3	8270D	ND		0.80	0.50	ug/L	1
bis(2-Ethylhexyl)phthalate	117-81-7	8270D	ND		4.0	0.50	ug/L	1
Fluoranthene	206-44-0	8270D	ND		0.20	0.10	ug/L	1
Fluorene	86-73-7	8270D	ND		0.20	0.030	ug/L	1
Hexachlorobenzene	118-74-1	8270D	ND		0.80	0.50	ug/L	1
Hexachlorobutadiene	87-68-3	8270D	ND		0.80	0.50	ug/L	1
Hexachlorocyclopentadiene	77-47-4	8270D	ND		4.0	2.0	ug/L	1
Hexachloroethane	67-72-1	8270D	ND		0.80	0.31	ug/L	1
Indeno(1,2,3-c,d)pyrene	193-39-5	8270D	ND		0.20	0.040	ug/L	1
Isophorone	78-59-1	8270D	ND		0.80	0.50	ug/L	1
2-Methylnaphthalene	91-57-6	8270D	ND		0.20	0.040	ug/L	1
2-Methylphenol	95-48-7	8270D	ND		0.80	0.21	ug/L	1
3+4-Methylphenol	106-44-5	8270D	ND		1.6	1.5	ug/L	1
Naphthalene	91-20-3	8270D	ND		0.20	0.050	ug/L	1

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%

Semivolatile Organic Compounds by GC/MS

Client: **GZA GeoEnvironmental, Inc.**
Laboratory ID: **UC21029-008**
Description: **HS-MW-6D**
Matrix: **Aqueous**
Date Sampled: **03/20/2019 1600**
Date Received: **03/21/2019**

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	3520C	8270D	1	04/03/2019 1826	SCD	03/25/2019 1939	11166

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
Nitrobenzene	98-95-3	8270D	ND		0.80	0.55	ug/L	1
2-Nitrophenol	88-75-5	8270D	ND		1.6	1.0	ug/L	1
N-Nitrosodi-n-propylamine	621-64-7	8270D	ND		0.80	0.50	ug/L	1
N-Nitrosodiphenylamine (Diphenylamine)	86-30-6	8270D	ND		0.80	0.50	ug/L	1
Pentachlorophenol	87-86-5	8270D	ND		4.0	2.0	ug/L	1
Phenanthrene	85-01-8	8270D	ND		0.20	0.060	ug/L	1
Phenol	108-95-2	8270D	ND		0.80	0.50	ug/L	1
Pyrene	129-00-0	8270D	ND		0.20	0.10	ug/L	1
2,4,5-Trichlorophenol	95-95-4	8270D	ND		0.80	0.50	ug/L	1
2,4,6-Trichlorophenol	88-06-2	8270D	ND		0.80	0.50	ug/L	1

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
2-Fluorobiphenyl		53	37-129
2-Fluorophenol		46	24-127
Nitrobenzene-d5		68	38-127
Phenol-d5		55	28-128
Terphenyl-d14		83	10-148
2,4,6-Tribromophenol		53	35-144

LOQ = Limit of Quantitation
B = Detected in the method blank
E = Quantitation of compound exceeded the calibration range
ND = Not detected at or above the LOQ
N = Recovery is out of criteria
P = The RPD between two GC columns exceeds 40%
H = Out of holding time
W = Reported on wet weight basis

CVAA

Client: **GZA GeoEnvironmental, Inc.**
Laboratory ID: **UC21029-008**
Description: **HS-MW-6D**
Matrix: **Aqueous**
Date Sampled: **03/20/2019 1600**
Date Received: **03/21/2019**

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1		7470A	1	03/28/2019 1245	JMH	03/27/2019 1341	11405

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
Mercury	7439-97-6	7470A	ND		0.00020	0.000091	mg/L	1

LOQ = Limit of Quantitation	B = Detected in the method blank	E = Quantitation of compound exceeded the calibration range
ND = Not detected at or above the LOQ	N = Recovery is out of criteria	P = The RPD between two GC columns exceeds 40%
H = Out of holding time	W = Reported on wet weight basis	

ICP-MS

Client: **GZA GeoEnvironmental, Inc.**
Laboratory ID: **UC21029-008**
Description: **HS-MW-6D**
Matrix: **Aqueous**
Date Sampled: **03/20/2019 1600**
Date Received: **03/21/2019**

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	200.2	200.8	1	03/28/2019 0102	BNW	03/23/2019 0847	11022

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
Aluminum	**7429-90-5**	**200.8**	**62**		**40**	**10**	**ug/L**	**1**
Antimony	7440-36-0	200.8	ND		2.0	0.50	ug/L	1
Arsenic	**7440-38-2**	**200.8**	**3.5**		**2.0**	**1.3**	**ug/L**	**1**
Barium	**7440-39-3**	**200.8**	**28**		**5.0**	**1.3**	**ug/L**	**1**
Beryllium	7440-41-7	200.8	ND		0.40	0.15	ug/L	1
Boron	**7440-42-8**	**200.8**	**55**		**50**	**6.3**	**ug/L**	**1**
Cadmium	7440-43-9	200.8	ND		0.50	0.13	ug/L	1
Chromium	**7440-47-3**	**200.8**	**1.8**	**BJ**	**5.0**	**1.3**	**ug/L**	**1**
Cobalt	7440-48-4	200.8	ND		5.0	1.3	ug/L	1
Copper	7440-50-8	200.8	ND		5.0	1.3	ug/L	1
Iron	**7439-89-6**	**200.8**	**1500**		**50**	**13**	**ug/L**	**1**
Lead	7439-92-1	200.8	ND		1.0	0.25	ug/L	1
Magnesium	**7439-95-4**	**200.8**	**23000**		**400**	**50**	**ug/L**	**1**
Molybdenum	7439-98-7	200.8	ND		10	2.5	ug/L	1
Nickel	**7440-02-0**	**200.8**	**2.3**	**J**	**5.0**	**1.3**	**ug/L**	**1**
Selenium	7782-49-2	200.8	ND		5.0	1.3	ug/L	1
Silver	7440-22-4	200.8	ND		1.0	0.25	ug/L	1
Sodium	**7440-23-5**	**200.8**	**20000**		**400**	**150**	**ug/L**	**1**
Thallium	7440-28-0	200.8	ND		0.50	0.15	ug/L	1
Titanium	**7440-32-6**	**200.8**	**3.7**	**J**	**5.0**	**1.3**	**ug/L**	**1**
Vanadium	7440-62-2	200.8	ND		5.0	2.5	ug/L	1
Zinc	**7440-66-6**	**200.8**	**4.9**	**J**	**10**	**2.5**	**ug/L**	**1**

LOQ = Limit of Quantitation
B = Detected in the method blank
E = Quantitation of compound exceeded the calibration range
ND = Not detected at or above the LOQ
N = Recovery is out of criteria
P = The RPD between two GC columns exceeds 40%
H = Out of holding time
W = Reported on wet weight basis

PFAS by LC/MS/MS

Client: **GZA GeoEnvironmental, Inc.**
Laboratory ID: **UC21029-008**
Description: **HS-MW-6D**
Matrix: **Aqueous**
Date Sampled: **03/20/2019 1600**
Date Received: **03/21/2019**

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	537 MOD	537 Modified-ID	1	04/01/2019 1600	SES	03/27/2019 1140	11382

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	Units	Run
1H, 1H, 2H, 2H-perfluorodecane sulfonic acid (8:2 FTS)	39108-34-4	537 Modified-	ND		3.5	ng/L	1
1H, 1H, 2H, 2H-perfluorooctane sulfonic acid (6:2 FTS)	27619-97-2	537 Modified-	ND		3.5	ng/L	1
N-ethylperfluoro-1-octanesulfonamide (EtFOSA)	4151-50-2	537 Modified-	ND		3.5	ng/L	1
N-methylperfluoro-1-octanesulfonamide (MeFOSA)	31506-32-8	537 Modified-	ND		7.0	ng/L	1
Perfluoro-1-butanesulfonic acid (PFBS)	375-73-5	537 Modified-	ND		3.5	ng/L	1
Perfluoro-1-decanesulfonic acid (PFDS)	335-77-3	537 Modified-	ND		3.5	ng/L	1
Perfluoro-1-heptanesulfonic acid (PFHpS)	375-92-8	537 Modified-	ND		3.5	ng/L	1
Perfluoro-1-nonanesulfonic acid (PFNS)	68259-12-1	537 Modified-	ND		7.0	ng/L	1
Perfluoro-1-octanesulfonamide (PFOSA)	754-91-6	537 Modified-	ND		3.5	ng/L	1
Perfluoro-1-pentanesulfonic acid (PFPeS)	2706-91-4	537 Modified-	ND		3.5	ng/L	1
Perfluorohexanesulfonic acid (PFHxS)	355-46-4	537 Modified-	ND		3.5	ng/L	1
Perfluoro-n-butanoic acid (PFBA)	375-22-4	537 Modified-	ND		3.5	ng/L	1
Perfluoro-n-decanoic acid (PFDA)	335-76-2	537 Modified-	ND		3.5	ng/L	1
Perfluoro-n-dodecanoic acid (PFDoA)	307-55-1	537 Modified-	ND		3.5	ng/L	1
Perfluoro-n-heptanoic acid (PFHpA)	375-85-9	537 Modified-	ND		3.5	ng/L	1
Perfluoro-n-hexanoic acid (PFHxA)	307-24-4	537 Modified-	ND		3.5	ng/L	1
Perfluoro-n-nonanoic acid (PFNA)	375-95-1	537 Modified-	ND		3.5	ng/L	1
Perfluoro-n-octanoic acid (PFOA)	335-67-1	537 Modified-	ND		1.8	ng/L	1
Perfluoro-n-pentanoic acid (PFPeA)	2706-90-3	537 Modified-	ND		3.5	ng/L	1
Perfluoro-n-tetradecanoic acid (PFTeDA)	376-06-7	537 Modified-	ND		3.5	ng/L	1
Perfluoro-n-tridecanoic acid (PFTrDA)	72629-94-8	537 Modified-	ND		3.5	ng/L	1
Perfluoro-n-undecanoic acid (PFUdA)	2058-94-8	537 Modified-	ND		3.5	ng/L	1
Perfluorooctanesulfonic acid (PFOS)	1763-23-1	537 Modified-	ND		3.5	ng/L	1

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
13C2_6:2FTS		99	50-150
13C2_8:2FTS		134	50-150
13C2_PFDoA		108	50-150
13C2_PFTeDA		110	50-150
13C3_PFBS		101	50-150
13C3_PFHxS		99	50-150
13C4_PFBA		108	50-150
13C4_PFHpA		106	50-150
13C5_PFHxA		103	50-150
13C5_PFPeA		111	50-150
13C6_PFDA		117	50-150
13C7_PFUdA		107	50-150
13C8_PFOA		101	50-150
13C8_PFOS		111	50-150
13C8_PFOSA		97	50-150
13C9_PFNA		104	50-150
d-EtFOSA		73	50-150
d-MeFOSA		68	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%

PFAS by LC/MS/MS

Client: **GZA GeoEnvironmental, Inc.** Laboratory ID: **UC21029-009**
Description: **FB-3/20** Matrix: **Aqueous**
Date Sampled: **03/20/2019 1610**
Date Received: **03/21/2019**

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	537 MOD	537 Modified-ID	1	04/02/2019 1727	SES	03/27/2019 1140	11382

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	Units	Run
1H, 1H, 2H, 2H-perfluorodecane sulfonic acid (8:2 FTS)	39108-34-4	537 Modified-	ND		4.1	ng/L	1
1H, 1H, 2H, 2H-perfluorooctane sulfonic acid (6:2 FTS)	27619-97-2	537 Modified-	ND		4.1	ng/L	1
N-ethylperfluoro-1-octanesulfonamide (EtFOSA)	4151-50-2	537 Modified-	ND		4.1	ng/L	1
N-methylperfluoro-1-octanesulfonamide (MeFOSA)	31506-32-8	537 Modified-	ND		8.3	ng/L	1
Perfluoro-1-butanesulfonic acid (PFBS)	375-73-5	537 Modified-	ND		4.1	ng/L	1
Perfluoro-1-decanesulfonic acid (PFDS)	335-77-3	537 Modified-	ND		4.1	ng/L	1
Perfluoro-1-heptanesulfonic acid (PFHpS)	375-92-8	537 Modified-	ND		4.1	ng/L	1
Perfluoro-1-nonanesulfonic acid (PFNS)	68259-12-1	537 Modified-	ND		8.3	ng/L	1
Perfluoro-1-octanesulfonamide (PFOSA)	754-91-6	537 Modified-	ND		4.1	ng/L	1
Perfluoro-1-pentanesulfonic acid (PFPeS)	2706-91-4	537 Modified-	ND		4.1	ng/L	1
Perfluorohexanesulfonic acid (PFHxS)	355-46-4	537 Modified-	ND		4.1	ng/L	1
Perfluoro-n-butanoic acid (PFBA)	375-22-4	537 Modified-	ND		4.1	ng/L	1
Perfluoro-n-decanoic acid (PFDA)	335-76-2	537 Modified-	ND		4.1	ng/L	1
Perfluoro-n-dodecanoic acid (PFDoA)	307-55-1	537 Modified-	ND		4.1	ng/L	1
Perfluoro-n-heptanoic acid (PFHpA)	375-85-9	537 Modified-	ND		4.1	ng/L	1
Perfluoro-n-hexanoic acid (PFHxA)	307-24-4	537 Modified-	ND		4.1	ng/L	1
Perfluoro-n-nonanoic acid (PFNA)	375-95-1	537 Modified-	ND		4.1	ng/L	1
Perfluoro-n-octanoic acid (PFOA)	335-67-1	537 Modified-	ND		2.1	ng/L	1
Perfluoro-n-pentanoic acid (PFPeA)	2706-90-3	537 Modified-	ND		4.1	ng/L	1
Perfluoro-n-tetradecanoic acid (PFTeDA)	376-06-7	537 Modified-	ND		4.1	ng/L	1
Perfluoro-n-tridecanoic acid (PFTrDA)	72629-94-8	537 Modified-	ND		4.1	ng/L	1
Perfluoro-n-undecanoic acid (PFUdA)	2058-94-8	537 Modified-	ND		4.1	ng/L	1
Perfluorooctanesulfonic acid (PFOS)	1763-23-1	537 Modified-	ND		4.1	ng/L	1

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
13C2_6:2FTS		121	50-150
13C2_8:2FTS		118	50-150
13C2_PFDoA		119	50-150
13C2_PFTeDA		114	50-150
13C3_PFBS		125	50-150
13C3_PFHxS		127	50-150
13C4_PFBA		128	50-150
13C4_PFHpA		131	50-150
13C5_PFHxA		124	50-150
13C5_PFPeA		128	50-150
13C6_PFDA		118	50-150
13C7_PFUdA		122	50-150
13C8_PFOA		130	50-150
13C8_PFOS		121	50-150
13C8_PFOSA		102	50-150
13C9_PFNA		133	50-150
d-EtFOSA		63	50-150
d-MeFOSA		61	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%

QC Summary

Inorganic non-metals - MB

Sample ID: UQ10988-001 **Matrix:** Aqueous

Batch: 10988

Analytical Method: SM 4500-S2 F-2011

Parameter	Result	Q	Dil	LOQ	DL	Units	Analysis Date
Sulfide	ND		1	1.0	1.0	mg/L	03/21/2019 2027

Inorganic non-metals - LCS

Sample ID: UQ10988-002
Batch: 10988
Analytical Method: SM 4500-S2 F-2011

Matrix: Aqueous

Parameter	Spike Amount (mg/L)	Result (mg/L)	Q	Dil	% Rec	% Rec Limit	Analysis Date
Sulfide	10	11		1	105	80-120	03/21/2019 2027

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the LOQ

N = Recovery is out of criteria
+ = RPD is out of criteria

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

Inorganic non-metals - MB

Sample ID: UQ11110-001
Batch: 11110
Analytical Method: 353.2

Matrix: Aqueous

Parameter	Result	Q	Dil	LOQ	DL	Units	Analysis Date
Nitrate-Nitrite - N	**0.0021**	**J**	**1**	**0.020**	**0.0015**	**mg/L**	**03/23/2019 1640**

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the LOQ

N = Recovery is out of criteria
+ = RPD is out of criteria

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

Inorganic non-metals - LCS

Sample ID: UQ11110-002
Batch: 11110
Analytical Method: 353.2

Matrix: Aqueous

Parameter	Spike Amount (mg/L)	Result (mg/L)	Q	Dil	% Rec	% Rec Limit	Analysis Date
Nitrate-Nitrite - N	0.80	0.83		1	104	90-110	03/23/2019 1641

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the LOQ

N = Recovery is out of criteria
+ = RPD is out of criteria

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

Inorganic non-metals - MS

Sample ID: UC21029-003MS

Batch: 11110

Analytical Method: 353.2

Matrix: Aqueous

Parameter	Sample Amount (mg/L)	Spike Amount (mg/L)	Result (mg/L)	Q	Dil	% Rec	% Rec Limit	Analysis Date
Nitrate-Nitrite - N	0.014	0.80	0.69	N	1	84	90-110	03/23/2019 1702

LOQ = Limit of Quantitation

DL = Detection Limit

LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%

J = Estimated result < LOQ and ≥ DL

ND = Not detected at or above the LOQ

N = Recovery is out of criteria

+ = RPD is out of criteria

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

Inorganic non-metals - MSD

Sample ID: UC21029-003MD

Matrix: Aqueous

Batch: 11110

Analytical Method: 353.2

Parameter	Sample Amount (mg/L)	Spike Amount (mg/L)	Result (mg/L)	Q	Dil	% Rec	% RPD	% Rec Limit	% RPD Limit	Analysis Date
Nitrate-Nitrite - N	0.014	0.80	0.67	N	1	82	2.8	90-110	20	03/23/2019 1704

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

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

Inorganic non-metals - MS

Sample ID: UC21029-005MS

Matrix: Aqueous

Batch: 11110

Analytical Method: 353.2

Parameter	Sample Amount (mg/L)	Spike Amount (mg/L)	Result (mg/L)	Q	Dil	% Rec	% Rec Limit	Analysis Date
Nitrate-Nitrite - N	0.014	0.80	0.83		1	102	90-110	03/23/2019 1712

LOQ = Limit of Quantitation

P = The RPD between two GC columns exceeds 40%

N = Recovery is out of criteria

DL = Detection Limit

J = Estimated result < LOQ and ≥ DL

+ = RPD is out of criteria

LOD = Limit of Detection

ND = Not detected at or above the LOQ

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

Inorganic non-metals - MSD

Sample ID: UC21029-005MD

Matrix: Aqueous

Batch: 11110

Analytical Method: 353.2

Parameter	Sample Amount (mg/L)	Spike Amount (mg/L)	Result (mg/L)	Q	Dil	% Rec	% RPD	% Rec Limit	% RPD Limit	Analysis Date
Nitrate-Nitrite - N	0.014	0.80	0.82		1	101	0.63	90-110	20	03/23/2019 1713

LOQ = Limit of Quantitation

DL = Detection Limit

LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%

J = Estimated result < LOQ and ≥ DL

ND = Not detected at or above the LOQ

N = Recovery is out of criteria

+ = RPD is out of criteria

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

Inorganic non-metals - MB

Sample ID: UQ11197-001
Batch: 11197
Analytical Method: 365.1

Matrix: Aqueous
Prep Method: 365.1
Prep Date: 03/25/2019 1335

Parameter	Result	Q	Dil	LOQ	DL	Units	Analysis Date
Phosphorus	ND		1	0.050	0.0050	mg/L	03/26/2019 1322

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

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

Inorganic non-metals - LCS

Sample ID: UQ11197-002
Batch: 11197
Analytical Method: 365.1

Matrix: Aqueous
Prep Method: 365.1
Prep Date: 03/25/2019 1335

Parameter	Spike Amount (mg/L)	Result (mg/L)	Q	Dil	% Rec	% Rec Limit	Analysis Date
Phosphorus	0.25	0.23		1	92	90-110	03/26/2019 1322

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the LOQ

N = Recovery is out of criteria
+ = RPD is out of criteria

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

Inorganic non-metals - MS

Sample ID:	UC21029-001MS	**Matrix:**	Aqueous
Batch:	11197	**Prep Method:**	365.1
Analytical Method:	365.1	**Prep Date:**	03/25/2019 1335

Parameter	Sample Amount (mg/L)	Spike Amount (mg/L)	Result (mg/L)	Q	Dil	% Rec	% Rec Limit	Analysis Date
Phosphorus	0.0057	0.25	0.23		1	91	90-110	03/26/2019 1413

LOQ = Limit of Quantitation

DL = Detection Limit

LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%

J = Estimated result < LOQ and ≥ DL

ND = Not detected at or above the LOQ

N = Recovery is out of criteria

+ = RPD is out of criteria

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

Inorganic non-metals - MSD

Sample ID:	UC21029-001MD	**Matrix:**	Aqueous
Batch:	11197	**Prep Method:**	365.1
Analytical Method:	365.1	**Prep Date:**	03/25/2019 1335

Parameter	**Sample Amount (mg/L)**	**Spike Amount (mg/L)**	**Result (mg/L)**	**Q**	**Dil**	**% Rec**	**% RPD**	**% Rec Limit**	**% RPD Limit**	**Analysis Date**
Phosphorus	0.0057	0.25	0.24		1	94	3.3	90-110	20	03/26/2019 1414

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

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

Inorganic non-metals - MB

Sample ID: UQ11401-001
Batch: 11401
Analytical Method: SM 4500-CN E-2011

Matrix: Aqueous
Prep Method: 10-204-00-1-X
Prep Date: 03/27/2019 1140

Parameter	Result	Q	Dil	LOQ	DL	Units	Analysis Date
Cyanide - Total	ND		1	0.010	0.010	mg/L	03/27/2019 1442

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

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

Inorganic non-metals - LCS

Sample ID: UQ11401-002
Batch: 11401
Analytical Method: SM 4500-CN E-2011

Matrix: Aqueous
Prep Method: 10-204-00-1-X
Prep Date: 03/27/2019 1140

Parameter	Spike Amount (mg/L)	Result (mg/L)	Q	Dil	% Rec	% Rec Limit	Analysis Date
Cyanide - Total	0.10	0.11		1	108	90-110	03/27/2019 1443

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

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

Inorganic non-metals - MB

Sample ID: UQ11494-001

Batch: 11494

Analytical Method: SM 2340C-2011

Matrix: Aqueous

Parameter	Result	Q	Dil	LOQ	DL	Units	Analysis Date
Hardness (total)	ND		1	10	2.0	mg/L	03/27/2019 1719

LOQ = Limit of Quantitation

DL = Detection Limit

LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%

J = Estimated result < LOQ and ≥ DL

ND = Not detected at or above the LOQ

N = Recovery is out of criteria

\+ = RPD is out of criteria

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

Inorganic non-metals - LCS

Sample ID: UQ11494-002
Batch: 11494
Analytical Method: SM 2340C-2011

Matrix: Aqueous

Parameter	Spike Amount (mg/L)	Result (mg/L)	Q	Dil	% Rec	% Rec Limit	Analysis Date
Hardness (total)	100	110		1	110	90-110	03/27/2019 1719

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

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

Inorganic non-metals - MB

Sample ID: UQ11519-001
Batch: 11519
Analytical Method: SM 4500-CN E-2011

Matrix: Aqueous
Prep Method: 10-204-00-1-X
Prep Date: 03/28/2019 1101

Parameter	Result	Q	Dil	LOQ	DL	Units	Analysis Date
Cyanide - Total	ND		1	0.010	0.010	mg/L	03/28/2019 1203

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

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

Inorganic non-metals - LCS

Sample ID: UQ11519-002
Batch: 11519
Analytical Method: SM 4500-CN E-2011

Matrix: Aqueous
Prep Method: 10-204-00-1-X
Prep Date: 03/28/2019 1101

Parameter	Spike Amount (mg/L)	Result (mg/L)	Q	Dil	% Rec	% Rec Limit	Analysis Date
Cyanide - Total	0.10	0.11		1	106	90-110	03/28/2019 1204

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the LOQ

N = Recovery is out of criteria
+ = RPD is out of criteria

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

Inorganic non-metals - MB

Sample ID: UQ11531-001
Batch: 11531
Analytical Method: 365.1

Matrix: Aqueous
Prep Method: 365.1
Prep Date: 03/28/2019 1218

Parameter	Result	Q	Dil	LOQ	DL	Units	Analysis Date
Phosphorus	ND		1	0.050	0.0050	mg/L	03/28/2019 1620

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the LOQ

N = Recovery is out of criteria
+ = RPD is out of criteria

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

Inorganic non-metals - LCS

Sample ID: UQ11531-002
Batch: 11531
Analytical Method: 365.1

Matrix: Aqueous
Prep Method: 365.1
Prep Date: 03/28/2019 1218

Parameter	Spike Amount (mg/L)	Result (mg/L)	Q	Dil	% Rec	% Rec Limit	Analysis Date
Phosphorus	0.25	0.23		1	93	90-110	03/28/2019 1625

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

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

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Inorganic non-metals - MB

Sample ID: UQ11537-001
Batch: 11537
Analytical Method: 350.1

Matrix: Aqueous
Prep Method: 350.1

Parameter	Result	Q	Dil	LOQ	DL	Units	Analysis Date
Ammonia - N (gas diffusion)	**0.021**	**J**	**1**	**0.10**	**0.020**	**mg/L**	**03/28/2019 1354**

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the LOQ

N = Recovery is out of criteria
+ = RPD is out of criteria

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

Inorganic non-metals - LCS

Sample ID: UQ11537-002
Batch: 11537
Analytical Method: 350.1

Matrix: Aqueous
Prep Method: 350.1

Parameter	Spike Amount (mg/L)	Result (mg/L)	Q	Dil	% Rec	% Rec Limit	Analysis Date
Ammonia - N (gas diffusion)	1.0	1.0		1	102	90-110	03/28/2019 1356

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the LOQ

N = Recovery is out of criteria
+ = RPD is out of criteria

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

Inorganic non-metals - MB

Sample ID: UQ11687-001
Batch: 11687
Analytical Method: 350.1

Matrix: Aqueous
Prep Method: 350.1

Parameter	Result	Q	Dil	LOQ	DL	Units	Analysis Date
Ammonia - N (gas diffusion)	ND		1	0.10	0.020	mg/L	03/29/2019 1409

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the LOQ

N = Recovery is out of criteria
\+ = RPD is out of criteria

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

Inorganic non-metals - LCS

Sample ID: UQ11687-002
Batch: 11687
Analytical Method: 350.1
Matrix: Aqueous
Prep Method: 350.1

Parameter	Spike Amount (mg/L)	Result (mg/L)	Q	Dil	% Rec	% Rec Limit	Analysis Date
Ammonia - N (gas diffusion)	1.0	1.1		1	105	90-110	03/29/2019 1411

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

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

Inorganic non-metals - MS

Sample ID: UC21029-006MS
Batch: 11687
Analytical Method: 350.1

Matrix: Aqueous
Prep Method: 350.1

Parameter	Sample Amount (mg/L)	Spike Amount (mg/L)	Result (mg/L)	Q	Dil	% Rec	% Rec Limit	Analysis Date
Ammonia - N (gas diffusion)	0.43	1.0	1.4		1	100	90-110	03/29/2019 1431

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the LOQ

N = Recovery is out of criteria
+ = RPD is out of criteria

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

Inorganic non-metals - MSD

Sample ID: UC21029-006MD
Batch: 11687
Analytical Method: 350.1

Matrix: Aqueous
Prep Method: 350.1

Parameter	Sample Amount (mg/L)	Spike Amount (mg/L)	Result (mg/L)	Q	Dil	% Rec	% RPD	% Rec Limit	% RPD Limit	Analysis Date
Ammonia - N (gas diffusion)	0.43	1.0	1.4		1	99	0.14	90-110	20	03/29/2019 1433

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the LOQ

N = Recovery is out of criteria
+ = RPD is out of criteria

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

Inorganic non-metals - MB

Sample ID: UQ11830-001
Batch: 11830
Analytical Method: 300.0

Matrix: Aqueous

Parameter	Result	Q	Dil	LOQ	DL	Units	Analysis Date
Sulfate	ND		1	1.0	0.20	mg/L	03/29/2019 1905

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and $\geq$ DL
ND = Not detected at or above the LOQ

N = Recovery is out of criteria
+ = RPD is out of criteria

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

Inorganic non-metals - LCS

Sample ID: UQ11830-002
Batch: 11830
Analytical Method: 300.0

Matrix: Aqueous

Parameter	Spike Amount (mg/L)	Result (mg/L)	Q	Dil	% Rec	% Rec Limit	Analysis Date
Sulfate	20	20		1	101	90-110	03/29/2019 2233

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

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

Inorganic non-metals - MS

Sample ID: UC21029-004MS
Batch: 11830
Analytical Method: 300.0

Matrix: Aqueous

Parameter	Sample Amount (mg/L)	Spike Amount (mg/L)	Result (mg/L)	Q	Dil	% Rec	% Rec Limit	Analysis Date
Sulfate	14	20	33		1	93	90-110	03/30/2019 1135

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the LOQ

N = Recovery is out of criteria
+ = RPD is out of criteria

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

Inorganic non-metals - MSD

Sample ID: UC21029-004MD

Matrix: Aqueous

Batch: 11830

Analytical Method: 300.0

Parameter	Sample Amount (mg/L)	Spike Amount (mg/L)	Result (mg/L)	Q	Dil	% Rec	% RPD	% Rec Limit	% RPD Limit	Analysis Date
Sulfate	14	20	33		1	95	0.91	90-110	20	03/30/2019 1201

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

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

Inorganic non-metals - MB

Sample ID: UQ11833-001

Batch: 11833

Analytical Method: 300.0

Matrix: Aqueous

Parameter	Result	Q	Dil	LOQ	DL	Units	Analysis Date
Chloride	ND		1	1.0	0.20	mg/L	03/29/2019 1905

LOQ = Limit of Quantitation

DL = Detection Limit

LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%

J = Estimated result < LOQ and ≥ DL

ND = Not detected at or above the LOQ

N = Recovery is out of criteria

\+ = RPD is out of criteria

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

Inorganic non-metals - LCS

Sample ID: UQ11833-002
Batch: 11833
Analytical Method: 300.0

Matrix: Aqueous

Parameter	Spike Amount (mg/L)	Result (mg/L)	Q	Dil	% Rec	% Rec Limit	Analysis Date
Chloride	20	20		1	102	90-110	03/29/2019 2233

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the LOQ

N = Recovery is out of criteria
+ = RPD is out of criteria

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

Inorganic non-metals - MS

Sample ID: UC21029-004MS **Matrix:** Aqueous

Batch: 11833

Analytical Method: 300.0

Parameter	Sample Amount (mg/L)	Spike Amount (mg/L)	Result (mg/L)	Q	Dil	% Rec	% Rec Limit	Analysis Date
Chloride	71	20	89		1	93	90-110	03/30/2019 1135

Inorganic non-metals - MSD

Sample ID: UC21029-004MD

Batch: 11833

Analytical Method: 300.0

Matrix: Aqueous

Parameter	Sample Amount (mg/L)	Spike Amount (mg/L)	Result (mg/L)	Q	Dil	% Rec	% RPD	% Rec Limit	% RPD Limit	Analysis Date
Chloride	71	20	90		1	95	0.67	90-110	20	03/30/2019 1201

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the LOQ

N = Recovery is out of criteria
+ = RPD is out of criteria

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

Inorganic non-metals - MB

Sample ID: UQ12072-001

Batch: 12072

Analytical Method: 300.0

Matrix: Aqueous

Parameter	Result	Q	Dil	LOQ	DL	Units	Analysis Date
Sulfate	ND		1	1.0	0.20	mg/L	04/02/2019 0947

LOQ = Limit of Quantitation

DL = Detection Limit

LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%

J = Estimated result < LOQ and ≥ DL

ND = Not detected at or above the LOQ

N = Recovery is out of criteria

\+ = RPD is out of criteria

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

Inorganic non-metals - LCS

Sample ID: UQ12072-002
Batch: 12072
Analytical Method: 300.0

Matrix: Aqueous

Parameter	Spike Amount (mg/L)	Result (mg/L)	Q	Dil	% Rec	% Rec Limit	Analysis Date
Sulfate	20	20		1	101	90-110	04/02/2019 1020

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

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

Inorganic non-metals - MS

Sample ID: UC21029-005MS

Matrix: Aqueous

Batch: 12072

Analytical Method: 300.0

Parameter	Sample Amount (mg/L)	Spike Amount (mg/L)	Result (mg/L)	Q	Dil	% Rec	% Rec Limit	Analysis Date
Sulfate	24	20	43		1	96	90-110	04/02/2019 1511

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the LOQ

N = Recovery is out of criteria
\+ = RPD is out of criteria

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

Inorganic non-metals - MSD

Sample ID: UC21029-005MD

Matrix: Aqueous

Batch: 12072

Analytical Method: 300.0

Parameter	Sample Amount (mg/L)	Spike Amount (mg/L)	Result (mg/L)	Q	Dil	% Rec	% RPD	% Rec Limit	% RPD Limit	Analysis Date
Sulfate	24	20	43		1	96	0.23	90-110	20	04/02/2019 1528

Inorganic non-metals - MB

Sample ID: UQ12073-001
Batch: 12073
Analytical Method: 300.0

Matrix: Aqueous

Parameter	Result	Q	Dil	LOQ	DL	Units	Analysis Date
Chloride	ND		1	1.0	0.20	mg/L	04/02/2019 0947

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the LOQ

N = Recovery is out of criteria
+ = RPD is out of criteria

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

Inorganic non-metals - LCS

Sample ID: UQ12073-002
Batch: 12073
Analytical Method: 300.0

Matrix: Aqueous

Parameter	Spike Amount (mg/L)	Result (mg/L)	Q	Dil	% Rec	% Rec Limit	Analysis Date
Chloride	20	20		1	101	90-110	04/02/2019 1020

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

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

Inorganic non-metals - MS

Sample ID: UC21029-005MS
Batch: 12073
Analytical Method: 300.0

Matrix: Aqueous

Parameter	Sample Amount (mg/L)	Spike Amount (mg/L)	Result (mg/L)	Q	Dil	% Rec	% Rec Limit	Analysis Date
Chloride	23	20	42		1	98	90-110	04/02/2019 1511

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the LOQ

N = Recovery is out of criteria
+ = RPD is out of criteria

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

Inorganic non-metals - MSD

Sample ID: UC21029-005MD

Batch: 12073

Analytical Method: 300.0

Matrix: Aqueous

Parameter	Sample Amount (mg/L)	Spike Amount (mg/L)	Result (mg/L)	Q	Dil	% Rec	% RPD	% Rec Limit	% RPD Limit	Analysis Date
Chloride	23	20	43		1	99	0.47	90-110	20	04/02/2019 1528

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

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

Volatile Organic Compounds by GC/MS - MB

Sample ID: UQ11689-001
Batch: 11689
Analytical Method: 8260B

Matrix: Aqueous
Prep Method: 5030B

Parameter	Result	Q	Dil	LOQ	DL	Units	Analysis Date
Acetone	ND		1	20	2.0	ug/L	03/29/2019 1050
Benzene	ND		1	1.0	0.40	ug/L	03/29/2019 1050
Bromodichloromethane	ND		1	1.0	0.40	ug/L	03/29/2019 1050
Bromoform	ND		1	1.0	0.40	ug/L	03/29/2019 1050
Bromomethane (Methyl bromide)	ND		1	2.0	0.40	ug/L	03/29/2019 1050
2-Butanone (MEK)	ND		1	10	2.0	ug/L	03/29/2019 1050
Carbon disulfide	ND		1	1.0	0.40	ug/L	03/29/2019 1050
Carbon tetrachloride	ND		1	1.0	0.40	ug/L	03/29/2019 1050
Chlorobenzene	ND		1	1.0	0.40	ug/L	03/29/2019 1050
Chloroethane	ND		1	2.0	0.40	ug/L	03/29/2019 1050
Chloroform	ND		1	1.0	0.40	ug/L	03/29/2019 1050
Chloromethane (Methyl chloride)	ND		1	1.0	0.50	ug/L	03/29/2019 1050
Cyclohexane	ND		1	1.0	0.40	ug/L	03/29/2019 1050
1,2-Dibromo-3-chloropropane (DBCP)	ND		1	1.0	0.40	ug/L	03/29/2019 1050
Dibromochloromethane	ND		1	1.0	0.40	ug/L	03/29/2019 1050
1,2-Dibromoethane (EDB)	ND		1	1.0	0.40	ug/L	03/29/2019 1050
1,2-Dichlorobenzene	ND		1	1.0	0.40	ug/L	03/29/2019 1050
1,3-Dichlorobenzene	ND		1	1.0	0.40	ug/L	03/29/2019 1050
1,4-Dichlorobenzene	ND		1	1.0	0.40	ug/L	03/29/2019 1050
Dichlorodifluoromethane	ND		1	2.0	0.60	ug/L	03/29/2019 1050
1,1-Dichloroethane	ND		1	1.0	0.40	ug/L	03/29/2019 1050
1,2-Dichloroethane	ND		1	1.0	0.40	ug/L	03/29/2019 1050
1,1-Dichloroethene	ND		1	1.0	0.40	ug/L	03/29/2019 1050
cis-1,2-Dichloroethene	ND		1	1.0	0.40	ug/L	03/29/2019 1050
trans-1,2-Dichloroethene	ND		1	1.0	0.40	ug/L	03/29/2019 1050
1,2-Dichloropropane	ND		1	1.0	0.40	ug/L	03/29/2019 1050
cis-1,3-Dichloropropene	ND		1	1.0	0.40	ug/L	03/29/2019 1050
trans-1,3-Dichloropropene	ND		1	1.0	0.40	ug/L	03/29/2019 1050
Ethylbenzene	ND		1	1.0	0.40	ug/L	03/29/2019 1050
2-Hexanone	ND		1	10	2.0	ug/L	03/29/2019 1050
Isopropylbenzene	ND		1	1.0	0.40	ug/L	03/29/2019 1050
Methyl acetate	ND		1	1.0	0.40	ug/L	03/29/2019 1050
Methyl tertiary butyl ether (MTBE)	ND		1	1.0	0.40	ug/L	03/29/2019 1050
4-Methyl-2-pentanone	ND		1	10	2.0	ug/L	03/29/2019 1050
Methylcyclohexane	ND		1	5.0	0.40	ug/L	03/29/2019 1050
Methylene chloride	ND		1	1.0	0.40	ug/L	03/29/2019 1050
Styrene	ND		1	1.0	0.41	ug/L	03/29/2019 1050
1,1,2,2-Tetrachloroethane	ND		1	1.0	0.40	ug/L	03/29/2019 1050
Tetrachloroethene	ND		1	1.0	0.40	ug/L	03/29/2019 1050
Toluene	ND		1	1.0	0.40	ug/L	03/29/2019 1050
1,1,2-Trichloro-1,2,2-Trifluoroethane	ND		1	1.0	0.42	ug/L	03/29/2019 1050
1,2,4-Trichlorobenzene	ND		1	1.0	0.40	ug/L	03/29/2019 1050
1,1,1-Trichloroethane	ND		1	1.0	0.40	ug/L	03/29/2019 1050
1,1,2-Trichloroethane	ND		1	1.0	0.40	ug/L	03/29/2019 1050

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

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

Volatile Organic Compounds by GC/MS - MB

Sample ID: UQ11689-001
Batch: 11689
Analytical Method: 8260B

Matrix: Aqueous
Prep Method: 5030B

Parameter	Result	Q	Dil	LOQ	DL	Units	Analysis Date
Trichloroethene	ND		1	1.0	0.40	ug/L	03/29/2019 1050
Trichlorofluoromethane	ND		1	1.0	0.40	ug/L	03/29/2019 1050
Vinyl chloride	ND		1	1.0	0.40	ug/L	03/29/2019 1050
Xylenes (total)	ND		1	1.0	0.40	ug/L	03/29/2019 1050
m+p - Xylenes	ND		1	1.0	0.40	ug/L	03/29/2019 1050
o - Xylenes	ND		1	1.0	0.40	ug/L	03/29/2019 1050

Surrogate	Q	% Rec	Acceptance Limit
1,2-Dichloroethane-d4		98	70-130
Bromofluorobenzene		84	70-130
Toluene-d8		93	70-130

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

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

Volatile Organic Compounds by GC/MS - LCS

Sample ID: UQ11689-002
Batch: 11689
Analytical Method: 8260B

Matrix: Aqueous
Prep Method: 5030B

Parameter	Spike Amount (ug/L)	Result (ug/L)	Q	Dil	% Rec	% Rec Limit	Analysis Date
Acetone	100	87		1	87	60-140	03/29/2019 0951
Benzene	50	48		1	97	70-130	03/29/2019 0951
Bromodichloromethane	50	48		1	97	70-130	03/29/2019 0951
Bromoform	50	43		1	85	70-130	03/29/2019 0951
Bromomethane (Methyl bromide)	50	52		1	104	70-130	03/29/2019 0951
2-Butanone (MEK)	100	88		1	88	70-130	03/29/2019 0951
Carbon disulfide	50	44		1	87	70-130	03/29/2019 0951
Carbon tetrachloride	50	47		1	93	70-130	03/29/2019 0951
Chlorobenzene	50	46		1	93	70-130	03/29/2019 0951
Chloroethane	50	44		1	89	70-130	03/29/2019 0951
Chloroform	50	46		1	92	70-130	03/29/2019 0951
Chloromethane (Methyl chloride)	50	55		1	111	60-140	03/29/2019 0951
Cyclohexane	50	57		1	114	70-130	03/29/2019 0951
1,2-Dibromo-3-chloropropane (DBCP)	50	46		1	92	70-130	03/29/2019 0951
Dibromochloromethane	50	46		1	92	70-130	03/29/2019 0951
1,2-Dibromoethane (EDB)	50	49		1	98	70-130	03/29/2019 0951
1,2-Dichlorobenzene	50	45		1	90	70-130	03/29/2019 0951
1,3-Dichlorobenzene	50	44		1	88	70-130	03/29/2019 0951
1,4-Dichlorobenzene	50	44		1	88	70-130	03/29/2019 0951
Dichlorodifluoromethane	50	47		1	94	60-140	03/29/2019 0951
1,1-Dichloroethane	50	49		1	98	70-130	03/29/2019 0951
1,2-Dichloroethane	50	55		1	110	70-130	03/29/2019 0951
1,1-Dichloroethene	50	46		1	91	70-130	03/29/2019 0951
cis-1,2-Dichloroethene	50	45		1	90	70-130	03/29/2019 0951
trans-1,2-Dichloroethene	50	46		1	92	70-130	03/29/2019 0951
1,2-Dichloropropane	50	52		1	103	70-130	03/29/2019 0951
cis-1,3-Dichloropropene	50	50		1	99	70-130	03/29/2019 0951
trans-1,3-Dichloropropene	50	48		1	96	70-130	03/29/2019 0951
Ethylbenzene	50	47		1	95	70-130	03/29/2019 0951
2-Hexanone	100	110		1	107	70-130	03/29/2019 0951
Isopropylbenzene	50	48		1	96	70-130	03/29/2019 0951
Methyl acetate	50	55		1	110	70-130	03/29/2019 0951
Methyl tertiary butyl ether (MTBE)	50	43		1	86	70-130	03/29/2019 0951
4-Methyl-2-pentanone	100	110		1	108	70-130	03/29/2019 0951
Methylcyclohexane	50	51		1	103	70-130	03/29/2019 0951
Methylene chloride	50	44		1	88	70-130	03/29/2019 0951
Styrene	50	47		1	95	70-130	03/29/2019 0951
1,1,2,2-Tetrachloroethane	50	46		1	92	70-130	03/29/2019 0951
Tetrachloroethene	50	48		1	95	70-130	03/29/2019 0951
Toluene	50	48		1	95	70-130	03/29/2019 0951
1,1,2-Trichloro-1,2,2-Trifluoroethane	50	47		1	95	70-130	03/29/2019 0951
1,2,4-Trichlorobenzene	50	41		1	82	70-130	03/29/2019 0951
1,1,1-Trichloroethane	50	48		1	97	70-130	03/29/2019 0951
1,1,2-Trichloroethane	50	47		1	94	70-130	03/29/2019 0951

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the LOQ

N = Recovery is out of criteria
+ = RPD is out of criteria

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

Volatile Organic Compounds by GC/MS - LCS

Sample ID: UQ11689-002
Batch: 11689
Analytical Method: 8260B

Matrix: Aqueous
Prep Method: 5030B

Parameter	Spike Amount (ug/L)	Result (ug/L)	Q	Dil	% Rec	% Rec Limit	Analysis Date
Trichloroethene	50	50		1	101	70-130	03/29/2019 0951
Trichlorofluoromethane	50	47		1	95	70-130	03/29/2019 0951
Vinyl chloride	50	50		1	101	70-130	03/29/2019 0951
Xylenes (total)	100	95		1	95	70-130	03/29/2019 0951
m+p - Xylenes	50	48		1	95	70-130	03/29/2019 0951
o - Xylenes	50	47		1	94	70-130	03/29/2019 0951

Surrogate	Q	% Rec	Acceptance Limit
1,2-Dichloroethane-d4		98	70-130
Bromofluorobenzene		97	70-130
Toluene-d8		97	70-130

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the LOQ

N = Recovery is out of criteria
+ = RPD is out of criteria

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

Semivolatile Organic Compounds by GC/MS - MB

Sample ID: UQ11166-001
Batch: 11166
Analytical Method: 8270D

Matrix: Aqueous
Prep Method: 3520C
Prep Date: 03/25/2019 1939

Parameter	Result	Q	Dil	LOQ	DL	Units	Analysis Date
Acenaphthene	ND		1	0.20	0.040	ug/L	04/03/2019 1041
Acenaphthylene	ND		1	0.20	0.040	ug/L	04/03/2019 1041
Acetophenone	ND		1	0.80	0.50	ug/L	04/03/2019 1041
Anthracene	ND		1	0.20	0.060	ug/L	04/03/2019 1041
Atrazine	ND		1	0.80	0.50	ug/L	04/03/2019 1041
Benzidine	ND		1	20	1.0	ug/L	04/03/2019 1041
Benzo(a)anthracene	ND		1	0.20	0.040	ug/L	04/03/2019 1041
Benzo(a)pyrene	ND		1	0.20	0.070	ug/L	04/03/2019 1041
Benzo(b)fluoranthene	ND		1	0.20	0.040	ug/L	04/03/2019 1041
Benzo(g,h,i)perylene	ND		1	0.20	0.040	ug/L	04/03/2019 1041
Benzo(k)fluoranthene	ND		1	0.20	0.040	ug/L	04/03/2019 1041
Butyl benzyl phthalate	ND		1	0.80	0.50	ug/L	04/03/2019 1041
Caprolactam	ND		1	1.6	1.0	ug/L	04/03/2019 1041
Carbazole	ND		1	0.80	0.50	ug/L	04/03/2019 1041
4-Chloro-3-methyl phenol	ND		1	0.80	0.50	ug/L	04/03/2019 1041
bis(2-Chloroethyl)ether	ND		1	0.80	0.50	ug/L	04/03/2019 1041
2-Chloronaphthalene	ND		1	0.80	0.50	ug/L	04/03/2019 1041
2-Chlorophenol	ND		1	0.80	0.50	ug/L	04/03/2019 1041
Chrysene	ND		1	0.20	0.030	ug/L	04/03/2019 1041
Dibenzo(a,h)anthracene	ND		1	0.20	0.030	ug/L	04/03/2019 1041
Dibenzofuran	ND		1	0.80	0.50	ug/L	04/03/2019 1041
3,3'-Dichlorobenzidine	ND		1	4.0	1.8	ug/L	04/03/2019 1041
2,4-Dichlorophenol	ND		1	1.6	1.0	ug/L	04/03/2019 1041
Diethylphthalate	ND		1	0.80	0.50	ug/L	04/03/2019 1041
Dimethyl phthalate	ND		1	0.80	0.50	ug/L	04/03/2019 1041
2,4-Dimethylphenol	ND		1	0.80	0.48	ug/L	04/03/2019 1041
Di-n-butyl phthalate	ND		1	0.80	0.50	ug/L	04/03/2019 1041
4,6-Dinitro-2-methylphenol	ND		1	4.0	1.0	ug/L	04/03/2019 1041
2,4-Dinitrotoluene	ND		1	1.6	0.50	ug/L	04/03/2019 1041
Di-n-octylphthalate	ND		1	0.80	0.50	ug/L	04/03/2019 1041
1,2-Diphenylhydrazine(as azobenzene)	ND		1	0.80	0.50	ug/L	04/03/2019 1041
bis(2-Ethylhexyl)phthalate	ND		1	4.0	0.50	ug/L	04/03/2019 1041
Fluoranthene	ND		1	0.20	0.10	ug/L	04/03/2019 1041
Fluorene	ND		1	0.20	0.030	ug/L	04/03/2019 1041
Hexachlorobenzene	ND		1	0.80	0.50	ug/L	04/03/2019 1041
Hexachlorobutadiene	ND		1	0.80	0.50	ug/L	04/03/2019 1041
Hexachlorocyclopentadiene	ND		1	4.0	2.0	ug/L	04/03/2019 1041
Hexachloroethane	ND		1	0.80	0.31	ug/L	04/03/2019 1041
Indeno(1,2,3-c,d)pyrene	ND		1	0.20	0.040	ug/L	04/03/2019 1041
Isophorone	ND		1	0.80	0.50	ug/L	04/03/2019 1041
2-Methylnaphthalene	ND		1	0.20	0.040	ug/L	04/03/2019 1041
2-Methylphenol	ND		1	0.80	0.21	ug/L	04/03/2019 1041
3+4-Methylphenol	ND		1	1.6	1.5	ug/L	04/03/2019 1041
Naphthalene	ND		1	0.20	0.050	ug/L	04/03/2019 1041

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the LOQ

N = Recovery is out of criteria
\+ = RPD is out of criteria

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

Semivolatile Organic Compounds by GC/MS - MB

Sample ID: UQ11166-001
Batch: 11166
Analytical Method: 8270D

Matrix: Aqueous
Prep Method: 3520C
Prep Date: 03/25/2019 1939

Parameter	Result	Q	Dil	LOQ	DL	Units	Analysis Date
Nitrobenzene	ND		1	0.80	0.55	ug/L	04/03/2019 1041
2-Nitrophenol	ND		1	1.6	1.0	ug/L	04/03/2019 1041
N-Nitrosodi-n-propylamine	ND		1	0.80	0.50	ug/L	04/03/2019 1041
N-Nitrosodiphenylamine (Diphenylamine)	ND		1	0.80	0.50	ug/L	04/03/2019 1041
Pentachlorophenol	ND		1	4.0	2.0	ug/L	04/03/2019 1041
Phenanthrene	ND		1	0.20	0.060	ug/L	04/03/2019 1041
Phenol	ND		1	0.80	0.50	ug/L	04/03/2019 1041
Pyrene	ND		1	0.20	0.10	ug/L	04/03/2019 1041
2,4,5-Trichlorophenol	ND		1	0.80	0.50	ug/L	04/03/2019 1041
2,4,6-Trichlorophenol	ND		1	0.80	0.50	ug/L	04/03/2019 1041

Surrogate	Q	% Rec	Acceptance Limit
2-Fluorobiphenyl		55	37-129
2-Fluorophenol		46	24-127
Nitrobenzene-d5		70	38-127
Phenol-d5		56	28-128
Terphenyl-d14		96	10-148
2,4,6-Tribromophenol		63	35-144

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the LOQ

N = Recovery is out of criteria
+ = RPD is out of criteria

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

Semivolatile Organic Compounds by GC/MS - LCS

Sample ID: UQ11166-002
Batch: 11166
Analytical Method: 8270D

Matrix: Aqueous
Prep Method: 3520C
Prep Date: 03/25/2019 1939

Parameter	Spike Amount (ug/L)	Result (ug/L)	Q	Dil	% Rec	% Rec Limit	Analysis Date
Acenaphthene	8.0	5.4		1	68	30-122	04/03/2019 1106
Acenaphthylene	8.0	5.4		1	67	30-130	04/03/2019 1106
Acetophenone	8.0	8.4		1	105	30-130	04/03/2019 1106
Anthracene	8.0	6.1		1	77	30-123	04/03/2019 1106
Atrazine	8.0	6.6		1	82	30-130	04/03/2019 1106
Benzidine	40	24		1	61	10-115	04/03/2019 1106
Benzo(a)anthracene	8.0	6.6		1	83	40-125	04/03/2019 1106
Benzo(a)pyrene	8.0	6.5		1	81	40-128	04/03/2019 1106
Benzo(b)fluoranthene	8.0	7.0		1	88	32-145	04/03/2019 1106
Benzo(g,h,i)perylene	8.0	6.8		1	86	42-128	04/03/2019 1106
Benzo(k)fluoranthene	8.0	7.0		1	87	50-135	04/03/2019 1106
Butyl benzyl phthalate	8.0	7.9		1	98	54-135	04/03/2019 1106
Caprolactam	8.0	6.2		1	78	30-130	04/03/2019 1106
Carbazole	8.0	6.7		1	83	30-130	04/03/2019 1106
4-Chloro-3-methyl phenol	8.0	5.5		1	69	30-123	04/03/2019 1106
bis(2-Chloroethyl)ether	8.0	9.2	N	1	116	35-114	04/03/2019 1106
2-Chloronaphthalene	8.0	4.8		1	60	39-128	04/03/2019 1106
2-Chlorophenol	8.0	4.6		1	57	39-115	04/03/2019 1106
Chrysene	8.0	6.6		1	83	50-130	04/03/2019 1106
Dibenzo(a,h)anthracene	8.0	7.2		1	90	30-130	04/03/2019 1106
Dibenzofuran	8.0	5.2		1	64	30-118	04/03/2019 1106
3,3'-Dichlorobenzidine	8.0	5.1		1	63	10-126	04/03/2019 1106
2,4-Dichlorophenol	8.0	4.6		1	58	30-121	04/03/2019 1106
Diethylphthalate	8.0	6.4		1	80	40-125	04/03/2019 1106
Dimethyl phthalate	8.0	5.8		1	73	40-127	04/03/2019 1106
2,4-Dimethylphenol	8.0	5.2		1	65	20-125	04/03/2019 1106
Di-n-butyl phthalate	8.0	7.6		1	95	40-127	04/03/2019 1106
4,6-Dinitro-2-methylphenol	8.0	5.5		1	68	46-134	04/03/2019 1106
2,4-Dinitrotoluene	8.0	6.0		1	75	51-128	04/03/2019 1106
Di-n-octylphthalate	8.0	7.0		1	88	55-143	04/03/2019 1106
1,2-Diphenylhydrazine(as azobenzene)	8.0	6.8		1	85	30-130	04/03/2019 1106
bis(2-Ethylhexyl)phthalate	8.0	7.9		1	99	50-133	04/03/2019 1106
Fluoranthene	8.0	6.5		1	82	40-128	04/03/2019 1106
Fluorene	8.0	5.4		1	67	30-124	04/03/2019 1106
Hexachlorobenzene	8.0	5.5		1	69	30-125	04/03/2019 1106
Hexachlorobutadiene	8.0	4.2		1	52	24-110	04/03/2019 1106
Hexachlorocyclopentadiene	40	18		1	46	22-122	04/03/2019 1106
Hexachloroethane	8.0	4.5		1	56	28-116	04/03/2019 1106
Indeno(1,2,3-c,d)pyrene	8.0	7.1		1	89	50-125	04/03/2019 1106
Isophorone	8.0	6.2		1	77	30-130	04/03/2019 1106
2-Methylnaphthalene	8.0	4.8		1	60	40-132	04/03/2019 1106
2-Methylphenol	8.0	7.5		1	94	37-115	04/03/2019 1106
3+4-Methylphenol	8.0	7.0		1	88	44-112	04/03/2019 1106
Naphthalene	8.0	5.1		1	64	40-122	04/03/2019 1106

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

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

Semivolatile Organic Compounds by GC/MS - LCS

Sample ID: UQ11166-002
Batch: 11166
Analytical Method: 8270D

Matrix: Aqueous
Prep Method: 3520C
Prep Date: 03/25/2019 1939

Parameter	Spike Amount (ug/L)	Result (ug/L)	Q	Dil	% Rec	% Rec Limit	Analysis Date
Nitrobenzene	8.0	5.9		1	74	39-123	04/03/2019 1106
2-Nitrophenol	8.0	5.2		1	65	36-123	04/03/2019 1106
N-Nitrosodi-n-propylamine	8.0	9.0		1	113	39-119	04/03/2019 1106
N-Nitrosodiphenylamine (Diphenylamine)	8.0	5.7		1	71	30-123	04/03/2019 1106
Pentachlorophenol	16	11		1	67	34-137	04/03/2019 1106
Phenanthrene	8.0	6.0		1	75	40-123	04/03/2019 1106
Phenol	8.0	4.7		1	59	30-130	04/03/2019 1106
Pyrene	8.0	7.0		1	87	40-126	04/03/2019 1106
2,4,5-Trichlorophenol	8.0	4.8		1	59	30-123	04/03/2019 1106
2,4,6-Trichlorophenol	8.0	5.0		1	62	30-125	04/03/2019 1106

Surrogate	Q	% Rec	Acceptance Limit
2-Fluorobiphenyl		61	37-129
2-Fluorophenol		35	24-127
Nitrobenzene-d5		74	38-127
Phenol-d5		57	28-128
Terphenyl-d14		93	10-148
2,4,6-Tribromophenol		70	35-144

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the LOQ

N = Recovery is out of criteria
+ = RPD is out of criteria

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

Semivolatile Organic Compounds by GC/MS - MS

Sample ID: UC21029-001MS
Batch: 11166
Analytical Method: 8270D

Matrix: Aqueous
Prep Method: 3520C
Prep Date: 03/25/2019 1939

Parameter	Sample Amount (ug/L)	Spike Amount (ug/L)	Result (ug/L)	Q	Dil	% Rec	% Rec Limit	Analysis Date
Acenaphthene	ND	16	9.0		1	56	30-122	04/03/2019 2028
Acenaphthylene	ND	16	9.1		1	57	30-130	04/03/2019 2028
Acetophenone	ND	16	13		1	81	30-130	04/03/2019 2028
Anthracene	ND	16	9.6		1	60	30-123	04/03/2019 2028
Atrazine	ND	16	12		1	74	30-130	04/03/2019 2028
Benzidine	ND	80	43		1	54	10-115	04/03/2019 2028
Benzo(a)anthracene	ND	16	12		1	77	40-125	04/03/2019 2028
Benzo(a)pyrene	ND	16	13		1	78	40-128	04/03/2019 2028
Benzo(b)fluoranthene	ND	16	13		1	82	30-130	04/03/2019 2028
Benzo(g,h,i)perylene	ND	16	13		1	84	30-130	04/03/2019 2028
Benzo(k)fluoranthene	ND	16	13		1	79	30-130	04/03/2019 2028
Butyl benzyl phthalate	ND	16	15		1	92	54-135	04/03/2019 2028
Caprolactam	ND	16	11		1	68	30-130	04/03/2019 2028
Carbazole	ND	16	11		1	71	30-130	04/03/2019 2028
4-Chloro-3-methyl phenol	ND	16	9.8		1	61	30-130	04/03/2019 2028
bis(2-Chloroethyl)ether	ND	16	15		1	94	30-130	04/03/2019 2028
2-Chloronaphthalene	ND	16	7.8		1	49	30-130	04/03/2019 2028
2-Chlorophenol	ND	16	8.1		1	51	30-130	04/03/2019 2028
Chrysene	ND	16	12		1	75	30-130	04/03/2019 2028
Dibenzo(a,h)anthracene	ND	16	13		1	83	30-130	04/03/2019 2028
Dibenzofuran	ND	16	8.6		1	54	30-118	04/03/2019 2028
3,3'-Dichlorobenzidine	ND	16	10		1	65	10-126	04/03/2019 2028
2,4-Dichlorophenol	ND	16	8.1		1	51	30-121	04/03/2019 2028
Diethylphthalate	ND	16	11		1	67	40-125	04/03/2019 2028
Dimethyl phthalate	ND	16	9.5		1	59	40-127	04/03/2019 2028
2,4-Dimethylphenol	ND	16	11		1	67	20-125	04/03/2019 2028
Di-n-butyl phthalate	ND	16	14		1	86	40-127	04/03/2019 2028
4,6-Dinitro-2-methylphenol	ND	16	8.6		1	54	30-130	04/03/2019 2028
2,4-Dinitrotoluene	ND	16	10		1	63	30-130	04/03/2019 2028
Di-n-octylphthalate	ND	16	13		1	82	30-130	04/03/2019 2028
1,2-Diphenylhydrazine(as azobenzene)	ND	16	11		1	70	30-130	04/03/2019 2028
bis(2-Ethylhexyl)phthalate	ND	16	15		1	91	30-130	04/03/2019 2028
Fluoranthene	ND	16	11		1	71	40-128	04/03/2019 2028
Fluorene	ND	16	9.0		1	56	30-124	04/03/2019 2028
Hexachlorobenzene	ND	16	8.6		1	54	30-125	04/03/2019 2028
Hexachlorobutadiene	ND	16	6.7		1	42	24-110	04/03/2019 2028
Hexachlorocyclopentadiene	ND	80	29		1	36	30-130	04/03/2019 2028
Hexachloroethane	ND	16	7.0		1	44	30-130	04/03/2019 2028
Indeno(1,2,3-c,d)pyrene	ND	16	13		1	83	30-130	04/03/2019 2028
Isophorone	ND	16	11		1	68	30-130	04/03/2019 2028
2-Methylnaphthalene	ND	16	7.9		1	50	40-132	04/03/2019 2028
2-Methylphenol	ND	16	12		1	74	30-130	04/03/2019 2028
3+4-Methylphenol	ND	16	12		1	72	30-130	04/03/2019 2028
Naphthalene	ND	16	8.7		1	54	30-130	04/03/2019 2028

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

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

Semivolatile Organic Compounds by GC/MS - MS

Sample ID: UC21029-001MS
Batch: 11166
Analytical Method: 8270D

Matrix: Aqueous
Prep Method: 3520C
Prep Date: 03/25/2019 1939

Parameter	Sample Amount (ug/L)	Spike Amount (ug/L)	Result (ug/L)	Q	Dil	% Rec	% Rec Limit	Analysis Date
Nitrobenzene	ND	16	11		1	69	30-130	04/03/2019 2028
2-Nitrophenol	ND	16	9.2		1	57	30-130	04/03/2019 2028
N-Nitrosodi-n-propylamine	ND	16	14		1	86	30-130	04/03/2019 2028
N-Nitrosodiphenylamine (Diphenylamine)	ND	16	9.1		1	57	30-123	04/03/2019 2028
Pentachlorophenol	ND	32	18		1	57	30-130	04/03/2019 2028
Phenanthrene	ND	16	9.4		1	59	40-123	04/03/2019 2028
Phenol	ND	16	8.1		1	51	30-130	04/03/2019 2028
Pyrene	ND	16	12		1	74	40-126	04/03/2019 2028
2,4,5-Trichlorophenol	ND	16	8.0		1	50	30-123	04/03/2019 2028
2,4,6-Trichlorophenol	ND	16	8.3		1	52	30-125	04/03/2019 2028

Surrogate	Q	% Rec	Acceptance Limit
2-Fluorobiphenyl		50	37-129
2-Fluorophenol		34	24-127
Nitrobenzene-d5		68	38-127
Phenol-d5		50	28-128
Terphenyl-d14		82	10-148
2,4,6-Tribromophenol		54	35-144

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

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

Semivolatile Organic Compounds by GC/MS - MSD

Sample ID: UC21029-001MD
Batch: 11166
Analytical Method: 8270D

Matrix: Aqueous
Prep Method: 3520C
Prep Date: 03/25/2019 1939

Parameter	Sample Amount (ug/L)	Spike Amount (ug/L)	Result (ug/L)	Q	Dil	% Rec	% RPD	% Rec Limit	% RPD Limit	Analysis Date
Acenaphthene	ND	16	12		1	72	25	30-122	40	04/03/2019 2053
Acenaphthylene	ND	16	12		1	73	25	30-130	40	04/03/2019 2053
Acetophenone	ND	16	20	+	1	123	41	30-130	40	04/03/2019 2053
Anthracene	ND	16	12		1	77	24	30-123	40	04/03/2019 2053
Atrazine	ND	16	14		1	87	16	30-130	40	04/03/2019 2053
Benzidine	ND	80	48		1	59	9.7	10-115	40	04/03/2019 2053
Benzo(a)anthracene	ND	16	14		1	87	12	40-125	40	04/03/2019 2053
Benzo(a)pyrene	ND	16	14		1	86	9.6	40-128	40	04/03/2019 2053
Benzo(b)fluoranthene	ND	16	15		1	91	10	30-130	40	04/03/2019 2053
Benzo(g,h,i)perylene	ND	16	14		1	87	3.3	30-130	40	04/03/2019 2053
Benzo(k)fluoranthene	ND	16	14		1	88	11	30-130	40	04/03/2019 2053
Butyl benzyl phthalate	ND	16	17		1	106	14	54-135	40	04/03/2019 2053
Caprolactam	ND	16	14		1	86	25	30-130	40	04/03/2019 2053
Carbazole	ND	16	14		1	85	18	30-130	40	04/03/2019 2053
4-Chloro-3-methyl phenol	ND	16	13		1	79	25	30-130	40	04/03/2019 2053
bis(2-Chloroethyl)ether	ND	16	23	N,+	1	144	43	30-130	40	04/03/2019 2053
2-Chloronaphthalene	ND	16	10		1	65	28	30-130	40	04/03/2019 2053
2-Chlorophenol	ND	16	12		1	75	39	30-130	40	04/03/2019 2053
Chrysene	ND	16	14		1	86	14	30-130	40	04/03/2019 2053
Dibenzo(a,h)anthracene	ND	16	14		1	88	5.6	30-130	40	04/03/2019 2053
Dibenzofuran	ND	16	11		1	68	23	30-118	40	04/03/2019 2053
3,3'-Dichlorobenzidine	ND	16	9.1		1	57	14	10-126	40	04/03/2019 2053
2,4-Dichlorophenol	ND	16	10		1	63	22	30-121	40	04/03/2019 2053
Diethylphthalate	ND	16	14		1	87	25	40-125	40	04/03/2019 2053
Dimethyl phthalate	ND	16	12		1	76	25	40-127	40	04/03/2019 2053
2,4-Dimethylphenol	ND	16	13		1	84	23	20-125	40	04/03/2019 2053
Di-n-butyl phthalate	ND	16	16		1	98	13	40-127	40	04/03/2019 2053
4,6-Dinitro-2-methylphenol	ND	16	9.8		1	61	13	30-130	40	04/03/2019 2053
2,4-Dinitrotoluene	ND	16	13		1	80	24	30-130	40	04/03/2019 2053
Di-n-octylphthalate	ND	16	14		1	90	10	30-130	40	04/03/2019 2053
1,2-Diphenylhydrazine(as azobenzene)	ND	16	14		1	89	23	30-130	40	04/03/2019 2053
bis(2-Ethylhexyl)phthalate	ND	16	16		1	99	8.5	30-130	40	04/03/2019 2053
Fluoranthene	ND	16	13		1	84	18	40-128	40	04/03/2019 2053
Fluorene	ND	16	11		1	72	24	30-124	40	04/03/2019 2053
Hexachlorobenzene	ND	16	11		1	69	25	30-125	40	04/03/2019 2053
Hexachlorobutadiene	ND	16	7.6		1	47	12	24-110	40	04/03/2019 2053
Hexachlorocyclopentadiene	ND	80	33		1	41	14	30-130	40	04/03/2019 2053
Hexachloroethane	ND	16	9.2		1	58	27	30-130	40	04/03/2019 2053
Indeno(1,2,3-c,d)pyrene	ND	16	14		1	88	6.9	30-130	40	04/03/2019 2053
Isophorone	ND	16	14		1	87	24	30-130	40	04/03/2019 2053
2-Methylnaphthalene	ND	16	10		1	65	27	40-132	40	04/03/2019 2053
2-Methylphenol	ND	16	18	+	1	112	41	30-130	40	04/03/2019 2053
3+4-Methylphenol	ND	16	17		1	109	40	30-130	40	04/03/2019 2053
Naphthalene	ND	16	11		1	71	26	30-130	40	04/03/2019 2053

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the LOQ

N = Recovery is out of criteria
\+ = RPD is out of criteria

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

Semivolatile Organic Compounds by GC/MS - MSD

Sample ID: UC21029-001MD
Batch: 11166
Analytical Method: 8270D

Matrix: Aqueous
Prep Method: 3520C
Prep Date: 03/25/2019 1939

Parameter	Sample Amount (ug/L)	Spike Amount (ug/L)	Result (ug/L)	Q	Dil	% Rec	% RPD	% Rec Limit	% RPD Limit	Analysis Date
Nitrobenzene	ND	16	14		1	85	21	30-130	40	04/03/2019 2053
2-Nitrophenol	ND	16	12		1	72	23	30-130	40	04/03/2019 2053
N-Nitrosodi-n-propylamine	ND	16	21	N,+	1	134	44	30-130	40	04/03/2019 2053
N-Nitrosodiphenylamine (Diphenylamine)	ND	16	11		1	69	20	30-123	40	04/03/2019 2053
Pentachlorophenol	ND	32	22		1	68	17	30-130	40	04/03/2019 2053
Phenanthrene	ND	16	12		1	75	25	40-123	40	04/03/2019 2053
Phenol	ND	16	12	+	1	77	41	30-130	40	04/03/2019 2053
Pyrene	ND	16	14		1	89	18	40-126	40	04/03/2019 2053
2,4,5-Trichlorophenol	ND	16	10		1	63	22	30-123	40	04/03/2019 2053
2,4,6-Trichlorophenol	ND	16	11		1	66	24	30-125	40	04/03/2019 2053

Surrogate	Q	% Rec	Acceptance Limit
2-Fluorobiphenyl		62	37-129
2-Fluorophenol		30	24-127
Nitrobenzene-d5		83	38-127
Phenol-d5		74	28-128
Terphenyl-d14		92	10-148
2,4,6-Tribromophenol		69	35-144

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

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

ICP-MS - MB

Sample ID: UQ11022-001
Batch: 11022
Analytical Method: 200.8
Matrix: Aqueous
Prep Method: 200.2
Prep Date: 03/23/2019 847

Parameter	Result	Q	Dil	LOQ	DL	Units	Analysis Date
Aluminum	ND		1	40	10	ug/L	03/25/2019 1257
Antimony	ND		1	2.0	0.50	ug/L	03/25/2019 1257
Arsenic	ND		1	2.0	1.3	ug/L	03/25/2019 1257
Barium	ND		1	5.0	1.3	ug/L	03/25/2019 1257
Beryllium	ND		1	0.40	0.15	ug/L	03/25/2019 1257
Boron	ND		1	50	6.3	ug/L	03/27/2019 1110
Cadmium	ND		1	0.50	0.13	ug/L	03/25/2019 1257
Chromium	**1.3**	**J**	**1**	**5.0**	**1.3**	**ug/L**	**03/25/2019 1257**
Cobalt	ND		1	5.0	1.3	ug/L	03/25/2019 1257
Copper	ND		1	5.0	1.3	ug/L	03/25/2019 1257
Iron	ND		1	50	13	ug/L	03/25/2019 1257
Lead	ND		1	1.0	0.25	ug/L	03/25/2019 1257
Magnesium	ND		1	400	50	ug/L	03/25/2019 1257
Molybdenum	ND		1	10	2.5	ug/L	03/25/2019 1257
Nickel	ND		1	5.0	1.3	ug/L	03/25/2019 1257
Selenium	ND		1	5.0	1.3	ug/L	03/25/2019 1257
Silver	ND		1	1.0	0.25	ug/L	03/25/2019 1257
Sodium	ND		1	400	150	ug/L	03/27/2019 1110
Thallium	ND		1	0.50	0.15	ug/L	03/25/2019 1257
Titanium	ND		1	5.0	1.3	ug/L	03/25/2019 1257
Vanadium	ND		1	5.0	2.5	ug/L	03/25/2019 1257
Zinc	ND		1	10	2.5	ug/L	03/25/2019 1257

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

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

ICP-MS - LCS

Sample ID: UQ11022-002
Batch: 11022
Analytical Method: 200.8

Matrix: Aqueous
Prep Method: 200.2
Prep Date: 03/23/2019 847

Parameter	Spike Amount (ug/L)	Result (ug/L)	Q	Dil	% Rec	% Rec Limit	Analysis Date
Aluminum	100	100		1	103	85-115	03/25/2019 1303
Antimony	100	93		1	93	85-115	03/25/2019 1303
Arsenic	100	100		1	100	85-115	03/25/2019 1303
Barium	100	100		1	101	85-115	03/25/2019 1303
Beryllium	100	110		1	111	85-115	03/25/2019 1303
Boron	100	100		1	104	85-115	03/27/2019 1116
Cadmium	100	97		1	97	85-115	03/25/2019 1303
Chromium	100	95		1	95	85-115	03/25/2019 1303
Cobalt	100	91		1	91	85-115	03/25/2019 1303
Copper	100	96		1	96	85-115	03/25/2019 1303
Iron	1000	960		1	96	85-115	03/25/2019 1303
Lead	100	96		1	96	85-115	03/25/2019 1303
Magnesium	1000	1100		1	108	85-115	03/25/2019 1303
Molybdenum	100	95		1	95	85-115	03/25/2019 1303
Nickel	100	97		1	97	85-115	03/25/2019 1303
Selenium	100	99		1	99	85-115	03/25/2019 1303
Silver	100	100		1	100	85-115	03/25/2019 1303
Sodium	1000	1000		1	102	85-115	03/27/2019 1116
Thallium	100	93		1	93	85-115	03/25/2019 1303
Titanium	100	96		1	96	85-115	03/25/2019 1303
Vanadium	100	98		1	98	85-115	03/25/2019 1303
Zinc	100	100		1	100	85-115	03/25/2019 1303

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

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

CVAA - MB

Sample ID: UQ11405-001
Batch: 11405
Analytical Method: 7470A

Matrix: Aqueous
Prep Method: 245.1
Prep Date: 03/27/2019 1341

Parameter	Result	Q	Dil	LOQ	DL	Units	Analysis Date
Mercury	ND		1	0.00020	0.000091	mg/L	03/28/2019 1202

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

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

CVAA - LCS

Sample ID: UQ11405-002
Batch: 11405
Analytical Method: 7470A

Matrix: Aqueous
Prep Method: 245.1
Prep Date: 03/27/2019 1341

Parameter	Spike Amount (mg/L)	Result (mg/L)	Q	Dil	% Rec	% Rec Limit	Analysis Date
Mercury	0.0020	0.0019		1	96	80-120	03/28/2019 1205

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the LOQ

N = Recovery is out of criteria
\+ = RPD is out of criteria

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

CVAA - MS

Sample ID: UC21029-001MS
Batch: 11405
Analytical Method: 7470A

Matrix: Aqueous
Prep Method: 245.1
Prep Date: 03/27/2019 1341

Parameter	Sample Amount (mg/L)	Spike Amount (mg/L)	Result (mg/L)	Q	Dil	% Rec	% Rec Limit	Analysis Date
Mercury	ND	0.0020	0.0019		1	94	85-115	03/28/2019 1220

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the LOQ

N = Recovery is out of criteria
+ = RPD is out of criteria

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

CVAA - MSD

Sample ID: UC21029-001MD
Batch: 11405
Analytical Method: 7470A

Matrix: Aqueous
Prep Method: 245.1
Prep Date: 03/27/2019 1341

Parameter	Sample Amount (mg/L)	Spike Amount (mg/L)	Result (mg/L)	Q	Dil	% Rec	% RPD	% Rec Limit	% RPD Limit	Analysis Date
Mercury	ND	0.0020	0.0019		1	93	1.1	85-115	20	03/28/2019 1222

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the LOQ

N = Recovery 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: UQ11294-001
Batch: 11294
Analytical Method: 537 Modified-ID

Matrix: Aqueous
Prep Method: 537 MOD
Prep Date: 03/26/2019 1814

Parameter	Result	Q	Dil	LOQ	Units	Analysis Date
8:2 FTS	ND		1	4.0	ng/L	03/27/2019 2117
6:2 FTS	ND		1	4.0	ng/L	03/27/2019 2117
EtFOSA	ND		1	4.0	ng/L	03/27/2019 2117
MeFOSA	ND		1	8.0	ng/L	03/27/2019 2117
PFBS	ND		1	4.0	ng/L	03/27/2019 2117
PFDS	ND		1	4.0	ng/L	03/27/2019 2117
PFHpS	ND		1	4.0	ng/L	03/27/2019 2117
PFNS	ND		1	8.0	ng/L	03/27/2019 2117
PFOSA	ND		1	4.0	ng/L	03/27/2019 2117
PFPeS	ND		1	4.0	ng/L	03/27/2019 2117
PFHxS	ND		1	4.0	ng/L	03/27/2019 2117
PFBA	ND		1	4.0	ng/L	03/27/2019 2117
PFDA	ND		1	4.0	ng/L	03/27/2019 2117
PFDoA	ND		1	4.0	ng/L	03/27/2019 2117
PFHpA	ND		1	4.0	ng/L	03/27/2019 2117
PFHxA	ND		1	4.0	ng/L	03/27/2019 2117
PFNA	ND		1	4.0	ng/L	03/27/2019 2117
PFOA	ND		1	2.0	ng/L	03/27/2019 2117
PFPeA	ND		1	4.0	ng/L	03/27/2019 2117
PFTeDA	ND		1	4.0	ng/L	03/27/2019 2117
PFTrDA	ND		1	4.0	ng/L	03/27/2019 2117
PFUdA	ND		1	4.0	ng/L	03/27/2019 2117
PFOS	ND		1	4.0	ng/L	03/27/2019 2117

Surrogate	Q	% Rec	Acceptance Limit
13C2_6:2FTS		103	50-150
13C2_8:2FTS		124	50-150
13C2_PFDoA		111	50-150
13C2_PFTeDA		118	50-150
13C3_PFBS		121	50-150
13C3_PFHxS		115	50-150
13C4_PFBA		111	50-150
13C4_PFHpA		110	50-150
13C5_PFHxA		113	50-150
13C5_PFPeA		116	50-150
13C6_PFDA		107	50-150
13C7_PFUdA		118	50-150
13C8_PFOA		109	50-150
13C8_PFOS		123	50-150
13C8_PFOSA		97	50-150
13C9_PFNA		116	50-150

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the LOQ

N = Recovery 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:	UQ11294-001	**Matrix:**	Aqueous
Batch:	11294	**Prep Method:**	537 MOD
Analytical Method:	537 Modified-ID	**Prep Date:**	03/26/2019 1814

Surrogate	**Q**	**% Rec**	**Acceptance Limit**
d-EtFOSA		72	50-150
d-MeFOSA		68	50-150

LOQ = Limit of Quantitation

DL = Detection Limit

LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%

J = Estimated result < LOQ and ≥ DL

ND = Not detected at or above the LOQ

N = Recovery 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 - LCS

Sample ID: UQ11294-002
Batch: 11294
Analytical Method: 537 Modified-ID

Matrix: Aqueous
Prep Method: 537 MOD
Prep Date: 03/26/2019 1814

Parameter	Spike Amount (ng/L)	Result (ng/L)	Q	Dil	% Rec	% Rec Limit	Analysis Date
8:2 FTS	19	19		1	102	70-150	03/27/2019 2130
6:2 FTS	19	23		1	121	70-150	03/27/2019 2130
EtFOSA	20	21		1	106	70-150	03/27/2019 2130
MeFOSA	20	24		1	118	70-150	03/27/2019 2130
PFBS	18	17		1	95	70-150	03/27/2019 2130
PFDS	19	17		1	86	70-150	03/27/2019 2130
PFHpS	19	18		1	95	70-150	03/27/2019 2130
PFNS	19	18		1	93	70-150	03/27/2019 2130
PFOSA	20	19		1	94	70-150	03/27/2019 2130
PFPeS	19	18		1	93	70-150	03/27/2019 2130
PFHxS	18	18		1	100	70-150	03/27/2019 2130
PFBA	20	19		1	97	70-150	03/27/2019 2130
PFDA	20	18		1	92	70-150	03/27/2019 2130
PFDoA	20	19		1	97	70-150	03/27/2019 2130
PFHpA	20	20		1	99	70-150	03/27/2019 2130
PFHxA	20	19		1	95	70-150	03/27/2019 2130
PFNA	20	17		1	87	70-150	03/27/2019 2130
PFOA	20	19		1	94	70-150	03/27/2019 2130
PFPeA	20	19		1	95	70-150	03/27/2019 2130
PFTeDA	20	20		1	98	70-150	03/27/2019 2130
PFTrDA	20	20		1	100	70-150	03/27/2019 2130
PFUdA	20	18		1	89	70-150	03/27/2019 2130
PFOS	19	19		1	102	70-150	03/27/2019 2130

Surrogate	Q	% Rec	Acceptance Limit
13C2_6:2FTS		93	50-150
13C2_8:2FTS		123	50-150
13C2_PFDoA		115	50-150
13C2_PFTeDA		115	50-150
13C3_PFBS		122	50-150
13C3_PFHxS		114	50-150
13C4_PFBA		116	50-150
13C4_PFHpA		116	50-150
13C5_PFHxA		120	50-150
13C5_PFPeA		117	50-150
13C6_PFDA		115	50-150
13C7_PFUdA		120	50-150
13C8_PFOA		114	50-150
13C8_PFOS		118	50-150
13C8_PFOSA		106	50-150
13C9_PFNA		122	50-150

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the LOQ

N = Recovery 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 - LCS

Sample ID: UQ11294-002
Batch: 11294
Analytical Method: 537 Modified-ID

Matrix: Aqueous
Prep Method: 537 MOD
Prep Date: 03/26/2019 1814

Surrogate	Q	% Rec	Acceptance Limit
d-EtFOSA		60	50-150
d-MeFOSA		60	50-150

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection
P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the LOQ
N = Recovery 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 - LCSD

Sample ID: UQ11294-003
Batch: 11294
Analytical Method: 537 Modified-ID

Matrix: Aqueous
Prep Method: 537 MOD
Prep Date: 03/26/2019 1814

Parameter	Spike Amount (ng/L)	Result (ng/L)	Q	Dil	% Rec	% RPD	% Rec Limit	% RPD Limit	Analysis Date
8:2 FTS	19	21		1	107	5.5	70-150	30	03/27/2019 2142
6:2 FTS	19	18		1	96	23	70-150	30	03/27/2019 2142
EtFOSA	20	20		1	98	7.9	70-150	30	03/27/2019 2142
MeFOSA	20	24		1	121	3.0	70-150	30	03/27/2019 2142
PFBS	18	18		1	101	6.3	70-150	30	03/27/2019 2142
PFDS	19	17		1	90	4.1	70-150	30	03/27/2019 2142
PFHpS	19	18		1	94	1.3	70-150	30	03/27/2019 2142
PFNS	19	17		1	89	5.3	70-150	30	03/27/2019 2142
PFOSA	20	20		1	98	4.3	70-150	30	03/27/2019 2142
PFPeS	19	17		1	92	1.0	70-150	30	03/27/2019 2142
PFHxS	18	17		1	92	8.2	70-150	30	03/27/2019 2142
PFBA	20	20		1	98	1.5	70-150	30	03/27/2019 2142
PFDA	20	19		1	93	1.2	70-150	30	03/27/2019 2142
PFDoA	20	19		1	97	0.33	70-150	30	03/27/2019 2142
PFHpA	20	20		1	99	0.091	70-150	30	03/27/2019 2142
PFHxA	20	19		1	95	0.23	70-150	30	03/27/2019 2142
PFNA	20	18		1	92	5.9	70-150	30	03/27/2019 2142
PFOA	20	18		1	89	4.8	70-150	30	03/27/2019 2142
PFPeA	20	19		1	94	1.5	70-150	30	03/27/2019 2142
PFTeDA	20	19		1	97	0.96	70-150	30	03/27/2019 2142
PFTrDA	20	18		1	92	8.6	70-150	30	03/27/2019 2142
PFUdA	20	18		1	90	1.1	70-150	30	03/27/2019 2142
PFOS	19	16		1	88	15	70-150	30	03/27/2019 2142

Surrogate	Q	% Rec	Acceptance Limit
13C2_6:2FTS		103	50-150
13C2_8:2FTS		110	50-150
13C2_PFDoA		115	50-150
13C2_PFTeDA		116	50-150
13C3_PFBS		120	50-150
13C3_PFHxS		114	50-150
13C4_PFBA		114	50-150
13C4_PFHpA		112	50-150
13C5_PFHxA		117	50-150
13C5_PFPeA		117	50-150
13C6_PFDA		119	50-150
13C7_PFUdA		116	50-150
13C8_PFOA		119	50-150
13C8_PFOS		121	50-150
13C8_PFOSA		102	50-150
13C9_PFNA		116	50-150

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the LOQ

N = Recovery 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 - LCSD

Sample ID: UQ11294-003
Batch: 11294
Analytical Method: 537 Modified-ID

Matrix: Aqueous
Prep Method: 537 MOD
Prep Date: 03/26/2019 1814

Surrogate	Q	% Rec	Acceptance Limit
d-EtFOSA		64	50-150
d-MeFOSA		62	50-150

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the LOQ

N = Recovery 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: UQ11382-001
Batch: 11382
Analytical Method: 537 Modified-ID

Matrix: Aqueous
Prep Method: 537 MOD
Prep Date: 03/27/2019 1140

Parameter	Result	Q	Dil	LOQ	Units	Analysis Date
8:2 FTS	ND		1	4.0	ng/L	04/01/2019 1240
6:2 FTS	ND		1	4.0	ng/L	04/01/2019 1240
EtFOSA	ND		1	4.0	ng/L	04/01/2019 1240
MeFOSA	ND		1	8.0	ng/L	04/01/2019 1240
PFBS	ND		1	4.0	ng/L	04/01/2019 1240
PFDS	ND		1	4.0	ng/L	04/01/2019 1240
PFHpS	ND		1	4.0	ng/L	04/01/2019 1240
PFNS	ND		1	8.0	ng/L	04/01/2019 1240
PFOSA	ND		1	4.0	ng/L	04/01/2019 1240
PFPeS	ND		1	4.0	ng/L	04/01/2019 1240
PFHxS	ND		1	4.0	ng/L	04/01/2019 1240
PFBA	ND		1	4.0	ng/L	04/01/2019 1240
PFDA	ND		1	4.0	ng/L	04/01/2019 1240
PFDoA	ND		1	4.0	ng/L	04/01/2019 1240
PFHpA	ND		1	4.0	ng/L	04/01/2019 1240
PFHxA	ND		1	4.0	ng/L	04/01/2019 1240
PFNA	ND		1	4.0	ng/L	04/01/2019 1240
PFOA	ND		1	2.0	ng/L	04/01/2019 1240
PFPeA	ND		1	4.0	ng/L	04/01/2019 1240
PFTeDA	ND		1	4.0	ng/L	04/01/2019 1240
PFTrDA	ND		1	4.0	ng/L	04/01/2019 1240
PFUdA	ND		1	4.0	ng/L	04/01/2019 1240
PFOS	ND		1	4.0	ng/L	04/01/2019 1240

Surrogate	Q	% Rec	Acceptance Limit
13C2_6:2FTS		91	50-150
13C2_8:2FTS		118	50-150
13C2_PFDoA		103	50-150
13C2_PFTeDA		97	50-150
13C3_PFBS		103	50-150
13C3_PFHxS		97	50-150
13C4_PFBA		102	50-150
13C4_PFHpA		101	50-150
13C5_PFHxA		100	50-150
13C5_PFPeA		108	50-150
13C6_PFDA		100	50-150
13C7_PFUdA		104	50-150
13C8_PFOA		99	50-150
13C8_PFOS		102	50-150
13C8_PFOSA		93	50-150
13C9_PFNA		100	50-150

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the LOQ

N = Recovery 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: UQ11382-001
Batch: 11382
Analytical Method: 537 Modified-ID

Matrix: Aqueous
Prep Method: 537 MOD
Prep Date: 03/27/2019 1140

Surrogate	Q	% Rec	Acceptance Limit
d-EtFOSA		66	50-150
d-MeFOSA		58	50-150

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the LOQ

N = Recovery 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 - LCS

Sample ID: UQ11382-002
Batch: 11382
Analytical Method: 537 Modified-ID

Matrix: Aqueous
Prep Method: 537 MOD
Prep Date: 03/27/2019 1140

Parameter	Spike Amount (ng/L)	Result (ng/L)	Q	Dil	% Rec	% Rec Limit	Analysis Date
8:2 FTS	19	18		1	95	70-150	04/01/2019 1253
6:2 FTS	19	18		1	96	70-150	04/01/2019 1253
EtFOSA	20	22		1	108	70-150	04/01/2019 1253
MeFOSA	20	24		1	122	70-150	04/01/2019 1253
PFBS	18	16		1	92	70-150	04/01/2019 1253
PFDS	19	15		1	80	70-150	04/01/2019 1253
PFHpS	19	16		1	84	70-150	04/01/2019 1253
PFNS	19	17		1	90	70-150	04/01/2019 1253
PFOSA	20	18		1	92	70-150	04/01/2019 1253
PFPeS	19	15		1	80	70-150	04/01/2019 1253
PFHxS	18	17		1	95	70-150	04/01/2019 1253
PFBA	20	19		1	95	70-150	04/01/2019 1253
PFDA	20	17		1	84	70-150	04/01/2019 1253
PFDoA	20	18		1	88	70-150	04/01/2019 1253
PFHpA	20	18		1	89	70-150	04/01/2019 1253
PFHxA	20	18		1	89	70-150	04/01/2019 1253
PFNA	20	16		1	82	70-150	04/01/2019 1253
PFOA	20	17		1	85	70-150	04/01/2019 1253
PFPeA	20	18		1	90	70-150	04/01/2019 1253
PFTeDA	20	18		1	89	70-150	04/01/2019 1253
PFTrDA	20	17		1	85	70-150	04/01/2019 1253
PFUdA	20	17		1	86	70-150	04/01/2019 1253
PFOS	19	15		1	83	70-150	04/01/2019 1253

Surrogate	Q	% Rec	Acceptance Limit
13C2_6:2FTS		93	50-150
13C2_8:2FTS		126	50-150
13C2_PFDoA		107	50-150
13C2_PFTeDA		89	50-150
13C3_PFBS		113	50-150
13C3_PFHxS		103	50-150
13C4_PFBA		110	50-150
13C4_PFHpA		107	50-150
13C5_PFHxA		105	50-150
13C5_PFPeA		111	50-150
13C6_PFDA		114	50-150
13C7_PFUdA		113	50-150
13C8_PFOA		102	50-150
13C8_PFOS		114	50-150
13C8_PFOSA		96	50-150
13C9_PFNA		107	50-150

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection
P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the LOQ
N = Recovery 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 - LCS

Sample ID: UQ11382-002
Batch: 11382
Analytical Method: 537 Modified-ID

Matrix: Aqueous
Prep Method: 537 MOD
Prep Date: 03/27/2019 1140

Surrogate	Q	% Rec	Acceptance Limit
d-EtFOSA		60	50-150
d-MeFOSA		53	50-150

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

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

PFAS by LC/MS/MS - LCSD

Sample ID: UQ11382-003
Batch: 11382
Analytical Method: 537 Modified-ID

Matrix: Aqueous
Prep Method: 537 MOD
Prep Date: 03/27/2019 1140

Parameter	Spike Amount (ng/L)	Result (ng/L)	Q	Dil	% Rec	% RPD	% Rec Limit	% RPD Limit	Analysis Date
8:2 FTS	19	19		1	98	3.0	70-150	30	04/01/2019 1305
6:2 FTS	19	20		1	104	7.4	70-150	30	04/01/2019 1305
EtFOSA	20	24		1	119	9.5	70-150	30	04/01/2019 1305
MeFOSA	20	29		1	143	16	70-150	30	04/01/2019 1305
PFBS	18	17		1	98	6.9	70-150	30	04/01/2019 1305
PFDS	19	17		1	89	10	70-150	30	04/01/2019 1305
PFHpS	19	17		1	91	8.5	70-150	30	04/01/2019 1305
PFNS	19	18		1	92	2.5	70-150	30	04/01/2019 1305
PFOSA	20	20		1	99	6.6	70-150	30	04/01/2019 1305
PFPeS	19	17		1	93	16	70-150	30	04/01/2019 1305
PFHxS	18	16		1	89	6.7	70-150	30	04/01/2019 1305
PFBA	20	19		1	96	1.6	70-150	30	04/01/2019 1305
PFDA	20	19		1	95	12	70-150	30	04/01/2019 1305
PFDoA	20	17		1	87	0.55	70-150	30	04/01/2019 1305
PFHpA	20	19		1	94	5.8	70-150	30	04/01/2019 1305
PFHxA	20	19		1	94	6.1	70-150	30	04/01/2019 1305
PFNA	20	17		1	85	4.3	70-150	30	04/01/2019 1305
PFOA	20	19		1	93	9.1	70-150	30	04/01/2019 1305
PFPeA	20	18		1	92	2.8	70-150	30	04/01/2019 1305
PFTeDA	20	19		1	94	5.0	70-150	30	04/01/2019 1305
PFTrDA	20	18		1	88	3.9	70-150	30	04/01/2019 1305
PFUdA	20	18		1	91	5.8	70-150	30	04/01/2019 1305
PFOS	19	17		1	93	11	70-150	30	04/01/2019 1305

Surrogate	Q	% Rec	Acceptance Limit
13C2_6:2FTS		94	50-150
13C2_8:2FTS		121	50-150
13C2_PFDoA		110	50-150
13C2_PFTeDA		91	50-150
13C3_PFBS		108	50-150
13C3_PFHxS		108	50-150
13C4_PFBA		109	50-150
13C4_PFHpA		102	50-150
13C5_PFHxA		108	50-150
13C5_PFPeA		115	50-150
13C6_PFDA		105	50-150
13C7_PFUdA		116	50-150
13C8_PFOA		102	50-150
13C8_PFOS		109	50-150
13C8_PFOSA		93	50-150
13C9_PFNA		104	50-150

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the LOQ

N = Recovery 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 - LCSD

Sample ID: UQ11382-003
Batch: 11382
Analytical Method: 537 Modified-ID

Matrix: Aqueous
Prep Method: 537 MOD
Prep Date: 03/27/2019 1140

Surrogate	Q	% Rec	Acceptance Limit
d-EtFOSA		64	50-150
d-MeFOSA		54	50-150

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

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

Chain of Custody

and

Miscellaneous Documents

SHEALY

Chain of Custody Record

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

Number

Client: **Rose and Westra / GZA**

Address: 601 Fifth Street NW, Suite 102

City: Grand Rapids State: MI Zip Code: 49504

Project Name: 16.0062335.52 T2

Project Number: 16.0062335.52 T2

P.O No.:

Report to Contact: Lori Powers

Sampler's Signature: x

Printed Name: Makayla Myers

Telephone No. / E-mail: 616-956-6123 loretta.powers@gza.com

Quote No.: 21129

Page 1 of 1

UC21029

NMS

Sample ID / Description (Containers for each sample may be combined on one line)	Date	Time	G=Grab C=Composite	Matrix				No of Containers by Preservative Type							Analysis (Attach list if more space is needed)									Remarks / Cooler I.D.
				Aqueous	Solid	Non-Aqueous		Unpres.	H2SO4	HNO3	HCl	NaOH	H2O	MeOH	PFAS									
HS-MW-10S	3/18/2019	15:05	G	x				2							x									
HS-MW-10M	3/18/2019	12:35	G	x				2							x									
HS-MW-10D	3/18/2019	12:10	G	x				2							x									
HS-MW-9S	3/19/2019	15:00	G	x				2							x									
HS-MW-9M	3/19/2019	13:45	G	x				2							x									
HS-MW-9D	3/19/2019	13:50	G	x				2							x									
HS-MW-6S	3/20/2019	14:15	G	x				2							x									
HS-MW-6D	3/20/2019	16:00	G	x				2							x									
FB - 3/20	3/20/19	16:10	G	X				2							X									

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

Sample Disposal
☐ Return to Client ☒ Disposal by Lab

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

QC Requirements

Relinquished by	Date	Time	Received by	Date	Time
1. Relinquished by Makayla Myers	3/20/2019	1700	1. Received by		
2. Relinquished by			2. Received by		
3. Relinquished by			3. Received by		
4. Relinquished by Fed EX	3-21-19	0932	4. Laboratory Received by L Hit	3-21-19	0932

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

LAB USE ONLY
Received on Ice (Check) ☑ Y ☐ N ☐ Ice Pack
Receipt Temp 2.9 °C

Document Number: ME002OW-01

SHEALY

Chain of Custody Record

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

Number

Client **Rose and Westra / GZA**	Report to Contact Lori Powers	Telephone No. / E-mail 816-856-8123 loretta.powers@gza.com	Quote No. 21129
Address 601 Fifth Street NW, Suite 102	Sampler's Signature x	Analysis (Attach list if more space is needed)	Page 1 of 1
City Grand Rapids / State MI / Zip Code 49504	Printed Name Makayla Myers		
Project Name 16.0062336.52 T2			
Project Number 16.0062336.52 T2 / P.O No.			UC21029 NMS

Sample ID / Description (Containers for each sample may be combined on one line)	Date	Time	G=Grab C=Composite	Matrix: Aqueous	Solid	Non-Aqueous		No of Containers by Preservative Type: Unpres.	H2SO4	HNO3	HCl	NaOH	NaOH & Zn Acetate	MeOH	VOCs & SVOCs	Project List Metals, Hg, & Hardness	Chloride	Total phosphorus	Total ammonia, Nitrate/Nitrite	Sulfide	Sulfate	Total Cyanide		Remarks / Cooler No. Sheely Water
HS-MW-9S	3/19/2019	15:00	G	x				2	1	3	3	1	2		x	x	x	x	x	x	x	x		
HS-MW-9M	3/19/2019	13:45	G	x				2	1	3	3	1	2		x	x	x	x	x	x	x	x		
HS-MW-9D	3/19/2019	13:50	G	x				2	1	3	3	1	2		x	x	x	x	x	x	x	x		
HS-MW-10S	3/18/2019	15:05	G	x				2	1	3	3	1	2		x	x	x	x	x	x	x	x		
HS-MW-10M	3/18/2019	12:35	G	x				2	1	3	3	1	2		x	x	x	x	x	x	x	x		
HS-MW-10D	3/18/2019	12:10	G	x				2	1	3	3	1	2		x	x	x	x	x	x	x	x		
HS-MW-6D	3/20/2019	16:00	G	x				2	1	3	3	1	2		x	x	x	x	x	x	x	x		
HS-MW-6S	3/20/2019	14:15	G	x				2	1	3	3	1	2		x	x	x	x	x	x	x	x		

Turn Around Time Required (Prior lab approval required for expedited TAT) ☒ ☐	Sample Disposal ☐ Return to Client ☒ Disposal by Lab	Possible Hazard Identification (List any known hazards in the remarks) ☒ Non-Hazardous ☐ Flammable ☐ Skin Irritant ☐ SDS provided ☐ Unknown	QC Requirements

1. Relinquished by Makayla Myers	Date 3/20/2019	Time 1700	1. Received by	Date	Time
2. Relinquished by	Date	Time	2. Received by	Date	Time
3. Relinquished by	Date	Time	3. Received by	Date	Time
4. Relinquished by Fed EX	Date 3-21-19	Time 0932	4. Laboratory Received by	Date 3-21-19	Time 0932

Project Metals List: Al, Sb, As, Ba, Be, B, Cd, Cr, Co, Cu, Fe, Pb, Mg, Hg, Mo, Ni, Se, Ag, Na, Ti, Tl, V, Zn.
Samples are retained for 4 weeks unless other arrangements are made.

LAB USE ONLY
Received on Ice (Check) ☑ Y ☐ N ☐ Ice Pack Receipt Temp. 4.2 °C 3.7c

Document Number: ME002OW-01

Shealy Environmental Services, Inc.
Document Number: ME0018C-14

Page 1 of 1
Effective Date: 8/2/2018

Sample Receipt Checklist (SRC)

Client: GZA Cooler Inspected by/date: LKH / 03-21-2019 Lot #: UC21029

Means of receipt: ☐ SESI ☐ 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: 18-2225 Chlorine Strip ID: 19-152 Tested by: LKH/MEC

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

4.2 /4.2 °C 3.7 /3.7 °C NA /NA °C NA /NA °C

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

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

☐ Yes	☐ No	☑ NA	3. If temperature of any cooler exceeded 6.0°C, was Project Manager Notified? PM was Notified by: phone / email / face-to-face (circle one).
☑ Yes	☐ No	☐ NA	4. Is the commercial courier's packing slip attached to this form?
☑ Yes	☐ No		5. Were proper custody procedures (relinquished/received) followed?
☑ Yes	☐ No		6. Were sample IDs listed on the COC?
☑ Yes	☐ No		7. Were sample IDs listed on all sample containers?
☑ Yes	☐ No		8. Was collection date & time listed on the COC?
☑ Yes	☐ No		9. Was collection date & time listed on all sample containers?
☑ Yes	☐ No		10. Did all container label information (ID, date, time) agree with the COC?
☑ Yes	☐ No		11. Were tests to be performed listed on the COC?
☑ Yes	☐ No		12. Did all samples arrive in the proper containers for each test and/or in good condition (unbroken, lids on, etc.)?
☑ Yes	☐ No		13. Was adequate sample volume available?
☑ Yes	☐ No		14. Were all samples received within ½ the holding time or 48 hours, whichever comes first?
☐ Yes	☑ No		15. Were any samples containers missing/excess (circle one) samples Not listed on COC?
☐ Yes	☑ No	☐ NA	16. For VOA and RSK-175 samples, were bubbles present >"pea-size" (¼"or 6mm in diameter) in any of the VOA vials?
☑ Yes	☐ No	☐ NA	17. Were all DRO/metals/nutrient samples received at a pH of < 2?
☑ Yes	☐ No	☐ NA	18. Were all cyanide samples received at a pH > 12 and sulfide samples received at a pH > 9?
☑ Yes	☐ No	☐ NA	19. Were all applicable NH_3/TKN/cyanide/phenol/625 (< 0.5mg/L) samples free of residual chlorine?
☐ Yes	☐ No	☑ NA	20. Were client remarks/requests (i.e. requested dilutions, MS/MSD designations, etc…) correctly transcribed from the COC into the comment section in LIMS?
☐ Yes	☑ No		21. Was the quote number listed on the container label? If yes, Quote # 16938

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

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

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

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

SR barcode labels applied by: LKH/MEC Date: 03-21-2019

Comments:

SHEALY ENVIRONMENTAL SERVICES, INC.

Report of Analysis

GZA GeoEnvironmental, Inc.
601 Fifth Street N.W., Suite 102
Grand Rapids, MI 49504
Attention: Loretta J. Powers

Project Name: 16.0062335.52 T2

Project Number: 16.0062335.52 T2

Lot Number:**UC23028**

Date Completed:04/08/2019

N. Saikaly

04/09/2019 2:05 PM
Approved and released by:
Project Manager: Nisreen Saikaly

Case Narrative
GZA GeoEnvironmental, Inc.
Lot Number: UC23028

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 Shealy Environmental Services, Inc. ("Shealy") Quality Assurance Management Plan (QAMP), applicable Shealy standard operating procedures (SOPs), the 2003 NELAC standard, and Shealy policies. Additionally, the DoD QSM version 5.1 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.

PFAS

All QC associated with these samples was in compliance with DOD QSM 5.1 table B-15 and our PFAS SOP. DoD reporting conventions and qualifiers are not utilized in this data package.

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

CF = DF * FV / Vo

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

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

$$\mathrm{Cs} = \left(\frac{A_s}{A_{is}} - b\right) * \left(\frac{C_{is}}{a}\right)$$

Where:

A_s is peak response of target analyte in the sample
A_{is} is peak response of internal standard in the sample
C_s is concentration of target analyte in the sample
C_{is} is concentration of internal standard in the sample (1ng/mL)
a is the slope from the ICAL linear regression
b is the y-intercept from the ICAL linear regression

Surrogate recovery for the following samples was outside the upper control limit: UC23028-001 (4:2 FTS, 6:2 FTS), UC23028-004 (8:2 FTS). These samples did not contain any associated target analytes; therefore, re-extraction was not performed.

The matrix spike duplicate (MSD) recoveries in batch 11828 were outside acceptance criteria. All other

QC criteria for the batch was within acceptance criteria and method control limits. The MS/MSD recovery results are attributed to matrix interference. The associated sample results were reported and no corrective action was required.

Volatile Organic Compounds

The continuing calibration verification (CCV) associated with sample UC23028-002, UC23028-003, UC23028-005 recovered above the upper control limit for Acetone. The samples associated with this CCV were non-detect for the affected analytes; therefore, the data has been reported.

The laboratory control sample (LCS) and laboratory control sample duplicate (LCSD) for analytical batch 12007 exceeded acceptance criteria for the following analyte: Acetone. Acetone was biased high and not detected in the samples affected: UC23028-002, UC23028-003, UC23028-005.

Semivolatile Organic Compounds

The LCS recovery for bis(2-Chloroethyl)ether exceeded method control limits in batch 11166; however, all other QC criteria for the LCS/LCSD were within acceptance criteria and method control limits. The associated sample results were non-detect, therefore the results were reported and no corrective action was required.

Metals

The MS/MSD recoveries in batch 11443 were outside acceptance criteria. All other QC criteria for the batch was within acceptance criteria and method control limits. The MS/MSD recovery results are attributed to matrix interference. The associated sample results were reported and no corrective action was required.

Cyanide

The matrix spike and matrix spike duplicate (MS/MSD) recoveries in batch 11698 were outside acceptance criteria. All other QC criteria for the batch was within acceptance criteria and method control limits. The MS/MSD recovery results are attributed to matrix interference. The associated sample results were reported and no corrective action was required.

Sample Summary

GZA GeoEnvironmental, Inc.

Lot Number: UC23028

Sample Number	Sample ID	Matrix	Date Sampled	Date Received
001	HS-MW-7S	Aqueous	03/21/2019 1110	03/23/2019
002	HS-MW-7S DUP	Aqueous	03/21/2019 1110	03/23/2019
003	HS-MW-8	Aqueous	03/21/2019 1400	03/23/2019
004	EB-32019-SS	Aqueous	03/21/2019 1000	03/23/2019
005	Trip Blank	Aqueous	03/21/2019 0800	03/23/2019

(5 samples)

Detection Summary
GZA GeoEnvironmental, Inc.
Lot Number: UC23028

Sample	Sample ID	Matrix	Parameter	Method	Result	Q	Units	Page
001	HS-MW-7S	Aqueous	Chloride	300.0	31		mg/L	6
001	HS-MW-7S	Aqueous	Hardness (total)	SM 2340C-	400		mg/L	6
001	HS-MW-7S	Aqueous	Nitrate-Nitrite - N	353.2	2.1	B	mg/L	6
001	HS-MW-7S	Aqueous	Phosphorus	365.1	0.010	J	mg/L	6
001	HS-MW-7S	Aqueous	Sulfate	300.0	18		mg/L	6
001	HS-MW-7S	Aqueous	Acetone	8260B	2.7	J	ug/L	7
001	HS-MW-7S	Aqueous	Benzo(a)anthracene	8270D	0.11	J	ug/L	9
001	HS-MW-7S	Aqueous	Benzo(b)fluoranthene	8270D	0.12	J	ug/L	9
001	HS-MW-7S	Aqueous	Benzo(g,h,i)perylene	8270D	0.072	J	ug/L	9
001	HS-MW-7S	Aqueous	Benzo(k)fluoranthene	8270D	0.049	J	ug/L	9
001	HS-MW-7S	Aqueous	Chrysene	8270D	0.074	J	ug/L	9
001	HS-MW-7S	Aqueous	Fluoranthene	8270D	0.14	J	ug/L	9
001	HS-MW-7S	Aqueous	Indeno(1,2,3-c,d)pyrene	8270D	0.058	J	ug/L	9
001	HS-MW-7S	Aqueous	Aluminum	200.8	14	J	ug/L	12
001	HS-MW-7S	Aqueous	Barium	200.8	58		ug/L	12
001	HS-MW-7S	Aqueous	Boron	200.8	14	BJ	ug/L	12
001	HS-MW-7S	Aqueous	Iron	200.8	420		ug/L	12
001	HS-MW-7S	Aqueous	Magnesium	200.8	37000		ug/L	12
001	HS-MW-7S	Aqueous	Nickel	200.8	1.3	J	ug/L	12
001	HS-MW-7S	Aqueous	Sodium	200.8	7200		ug/L	12
001	HS-MW-7S	Aqueous	Titanium	200.8	2.5	J	ug/L	12
001	HS-MW-7S	Aqueous	Zinc	200.8	8.7	J	ug/L	12
001	HS-MW-7S	Aqueous	PFBS	537 Modified-	5.1		ng/L	13
001	HS-MW-7S	Aqueous	PFHxS	537 Modified-	11		ng/L	13
001	HS-MW-7S	Aqueous	PFOA	537 Modified-	2.9		ng/L	13
002	HS-MW-7S DUP	Aqueous	Chloride	300.0	31		mg/L	14
002	HS-MW-7S DUP	Aqueous	Hardness (total)	SM 2340C-	400		mg/L	14
002	HS-MW-7S DUP	Aqueous	Nitrate-Nitrite - N	353.2	2.0	B	mg/L	14
002	HS-MW-7S DUP	Aqueous	Phosphorus	365.1	0.0092	J	mg/L	14
002	HS-MW-7S DUP	Aqueous	Sulfate	300.0	18		mg/L	14
002	HS-MW-7S DUP	Aqueous	Benzo(a)anthracene	8270D	0.060	J	ug/L	17
002	HS-MW-7S DUP	Aqueous	Benzo(b)fluoranthene	8270D	0.19	J	ug/L	17
002	HS-MW-7S DUP	Aqueous	Benzo(g,h,i)perylene	8270D	0.054	J	ug/L	17
002	HS-MW-7S DUP	Aqueous	Benzo(k)fluoranthene	8270D	0.062	J	ug/L	17
002	HS-MW-7S DUP	Aqueous	Chrysene	8270D	0.055	J	ug/L	17
002	HS-MW-7S DUP	Aqueous	bis(2-Ethylhexyl)phthalate	8270D	1.1	J	ug/L	17
002	HS-MW-7S DUP	Aqueous	Indeno(1,2,3-c,d)pyrene	8270D	0.058	J	ug/L	17
002	HS-MW-7S DUP	Aqueous	Pyrene	8270D	0.10	J	ug/L	18
002	HS-MW-7S DUP	Aqueous	Aluminum	200.8	16	J	ug/L	20
002	HS-MW-7S DUP	Aqueous	Barium	200.8	58		ug/L	20
002	HS-MW-7S DUP	Aqueous	Boron	200.8	14	BJ	ug/L	20
002	HS-MW-7S DUP	Aqueous	Iron	200.8	400		ug/L	20
002	HS-MW-7S DUP	Aqueous	Magnesium	200.8	36000		ug/L	20
002	HS-MW-7S DUP	Aqueous	Nickel	200.8	1.4	J	ug/L	20
002	HS-MW-7S DUP	Aqueous	Sodium	200.8	7100		ug/L	20

Detection Summary (Continued)

Lot Number: UC23028

Sample	Sample ID	Matrix	Parameter	Method	Result	Q	Units	Page
002	HS-MW-7S DUP	Aqueous	Titanium	200.8	2.7	J	ug/L	20
002	HS-MW-7S DUP	Aqueous	Zinc	200.8	5.4	J	ug/L	20
002	HS-MW-7S DUP	Aqueous	PFBS	537 Modified-	5.3		ng/L	21
002	HS-MW-7S DUP	Aqueous	PFHxS	537 Modified-	9.9		ng/L	21
002	HS-MW-7S DUP	Aqueous	PFOA	537 Modified-	3.0		ng/L	21
003	HS-MW-8	Aqueous	Chloride	300.0	29		mg/L	22
003	HS-MW-8	Aqueous	Hardness (total)	SM 2340C-	220		mg/L	22
003	HS-MW-8	Aqueous	Nitrate-Nitrite - N	353.2	1.3	B	mg/L	22
003	HS-MW-8	Aqueous	Phosphorus	365.1	0.010	J	mg/L	22
003	HS-MW-8	Aqueous	Sulfate	300.0	11		mg/L	22
003	HS-MW-8	Aqueous	Acetone	8260B	2.2	J	ug/L	23
003	HS-MW-8	Aqueous	Barium	200.8	14		ug/L	28
003	HS-MW-8	Aqueous	Boron	200.8	23	BJ	ug/L	28
003	HS-MW-8	Aqueous	Iron	200.8	220		ug/L	28
003	HS-MW-8	Aqueous	Magnesium	200.8	17000		ug/L	28
003	HS-MW-8	Aqueous	Sodium	200.8	9000		ug/L	28
003	HS-MW-8	Aqueous	Titanium	200.8	1.6	J	ug/L	28
003	HS-MW-8	Aqueous	PFBS	537 Modified-	26		ng/L	29
003	HS-MW-8	Aqueous	PFHpS	537 Modified-	78		ng/L	29
003	HS-MW-8	Aqueous	PFPeS	537 Modified-	44		ng/L	29
003	HS-MW-8	Aqueous	PFHxS	537 Modified-	150		ng/L	29
003	HS-MW-8	Aqueous	PFBA	537 Modified-	6.6		ng/L	29
003	HS-MW-8	Aqueous	PFHpA	537 Modified-	37		ng/L	29
003	HS-MW-8	Aqueous	PFHxA	537 Modified-	16		ng/L	29
003	HS-MW-8	Aqueous	PFOA	537 Modified-	380		ng/L	29
003	HS-MW-8	Aqueous	PFPeA	537 Modified-	5.5		ng/L	29
003	HS-MW-8	Aqueous	PFOS	537 Modified-	140		ng/L	29
005	Trip Blank	Aqueous	Acetone	8260B	5.9	J	ug/L	31

(73 detections)

Inorganic non-metals

Client: GZA GeoEnvironmental, Inc.
Laboratory ID: UC23028-001
Description: HS-MW-7S
Matrix: Aqueous
Date Sampled: 03/21/2019 1110
Date Received: 03/23/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	350.1	(Ammonia - N) 350.1	1	03/29/2019 1623	DMA		11688
1		(Chloride) 300.0	1	04/02/2019 1721	SLU		12073
1	10-204-00-1-X	(Cyanide - To) SM 4500-CN E-	1	03/29/2019 1859	MSG	03/29/2019 1632	11698
1		(Hardness (to) SM 2340C-2011	1	03/27/2019 1719	KFE		11494
1		(Nitrate-Nitr) 353.2	2	03/23/2019 1718	MDD		11110
1		(Phosphorus) 365.1	1	03/28/2019 1632	MSG	03/28/2019 1218	11531
1		(Sulfate) 300.0	1	04/02/2019 1721	SLU		12072
1		(Sulfide) SM 4500-S2 F-2011	1	03/27/2019 1542	HET		11466

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
Ammonia - N (gas diffusion)		350.1	ND		0.10	0.020	mg/L	1
Chloride		300.0	31		1.0	0.20	mg/L	1
Cyanide - Total	57-12-5	SM 4500-CN E-	ND		0.010	0.010	mg/L	1
Hardness (total)		SM 2340C-	400		10	2.0	mg/L	1
Nitrate-Nitrite - N		353.2	2.1	B	0.040	0.0030	mg/L	1
Phosphorus	7723-14-0	365.1	0.010	J	0.050	0.0050	mg/L	1
Sulfate		300.0	18		1.0	0.20	mg/L	1
Sulfide	18496-25-8	SM 4500-S2 F-	ND		1.0	1.0	mg/L	1

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%

Volatile Organic Compounds by GC/MS

Client: GZA GeoEnvironmental, Inc.
Laboratory ID: UC23028-001
Description: HS-MW-7S
Matrix: Aqueous
Date Sampled: 03/21/2019 1110
Date Received: 03/23/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	5030B	8260B	1	04/02/2019 0613	MNS		11939

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
Acetone	67-64-1	8260B	2.7	J	20	2.0	ug/L	1
Benzene	71-43-2	8260B	ND		1.0	0.40	ug/L	1
Bromodichloromethane	75-27-4	8260B	ND		1.0	0.40	ug/L	1
Bromoform	75-25-2	8260B	ND		1.0	0.40	ug/L	1
Bromomethane (Methyl bromide)	74-83-9	8260B	ND		2.0	0.40	ug/L	1
2-Butanone (MEK)	78-93-3	8260B	ND		10	2.0	ug/L	1
Carbon disulfide	75-15-0	8260B	ND		1.0	0.40	ug/L	1
Carbon tetrachloride	56-23-5	8260B	ND		1.0	0.40	ug/L	1
Chlorobenzene	108-90-7	8260B	ND		1.0	0.40	ug/L	1
Chloroethane	75-00-3	8260B	ND		2.0	0.40	ug/L	1
Chloroform	67-66-3	8260B	ND		1.0	0.40	ug/L	1
Chloromethane (Methyl chloride)	74-87-3	8260B	ND		1.0	0.50	ug/L	1
Cyclohexane	110-82-7	8260B	ND		1.0	0.40	ug/L	1
1,2-Dibromo-3-chloropropane (DBCP)	96-12-8	8260B	ND		1.0	0.40	ug/L	1
Dibromochloromethane	124-48-1	8260B	ND		1.0	0.40	ug/L	1
1,2-Dibromoethane (EDB)	106-93-4	8260B	ND		1.0	0.40	ug/L	1
1,2-Dichlorobenzene	95-50-1	8260B	ND		1.0	0.40	ug/L	1
1,3-Dichlorobenzene	541-73-1	8260B	ND		1.0	0.40	ug/L	1
1,4-Dichlorobenzene	106-46-7	8260B	ND		1.0	0.40	ug/L	1
Dichlorodifluoromethane	75-71-8	8260B	ND		2.0	0.60	ug/L	1
1,1-Dichloroethane	75-34-3	8260B	ND		1.0	0.40	ug/L	1
1,2-Dichloroethane	107-06-2	8260B	ND		1.0	0.40	ug/L	1
1,1-Dichloroethene	75-35-4	8260B	ND		1.0	0.40	ug/L	1
cis-1,2-Dichloroethene	156-59-2	8260B	ND		1.0	0.40	ug/L	1
trans-1,2-Dichloroethene	156-60-5	8260B	ND		1.0	0.40	ug/L	1
1,2-Dichloropropane	78-87-5	8260B	ND		1.0	0.40	ug/L	1
cis-1,3-Dichloropropene	10061-01-5	8260B	ND		1.0	0.40	ug/L	1
trans-1,3-Dichloropropene	10061-02-6	8260B	ND		1.0	0.40	ug/L	1
Ethylbenzene	100-41-4	8260B	ND		1.0	0.40	ug/L	1
2-Hexanone	591-78-6	8260B	ND		10	2.0	ug/L	1
Isopropylbenzene	98-82-8	8260B	ND		1.0	0.40	ug/L	1
Methyl acetate	79-20-9	8260B	ND		1.0	0.40	ug/L	1
Methyl tertiary butyl ether (MTBE)	1634-04-4	8260B	ND		1.0	0.40	ug/L	1
4-Methyl-2-pentanone	108-10-1	8260B	ND		10	2.0	ug/L	1
Methylcyclohexane	108-87-2	8260B	ND		5.0	0.40	ug/L	1
Methylene chloride	75-09-2	8260B	ND		1.0	0.40	ug/L	1
Styrene	100-42-5	8260B	ND		1.0	0.41	ug/L	1
1,1,2,2-Tetrachloroethane	79-34-5	8260B	ND		1.0	0.40	ug/L	1
Tetrachloroethene	127-18-4	8260B	ND		1.0	0.40	ug/L	1
Toluene	108-88-3	8260B	ND		1.0	0.40	ug/L	1
1,1,2-Trichloro-1,2,2-Trifluoroethane	76-13-1	8260B	ND		1.0	0.42	ug/L	1
1,2,4-Trichlorobenzene	120-82-1	8260B	ND		1.0	0.40	ug/L	1
1,1,1-Trichloroethane	71-55-6	8260B	ND		1.0	0.40	ug/L	1
1,1,2-Trichloroethane	79-00-5	8260B	ND		1.0	0.40	ug/L	1

LOQ = Limit of Quantitation
B = Detected in the method blank
E = Quantitation of compound exceeded the calibration range
ND = Not detected at or above the LOQ
N = Recovery is out of criteria
P = The RPD between two GC columns exceeds 40%
H = Out of holding time
W = Reported on wet weight basis

Volatile Organic Compounds by GC/MS

Client: GZA GeoEnvironmental, Inc.
Laboratory ID: UC23028-001
Description: HS-MW-7S
Matrix: Aqueous
Date Sampled: 03/21/2019 1110
Date Received: 03/23/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	5030B	8260B	1	04/02/2019 0613	MNS		11939

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
Trichloroethene	79-01-6	8260B	ND		1.0	0.40	ug/L	1
Trichlorofluoromethane	75-69-4	8260B	ND		1.0	0.40	ug/L	1
Vinyl chloride	75-01-4	8260B	ND		1.0	0.40	ug/L	1
Xylenes (total)	1330-20-7	8260B	ND		1.0	0.40	ug/L	1
m+p - Xylenes	179601-23-1	8260B	ND		1.0	0.40	ug/L	1
o - Xylenes	95-47-6	8260B	ND		1.0	0.40	ug/L	1

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
1,2-Dichloroethane-d4		105	70-130
Bromofluorobenzene		93	70-130
Toluene-d8		103	70-130

LOQ = Limit of Quantitation
B = Detected in the method blank
E = Quantitation of compound exceeded the calibration range
ND = Not detected at or above the LOQ
N = Recovery is out of criteria
P = The RPD between two GC columns exceeds 40%
H = Out of holding time
W = Reported on wet weight basis

Semivolatile Organic Compounds by GC/MS

Client: GZA GeoEnvironmental, Inc.	Laboratory ID: UC23028-001
Description: HS-MW-7S	Matrix: Aqueous
Date Sampled: 03/21/2019 1110	
Date Received: 03/23/2019	

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	3520C	8270D	1	04/03/2019 1851	SCD	03/25/2019 1939	11166

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
Acenaphthene	83-32-9	8270D	ND		0.20	0.040	ug/L	1
Acenaphthylene	208-96-8	8270D	ND		0.20	0.040	ug/L	1
Acetophenone	98-86-2	8270D	ND		0.80	0.50	ug/L	1
Anthracene	120-12-7	8270D	ND		0.20	0.060	ug/L	1
Atrazine	1912-24-9	8270D	ND		0.80	0.50	ug/L	1
Benzidine	92-87-5	8270D	ND		20	1.0	ug/L	1
Benzo(a)anthracene	56-55-3	8270D	0.11	J	0.20	0.040	ug/L	1
Benzo(a)pyrene	50-32-8	8270D	ND		0.20	0.070	ug/L	1
Benzo(b)fluoranthene	205-99-2	8270D	0.12	J	0.20	0.040	ug/L	1
Benzo(g,h,i)perylene	191-24-2	8270D	0.072	J	0.20	0.040	ug/L	1
Benzo(k)fluoranthene	207-08-9	8270D	0.049	J	0.20	0.040	ug/L	1
Butyl benzyl phthalate	85-68-7	8270D	ND		0.80	0.50	ug/L	1
Caprolactam	105-60-2	8270D	ND		1.6	1.0	ug/L	1
Carbazole	86-74-8	8270D	ND		0.80	0.50	ug/L	1
4-Chloro-3-methyl phenol	59-50-7	8270D	ND		0.80	0.50	ug/L	1
bis(2-Chloroethyl)ether	111-44-4	8270D	ND		0.80	0.50	ug/L	1
2-Chloronaphthalene	91-58-7	8270D	ND		0.80	0.50	ug/L	1
2-Chlorophenol	95-57-8	8270D	ND		0.80	0.50	ug/L	1
Chrysene	218-01-9	8270D	0.074	J	0.20	0.030	ug/L	1
Dibenzo(a,h)anthracene	53-70-3	8270D	ND		0.20	0.030	ug/L	1
Dibenzofuran	132-64-9	8270D	ND		0.80	0.50	ug/L	1
3,3'-Dichlorobenzidine	91-94-1	8270D	ND		4.0	1.8	ug/L	1
2,4-Dichlorophenol	120-83-2	8270D	ND		1.6	1.0	ug/L	1
Diethylphthalate	84-66-2	8270D	ND		0.80	0.50	ug/L	1
Dimethyl phthalate	131-11-3	8270D	ND		0.80	0.50	ug/L	1
2,4-Dimethylphenol	105-67-9	8270D	ND		0.80	0.48	ug/L	1
Di-n-butyl phthalate	84-74-2	8270D	ND		0.80	0.50	ug/L	1
4,6-Dinitro-2-methylphenol	534-52-1	8270D	ND		4.0	1.0	ug/L	1
2,4-Dinitrotoluene	121-14-2	8270D	ND		1.6	0.50	ug/L	1
Di-n-octylphthalate	117-84-0	8270D	ND		0.80	0.50	ug/L	1
1,2-Diphenylhydrazine(as azobenzene)	103-33-3	8270D	ND		0.80	0.50	ug/L	1
bis(2-Ethylhexyl)phthalate	117-81-7	8270D	ND		4.0	0.50	ug/L	1
Fluoranthene	206-44-0	8270D	0.14	J	0.20	0.10	ug/L	1
Fluorene	86-73-7	8270D	ND		0.20	0.030	ug/L	1
Hexachlorobenzene	118-74-1	8270D	ND		0.80	0.50	ug/L	1
Hexachlorobutadiene	87-68-3	8270D	ND		0.80	0.50	ug/L	1
Hexachlorocyclopentadiene	77-47-4	8270D	ND		4.0	2.0	ug/L	1
Hexachloroethane	67-72-1	8270D	ND		0.80	0.31	ug/L	1
Indeno(1,2,3-c,d)pyrene	193-39-5	8270D	0.058	J	0.20	0.040	ug/L	1
Isophorone	78-59-1	8270D	ND		0.80	0.50	ug/L	1
2-Methylnaphthalene	91-57-6	8270D	ND		0.20	0.040	ug/L	1
2-Methylphenol	95-48-7	8270D	ND		0.80	0.21	ug/L	1
3+4-Methylphenol	106-44-5	8270D	ND		1.6	1.5	ug/L	1
Naphthalene	91-20-3	8270D	ND		0.20	0.050	ug/L	1

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%

Semivolatile Organic Compounds by GC/MS

Client: GZA GeoEnvironmental, Inc.
Laboratory ID: UC23028-001
Description: HS-MW-7S
Matrix: Aqueous
Date Sampled: 03/21/2019 1110
Date Received: 03/23/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	3520C	8270D	1	04/03/2019 1851	SCD	03/25/2019 1939	11166

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
Nitrobenzene	98-95-3	8270D	ND		0.80	0.55	ug/L	1
2-Nitrophenol	88-75-5	8270D	ND		1.6	1.0	ug/L	1
N-Nitrosodi-n-propylamine	621-64-7	8270D	ND		0.80	0.50	ug/L	1
N-Nitrosodiphenylamine (Diphenylamine)	86-30-6	8270D	ND		0.80	0.50	ug/L	1
Pentachlorophenol	87-86-5	8270D	ND		4.0	2.0	ug/L	1
Phenanthrene	85-01-8	8270D	ND		0.20	0.060	ug/L	1
Phenol	108-95-2	8270D	ND		0.80	0.50	ug/L	1
Pyrene	129-00-0	8270D	ND		0.20	0.10	ug/L	1
2,4,5-Trichlorophenol	95-95-4	8270D	ND		0.80	0.50	ug/L	1
2,4,6-Trichlorophenol	88-06-2	8270D	ND		0.80	0.50	ug/L	1

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
2-Fluorobiphenyl		68	37-129
2-Fluorophenol		79	24-127
Nitrobenzene-d5		89	38-127
Phenol-d5		95	28-128
Terphenyl-d14		98	10-148
2,4,6-Tribromophenol		76	35-144

LOQ = Limit of Quantitation
B = Detected in the method blank
E = Quantitation of compound exceeded the calibration range
ND = Not detected at or above the LOQ
N = Recovery is out of criteria
P = The RPD between two GC columns exceeds 40%
H = Out of holding time
W = Reported on wet weight basis

CVAA

Client: GZA GeoEnvironmental, Inc.	Laboratory ID: UC23028-001
Description: HS-MW-7S	Matrix: Aqueous
Date Sampled: 03/21/2019 1110	
Date Received: 03/23/2019	

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1		7470A	1	04/01/2019 1906	JMH	04/01/2019 1354	11839

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
Mercury	7439-97-6	7470A	ND		0.00020	0.000091	mg/L	1

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%

ICP-MS

Client: GZA GeoEnvironmental, Inc.	Laboratory ID: UC23028-001
Description: HS-MW-7S	Matrix: Aqueous
Date Sampled: 03/21/2019 1110	
Date Received: 03/23/2019	

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	200.2	200.8	1	03/30/2019 2312	BNW	03/27/2019 1908	11443
2	200.2	200.8	1	04/03/2019 1724	BNW	03/27/2019 1908	11443

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
Aluminum	7429-90-5	200.8	14	J	40	10	ug/L	1
Antimony	7440-36-0	200.8	ND		2.0	0.50	ug/L	1
Arsenic	7440-38-2	200.8	ND		2.0	1.3	ug/L	1
Barium	7440-39-3	200.8	58		5.0	1.3	ug/L	1
Beryllium	7440-41-7	200.8	ND		0.40	0.15	ug/L	1
Boron	7440-42-8	200.8	14	BJ	50	6.3	ug/L	1
Cadmium	7440-43-9	200.8	ND		0.50	0.13	ug/L	1
Chromium	7440-47-3	200.8	ND		5.0	1.3	ug/L	1
Cobalt	7440-48-4	200.8	ND		5.0	1.3	ug/L	1
Copper	7440-50-8	200.8	ND		5.0	1.3	ug/L	1
Iron	7439-89-6	200.8	420		50	13	ug/L	2
Lead	7439-92-1	200.8	ND		1.0	0.25	ug/L	1
Magnesium	7439-95-4	200.8	37000		400	50	ug/L	1
Molybdenum	7439-98-7	200.8	ND		10	2.5	ug/L	1
Nickel	7440-02-0	200.8	1.3	J	5.0	1.3	ug/L	1
Selenium	7782-49-2	200.8	ND		5.0	1.3	ug/L	1
Silver	7440-22-4	200.8	ND		1.0	0.25	ug/L	1
Sodium	7440-23-5	200.8	7200		400	150	ug/L	1
Thallium	7440-28-0	200.8	ND		0.50	0.15	ug/L	1
Titanium	7440-32-6	200.8	2.5	J	5.0	1.3	ug/L	1
Vanadium	7440-62-2	200.8	ND		5.0	2.5	ug/L	1
Zinc	7440-66-6	200.8	8.7	J	10	2.5	ug/L	1

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%

PFAS by LC/MS/MS

Client: GZA GeoEnvironmental, Inc.
Laboratory ID: UC23028-001
Description: HS-MW-7S
Matrix: Aqueous
Date Sampled: 03/21/2019 1110
Date Received: 03/23/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	537 MOD	537 Modified-ID	1	04/03/2019 1403	SES	04/01/2019 1155	11828

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	Units	Run
1H, 1H, 2H, 2H-perfluorodecane sulfonic acid (8:2 FTS)	39108-34-4	537 Modified-	ND		3.5	ng/L	1
1H, 1H, 2H, 2H-perfluorooctane sulfonic acid (6:2 FTS)	27619-97-2	537 Modified-	ND		3.5	ng/L	1
N-ethylperfluoro-1-octanesulfonamide (EtFOSA)	4151-50-2	537 Modified-	ND		3.5	ng/L	1
N-methylperfluoro-1-octanesulfonamide (MeFOSA)	31506-32-8	537 Modified-	ND		7.1	ng/L	1
Perfluoro-1-butanesulfonic acid (PFBS)	375-73-5	537 Modified-	5.1		3.5	ng/L	1
Perfluoro-1-decanesulfonic acid (PFDS)	335-77-3	537 Modified-	ND		3.5	ng/L	1
Perfluoro-1-heptanesulfonic acid (PFHpS)	375-92-8	537 Modified-	ND		3.5	ng/L	1
Perfluoro-1-nonanesulfonic acid (PFNS)	68259-12-1	537 Modified-	ND		7.1	ng/L	1
Perfluoro-1-octanesulfonamide (PFOSA)	754-91-6	537 Modified-	ND		3.5	ng/L	1
Perfluoro-1-pentanesulfonic acid (PFPeS)	2706-91-4	537 Modified-	ND		3.5	ng/L	1
Perfluorohexanesulfonic acid (PFHxS)	355-46-4	537 Modified-	11		3.5	ng/L	1
Perfluoro-n-butanoic acid (PFBA)	375-22-4	537 Modified-	ND		3.5	ng/L	1
Perfluoro-n-decanoic acid (PFDA)	335-76-2	537 Modified-	ND		3.5	ng/L	1
Perfluoro-n-dodecanoic acid (PFDoA)	307-55-1	537 Modified-	ND		3.5	ng/L	1
Perfluoro-n-heptanoic acid (PFHpA)	375-85-9	537 Modified-	ND		3.5	ng/L	1
Perfluoro-n-hexanoic acid (PFHxA)	307-24-4	537 Modified-	ND		3.5	ng/L	1
Perfluoro-n-nonanoic acid (PFNA)	375-95-1	537 Modified-	ND		3.5	ng/L	1
Perfluoro-n-octanoic acid (PFOA)	335-67-1	537 Modified-	2.9		1.8	ng/L	1
Perfluoro-n-pentanoic acid (PFPeA)	2706-90-3	537 Modified-	ND		3.5	ng/L	1
Perfluoro-n-tetradecanoic acid (PFTeDA)	376-06-7	537 Modified-	ND		3.5	ng/L	1
Perfluoro-n-tridecanoic acid (PFTrDA)	72629-94-8	537 Modified-	ND		3.5	ng/L	1
Perfluoro-n-undecanoic acid (PFUdA)	2058-94-8	537 Modified-	ND		3.5	ng/L	1
Perfluorooctanesulfonic acid (PFOS)	1763-23-1	537 Modified-	ND		3.5	ng/L	1

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
13C2_6:2FTS	N	152	50-150
13C2_8:2FTS		137	50-150
13C2_PFDoA		129	50-150
13C2_PFTeDA		127	50-150
13C3_PFBS		130	50-150
13C3_PFHxS		132	50-150
13C4_PFBA		133	50-150
13C4_PFHpA		143	50-150
13C5_PFHxA		139	50-150
13C5_PFPeA		131	50-150
13C6_PFDA		131	50-150
13C7_PFUdA		125	50-150
13C8_PFOA		140	50-150
13C8_PFOS		130	50-150
13C8_PFOSA		122	50-150
13C9_PFNA		138	50-150
d-EtFOSA		94	50-150
d-MeFOSA		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%

Inorganic non-metals

Client: GZA GeoEnvironmental, Inc.	Laboratory ID: UC23028-002
Description: HS-MW-7S DUP	Matrix: Aqueous
Date Sampled: 03/21/2019 1110	
Date Received: 03/23/2019	

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	350.1	(Ammonia - N) 350.1	1	03/29/2019 1631	DMA		11688
1		(Chloride) 300.0	1	04/02/2019 1737	SLU		12073
1	10-204-00-1-X	(Cyanide - To) SM 4500-CN E-	1	03/29/2019 1900	MSG	03/29/2019 1632	11698
1		(Hardness (to) SM 2340C-2011	1	03/27/2019 1719	KFE		11494
1		(Nitrate-Nitr) 353.2	2	03/23/2019 1720	MDD		11110
1		(Phosphorus) 365.1	1	04/02/2019 1346	DMA	04/01/2019 1007	11825
1		(Sulfate) 300.0	1	04/02/2019 1737	SLU		12072
1		(Sulfide) SM 4500-S2 F-2011	1	03/27/2019 1542	HET		11466

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
Ammonia - N (gas diffusion)		350.1	ND		0.10	0.020	mg/L	1
Chloride		300.0	31		1.0	0.20	mg/L	1
Cyanide - Total	57-12-5	SM 4500-CN E-	ND		0.010	0.010	mg/L	1
Hardness (total)		SM 2340C-	400		10	2.0	mg/L	1
Nitrate-Nitrite - N		353.2	2.0	B	0.040	0.0030	mg/L	1
Phosphorus	7723-14-0	365.1	0.0092	J	0.050	0.0050	mg/L	1
Sulfate		300.0	18		1.0	0.20	mg/L	1
Sulfide	18496-25-8	SM 4500-S2 F-	ND		1.0	1.0	mg/L	1

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%

Volatile Organic Compounds by GC/MS

Client: GZA GeoEnvironmental, Inc.
Laboratory ID: UC23028-002
Description: HS-MW-7S DUP
Matrix: Aqueous
Date Sampled: 03/21/2019 1110
Date Received: 03/23/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	5030B	8260B	1	04/02/2019 1424	BWS		12007

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
Acetone	67-64-1	8260B	ND		20	2.0	ug/L	1
Benzene	71-43-2	8260B	ND		1.0	0.40	ug/L	1
Bromodichloromethane	75-27-4	8260B	ND		1.0	0.40	ug/L	1
Bromoform	75-25-2	8260B	ND		1.0	0.40	ug/L	1
Bromomethane (Methyl bromide)	74-83-9	8260B	ND		2.0	0.40	ug/L	1
2-Butanone (MEK)	78-93-3	8260B	ND		10	2.0	ug/L	1
Carbon disulfide	75-15-0	8260B	ND		1.0	0.40	ug/L	1
Carbon tetrachloride	56-23-5	8260B	ND		1.0	0.40	ug/L	1
Chlorobenzene	108-90-7	8260B	ND		1.0	0.40	ug/L	1
Chloroethane	75-00-3	8260B	ND		2.0	0.40	ug/L	1
Chloroform	67-66-3	8260B	ND		1.0	0.40	ug/L	1
Chloromethane (Methyl chloride)	74-87-3	8260B	ND		1.0	0.50	ug/L	1
Cyclohexane	110-82-7	8260B	ND		1.0	0.40	ug/L	1
1,2-Dibromo-3-chloropropane (DBCP)	96-12-8	8260B	ND		1.0	0.40	ug/L	1
Dibromochloromethane	124-48-1	8260B	ND		1.0	0.40	ug/L	1
1,2-Dibromoethane (EDB)	106-93-4	8260B	ND		1.0	0.40	ug/L	1
1,2-Dichlorobenzene	95-50-1	8260B	ND		1.0	0.40	ug/L	1
1,3-Dichlorobenzene	541-73-1	8260B	ND		1.0	0.40	ug/L	1
1,4-Dichlorobenzene	106-46-7	8260B	ND		1.0	0.40	ug/L	1
Dichlorodifluoromethane	75-71-8	8260B	ND		2.0	0.60	ug/L	1
1,1-Dichloroethane	75-34-3	8260B	ND		1.0	0.40	ug/L	1
1,2-Dichloroethane	107-06-2	8260B	ND		1.0	0.40	ug/L	1
1,1-Dichloroethene	75-35-4	8260B	ND		1.0	0.40	ug/L	1
cis-1,2-Dichloroethene	156-59-2	8260B	ND		1.0	0.40	ug/L	1
trans-1,2-Dichloroethene	156-60-5	8260B	ND		1.0	0.40	ug/L	1
1,2-Dichloropropane	78-87-5	8260B	ND		1.0	0.40	ug/L	1
cis-1,3-Dichloropropene	10061-01-5	8260B	ND		1.0	0.40	ug/L	1
trans-1,3-Dichloropropene	10061-02-6	8260B	ND		1.0	0.40	ug/L	1
Ethylbenzene	100-41-4	8260B	ND		1.0	0.40	ug/L	1
2-Hexanone	591-78-6	8260B	ND		10	2.0	ug/L	1
Isopropylbenzene	98-82-8	8260B	ND		1.0	0.40	ug/L	1
Methyl acetate	79-20-9	8260B	ND		1.0	0.40	ug/L	1
Methyl tertiary butyl ether (MTBE)	1634-04-4	8260B	ND		1.0	0.40	ug/L	1
4-Methyl-2-pentanone	108-10-1	8260B	ND		10	2.0	ug/L	1
Methylcyclohexane	108-87-2	8260B	ND		5.0	0.40	ug/L	1
Methylene chloride	75-09-2	8260B	ND		1.0	0.40	ug/L	1
Styrene	100-42-5	8260B	ND		1.0	0.41	ug/L	1
1,1,2,2-Tetrachloroethane	79-34-5	8260B	ND		1.0	0.40	ug/L	1
Tetrachloroethene	127-18-4	8260B	ND		1.0	0.40	ug/L	1
Toluene	108-88-3	8260B	ND		1.0	0.40	ug/L	1
1,1,2-Trichloro-1,2,2-Trifluoroethane	76-13-1	8260B	ND		1.0	0.42	ug/L	1
1,2,4-Trichlorobenzene	120-82-1	8260B	ND		1.0	0.40	ug/L	1
1,1,1-Trichloroethane	71-55-6	8260B	ND		1.0	0.40	ug/L	1
1,1,2-Trichloroethane	79-00-5	8260B	ND		1.0	0.40	ug/L	1

LOQ = Limit of Quantitation	B = Detected in the method blank	E = Quantitation of compound exceeded the calibration range
ND = Not detected at or above the LOQ	N = Recovery is out of criteria	P = The RPD between two GC columns exceeds 40%
H = Out of holding time	W = Reported on wet weight basis	

Volatile Organic Compounds by GC/MS

Client: GZA GeoEnvironmental, Inc.
Laboratory ID: UC23028-002
Description: HS-MW-7S DUP
Matrix: Aqueous
Date Sampled: 03/21/2019 1110
Date Received: 03/23/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	5030B	8260B	1	04/02/2019 1424	BWS		12007

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
Trichloroethene	79-01-6	8260B	ND		1.0	0.40	ug/L	1
Trichlorofluoromethane	75-69-4	8260B	ND		1.0	0.40	ug/L	1
Vinyl chloride	75-01-4	8260B	ND		1.0	0.40	ug/L	1
Xylenes (total)	1330-20-7	8260B	ND		1.0	0.40	ug/L	1
m+p - Xylenes	179601-23-1	8260B	ND		1.0	0.40	ug/L	1
o - Xylenes	95-47-6	8260B	ND		1.0	0.40	ug/L	1

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
1,2-Dichloroethane-d4		91	70-130
Bromofluorobenzene		97	70-130
Toluene-d8		95	70-130

LOQ = Limit of Quantitation
B = Detected in the method blank
E = Quantitation of compound exceeded the calibration range
ND = Not detected at or above the LOQ
N = Recovery is out of criteria
P = The RPD between two GC columns exceeds 40%
H = Out of holding time
W = Reported on wet weight basis

Semivolatile Organic Compounds by GC/MS

Client: GZA GeoEnvironmental, Inc.
Laboratory ID: UC23028-002
Description: HS-MW-7S DUP
Matrix: Aqueous
Date Sampled: 03/21/2019 1110
Date Received: 03/23/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	3520C	8270D	1	04/03/2019 1915	SCD	03/25/2019 1939	11166

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
Acenaphthene	83-32-9	8270D	ND		0.20	0.040	ug/L	1
Acenaphthylene	208-96-8	8270D	ND		0.20	0.040	ug/L	1
Acetophenone	98-86-2	8270D	ND		0.80	0.50	ug/L	1
Anthracene	120-12-7	8270D	ND		0.20	0.060	ug/L	1
Atrazine	1912-24-9	8270D	ND		0.80	0.50	ug/L	1
Benzidine	92-87-5	8270D	ND		20	1.0	ug/L	1
Benzo(a)anthracene	56-55-3	8270D	0.060	J	0.20	0.040	ug/L	1
Benzo(a)pyrene	50-32-8	8270D	ND		0.20	0.070	ug/L	1
Benzo(b)fluoranthene	205-99-2	8270D	0.19	J	0.20	0.040	ug/L	1
Benzo(g,h,i)perylene	191-24-2	8270D	0.054	J	0.20	0.040	ug/L	1
Benzo(k)fluoranthene	207-08-9	8270D	0.062	J	0.20	0.040	ug/L	1
Butyl benzyl phthalate	85-68-7	8270D	ND		0.80	0.50	ug/L	1
Caprolactam	105-60-2	8270D	ND		1.6	1.0	ug/L	1
Carbazole	86-74-8	8270D	ND		0.80	0.50	ug/L	1
4-Chloro-3-methyl phenol	59-50-7	8270D	ND		0.80	0.50	ug/L	1
bis(2-Chloroethyl)ether	111-44-4	8270D	ND		0.80	0.50	ug/L	1
2-Chloronaphthalene	91-58-7	8270D	ND		0.80	0.50	ug/L	1
2-Chlorophenol	95-57-8	8270D	ND		0.80	0.50	ug/L	1
Chrysene	218-01-9	8270D	0.055	J	0.20	0.030	ug/L	1
Dibenzo(a,h)anthracene	53-70-3	8270D	ND		0.20	0.030	ug/L	1
Dibenzofuran	132-64-9	8270D	ND		0.80	0.50	ug/L	1
3,3'-Dichlorobenzidine	91-94-1	8270D	ND		4.0	1.8	ug/L	1
2,4-Dichlorophenol	120-83-2	8270D	ND		1.6	1.0	ug/L	1
Diethylphthalate	84-66-2	8270D	ND		0.80	0.50	ug/L	1
Dimethyl phthalate	131-11-3	8270D	ND		0.80	0.50	ug/L	1
2,4-Dimethylphenol	105-67-9	8270D	ND		0.80	0.48	ug/L	1
Di-n-butyl phthalate	84-74-2	8270D	ND		0.80	0.50	ug/L	1
4,6-Dinitro-2-methylphenol	534-52-1	8270D	ND		4.0	1.0	ug/L	1
2,4-Dinitrotoluene	121-14-2	8270D	ND		1.6	0.50	ug/L	1
Di-n-octylphthalate	117-84-0	8270D	ND		0.80	0.50	ug/L	1
1,2-Diphenylhydrazine(as azobenzene)	103-33-3	8270D	ND		0.80	0.50	ug/L	1
bis(2-Ethylhexyl)phthalate	117-81-7	8270D	1.1	J	4.0	0.50	ug/L	1
Fluoranthene	206-44-0	8270D	ND		0.20	0.10	ug/L	1
Fluorene	86-73-7	8270D	ND		0.20	0.030	ug/L	1
Hexachlorobenzene	118-74-1	8270D	ND		0.80	0.50	ug/L	1
Hexachlorobutadiene	87-68-3	8270D	ND		0.80	0.50	ug/L	1
Hexachlorocyclopentadiene	77-47-4	8270D	ND		4.0	2.0	ug/L	1
Hexachloroethane	67-72-1	8270D	ND		0.80	0.31	ug/L	1
Indeno(1,2,3-c,d)pyrene	193-39-5	8270D	0.058	J	0.20	0.040	ug/L	1
Isophorone	78-59-1	8270D	ND		0.80	0.50	ug/L	1
2-Methylnaphthalene	91-57-6	8270D	ND		0.20	0.040	ug/L	1
2-Methylphenol	95-48-7	8270D	ND		0.80	0.21	ug/L	1
3+4-Methylphenol	106-44-5	8270D	ND		1.6	1.5	ug/L	1
Naphthalene	91-20-3	8270D	ND		0.20	0.050	ug/L	1

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%

Semivolatile Organic Compounds by GC/MS

Client: GZA GeoEnvironmental, Inc.
Laboratory ID: UC23028-002
Description: HS-MW-7S DUP
Matrix: Aqueous
Date Sampled: 03/21/2019 1110
Date Received: 03/23/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	3520C	8270D	1	04/03/2019 1915	SCD	03/25/2019 1939	11166

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
Nitrobenzene	98-95-3	8270D	ND		0.80	0.55	ug/L	1
2-Nitrophenol	88-75-5	8270D	ND		1.6	1.0	ug/L	1
N-Nitrosodi-n-propylamine	621-64-7	8270D	ND		0.80	0.50	ug/L	1
N-Nitrosodiphenylamine (Diphenylamine)	86-30-6	8270D	ND		0.80	0.50	ug/L	1
Pentachlorophenol	87-86-5	8270D	ND		4.0	2.0	ug/L	1
Phenanthrene	85-01-8	8270D	ND		0.20	0.060	ug/L	1
Phenol	108-95-2	8270D	ND		0.80	0.50	ug/L	1
Pyrene	129-00-0	8270D	0.10	J	0.20	0.10	ug/L	1
2,4,5-Trichlorophenol	95-95-4	8270D	ND		0.80	0.50	ug/L	1
2,4,6-Trichlorophenol	88-06-2	8270D	ND		0.80	0.50	ug/L	1

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
2-Fluorobiphenyl		52	37-129
2-Fluorophenol		32	24-127
Nitrobenzene-d5		67	38-127
Phenol-d5		46	28-128
Terphenyl-d14		88	10-148
2,4,6-Tribromophenol		52	35-144

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%

CVAA

Client: GZA GeoEnvironmental, Inc.	Laboratory ID: UC23028-002
Description: HS-MW-7S DUP	Matrix: Aqueous
Date Sampled: 03/21/2019 1110	
Date Received: 03/23/2019	

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1		7470A	1	04/01/2019 1908	JMH	04/01/2019 1354	11839

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
Mercury	7439-97-6	7470A	ND		0.00020	0.000091	mg/L	1

LOQ = Limit of Quantitation
B = Detected in the method blank
E = Quantitation of compound exceeded the calibration range
ND = Not detected at or above the LOQ
N = Recovery is out of criteria
P = The RPD between two GC columns exceeds 40%
H = Out of holding time
W = Reported on wet weight basis

ICP-MS

Client: GZA GeoEnvironmental, Inc.
Laboratory ID: UC23028-002
Description: HS-MW-7S DUP
Matrix: Aqueous
Date Sampled: 03/21/2019 1110
Date Received: 03/23/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	200.2	200.8	1	03/30/2019 2329	BNW	03/27/2019 1908	11443
2	200.2	200.8	1	04/03/2019 1747	BNW	03/27/2019 1908	11443

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
Aluminum	7429-90-5	200.8	16	J	40	10	ug/L	1
Antimony	7440-36-0	200.8	ND		2.0	0.50	ug/L	1
Arsenic	7440-38-2	200.8	ND		2.0	1.3	ug/L	1
Barium	7440-39-3	200.8	58		5.0	1.3	ug/L	1
Beryllium	7440-41-7	200.8	ND		0.40	0.15	ug/L	1
Boron	7440-42-8	200.8	14	BJ	50	6.3	ug/L	1
Cadmium	7440-43-9	200.8	ND		0.50	0.13	ug/L	1
Chromium	7440-47-3	200.8	ND		5.0	1.3	ug/L	1
Cobalt	7440-48-4	200.8	ND		5.0	1.3	ug/L	1
Copper	7440-50-8	200.8	ND		5.0	1.3	ug/L	1
Iron	7439-89-6	200.8	400		50	13	ug/L	2
Lead	7439-92-1	200.8	ND		1.0	0.25	ug/L	1
Magnesium	7439-95-4	200.8	36000		400	50	ug/L	1
Molybdenum	7439-98-7	200.8	ND		10	2.5	ug/L	1
Nickel	7440-02-0	200.8	1.4	J	5.0	1.3	ug/L	1
Selenium	7782-49-2	200.8	ND		5.0	1.3	ug/L	1
Silver	7440-22-4	200.8	ND		1.0	0.25	ug/L	1
Sodium	7440-23-5	200.8	7100		400	150	ug/L	1
Thallium	7440-28-0	200.8	ND		0.50	0.15	ug/L	1
Titanium	7440-32-6	200.8	2.7	J	5.0	1.3	ug/L	1
Vanadium	7440-62-2	200.8	ND		5.0	2.5	ug/L	1
Zinc	7440-66-6	200.8	5.4	J	10	2.5	ug/L	1

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%

PFAS by LC/MS/MS

Client: GZA GeoEnvironmental, Inc.

Laboratory ID: UC23028-002

Description: HS-MW-7S DUP

Matrix: Aqueous

Date Sampled: 03/21/2019 1110

Date Received: 03/23/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	537 MOD	537 Modified-ID	1	04/03/2019 1416	SES	04/01/2019 1155	11828

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	Units	Run
1H, 1H, 2H, 2H-perfluorodecane sulfonic acid (8:2 FTS)	39108-34-4	537 Modified-	ND		3.5	ng/L	1
1H, 1H, 2H, 2H-perfluorooctane sulfonic acid (6:2 FTS)	27619-97-2	537 Modified-	ND		3.5	ng/L	1
N-ethylperfluoro-1-octanesulfonamide (EtFOSA)	4151-50-2	537 Modified-	ND		3.5	ng/L	1
N-methylperfluoro-1-octanesulfonamide (MeFOSA)	31506-32-8	537 Modified-	ND		7.0	ng/L	1
Perfluoro-1-butanesulfonic acid (PFBS)	375-73-5	537 Modified-	5.3		3.5	ng/L	1
Perfluoro-1-decanesulfonic acid (PFDS)	335-77-3	537 Modified-	ND		3.5	ng/L	1
Perfluoro-1-heptanesulfonic acid (PFHpS)	375-92-8	537 Modified-	ND		3.5	ng/L	1
Perfluoro-1-nonanesulfonic acid (PFNS)	68259-12-1	537 Modified-	ND		7.0	ng/L	1
Perfluoro-1-octanesulfonamide (PFOSA)	754-91-6	537 Modified-	ND		3.5	ng/L	1
Perfluoro-1-pentanesulfonic acid (PFPeS)	2706-91-4	537 Modified-	ND		3.5	ng/L	1
Perfluorohexanesulfonic acid (PFHxS)	355-46-4	537 Modified-	9.9		3.5	ng/L	1
Perfluoro-n-butanoic acid (PFBA)	375-22-4	537 Modified-	ND		3.5	ng/L	1
Perfluoro-n-decanoic acid (PFDA)	335-76-2	537 Modified-	ND		3.5	ng/L	1
Perfluoro-n-dodecanoic acid (PFDoA)	307-55-1	537 Modified-	ND		3.5	ng/L	1
Perfluoro-n-heptanoic acid (PFHpA)	375-85-9	537 Modified-	ND		3.5	ng/L	1
Perfluoro-n-hexanoic acid (PFHxA)	307-24-4	537 Modified-	ND		3.5	ng/L	1
Perfluoro-n-nonanoic acid (PFNA)	375-95-1	537 Modified-	ND		3.5	ng/L	1
Perfluoro-n-octanoic acid (PFOA)	335-67-1	537 Modified-	3.0		1.8	ng/L	1
Perfluoro-n-pentanoic acid (PFPeA)	2706-90-3	537 Modified-	ND		3.5	ng/L	1
Perfluoro-n-tetradecanoic acid (PFTeDA)	376-06-7	537 Modified-	ND		3.5	ng/L	1
Perfluoro-n-tridecanoic acid (PFTrDA)	72629-94-8	537 Modified-	ND		3.5	ng/L	1
Perfluoro-n-undecanoic acid (PFUdA)	2058-94-8	537 Modified-	ND		3.5	ng/L	1
Perfluorooctanesulfonic acid (PFOS)	1763-23-1	537 Modified-	ND		3.5	ng/L	1

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
13C2_6:2FTS		149	50-150
13C2_8:2FTS		125	50-150
13C2_PFDoA		132	50-150
13C2_PFTeDA		124	50-150
13C3_PFBS		127	50-150
13C3_PFHxS		127	50-150
13C4_PFBA		126	50-150
13C4_PFHpA		131	50-150
13C5_PFHxA		132	50-150
13C5_PFPeA		128	50-150
13C6_PFDA		131	50-150
13C7_PFUdA		123	50-150
13C8_PFOA		133	50-150
13C8_PFOS		134	50-150
13C8_PFOSA		120	50-150
13C9_PFNA		136	50-150
d-EtFOSA		88	50-150
d-MeFOSA		81	50-150

LOQ = Limit of Quantitation
B = Detected in the method blank
E = Quantitation of compound exceeded the calibration range
ND = Not detected at or above the LOQ
N = Recovery is out of criteria
P = The RPD between two GC columns exceeds 40%
H = Out of holding time
W = Reported on wet weight basis

Inorganic non-metals

Client: GZA GeoEnvironmental, Inc.
Laboratory ID: UC23028-003
Description: HS-MW-8
Matrix: Aqueous
Date Sampled: 03/21/2019 1400
Date Received: 03/23/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
2	350.1	(Ammonia - N) 350.1	1	04/01/2019 1645	DMA		11903
1		(Chloride) 300.0	1	04/05/2019 1830	SLU		12587
1	10-204-00-1-X	(Cyanide - To) SM 4500-CN E-	1	03/29/2019 1901	MSG	03/29/2019 1632	11698
1		(Hardness (to) SM 2340C-2011	1	03/27/2019 1719	KFE		11494
1		(Nitrate-Nitr) 353.2	1	03/23/2019 1721	MDD		11110
1		(Phosphorus) 365.1	1	04/02/2019 1346	DMA	04/01/2019 1007	11825
1		(Sulfate) 300.0	1	04/05/2019 1830	SLU		12589
1		(Sulfide) SM 4500-S2 F-2011	1	03/27/2019 1542	HET		11466

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
Ammonia - N (gas diffusion)		350.1	ND		0.10	0.020	mg/L	2
Chloride		300.0	29		1.0	0.20	mg/L	1
Cyanide - Total	57-12-5	SM 4500-CN E-	ND		0.010	0.010	mg/L	1
Hardness (total)		SM 2340C-	220		10	2.0	mg/L	1
Nitrate-Nitrite - N		353.2	1.3	B	0.020	0.0015	mg/L	1
Phosphorus	7723-14-0	365.1	0.010	J	0.050	0.0050	mg/L	1
Sulfate		300.0	11		1.0	0.20	mg/L	1
Sulfide	18496-25-8	SM 4500-S2 F-	ND		1.0	1.0	mg/L	1

LOQ = Limit of Quantitation
B = Detected in the method blank
E = Quantitation of compound exceeded the calibration range
ND = Not detected at or above the LOQ
N = Recovery is out of criteria
P = The RPD between two GC columns exceeds 40%
H = Out of holding time
W = Reported on wet weight basis

Volatile Organic Compounds by GC/MS

Client: GZA GeoEnvironmental, Inc.
Laboratory ID: UC23028-003
Description: HS-MW-8
Matrix: Aqueous
Date Sampled: 03/21/2019 1400
Date Received: 03/23/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	5030B	8260B	1	04/02/2019 1447	BWS		12007

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
Acetone	67-64-1	8260B	2.2	J	20	2.0	ug/L	1
Benzene	71-43-2	8260B	ND		1.0	0.40	ug/L	1
Bromodichloromethane	75-27-4	8260B	ND		1.0	0.40	ug/L	1
Bromoform	75-25-2	8260B	ND		1.0	0.40	ug/L	1
Bromomethane (Methyl bromide)	74-83-9	8260B	ND		2.0	0.40	ug/L	1
2-Butanone (MEK)	78-93-3	8260B	ND		10	2.0	ug/L	1
Carbon disulfide	75-15-0	8260B	ND		1.0	0.40	ug/L	1
Carbon tetrachloride	56-23-5	8260B	ND		1.0	0.40	ug/L	1
Chlorobenzene	108-90-7	8260B	ND		1.0	0.40	ug/L	1
Chloroethane	75-00-3	8260B	ND		2.0	0.40	ug/L	1
Chloroform	67-66-3	8260B	ND		1.0	0.40	ug/L	1
Chloromethane (Methyl chloride)	74-87-3	8260B	ND		1.0	0.50	ug/L	1
Cyclohexane	110-82-7	8260B	ND		1.0	0.40	ug/L	1
1,2-Dibromo-3-chloropropane (DBCP)	96-12-8	8260B	ND		1.0	0.40	ug/L	1
Dibromochloromethane	124-48-1	8260B	ND		1.0	0.40	ug/L	1
1,2-Dibromoethane (EDB)	106-93-4	8260B	ND		1.0	0.40	ug/L	1
1,2-Dichlorobenzene	95-50-1	8260B	ND		1.0	0.40	ug/L	1
1,3-Dichlorobenzene	541-73-1	8260B	ND		1.0	0.40	ug/L	1
1,4-Dichlorobenzene	106-46-7	8260B	ND		1.0	0.40	ug/L	1
Dichlorodifluoromethane	75-71-8	8260B	ND		2.0	0.60	ug/L	1
1,1-Dichloroethane	75-34-3	8260B	ND		1.0	0.40	ug/L	1
1,2-Dichloroethane	107-06-2	8260B	ND		1.0	0.40	ug/L	1
1,1-Dichloroethene	75-35-4	8260B	ND		1.0	0.40	ug/L	1
cis-1,2-Dichloroethene	156-59-2	8260B	ND		1.0	0.40	ug/L	1
trans-1,2-Dichloroethene	156-60-5	8260B	ND		1.0	0.40	ug/L	1
1,2-Dichloropropane	78-87-5	8260B	ND		1.0	0.40	ug/L	1
cis-1,3-Dichloropropene	10061-01-5	8260B	ND		1.0	0.40	ug/L	1
trans-1,3-Dichloropropene	10061-02-6	8260B	ND		1.0	0.40	ug/L	1
Ethylbenzene	100-41-4	8260B	ND		1.0	0.40	ug/L	1
2-Hexanone	591-78-6	8260B	ND		10	2.0	ug/L	1
Isopropylbenzene	98-82-8	8260B	ND		1.0	0.40	ug/L	1
Methyl acetate	79-20-9	8260B	ND		1.0	0.40	ug/L	1
Methyl tertiary butyl ether (MTBE)	1634-04-4	8260B	ND		1.0	0.40	ug/L	1
4-Methyl-2-pentanone	108-10-1	8260B	ND		10	2.0	ug/L	1
Methylcyclohexane	108-87-2	8260B	ND		5.0	0.40	ug/L	1
Methylene chloride	75-09-2	8260B	ND		1.0	0.40	ug/L	1
Styrene	100-42-5	8260B	ND		1.0	0.41	ug/L	1
1,1,2,2-Tetrachloroethane	79-34-5	8260B	ND		1.0	0.40	ug/L	1
Tetrachloroethene	127-18-4	8260B	ND		1.0	0.40	ug/L	1
Toluene	108-88-3	8260B	ND		1.0	0.40	ug/L	1
1,1,2-Trichloro-1,2,2-Trifluoroethane	76-13-1	8260B	ND		1.0	0.42	ug/L	1
1,2,4-Trichlorobenzene	120-82-1	8260B	ND		1.0	0.40	ug/L	1
1,1,1-Trichloroethane	71-55-6	8260B	ND		1.0	0.40	ug/L	1
1,1,2-Trichloroethane	79-00-5	8260B	ND		1.0	0.40	ug/L	1

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%

Volatile Organic Compounds by GC/MS

Client: GZA GeoEnvironmental, Inc.
Laboratory ID: UC23028-003
Description: HS-MW-8
Matrix: Aqueous
Date Sampled: 03/21/2019 1400
Date Received: 03/23/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	5030B	8260B	1	04/02/2019 1447	BWS		12007

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
Trichloroethene	79-01-6	8260B	ND		1.0	0.40	ug/L	1
Trichlorofluoromethane	75-69-4	8260B	ND		1.0	0.40	ug/L	1
Vinyl chloride	75-01-4	8260B	ND		1.0	0.40	ug/L	1
Xylenes (total)	1330-20-7	8260B	ND		1.0	0.40	ug/L	1
m+p - Xylenes	179601-23-1	8260B	ND		1.0	0.40	ug/L	1
o - Xylenes	95-47-6	8260B	ND		1.0	0.40	ug/L	1

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
1,2-Dichloroethane-d4		94	70-130
Bromofluorobenzene		96	70-130
Toluene-d8		94	70-130

Semivolatile Organic Compounds by GC/MS

Client: GZA GeoEnvironmental, Inc.
Laboratory ID: UC23028-003
Description: HS-MW-8
Matrix: Aqueous
Date Sampled: 03/21/2019 1400
Date Received: 03/23/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	3520C	8270D	1	04/03/2019 1940	SCD	03/25/2019 1939	11166

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
Acenaphthene	83-32-9	8270D	ND		0.20	0.040	ug/L	1
Acenaphthylene	208-96-8	8270D	ND		0.20	0.040	ug/L	1
Acetophenone	98-86-2	8270D	ND		0.80	0.50	ug/L	1
Anthracene	120-12-7	8270D	ND		0.20	0.060	ug/L	1
Atrazine	1912-24-9	8270D	ND		0.80	0.50	ug/L	1
Benzidine	92-87-5	8270D	ND		20	1.0	ug/L	1
Benzo(a)anthracene	56-55-3	8270D	ND		0.20	0.040	ug/L	1
Benzo(a)pyrene	50-32-8	8270D	ND		0.20	0.070	ug/L	1
Benzo(b)fluoranthene	205-99-2	8270D	ND		0.20	0.040	ug/L	1
Benzo(g,h,i)perylene	191-24-2	8270D	ND		0.20	0.040	ug/L	1
Benzo(k)fluoranthene	207-08-9	8270D	ND		0.20	0.040	ug/L	1
Butyl benzyl phthalate	85-68-7	8270D	ND		0.80	0.50	ug/L	1
Caprolactam	105-60-2	8270D	ND		1.6	1.0	ug/L	1
Carbazole	86-74-8	8270D	ND		0.80	0.50	ug/L	1
4-Chloro-3-methyl phenol	59-50-7	8270D	ND		0.80	0.50	ug/L	1
bis(2-Chloroethyl)ether	111-44-4	8270D	ND		0.80	0.50	ug/L	1
2-Chloronaphthalene	91-58-7	8270D	ND		0.80	0.50	ug/L	1
2-Chlorophenol	95-57-8	8270D	ND		0.80	0.50	ug/L	1
Chrysene	218-01-9	8270D	ND		0.20	0.030	ug/L	1
Dibenzo(a,h)anthracene	53-70-3	8270D	ND		0.20	0.030	ug/L	1
Dibenzofuran	132-64-9	8270D	ND		0.80	0.50	ug/L	1
3,3'-Dichlorobenzidine	91-94-1	8270D	ND		4.0	1.8	ug/L	1
2,4-Dichlorophenol	120-83-2	8270D	ND		1.6	1.0	ug/L	1
Diethylphthalate	84-66-2	8270D	ND		0.80	0.50	ug/L	1
Dimethyl phthalate	131-11-3	8270D	ND		0.80	0.50	ug/L	1
2,4-Dimethylphenol	105-67-9	8270D	ND		0.80	0.48	ug/L	1
Di-n-butyl phthalate	84-74-2	8270D	ND		0.80	0.50	ug/L	1
4,6-Dinitro-2-methylphenol	534-52-1	8270D	ND		4.0	1.0	ug/L	1
2,4-Dinitrotoluene	121-14-2	8270D	ND		1.6	0.50	ug/L	1
Di-n-octylphthalate	117-84-0	8270D	ND		0.80	0.50	ug/L	1
1,2-Diphenylhydrazine(as azobenzene)	103-33-3	8270D	ND		0.80	0.50	ug/L	1
bis(2-Ethylhexyl)phthalate	117-81-7	8270D	ND		4.0	0.50	ug/L	1
Fluoranthene	206-44-0	8270D	ND		0.20	0.10	ug/L	1
Fluorene	86-73-7	8270D	ND		0.20	0.030	ug/L	1
Hexachlorobenzene	118-74-1	8270D	ND		0.80	0.50	ug/L	1
Hexachlorobutadiene	87-68-3	8270D	ND		0.80	0.50	ug/L	1
Hexachlorocyclopentadiene	77-47-4	8270D	ND		4.0	2.0	ug/L	1
Hexachloroethane	67-72-1	8270D	ND		0.80	0.31	ug/L	1
Indeno(1,2,3-c,d)pyrene	193-39-5	8270D	ND		0.20	0.040	ug/L	1
Isophorone	78-59-1	8270D	ND		0.80	0.50	ug/L	1
2-Methylnaphthalene	91-57-6	8270D	ND		0.20	0.040	ug/L	1
2-Methylphenol	95-48-7	8270D	ND		0.80	0.21	ug/L	1
3+4-Methylphenol	106-44-5	8270D	ND		1.6	1.5	ug/L	1
Naphthalene	91-20-3	8270D	ND		0.20	0.050	ug/L	1

LOQ = Limit of Quantitation	B = Detected in the method blank	E = Quantitation of compound exceeded the calibration range
ND = Not detected at or above the LOQ	N = Recovery is out of criteria	P = The RPD between two GC columns exceeds 40%
H = Out of holding time	W = Reported on wet weight basis	

Semivolatile Organic Compounds by GC/MS

Client: GZA GeoEnvironmental, Inc.	Laboratory ID: UC23028-003
Description: HS-MW-8	Matrix: Aqueous
Date Sampled: 03/21/2019 1400	
Date Received: 03/23/2019	

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	3520C	8270D	1	04/03/2019 1940	SCD	03/25/2019 1939	11166

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
Nitrobenzene	98-95-3	8270D	ND		0.80	0.55	ug/L	1
2-Nitrophenol	88-75-5	8270D	ND		1.6	1.0	ug/L	1
N-Nitrosodi-n-propylamine	621-64-7	8270D	ND		0.80	0.50	ug/L	1
N-Nitrosodiphenylamine (Diphenylamine)	86-30-6	8270D	ND		0.80	0.50	ug/L	1
Pentachlorophenol	87-86-5	8270D	ND		4.0	2.0	ug/L	1
Phenanthrene	85-01-8	8270D	ND		0.20	0.060	ug/L	1
Phenol	108-95-2	8270D	ND		0.80	0.50	ug/L	1
Pyrene	129-00-0	8270D	ND		0.20	0.10	ug/L	1
2,4,5-Trichlorophenol	95-95-4	8270D	ND		0.80	0.50	ug/L	1
2,4,6-Trichlorophenol	88-06-2	8270D	ND		0.80	0.50	ug/L	1

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
2-Fluorobiphenyl		60	37-129
2-Fluorophenol		39	24-127
Nitrobenzene-d5		77	38-127
Phenol-d5		55	28-128
Terphenyl-d14		101	10-148
2,4,6-Tribromophenol		65	35-144

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%

CVAA

Client: GZA GeoEnvironmental, Inc.

Laboratory ID: UC23028-003

Description: HS-MW-8

Matrix: Aqueous

Date Sampled: 03/21/2019 1400

Date Received: 03/23/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1		7470A	1	04/01/2019 1911	JMH	04/01/2019 1354	11839

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
Mercury	7439-97-6	7470A	ND		0.00020	0.000091	mg/L	1

LOQ = Limit of Quantitation	B = Detected in the method blank	E = Quantitation of compound exceeded the calibration range
ND = Not detected at or above the LOQ	N = Recovery is out of criteria	P = The RPD between two GC columns exceeds 40%
H = Out of holding time	W = Reported on wet weight basis	

ICP-MS

Client: GZA GeoEnvironmental, Inc.
Laboratory ID: UC23028-003
Description: HS-MW-8
Matrix: Aqueous
Date Sampled: 03/21/2019 1400
Date Received: 03/23/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	200.2	200.8	1	03/30/2019 2341	BNW	03/27/2019 1908	11443
2	200.2	200.8	1	04/03/2019 1759	BNW	03/27/2019 1908	11443

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
Aluminum	7429-90-5	200.8	ND		40	10	ug/L	1
Antimony	7440-36-0	200.8	ND		2.0	0.50	ug/L	1
Arsenic	7440-38-2	200.8	ND		2.0	1.3	ug/L	1
Barium	7440-39-3	200.8	14		5.0	1.3	ug/L	1
Beryllium	7440-41-7	200.8	ND		0.40	0.15	ug/L	1
Boron	7440-42-8	200.8	23	BJ	50	6.3	ug/L	1
Cadmium	7440-43-9	200.8	ND		0.50	0.13	ug/L	1
Chromium	7440-47-3	200.8	ND		5.0	1.3	ug/L	1
Cobalt	7440-48-4	200.8	ND		5.0	1.3	ug/L	1
Copper	7440-50-8	200.8	ND		5.0	1.3	ug/L	1
Iron	7439-89-6	200.8	220		50	13	ug/L	2
Lead	7439-92-1	200.8	ND		1.0	0.25	ug/L	1
Magnesium	7439-95-4	200.8	17000		400	50	ug/L	1
Molybdenum	7439-98-7	200.8	ND		10	2.5	ug/L	1
Nickel	7440-02-0	200.8	ND		5.0	1.3	ug/L	1
Selenium	7782-49-2	200.8	ND		5.0	1.3	ug/L	1
Silver	7440-22-4	200.8	ND		1.0	0.25	ug/L	1
Sodium	7440-23-5	200.8	9000		400	150	ug/L	1
Thallium	7440-28-0	200.8	ND		0.50	0.15	ug/L	1
Titanium	7440-32-6	200.8	1.6	J	5.0	1.3	ug/L	1
Vanadium	7440-62-2	200.8	ND		5.0	2.5	ug/L	1
Zinc	7440-66-6	200.8	ND		10	2.5	ug/L	1

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%

PFAS by LC/MS/MS

Client: GZA GeoEnvironmental, Inc.
Laboratory ID: UC23028-003
Description: HS-MW-8
Matrix: Aqueous
Date Sampled: 03/21/2019 1400
Date Received: 03/23/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	537 MOD	537 Modified-ID	1	04/03/2019 1428	SES	04/01/2019 1155	11828

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	Units	Run
1H, 1H, 2H, 2H-perfluorodecane sulfonic acid (8:2 FTS)	39108-34-4	537 Modified-	ND		3.6	ng/L	1
1H, 1H, 2H, 2H-perfluorooctane sulfonic acid (6:2 FTS)	27619-97-2	537 Modified-	ND		3.6	ng/L	1
N-ethylperfluoro-1-octanesulfonamide (EtFOSA)	4151-50-2	537 Modified-	ND		3.6	ng/L	1
N-methylperfluoro-1-octanesulfonamide (MeFOSA)	31506-32-8	537 Modified-	ND		7.2	ng/L	1
Perfluoro-1-butanesulfonic acid (PFBS)	375-73-5	537 Modified-	26		3.6	ng/L	1
Perfluoro-1-decanesulfonic acid (PFDS)	335-77-3	537 Modified-	ND		3.6	ng/L	1
Perfluoro-1-heptanesulfonic acid (PFHpS)	375-92-8	537 Modified-	78		3.6	ng/L	1
Perfluoro-1-nonanesulfonic acid (PFNS)	68259-12-1	537 Modified-	ND		7.2	ng/L	1
Perfluoro-1-octanesulfonamide (PFOSA)	754-91-6	537 Modified-	ND		3.6	ng/L	1
Perfluoro-1-pentanesulfonic acid (PFPeS)	2706-91-4	537 Modified-	44		3.6	ng/L	1
Perfluorohexanesulfonic acid (PFHxS)	355-46-4	537 Modified-	150		3.6	ng/L	1
Perfluoro-n-butanoic acid (PFBA)	375-22-4	537 Modified-	6.6		3.6	ng/L	1
Perfluoro-n-decanoic acid (PFDA)	335-76-2	537 Modified-	ND		3.6	ng/L	1
Perfluoro-n-dodecanoic acid (PFDoA)	307-55-1	537 Modified-	ND		3.6	ng/L	1
Perfluoro-n-heptanoic acid (PFHpA)	375-85-9	537 Modified-	37		3.6	ng/L	1
Perfluoro-n-hexanoic acid (PFHxA)	307-24-4	537 Modified-	16		3.6	ng/L	1
Perfluoro-n-nonanoic acid (PFNA)	375-95-1	537 Modified-	ND		3.6	ng/L	1
Perfluoro-n-octanoic acid (PFOA)	335-67-1	537 Modified-	380		1.8	ng/L	1
Perfluoro-n-pentanoic acid (PFPeA)	2706-90-3	537 Modified-	5.5		3.6	ng/L	1
Perfluoro-n-tetradecanoic acid (PFTeDA)	376-06-7	537 Modified-	ND		3.6	ng/L	1
Perfluoro-n-tridecanoic acid (PFTrDA)	72629-94-8	537 Modified-	ND		3.6	ng/L	1
Perfluoro-n-undecanoic acid (PFUdA)	2058-94-8	537 Modified-	ND		3.6	ng/L	1
Perfluorooctanesulfonic acid (PFOS)	1763-23-1	537 Modified-	140		3.6	ng/L	1

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
13C2_6:2FTS		143	50-150
13C2_8:2FTS		129	50-150
13C2_PFDoA		125	50-150
13C2_PFTeDA		120	50-150
13C3_PFBS		127	50-150
13C3_PFHxS		123	50-150
13C4_PFBA		123	50-150
13C4_PFHpA		124	50-150
13C5_PFHxA		135	50-150
13C5_PFPeA		125	50-150
13C6_PFDA		125	50-150
13C7_PFUdA		117	50-150
13C8_PFOA		128	50-150
13C8_PFOS		129	50-150
13C8_PFOSA		118	50-150
13C9_PFNA		135	50-150
d-EtFOSA		86	50-150
d-MeFOSA		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%

PFAS by LC/MS/MS

Client: GZA GeoEnvironmental, Inc.
Laboratory ID: UC23028-004
Description: EB-32019-SS
Matrix: Aqueous
Date Sampled: 03/21/2019 1000
Date Received: 03/23/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	537 MOD	537 Modified-ID	1	04/03/2019 1506	SES	04/01/2019 1155	11828

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	Units	Run
1H, 1H, 2H, 2H-perfluorodecane sulfonic acid (8:2 FTS)	39108-34-4	537 Modified-	ND		3.9	ng/L	1
1H, 1H, 2H, 2H-perfluorooctane sulfonic acid (6:2 FTS)	27619-97-2	537 Modified-	ND		3.9	ng/L	1
N-ethylperfluoro-1-octanesulfonamide (EtFOSA)	4151-50-2	537 Modified-	ND		3.9	ng/L	1
N-methylperfluoro-1-octanesulfonamide (MeFOSA)	31506-32-8	537 Modified-	ND		7.8	ng/L	1
Perfluoro-1-butanesulfonic acid (PFBS)	375-73-5	537 Modified-	ND		3.9	ng/L	1
Perfluoro-1-decanesulfonic acid (PFDS)	335-77-3	537 Modified-	ND		3.9	ng/L	1
Perfluoro-1-heptanesulfonic acid (PFHpS)	375-92-8	537 Modified-	ND		3.9	ng/L	1
Perfluoro-1-nonanesulfonic acid (PFNS)	68259-12-1	537 Modified-	ND		7.8	ng/L	1
Perfluoro-1-octanesulfonamide (PFOSA)	754-91-6	537 Modified-	ND		3.9	ng/L	1
Perfluoro-1-pentanesulfonic acid (PFPeS)	2706-91-4	537 Modified-	ND		3.9	ng/L	1
Perfluorohexanesulfonic acid (PFHxS)	355-46-4	537 Modified-	ND		3.9	ng/L	1
Perfluoro-n-butanoic acid (PFBA)	375-22-4	537 Modified-	ND		3.9	ng/L	1
Perfluoro-n-decanoic acid (PFDA)	335-76-2	537 Modified-	ND		3.9	ng/L	1
Perfluoro-n-dodecanoic acid (PFDoA)	307-55-1	537 Modified-	ND		3.9	ng/L	1
Perfluoro-n-heptanoic acid (PFHpA)	375-85-9	537 Modified-	ND		3.9	ng/L	1
Perfluoro-n-hexanoic acid (PFHxA)	307-24-4	537 Modified-	ND		3.9	ng/L	1
Perfluoro-n-nonanoic acid (PFNA)	375-95-1	537 Modified-	ND		3.9	ng/L	1
Perfluoro-n-octanoic acid (PFOA)	335-67-1	537 Modified-	ND		1.9	ng/L	1
Perfluoro-n-pentanoic acid (PFPeA)	2706-90-3	537 Modified-	ND		3.9	ng/L	1
Perfluoro-n-tetradecanoic acid (PFTeDA)	376-06-7	537 Modified-	ND		3.9	ng/L	1
Perfluoro-n-tridecanoic acid (PFTrDA)	72629-94-8	537 Modified-	ND		3.9	ng/L	1
Perfluoro-n-undecanoic acid (PFUdA)	2058-94-8	537 Modified-	ND		3.9	ng/L	1
Perfluorooctanesulfonic acid (PFOS)	1763-23-1	537 Modified-	ND		3.9	ng/L	1

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
13C2_6:2FTS		149	50-150
13C2_8:2FTS	N	159	50-150
13C2_PFDoA		134	50-150
13C2_PFTeDA		115	50-150
13C3_PFBS		131	50-150
13C3_PFHxS		128	50-150
13C4_PFBA		133	50-150
13C4_PFHpA		135	50-150
13C5_PFHxA		137	50-150
13C5_PFPeA		128	50-150
13C6_PFDA		127	50-150
13C7_PFUdA		125	50-150
13C8_PFOA		136	50-150
13C8_PFOS		125	50-150
13C8_PFOSA		122	50-150
13C9_PFNA		137	50-150
d-EtFOSA		84	50-150
d-MeFOSA		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%

Volatile Organic Compounds by GC/MS

Client: GZA GeoEnvironmental, Inc.
Laboratory ID: UC23028-005
Description: Trip Blank
Matrix: Aqueous
Date Sampled: 03/21/2019 0800
Date Received: 03/23/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	5030B	8260B	1	04/02/2019 1228	BWS		12007

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
Acetone	67-64-1	8260B	5.9	J	20	2.0	ug/L	1
Benzene	71-43-2	8260B	ND		1.0	0.40	ug/L	1
Bromodichloromethane	75-27-4	8260B	ND		1.0	0.40	ug/L	1
Bromoform	75-25-2	8260B	ND		1.0	0.40	ug/L	1
Bromomethane (Methyl bromide)	74-83-9	8260B	ND		2.0	0.40	ug/L	1
2-Butanone (MEK)	78-93-3	8260B	ND		10	2.0	ug/L	1
Carbon disulfide	75-15-0	8260B	ND		1.0	0.40	ug/L	1
Carbon tetrachloride	56-23-5	8260B	ND		1.0	0.40	ug/L	1
Chlorobenzene	108-90-7	8260B	ND		1.0	0.40	ug/L	1
Chloroethane	75-00-3	8260B	ND		2.0	0.40	ug/L	1
Chloroform	67-66-3	8260B	ND		1.0	0.40	ug/L	1
Chloromethane (Methyl chloride)	74-87-3	8260B	ND		1.0	0.50	ug/L	1
Cyclohexane	110-82-7	8260B	ND		1.0	0.40	ug/L	1
1,2-Dibromo-3-chloropropane (DBCP)	96-12-8	8260B	ND		1.0	0.40	ug/L	1
Dibromochloromethane	124-48-1	8260B	ND		1.0	0.40	ug/L	1
1,2-Dibromoethane (EDB)	106-93-4	8260B	ND		1.0	0.40	ug/L	1
1,2-Dichlorobenzene	95-50-1	8260B	ND		1.0	0.40	ug/L	1
1,3-Dichlorobenzene	541-73-1	8260B	ND		1.0	0.40	ug/L	1
1,4-Dichlorobenzene	106-46-7	8260B	ND		1.0	0.40	ug/L	1
Dichlorodifluoromethane	75-71-8	8260B	ND		2.0	0.60	ug/L	1
1,1-Dichloroethane	75-34-3	8260B	ND		1.0	0.40	ug/L	1
1,2-Dichloroethane	107-06-2	8260B	ND		1.0	0.40	ug/L	1
1,1-Dichloroethene	75-35-4	8260B	ND		1.0	0.40	ug/L	1
cis-1,2-Dichloroethene	156-59-2	8260B	ND		1.0	0.40	ug/L	1
trans-1,2-Dichloroethene	156-60-5	8260B	ND		1.0	0.40	ug/L	1
1,2-Dichloropropane	78-87-5	8260B	ND		1.0	0.40	ug/L	1
cis-1,3-Dichloropropene	10061-01-5	8260B	ND		1.0	0.40	ug/L	1
trans-1,3-Dichloropropene	10061-02-6	8260B	ND		1.0	0.40	ug/L	1
Ethylbenzene	100-41-4	8260B	ND		1.0	0.40	ug/L	1
2-Hexanone	591-78-6	8260B	ND		10	2.0	ug/L	1
Isopropylbenzene	98-82-8	8260B	ND		1.0	0.40	ug/L	1
Methyl acetate	79-20-9	8260B	ND		1.0	0.40	ug/L	1
Methyl tertiary butyl ether (MTBE)	1634-04-4	8260B	ND		1.0	0.40	ug/L	1
4-Methyl-2-pentanone	108-10-1	8260B	ND		10	2.0	ug/L	1
Methylcyclohexane	108-87-2	8260B	ND		5.0	0.40	ug/L	1
Methylene chloride	75-09-2	8260B	ND		1.0	0.40	ug/L	1
Styrene	100-42-5	8260B	ND		1.0	0.41	ug/L	1
1,1,2,2-Tetrachloroethane	79-34-5	8260B	ND		1.0	0.40	ug/L	1
Tetrachloroethene	127-18-4	8260B	ND		1.0	0.40	ug/L	1
Toluene	108-88-3	8260B	ND		1.0	0.40	ug/L	1
1,1,2-Trichloro-1,2,2-Trifluoroethane	76-13-1	8260B	ND		1.0	0.42	ug/L	1
1,2,4-Trichlorobenzene	120-82-1	8260B	ND		1.0	0.40	ug/L	1
1,1,1-Trichloroethane	71-55-6	8260B	ND		1.0	0.40	ug/L	1
1,1,2-Trichloroethane	79-00-5	8260B	ND		1.0	0.40	ug/L	1

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%

Volatile Organic Compounds by GC/MS

Client: GZA GeoEnvironmental, Inc.
Laboratory ID: UC23028-005
Description: Trip Blank
Matrix: Aqueous
Date Sampled: 03/21/2019 0800
Date Received: 03/23/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	5030B	8260B	1	04/02/2019 1228	BWS		12007

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
Trichloroethene	79-01-6	8260B	ND		1.0	0.40	ug/L	1
Trichlorofluoromethane	75-69-4	8260B	ND		1.0	0.40	ug/L	1
Vinyl chloride	75-01-4	8260B	ND		1.0	0.40	ug/L	1
Xylenes (total)	1330-20-7	8260B	ND		1.0	0.40	ug/L	1
m+p - Xylenes	179601-23-1	8260B	ND		1.0	0.40	ug/L	1
o - Xylenes	95-47-6	8260B	ND		1.0	0.40	ug/L	1

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
1,2-Dichloroethane-d4		95	70-130
Bromofluorobenzene		101	70-130
Toluene-d8		96	70-130

LOQ = Limit of Quantitation
B = Detected in the method blank
E = Quantitation of compound exceeded the calibration range
ND = Not detected at or above the LOQ
N = Recovery is out of criteria
P = The RPD between two GC columns exceeds 40%
H = Out of holding time
W = Reported on wet weight basis

QC Summary

Inorganic non-metals - MB

Sample ID: UQ11110-001
Batch: 11110
Analytical Method: 353.2

Matrix: Aqueous

Parameter	Result	Q	Dil	LOQ	DL	Units	Analysis Date
Nitrate-Nitrite - N	0.0021	J	1	0.020	0.0015	mg/L	03/23/2019 1640

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the LOQ

N = Recovery is out of criteria
+ = RPD is out of criteria

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

Inorganic non-metals - LCS

Sample ID: UQ11110-002
Batch: 11110
Analytical Method: 353.2

Matrix: Aqueous

Parameter	Spike Amount (mg/L)	Result (mg/L)	Q	Dil	% Rec	% Rec Limit	Analysis Date
Nitrate-Nitrite - N	0.80	0.83		1	104	90-110	03/23/2019 1641

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

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

Inorganic non-metals - MB

Sample ID: UQ11466-001
Batch: 11466
Analytical Method: SM 4500-S2 F-2011

Matrix: Aqueous

Parameter	Result	Q	Dil	LOQ	DL	Units	Analysis Date
Sulfide	ND		1	1.0	1.0	mg/L	03/27/2019 1542

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the LOQ

N = Recovery is out of criteria
+ = RPD is out of criteria

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

Inorganic non-metals - LCS

Sample ID: UQ11466-002
Batch: 11466
Analytical Method: SM 4500-S2 F-2011

Matrix: Aqueous

Parameter	Spike Amount (mg/L)	Result (mg/L)	Q	Dil	% Rec	% Rec Limit	Analysis Date
Sulfide	10	9.8		1	98	80-120	03/27/2019 1542

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the LOQ

N = Recovery is out of criteria
+ = RPD is out of criteria

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

Inorganic non-metals - LCSD

Sample ID: UQ11466-003
Batch: 11466
Analytical Method: SM 4500-S2 F-2011

Matrix: Aqueous

Parameter	Spike Amount (mg/L)	Result (mg/L)	Q	Dil	% Rec	% RPD	% Rec Limit	% RPD Limit	Analysis Date
Sulfide	10	9.9		1	99	1.0	80-120	20	03/27/2019 1542

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the LOQ

N = Recovery is out of criteria
+ = RPD is out of criteria

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

Inorganic non-metals - MS

Sample ID: UC23028-003MS

Batch: 11466

Analytical Method: SM 4500-S2 F-2011

Matrix: Aqueous

Parameter	Sample Amount (mg/L)	Spike Amount (mg/L)	Result (mg/L)	Q	Dil	% Rec	% Rec Limit	Analysis Date
Sulfide	ND	10	10		1	105	70-130	03/27/2019 1542

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the LOQ

N = Recovery is out of criteria
+ = RPD is out of criteria

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

Inorganic non-metals - MB

Sample ID: UQ11494-001
Batch: 11494
Analytical Method: SM 2340C-2011

Matrix: Aqueous

Parameter	Result	Q	Dil	LOQ	DL	Units	Analysis Date
Hardness (total)	ND		1	10	2.0	mg/L	03/27/2019 1719

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the LOQ

N = Recovery is out of criteria
+ = RPD is out of criteria

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

Inorganic non-metals - LCS

Sample ID: UQ11494-002

Batch: 11494

Analytical Method: SM 2340C-2011

Matrix: Aqueous

Parameter	Spike Amount (mg/L)	Result (mg/L)	Q	Dil	% Rec	% Rec Limit	Analysis Date
Hardness (total)	100	110		1	110	90-110	03/27/2019 1719

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

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

Inorganic non-metals - MS

Sample ID: UC23028-003MS

Matrix: Aqueous

Batch: 11494

Analytical Method: SM 2340C-2011

Parameter	Sample Amount (mg/L)	Spike Amount (mg/L)	Result (mg/L)	Q	Dil	% Rec	% Rec Limit	Analysis Date
Hardness (total)	220	100	300		1	88	70-130	03/27/2019 1719

LOQ = Limit of Quantitation

P = The RPD between two GC columns exceeds 40%

N = Recovery is out of criteria

DL = Detection Limit

J = Estimated result < LOQ and ≥ DL

\+ = RPD is out of criteria

LOD = Limit of Detection

ND = Not detected at or above the LOQ

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

Inorganic non-metals - MSD

Sample ID: UC23028-003MD

Batch: 11494

Analytical Method: SM 2340C-2011

Matrix: Aqueous

Parameter	Sample Amount (mg/L)	Spike Amount (mg/L)	Result (mg/L)	Q	Dil	% Rec	% RPD	% Rec Limit	% RPD Limit	Analysis Date
Hardness (total)	220	100	310		1	96	2.6	70-130	20	03/27/2019 1719

LOQ = Limit of Quantitation

DL = Detection Limit

LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%

J = Estimated result < LOQ and ≥ DL

ND = Not detected at or above the LOQ

N = Recovery is out of criteria

\+ = RPD is out of criteria

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

Inorganic non-metals - MB

Sample ID:	UQ11531-001	Matrix:	Aqueous
Batch:	11531	Prep Method:	365.1
Analytical Method:	365.1	Prep Date:	03/28/2019 1218

Parameter	Result	Q	Dil	LOQ	DL	Units	Analysis Date
Phosphorus	ND		1	0.050	0.0050	mg/L	03/28/2019 1620

LOQ = Limit of Quantitation

DL = Detection Limit

LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%

J = Estimated result < LOQ and ≥ DL

ND = Not detected at or above the LOQ

N = Recovery is out of criteria

+ = RPD is out of criteria

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

Inorganic non-metals - LCS

Sample ID: UQ11531-002
Batch: 11531
Analytical Method: 365.1

Matrix: Aqueous
Prep Method: 365.1
Prep Date: 03/28/2019 1218

Parameter	Spike Amount (mg/L)	Result (mg/L)	Q	Dil	% Rec	% Rec Limit	Analysis Date
Phosphorus	0.25	0.23		1	93	90-110	03/28/2019 1625

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

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

Inorganic non-metals - MB

Sample ID: UQ11688-001
Batch: 11688
Analytical Method: 350.1

Matrix: Aqueous
Prep Method: 350.1

Parameter	Result	Q	Dil	LOQ	DL	Units	Analysis Date
Ammonia - N (gas diffusion)	0.025	J	1	0.10	0.020	mg/L	03/29/2019 1523

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the LOQ

N = Recovery is out of criteria
+ = RPD is out of criteria

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

Inorganic non-metals - LCS

Sample ID: UQ11688-002
Batch: 11688
Analytical Method: 350.1

Matrix: Aqueous
Prep Method: 350.1

Parameter	Spike Amount (mg/L)	Result (mg/L)	Q	Dil	% Rec	% Rec Limit	Analysis Date
Ammonia - N (gas diffusion)	1.0	1.1		1	106	90-110	03/29/2019 1525

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the LOQ

N = Recovery is out of criteria
+ = RPD is out of criteria

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

Inorganic non-metals - MB

Sample ID: UQ11698-001
Batch: 11698
Analytical Method: SM 4500-CN E-2011

Matrix: Aqueous
Prep Method: 10-204-00-1-X
Prep Date: 03/29/2019 1632

Parameter	Result	Q	Dil	LOQ	DL	Units	Analysis Date
Cyanide - Total	ND		1	0.010	0.010	mg/L	03/29/2019 1855

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the LOQ

N = Recovery is out of criteria
+ = RPD is out of criteria

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

Inorganic non-metals - LCS

Sample ID: UQ11698-002	Matrix: Aqueous
Batch: 11698	Prep Method: 10-204-00-1-X
Analytical Method: SM 4500-CN E-2011	Prep Date: 03/29/2019 1632

Parameter	Spike Amount (mg/L)	Result (mg/L)	Q	Dil	% Rec	% Rec Limit	Analysis Date
Cyanide - Total	0.10	0.11		1	105	90-110	03/29/2019 1856

LOQ = Limit of Quantitation

DL = Detection Limit

LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%

J = Estimated result < LOQ and ≥ DL

ND = Not detected at or above the LOQ

N = Recovery is out of criteria

+ = RPD is out of criteria

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

Inorganic non-metals - MS

Sample ID: UC23028-003MS
Batch: 11698
Analytical Method: SM 4500-CN E-2011

Matrix: Aqueous
Prep Method: 10-204-00-1-X
Prep Date: 03/29/2019 1632

Parameter	Sample Amount (mg/L)	Spike Amount (mg/L)	Result (mg/L)	Q	Dil	% Rec	% Rec Limit	Analysis Date
Cyanide - Total	ND	0.10	0.11	N	1	113	90-110	03/29/2019 1902

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the LOQ

N = Recovery is out of criteria
+ = RPD is out of criteria

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

Inorganic non-metals - MSD

Sample ID: UC23028-003MD
Batch: 11698
Analytical Method: SM 4500-CN E-2011

Matrix: Aqueous
Prep Method: 10-204-00-1-X
Prep Date: 03/29/2019 1632

Parameter	Sample Amount (mg/L)	Spike Amount (mg/L)	Result (mg/L)	Q	Dil	% Rec	% RPD	% Rec Limit	% RPD Limit	Analysis Date
Cyanide - Total	ND	0.10	0.12	N	1	117	3.5	90-110	20	03/29/2019 1903

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the LOQ

N = Recovery is out of criteria
+ = RPD is out of criteria

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

Inorganic non-metals - MB

Sample ID: UQ11825-001
Batch: 11825
Analytical Method: 365.1

Matrix: Aqueous
Prep Method: 365.1
Prep Date: 04/01/2019 1007

Parameter	Result	Q	Dil	LOQ	DL	Units	Analysis Date
Phosphorus	ND		1	0.050	0.0050	mg/L	04/02/2019 1325

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

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

Inorganic non-metals - LCS

Sample ID: UQ11825-002
Batch: 11825
Analytical Method: 365.1

Matrix: Aqueous
Prep Method: 365.1
Prep Date: 04/01/2019 1007

Parameter	Spike Amount (mg/L)	Result (mg/L)	Q	Dil	% Rec	% Rec Limit	Analysis Date
Phosphorus	0.25	0.27		1	109	90-110	04/02/2019 1325

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

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

Inorganic non-metals - MS

Sample ID: UC23028-002MS
Batch: 11825
Analytical Method: 365.1

Matrix: Aqueous
Prep Method: 365.1
Prep Date: 04/01/2019 1007

Parameter	Sample Amount (mg/L)	Spike Amount (mg/L)	Result (mg/L)	Q	Dil	% Rec	% Rec Limit	Analysis Date
Phosphorus	0.0092	0.25	0.24		1	93	90-110	04/02/2019 1346

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

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

Inorganic non-metals - MSD

Sample ID: UC23028-002MD
Batch: 11825
Analytical Method: 365.1

Matrix: Aqueous
Prep Method: 365.1
Prep Date: 04/01/2019 1007

Parameter	Sample Amount (mg/L)	Spike Amount (mg/L)	Result (mg/L)	Q	Dil	% Rec	% RPD	% Rec Limit	% RPD Limit	Analysis Date
Phosphorus	0.0092	0.25	0.24		1	92	1.5	90-110	20	04/02/2019 1346

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

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

Inorganic non-metals - MS

Sample ID: UC23028-003MS
Batch: 11825
Analytical Method: 365.1

Matrix: Aqueous
Prep Method: 365.1
Prep Date: 04/01/2019 1007

Parameter	Sample Amount (mg/L)	Spike Amount (mg/L)	Result (mg/L)	Q	Dil	% Rec	% Rec Limit	Analysis Date
Phosphorus	0.010	0.25	0.25		1	94	90-110	04/02/2019 1346

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the LOQ

N = Recovery is out of criteria
+ = RPD is out of criteria

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

Inorganic non-metals - MSD

Sample ID: UC23028-003MD
Batch: 11825
Analytical Method: 365.1

Matrix: Aqueous
Prep Method: 365.1
Prep Date: 04/01/2019 1007

Parameter	Sample Amount (mg/L)	Spike Amount (mg/L)	Result (mg/L)	Q	Dil	% Rec	% RPD	% Rec Limit	% RPD Limit	Analysis Date
Phosphorus	0.010	0.25	0.25		1	94	0.15	90-110	20	04/02/2019 1346

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

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

Inorganic non-metals - MB

Sample ID: UQ11903-001
Batch: 11903
Analytical Method: 350.1

Matrix: Aqueous
Prep Method: 350.1

Parameter	Result	Q	Dil	LOQ	DL	Units	Analysis Date
Ammonia - N (gas diffusion)	0.020	J	1	0.10	0.020	mg/L	04/01/2019 1641

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the LOQ

N = Recovery is out of criteria
+ = RPD is out of criteria

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

Inorganic non-metals - LCS

Sample ID: UQ11903-002
Batch: 11903
Analytical Method: 350.1

Matrix: Aqueous
Prep Method: 350.1

Parameter	Spike Amount (mg/L)	Result (mg/L)	Q	Dil	% Rec	% Rec Limit	Analysis Date
Ammonia - N (gas diffusion)	1.0	1.0		1	101	90-110	04/01/2019 1643

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the LOQ

N = Recovery is out of criteria
+ = RPD is out of criteria

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

Inorganic non-metals - MS

Sample ID: UC23028-003MS
Batch: 11903
Analytical Method: 350.1

Matrix: Aqueous
Prep Method: 350.1

Parameter	Sample Amount (mg/L)	Spike Amount (mg/L)	Result (mg/L)	Q	Dil	% Rec	% Rec Limit	Analysis Date
Ammonia - N (gas diffusion)	ND	1.0	0.99		1	99	90-110	04/01/2019 1647

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

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

Inorganic non-metals - MSD

Sample ID: UC23028-003MD
Batch: 11903
Analytical Method: 350.1

Matrix: Aqueous
Prep Method: 350.1

Parameter	Sample Amount (mg/L)	Spike Amount (mg/L)	Result (mg/L)	Q	Dil	% Rec	% RPD	% Rec Limit	% RPD Limit	Analysis Date
Ammonia - N (gas diffusion)	ND	1.0	0.97		1	97	1.2	90-110	20	04/01/2019 1649

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the LOQ

N = Recovery is out of criteria
+ = RPD is out of criteria

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

Inorganic non-metals - MB

Sample ID: UQ12072-001
Batch: 12072
Analytical Method: 300.0

Matrix: Aqueous

Parameter	Result	Q	Dil	LOQ	DL	Units	Analysis Date
Sulfate	ND		1	1.0	0.20	mg/L	04/02/2019 0947

LOQ = Limit of Quantitation

DL = Detection Limit

LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%

J = Estimated result < LOQ and ≥ DL

ND = Not detected at or above the LOQ

N = Recovery is out of criteria

+ = RPD is out of criteria

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

Inorganic non-metals - LCS

Sample ID: UQ12072-002
Batch: 12072
Analytical Method: 300.0

Matrix: Aqueous

Parameter	Spike Amount (mg/L)	Result (mg/L)	Q	Dil	% Rec	% Rec Limit	Analysis Date
Sulfate	20	20		1	101	90-110	04/02/2019 1020

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

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

Inorganic non-metals - MB

Sample ID: UQ12073-001
Batch: 12073
Analytical Method: 300.0

Matrix: Aqueous

Parameter	Result	Q	Dil	LOQ	DL	Units	Analysis Date
Chloride	ND		1	1.0	0.20	mg/L	04/02/2019 0947

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the LOQ

N = Recovery is out of criteria
+ = RPD is out of criteria

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

Inorganic non-metals - LCS

Sample ID:	UQ12073-002	Matrix:	Aqueous
Batch:	12073		
Analytical Method:	300.0		

Parameter	Spike Amount (mg/L)	Result (mg/L)	Q	Dil	% Rec	% Rec Limit	Analysis Date
Chloride	20	20		1	101	90-110	04/02/2019 1020

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

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

Inorganic non-metals - MB

Sample ID: UQ12587-001
Batch: 12587
Analytical Method: 300.0

Matrix: Aqueous

Parameter	Result	Q	Dil	LOQ	DL	Units	Analysis Date
Chloride	ND		1	1.0	0.20	mg/L	04/05/2019 1712

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the LOQ

N = Recovery is out of criteria
+ = RPD is out of criteria

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

Inorganic non-metals - LCS

Sample ID: UQ12587-002

Batch: 12587

Analytical Method: 300.0

Matrix: Aqueous

Parameter	Spike Amount (mg/L)	Result (mg/L)	Q	Dil	% Rec	% Rec Limit	Analysis Date
Chloride	20	20		1	102	90-110	04/05/2019 1804

LOQ = Limit of Quantitation

DL = Detection Limit

LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%

J = Estimated result < LOQ and ≥ DL

ND = Not detected at or above the LOQ

N = Recovery is out of criteria

+ = RPD is out of criteria

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

Inorganic non-metals - MS

Sample ID: UC23028-003MS
Batch: 12587
Analytical Method: 300.0

Matrix: Aqueous

Parameter	Sample Amount (mg/L)	Spike Amount (mg/L)	Result (mg/L)	Q	Dil	% Rec	% Rec Limit	Analysis Date
Chloride	29	20	48		1	98	90-110	04/05/2019 1856

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

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

Inorganic non-metals - MSD

Sample ID: UC23028-003MD
Matrix: Aqueous
Batch: 12587
Analytical Method: 300.0

Parameter	Sample Amount (mg/L)	Spike Amount (mg/L)	Result (mg/L)	Q	Dil	% Rec	% RPD	% Rec Limit	% RPD Limit	Analysis Date
Chloride	29	20	49		1	98	0.21	90-110	20	04/05/2019 1922

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

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

Inorganic non-metals - MB

Sample ID: UQ12589-001
Batch: 12589
Analytical Method: 300.0

Matrix: Aqueous

Parameter	Result	Q	Dil	LOQ	DL	Units	Analysis Date
Sulfate	ND		1	1.0	0.20	mg/L	04/05/2019 1712

LOQ = Limit of Quantitation

DL = Detection Limit

LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%

J = Estimated result < LOQ and ≥ DL

ND = Not detected at or above the LOQ

N = Recovery is out of criteria

+ = RPD is out of criteria

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

Inorganic non-metals - LCS

Sample ID: UQ12589-002
Batch: 12589
Analytical Method: 300.0

Matrix: Aqueous

Parameter	Spike Amount (mg/L)	Result (mg/L)	Q	Dil	% Rec	% Rec Limit	Analysis Date
Sulfate	20	20		1	102	90-110	04/05/2019 1804

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

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

Inorganic non-metals - MS

Sample ID: UC23028-003MS
Batch: 12589
Analytical Method: 300.0

Matrix: Aqueous

Parameter	Sample Amount (mg/L)	Spike Amount (mg/L)	Result (mg/L)	Q	Dil	% Rec	% Rec Limit	Analysis Date
Sulfate	11	20	31		1	98	90-110	04/05/2019 1856

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

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

Inorganic non-metals - MSD

Sample ID: UC23028-003MD
Batch: 12589
Analytical Method: 300.0

Matrix: Aqueous

Parameter	Sample Amount (mg/L)	Spike Amount (mg/L)	Result (mg/L)	Q	Dil	% Rec	% RPD	% Rec Limit	% RPD Limit	Analysis Date
Sulfate	11	20	31		1	99	0.32	90-110	20	04/05/2019 1922

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the LOQ

N = Recovery is out of criteria
+ = RPD is out of criteria

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

Volatile Organic Compounds by GC/MS - MB

Sample ID: UQ11939-001
Batch: 11939
Analytical Method: 8260B

Matrix: Aqueous
Prep Method: 5030B

Parameter	Result	Q	Dil	LOQ	DL	Units	Analysis Date
Acetone	ND		1	20	2.0	ug/L	04/02/2019 0007
Benzene	ND		1	1.0	0.40	ug/L	04/02/2019 0007
Bromodichloromethane	ND		1	1.0	0.40	ug/L	04/02/2019 0007
Bromoform	ND		1	1.0	0.40	ug/L	04/02/2019 0007
Bromomethane (Methyl bromide)	ND		1	2.0	0.40	ug/L	04/02/2019 0007
2-Butanone (MEK)	ND		1	10	2.0	ug/L	04/02/2019 0007
Carbon disulfide	ND		1	1.0	0.40	ug/L	04/02/2019 0007
Carbon tetrachloride	ND		1	1.0	0.40	ug/L	04/02/2019 0007
Chlorobenzene	ND		1	1.0	0.40	ug/L	04/02/2019 0007
Chloroethane	ND		1	2.0	0.40	ug/L	04/02/2019 0007
Chloroform	ND		1	1.0	0.40	ug/L	04/02/2019 0007
Chloromethane (Methyl chloride)	ND		1	1.0	0.50	ug/L	04/02/2019 0007
Cyclohexane	ND		1	1.0	0.40	ug/L	04/02/2019 0007
1,2-Dibromo-3-chloropropane (DBCP)	ND		1	1.0	0.40	ug/L	04/02/2019 0007
Dibromochloromethane	ND		1	1.0	0.40	ug/L	04/02/2019 0007
1,2-Dibromoethane (EDB)	ND		1	1.0	0.40	ug/L	04/02/2019 0007
1,2-Dichlorobenzene	ND		1	1.0	0.40	ug/L	04/02/2019 0007
1,3-Dichlorobenzene	ND		1	1.0	0.40	ug/L	04/02/2019 0007
1,4-Dichlorobenzene	ND		1	1.0	0.40	ug/L	04/02/2019 0007
Dichlorodifluoromethane	ND		1	2.0	0.60	ug/L	04/02/2019 0007
1,1-Dichloroethane	ND		1	1.0	0.40	ug/L	04/02/2019 0007
1,2-Dichloroethane	ND		1	1.0	0.40	ug/L	04/02/2019 0007
1,1-Dichloroethene	ND		1	1.0	0.40	ug/L	04/02/2019 0007
cis-1,2-Dichloroethene	ND		1	1.0	0.40	ug/L	04/02/2019 0007
trans-1,2-Dichloroethene	ND		1	1.0	0.40	ug/L	04/02/2019 0007
1,2-Dichloropropane	ND		1	1.0	0.40	ug/L	04/02/2019 0007
cis-1,3-Dichloropropene	ND		1	1.0	0.40	ug/L	04/02/2019 0007
trans-1,3-Dichloropropene	ND		1	1.0	0.40	ug/L	04/02/2019 0007
Ethylbenzene	ND		1	1.0	0.40	ug/L	04/02/2019 0007
2-Hexanone	ND		1	10	2.0	ug/L	04/02/2019 0007
Isopropylbenzene	ND		1	1.0	0.40	ug/L	04/02/2019 0007
Methyl acetate	ND		1	1.0	0.40	ug/L	04/02/2019 0007
Methyl tertiary butyl ether (MTBE)	ND		1	1.0	0.40	ug/L	04/02/2019 0007
4-Methyl-2-pentanone	ND		1	10	2.0	ug/L	04/02/2019 0007
Methylcyclohexane	ND		1	5.0	0.40	ug/L	04/02/2019 0007
Methylene chloride	ND		1	1.0	0.40	ug/L	04/02/2019 0007
Styrene	ND		1	1.0	0.41	ug/L	04/02/2019 0007
1,1,2,2-Tetrachloroethane	ND		1	1.0	0.40	ug/L	04/02/2019 0007
Tetrachloroethene	ND		1	1.0	0.40	ug/L	04/02/2019 0007
Toluene	ND		1	1.0	0.40	ug/L	04/02/2019 0007
1,1,2-Trichloro-1,2,2-Trifluoroethane	ND		1	1.0	0.42	ug/L	04/02/2019 0007
1,2,4-Trichlorobenzene	ND		1	1.0	0.40	ug/L	04/02/2019 0007
1,1,1-Trichloroethane	ND		1	1.0	0.40	ug/L	04/02/2019 0007
1,1,2-Trichloroethane	ND		1	1.0	0.40	ug/L	04/02/2019 0007

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the LOQ

N = Recovery is out of criteria
\+ = RPD is out of criteria

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

Volatile Organic Compounds by GC/MS - MB

Sample ID:	UQ11939-001	Matrix:	Aqueous
Batch:	11939	Prep Method:	5030B
Analytical Method:	8260B		

Parameter	Result	Q	Dil	LOQ	DL	Units	Analysis Date
Trichloroethene	ND		1	1.0	0.40	ug/L	04/02/2019 0007
Trichlorofluoromethane	ND		1	1.0	0.40	ug/L	04/02/2019 0007
Vinyl chloride	ND		1	1.0	0.40	ug/L	04/02/2019 0007
Xylenes (total)	ND		1	1.0	0.40	ug/L	04/02/2019 0007
m+p - Xylenes	ND		1	1.0	0.40	ug/L	04/02/2019 0007
o - Xylenes	ND		1	1.0	0.40	ug/L	04/02/2019 0007

Surrogate	Q	% Rec	Acceptance Limit
1,2-Dichloroethane-d4		104	70-130
Bromofluorobenzene		96	70-130
Toluene-d8		105	70-130

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

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

Volatile Organic Compounds by GC/MS - LCS

Sample ID: UQ11939-002
Batch: 11939
Analytical Method: 8260B

Matrix: Aqueous
Prep Method: 5030B

Parameter	Spike Amount (ug/L)	Result (ug/L)	Q	Dil	% Rec	% Rec Limit	Analysis Date
Acetone	100	100		1	101	60-140	04/01/2019 2311
Benzene	50	52		1	104	70-130	04/01/2019 2311
Bromodichloromethane	50	52		1	104	70-130	04/01/2019 2311
Bromoform	50	43		1	86	70-130	04/01/2019 2311
Bromomethane (Methyl bromide)	50	51		1	102	70-130	04/01/2019 2311
2-Butanone (MEK)	100	100		1	101	70-130	04/01/2019 2311
Carbon disulfide	50	49		1	98	70-130	04/01/2019 2311
Carbon tetrachloride	50	54		1	108	70-130	04/01/2019 2311
Chlorobenzene	50	49		1	98	70-130	04/01/2019 2311
Chloroethane	50	45		1	89	70-130	04/01/2019 2311
Chloroform	50	51		1	102	70-130	04/01/2019 2311
Chloromethane (Methyl chloride)	50	60		1	120	60-140	04/01/2019 2311
Cyclohexane	50	57		1	113	70-130	04/01/2019 2311
1,2-Dibromo-3-chloropropane (DBCP)	50	49		1	97	70-130	04/01/2019 2311
Dibromochloromethane	50	54		1	109	70-130	04/01/2019 2311
1,2-Dibromoethane (EDB)	50	57		1	114	70-130	04/01/2019 2311
1,2-Dichlorobenzene	50	47		1	95	70-130	04/01/2019 2311
1,3-Dichlorobenzene	50	48		1	96	70-130	04/01/2019 2311
1,4-Dichlorobenzene	50	47		1	95	70-130	04/01/2019 2311
Dichlorodifluoromethane	50	66		1	132	60-140	04/01/2019 2311
1,1-Dichloroethane	50	52		1	103	70-130	04/01/2019 2311
1,2-Dichloroethane	50	58		1	117	70-130	04/01/2019 2311
1,1-Dichloroethene	50	53		1	107	70-130	04/01/2019 2311
cis-1,2-Dichloroethene	50	52		1	104	70-130	04/01/2019 2311
trans-1,2-Dichloroethene	50	52		1	105	70-130	04/01/2019 2311
1,2-Dichloropropane	50	52		1	104	70-130	04/01/2019 2311
cis-1,3-Dichloropropene	50	54		1	107	70-130	04/01/2019 2311
trans-1,3-Dichloropropene	50	55		1	109	70-130	04/01/2019 2311
Ethylbenzene	50	50		1	100	70-130	04/01/2019 2311
2-Hexanone	100	100		1	101	70-130	04/01/2019 2311
Isopropylbenzene	50	49		1	98	70-130	04/01/2019 2311
Methyl acetate	50	57		1	114	70-130	04/01/2019 2311
Methyl tertiary butyl ether (MTBE)	50	58		1	116	70-130	04/01/2019 2311
4-Methyl-2-pentanone	100	100		1	101	70-130	04/01/2019 2311
Methylcyclohexane	50	54		1	109	70-130	04/01/2019 2311
Methylene chloride	50	51		1	103	70-130	04/01/2019 2311
Styrene	50	49		1	98	70-130	04/01/2019 2311
1,1,2,2-Tetrachloroethane	50	54		1	108	70-130	04/01/2019 2311
Tetrachloroethene	50	47		1	94	70-130	04/01/2019 2311
Toluene	50	53		1	107	70-130	04/01/2019 2311
1,1,2-Trichloro-1,2,2-Trifluoroethane	50	54		1	107	70-130	04/01/2019 2311
1,2,4-Trichlorobenzene	50	39		1	79	70-130	04/01/2019 2311
1,1,1-Trichloroethane	50	53		1	107	70-130	04/01/2019 2311
1,1,2-Trichloroethane	50	56		1	112	70-130	04/01/2019 2311

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

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

Volatile Organic Compounds by GC/MS - LCS

Sample ID: UQ11939-002
Batch: 11939
Analytical Method: 8260B

Matrix: Aqueous
Prep Method: 5030B

Parameter	Spike Amount (ug/L)	Result (ug/L)	Q	Dil	% Rec	% Rec Limit	Analysis Date
Trichloroethene	50	52		1	105	70-130	04/01/2019 2311
Trichlorofluoromethane	50	53		1	105	70-130	04/01/2019 2311
Vinyl chloride	50	46		1	91	70-130	04/01/2019 2311
Xylenes (total)	100	99		1	99	70-130	04/01/2019 2311
m+p - Xylenes	50	49		1	98	70-130	04/01/2019 2311
o - Xylenes	50	50		1	99	70-130	04/01/2019 2311

Surrogate	Q	% Rec	Acceptance Limit
1,2-Dichloroethane-d4		102	70-130
Bromofluorobenzene		96	70-130
Toluene-d8		102	70-130

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

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

Volatile Organic Compounds by GC/MS - MB

Sample ID: UQ12007-001
Batch: 12007
Analytical Method: 8260B

Matrix: Aqueous
Prep Method: 5030B

Parameter	Result	Q	Dil	LOQ	DL	Units	Analysis Date
Acetone	ND		1	20	2.0	ug/L	04/02/2019 1123
Benzene	ND		1	1.0	0.40	ug/L	04/02/2019 1123
Bromodichloromethane	ND		1	1.0	0.40	ug/L	04/02/2019 1123
Bromoform	ND		1	1.0	0.40	ug/L	04/02/2019 1123
Bromomethane (Methyl bromide)	ND		1	2.0	0.40	ug/L	04/02/2019 1123
2-Butanone (MEK)	ND		1	10	2.0	ug/L	04/02/2019 1123
Carbon disulfide	ND		1	1.0	0.40	ug/L	04/02/2019 1123
Carbon tetrachloride	ND		1	1.0	0.40	ug/L	04/02/2019 1123
Chlorobenzene	ND		1	1.0	0.40	ug/L	04/02/2019 1123
Chloroethane	ND		1	2.0	0.40	ug/L	04/02/2019 1123
Chloroform	ND		1	1.0	0.40	ug/L	04/02/2019 1123
Chloromethane (Methyl chloride)	ND		1	1.0	0.50	ug/L	04/02/2019 1123
Cyclohexane	ND		1	1.0	0.40	ug/L	04/02/2019 1123
1,2-Dibromo-3-chloropropane (DBCP)	ND		1	1.0	0.40	ug/L	04/02/2019 1123
Dibromochloromethane	ND		1	1.0	0.40	ug/L	04/02/2019 1123
1,2-Dibromoethane (EDB)	ND		1	1.0	0.40	ug/L	04/02/2019 1123
1,2-Dichlorobenzene	ND		1	1.0	0.40	ug/L	04/02/2019 1123
1,3-Dichlorobenzene	ND		1	1.0	0.40	ug/L	04/02/2019 1123
1,4-Dichlorobenzene	ND		1	1.0	0.40	ug/L	04/02/2019 1123
Dichlorodifluoromethane	ND		1	2.0	0.60	ug/L	04/02/2019 1123
1,1-Dichloroethane	ND		1	1.0	0.40	ug/L	04/02/2019 1123
1,2-Dichloroethane	ND		1	1.0	0.40	ug/L	04/02/2019 1123
1,1-Dichloroethene	ND		1	1.0	0.40	ug/L	04/02/2019 1123
cis-1,2-Dichloroethene	ND		1	1.0	0.40	ug/L	04/02/2019 1123
trans-1,2-Dichloroethene	ND		1	1.0	0.40	ug/L	04/02/2019 1123
1,2-Dichloropropane	ND		1	1.0	0.40	ug/L	04/02/2019 1123
cis-1,3-Dichloropropene	ND		1	1.0	0.40	ug/L	04/02/2019 1123
trans-1,3-Dichloropropene	ND		1	1.0	0.40	ug/L	04/02/2019 1123
Ethylbenzene	ND		1	1.0	0.40	ug/L	04/02/2019 1123
2-Hexanone	ND		1	10	2.0	ug/L	04/02/2019 1123
Isopropylbenzene	ND		1	1.0	0.40	ug/L	04/02/2019 1123
Methyl acetate	ND		1	1.0	0.40	ug/L	04/02/2019 1123
Methyl tertiary butyl ether (MTBE)	ND		1	1.0	0.40	ug/L	04/02/2019 1123
4-Methyl-2-pentanone	ND		1	10	2.0	ug/L	04/02/2019 1123
Methylcyclohexane	ND		1	5.0	0.40	ug/L	04/02/2019 1123
Methylene chloride	ND		1	1.0	0.40	ug/L	04/02/2019 1123
Styrene	ND		1	1.0	0.41	ug/L	04/02/2019 1123
1,1,2,2-Tetrachloroethane	ND		1	1.0	0.40	ug/L	04/02/2019 1123
Tetrachloroethene	ND		1	1.0	0.40	ug/L	04/02/2019 1123
Toluene	ND		1	1.0	0.40	ug/L	04/02/2019 1123
1,1,2-Trichloro-1,2,2-Trifluoroethane	ND		1	1.0	0.42	ug/L	04/02/2019 1123
1,2,4-Trichlorobenzene	ND		1	1.0	0.40	ug/L	04/02/2019 1123
1,1,1-Trichloroethane	ND		1	1.0	0.40	ug/L	04/02/2019 1123
1,1,2-Trichloroethane	ND		1	1.0	0.40	ug/L	04/02/2019 1123

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the LOQ

N = Recovery is out of criteria
+ = RPD is out of criteria

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

Volatile Organic Compounds by GC/MS - MB

Sample ID: UQ12007-001
Batch: 12007
Analytical Method: 8260B

Matrix: Aqueous
Prep Method: 5030B

Parameter	Result	Q	Dil	LOQ	DL	Units	Analysis Date
Trichloroethene	ND		1	1.0	0.40	ug/L	04/02/2019 1123
Trichlorofluoromethane	ND		1	1.0	0.40	ug/L	04/02/2019 1123
Vinyl chloride	ND		1	1.0	0.40	ug/L	04/02/2019 1123
Xylenes (total)	ND		1	1.0	0.40	ug/L	04/02/2019 1123
m+p - Xylenes	ND		1	1.0	0.40	ug/L	04/02/2019 1123
o - Xylenes	ND		1	1.0	0.40	ug/L	04/02/2019 1123

Surrogate	Q	% Rec	Acceptance Limit
1,2-Dichloroethane-d4		96	70-130
Bromofluorobenzene		100	70-130
Toluene-d8		96	70-130

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the LOQ

N = Recovery is out of criteria
+ = RPD is out of criteria

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

Volatile Organic Compounds by GC/MS - LCS

Sample ID: UQ12007-002
Batch: 12007
Analytical Method: 8260B

Matrix: Aqueous
Prep Method: 5030B

Parameter	Spike Amount (ug/L)	Result (ug/L)	Q	Dil	% Rec	% Rec Limit	Analysis Date
Acetone	100	190	N	1	192	60-140	04/02/2019 1011
Benzene	50	49		1	97	70-130	04/02/2019 1011
Bromodichloromethane	50	47		1	94	70-130	04/02/2019 1011
Bromoform	50	43		1	87	70-130	04/02/2019 1011
Bromomethane (Methyl bromide)	50	54		1	107	70-130	04/02/2019 1011
2-Butanone (MEK)	100	130		1	126	70-130	04/02/2019 1011
Carbon disulfide	50	53		1	106	70-130	04/02/2019 1011
Carbon tetrachloride	50	49		1	99	70-130	04/02/2019 1011
Chlorobenzene	50	44		1	88	70-130	04/02/2019 1011
Chloroethane	50	43		1	85	70-130	04/02/2019 1011
Chloroform	50	48		1	96	70-130	04/02/2019 1011
Chloromethane (Methyl chloride)	50	52		1	104	60-140	04/02/2019 1011
Cyclohexane	50	57		1	113	70-130	04/02/2019 1011
1,2-Dibromo-3-chloropropane (DBCP)	50	48		1	96	70-130	04/02/2019 1011
Dibromochloromethane	50	45		1	91	70-130	04/02/2019 1011
1,2-Dibromoethane (EDB)	50	48		1	97	70-130	04/02/2019 1011
1,2-Dichlorobenzene	50	43		1	86	70-130	04/02/2019 1011
1,3-Dichlorobenzene	50	41		1	83	70-130	04/02/2019 1011
1,4-Dichlorobenzene	50	41		1	83	70-130	04/02/2019 1011
Dichlorodifluoromethane	50	63		1	126	60-140	04/02/2019 1011
1,1-Dichloroethane	50	51		1	102	70-130	04/02/2019 1011
1,2-Dichloroethane	50	56		1	112	70-130	04/02/2019 1011
1,1-Dichloroethene	50	54		1	107	70-130	04/02/2019 1011
cis-1,2-Dichloroethene	50	51		1	102	70-130	04/02/2019 1011
trans-1,2-Dichloroethene	50	51		1	102	70-130	04/02/2019 1011
1,2-Dichloropropane	50	46		1	92	70-130	04/02/2019 1011
cis-1,3-Dichloropropene	50	48		1	96	70-130	04/02/2019 1011
trans-1,3-Dichloropropene	50	47		1	94	70-130	04/02/2019 1011
Ethylbenzene	50	44		1	89	70-130	04/02/2019 1011
2-Hexanone	100	86		1	86	70-130	04/02/2019 1011
Isopropylbenzene	50	45		1	90	70-130	04/02/2019 1011
Methyl acetate	50	57		1	113	70-130	04/02/2019 1011
Methyl tertiary butyl ether (MTBE)	50	52		1	104	70-130	04/02/2019 1011
4-Methyl-2-pentanone	100	89		1	89	70-130	04/02/2019 1011
Methylcyclohexane	50	53		1	107	70-130	04/02/2019 1011
Methylene chloride	50	51		1	101	70-130	04/02/2019 1011
Styrene	50	44		1	88	70-130	04/02/2019 1011
1,1,2,2-Tetrachloroethane	50	45		1	90	70-130	04/02/2019 1011
Tetrachloroethene	50	47		1	94	70-130	04/02/2019 1011
Toluene	50	46		1	92	70-130	04/02/2019 1011
1,1,2-Trichloro-1,2,2-Trifluoroethane	50	56		1	112	70-130	04/02/2019 1011
1,2,4-Trichlorobenzene	50	41		1	82	70-130	04/02/2019 1011
1,1,1-Trichloroethane	50	50		1	100	70-130	04/02/2019 1011
1,1,2-Trichloroethane	50	45		1	90	70-130	04/02/2019 1011

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the LOQ

N = Recovery is out of criteria
+ = RPD is out of criteria

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

Volatile Organic Compounds by GC/MS - LCS

Sample ID: UQ12007-002
Batch: 12007
Analytical Method: 8260B

Matrix: Aqueous
Prep Method: 5030B

Parameter	Spike Amount (ug/L)	Result (ug/L)	Q	Dil	% Rec	% Rec Limit	Analysis Date
Trichloroethene	50	51		1	101	70-130	04/02/2019 1011
Trichlorofluoromethane	50	51		1	102	70-130	04/02/2019 1011
Vinyl chloride	50	50		1	99	70-130	04/02/2019 1011
Xylenes (total)	100	90		1	90	70-130	04/02/2019 1011
m+p - Xylenes	50	45		1	89	70-130	04/02/2019 1011
o - Xylenes	50	45		1	91	70-130	04/02/2019 1011

Surrogate	Q	% Rec	Acceptance Limit
1,2-Dichloroethane-d4		97	70-130
Bromofluorobenzene		97	70-130
Toluene-d8		94	70-130

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

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

Volatile Organic Compounds by GC/MS - MS

Sample ID: UC23028-003MS
Batch: 12007
Analytical Method: 8260B

Matrix: Aqueous
Prep Method: 5030B

Parameter	Sample Amount (ug/L)	Spike Amount (ug/L)	Result (ug/L)	Q	Dil	% Rec	% Rec Limit	Analysis Date
Acetone	2.2	100	100		1	99	60-140	04/02/2019 1900
Benzene	ND	50	50		1	101	70-130	04/02/2019 1900
Bromodichloromethane	ND	50	46		1	92	70-130	04/02/2019 1900
Bromoform	ND	50	38		1	76	70-130	04/02/2019 1900
Bromomethane (Methyl bromide)	ND	50	55		1	111	70-130	04/02/2019 1900
2-Butanone (MEK)	ND	100	95		1	95	70-130	04/02/2019 1900
Carbon disulfide	ND	50	50		1	99	70-130	04/02/2019 1900
Carbon tetrachloride	ND	50	50		1	100	70-130	04/02/2019 1900
Chlorobenzene	ND	50	46		1	92	70-130	04/02/2019 1900
Chloroethane	ND	50	43		1	86	70-130	04/02/2019 1900
Chloroform	ND	50	47		1	95	70-130	04/02/2019 1900
Chloromethane (Methyl chloride)	ND	50	51		1	101	60-140	04/02/2019 1900
Cyclohexane	ND	50	58		1	116	70-130	04/02/2019 1900
1,2-Dibromo-3-chloropropane (DBCP)	ND	50	46		1	92	70-130	04/02/2019 1900
Dibromochloromethane	ND	50	43		1	86	70-130	04/02/2019 1900
1,2-Dibromoethane (EDB)	ND	50	49		1	98	70-130	04/02/2019 1900
1,2-Dichlorobenzene	ND	50	43		1	85	70-130	04/02/2019 1900
1,3-Dichlorobenzene	ND	50	43		1	85	70-130	04/02/2019 1900
1,4-Dichlorobenzene	ND	50	43		1	85	70-130	04/02/2019 1900
Dichlorodifluoromethane	ND	50	68		1	136	60-140	04/02/2019 1900
1,1-Dichloroethane	ND	50	51		1	102	70-130	04/02/2019 1900
1,2-Dichloroethane	ND	50	54		1	109	70-130	04/02/2019 1900
1,1-Dichloroethene	ND	50	57		1	114	70-130	04/02/2019 1900
cis-1,2-Dichloroethene	ND	50	52		1	103	70-130	04/02/2019 1900
trans-1,2-Dichloroethene	ND	50	52		1	104	70-130	04/02/2019 1900
1,2-Dichloropropane	ND	50	47		1	94	70-130	04/02/2019 1900
cis-1,3-Dichloropropene	ND	50	47		1	93	70-130	04/02/2019 1900
trans-1,3-Dichloropropene	ND	50	46		1	92	70-130	04/02/2019 1900
Ethylbenzene	ND	50	48		1	96	70-130	04/02/2019 1900
2-Hexanone	ND	100	79		1	79	70-130	04/02/2019 1900
Isopropylbenzene	ND	50	47		1	93	70-130	04/02/2019 1900
Methyl acetate	ND	50	42		1	85	70-130	04/02/2019 1900
Methyl tertiary butyl ether (MTBE)	ND	50	51		1	103	70-130	04/02/2019 1900
4-Methyl-2-pentanone	ND	100	81		1	81	70-130	04/02/2019 1900
Methylcyclohexane	ND	50	58		1	115	70-130	04/02/2019 1900
Methylene chloride	ND	50	51		1	102	70-130	04/02/2019 1900
Styrene	ND	50	44		1	88	70-130	04/02/2019 1900
1,1,2,2-Tetrachloroethane	ND	50	45		1	89	70-130	04/02/2019 1900
Tetrachloroethene	ND	50	50		1	100	70-130	04/02/2019 1900
Toluene	ND	50	49		1	97	70-130	04/02/2019 1900
1,1,2-Trichloro-1,2,2-Trifluoroethane	ND	50	58		1	115	70-130	04/02/2019 1900
1,2,4-Trichlorobenzene	ND	50	41		1	82	70-130	04/02/2019 1900
1,1,1-Trichloroethane	ND	50	51		1	102	70-130	04/02/2019 1900
1,1,2-Trichloroethane	ND	50	45		1	89	70-130	04/02/2019 1900

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the LOQ

N = Recovery is out of criteria
+ = RPD is out of criteria

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

Volatile Organic Compounds by GC/MS - MS

Sample ID: UC23028-003MS
Batch: 12007
Analytical Method: 8260B

Matrix: Aqueous
Prep Method: 5030B

Parameter	Sample Amount (ug/L)	Spike Amount (ug/L)	Result (ug/L)	Q	Dil	% Rec	% Rec Limit	Analysis Date
Trichloroethene	ND	50	54		1	108	70-130	04/02/2019 1900
Trichlorofluoromethane	ND	50	53		1	106	70-130	04/02/2019 1900
Vinyl chloride	ND	50	51		1	101	70-130	04/02/2019 1900
Xylenes (total)	ND	100	93		1	93	70-130	04/02/2019 1900
m+p - Xylenes	ND	50	46		1	93	70-130	04/02/2019 1900
o - Xylenes	ND	50	46		1	93	70-130	04/02/2019 1900

Surrogate	Q	% Rec	Acceptance Limit
1,2-Dichloroethane-d4		91	70-130
Bromofluorobenzene		96	70-130
Toluene-d8		93	70-130

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

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

Volatile Organic Compounds by GC/MS - MSD

Sample ID: UC23028-003MD
Batch: 12007
Analytical Method: 8260B

Matrix: Aqueous
Prep Method: 5030B

Parameter	Sample Amount (ug/L)	Spike Amount (ug/L)	Result (ug/L)	Q	Dil	% Rec	% RPD	% Rec Limit	% RPD Limit	Analysis Date
Acetone	2.2	100	110		1	112	11	60-140	20	04/02/2019 1924
Benzene	ND	50	50		1	100	0.60	70-130	20	04/02/2019 1924
Bromodichloromethane	ND	50	46		1	92	0.31	70-130	20	04/02/2019 1924
Bromoform	ND	50	38		1	77	1.8	70-130	20	04/02/2019 1924
Bromomethane (Methyl bromide)	ND	50	56		1	111	0.64	70-130	20	04/02/2019 1924
2-Butanone (MEK)	ND	100	100		1	102	6.4	70-130	20	04/02/2019 1924
Carbon disulfide	ND	50	49		1	99	0.40	70-130	20	04/02/2019 1924
Carbon tetrachloride	ND	50	50		1	101	1.2	70-130	20	04/02/2019 1924
Chlorobenzene	ND	50	47		1	94	1.3	70-130	20	04/02/2019 1924
Chloroethane	ND	50	43		1	85	0.36	70-130	20	04/02/2019 1924
Chloroform	ND	50	48		1	95	0.80	70-130	20	04/02/2019 1924
Chloromethane (Methyl chloride)	ND	50	52		1	104	3.1	60-140	20	04/02/2019 1924
Cyclohexane	ND	50	58		1	117	0.47	70-130	20	04/02/2019 1924
1,2-Dibromo-3-chloropropane (DBCP)	ND	50	47		1	94	1.9	70-130	20	04/02/2019 1924
Dibromochloromethane	ND	50	43		1	87	0.63	70-130	20	04/02/2019 1924
1,2-Dibromoethane (EDB)	ND	50	50		1	100	1.2	70-130	20	04/02/2019 1924
1,2-Dichlorobenzene	ND	50	44		1	87	2.2	70-130	20	04/02/2019 1924
1,3-Dichlorobenzene	ND	50	43		1	87	1.7	70-130	20	04/02/2019 1924
1,4-Dichlorobenzene	ND	50	42		1	85	0.34	70-130	20	04/02/2019 1924
Dichlorodifluoromethane	ND	50	66		1	132	3.0	60-140	20	04/02/2019 1924
1,1-Dichloroethane	ND	50	52		1	104	1.9	70-130	20	04/02/2019 1924
1,2-Dichloroethane	ND	50	55		1	110	0.74	70-130	20	04/02/2019 1924
1,1-Dichloroethene	ND	50	56		1	112	2.1	70-130	20	04/02/2019 1924
cis-1,2-Dichloroethene	ND	50	52		1	105	1.4	70-130	20	04/02/2019 1924
trans-1,2-Dichloroethene	ND	50	53		1	105	0.67	70-130	20	04/02/2019 1924
1,2-Dichloropropane	ND	50	47		1	94	0.69	70-130	20	04/02/2019 1924
cis-1,3-Dichloropropene	ND	50	47		1	93	0.073	70-130	20	04/02/2019 1924
trans-1,3-Dichloropropene	ND	50	46		1	93	1.4	70-130	20	04/02/2019 1924
Ethylbenzene	ND	50	47		1	95	1.3	70-130	20	04/02/2019 1924
2-Hexanone	ND	100	82		1	82	3.3	70-130	20	04/02/2019 1924
Isopropylbenzene	ND	50	48		1	96	2.9	70-130	20	04/02/2019 1924
Methyl acetate	ND	50	47		1	94	10	70-130	20	04/02/2019 1924
Methyl tertiary butyl ether (MTBE)	ND	50	51		1	102	0.66	70-130	20	04/02/2019 1924
4-Methyl-2-pentanone	ND	100	84		1	84	4.2	70-130	20	04/02/2019 1924
Methylcyclohexane	ND	50	57		1	115	0.27	70-130	20	04/02/2019 1924
Methylene chloride	ND	50	50		1	100	1.2	70-130	20	04/02/2019 1924
Styrene	ND	50	45		1	91	2.9	70-130	20	04/02/2019 1924
1,1,2,2-Tetrachloroethane	ND	50	45		1	91	1.6	70-130	20	04/02/2019 1924
Tetrachloroethene	ND	50	50		1	100	0.33	70-130	20	04/02/2019 1924
Toluene	ND	50	49		1	98	0.53	70-130	20	04/02/2019 1924
1,1,2-Trichloro-1,2,2-Trifluoroethane	ND	50	58		1	116	1.1	70-130	20	04/02/2019 1924
1,2,4-Trichlorobenzene	ND	50	41		1	83	1.0	70-130	20	04/02/2019 1924
1,1,1-Trichloroethane	ND	50	52		1	104	1.7	70-130	20	04/02/2019 1924
1,1,2-Trichloroethane	ND	50	46		1	92	3.4	70-130	20	04/02/2019 1924

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

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

Volatile Organic Compounds by GC/MS - MSD

Sample ID: UC23028-003MD
Batch: 12007
Analytical Method: 8260B

Matrix: Aqueous
Prep Method: 5030B

Parameter	Sample Amount (ug/L)	Spike Amount (ug/L)	Result (ug/L)	Q	Dil	% Rec	% RPD	% Rec Limit	% RPD Limit	Analysis Date
Trichloroethene	ND	50	54		1	108	0.17	70-130	20	04/02/2019 1924
Trichlorofluoromethane	ND	50	53		1	106	0.18	70-130	20	04/02/2019 1924
Vinyl chloride	ND	50	51		1	103	1.6	70-130	20	04/02/2019 1924
Xylenes (total)	ND	100	94		1	94	1.1	70-130	20	04/02/2019 1924
m+p - Xylenes	ND	50	47		1	93	0.62	70-130	20	04/02/2019 1924
o - Xylenes	ND	50	47		1	94	1.6	70-130	20	04/02/2019 1924

Surrogate	Q	% Rec	Acceptance Limit
1,2-Dichloroethane-d4		92	70-130
Bromofluorobenzene		96	70-130
Toluene-d8		93	70-130

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

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

Semivolatile Organic Compounds by GC/MS - MB

Sample ID: UQ11166-001
Batch: 11166
Analytical Method: 8270D

Matrix: Aqueous
Prep Method: 3520C
Prep Date: 03/25/2019 1939

Parameter	Result	Q	Dil	LOQ	DL	Units	Analysis Date
Acenaphthene	ND		1	0.20	0.040	ug/L	04/03/2019 1041
Acenaphthylene	ND		1	0.20	0.040	ug/L	04/03/2019 1041
Acetophenone	ND		1	0.80	0.50	ug/L	04/03/2019 1041
Anthracene	ND		1	0.20	0.060	ug/L	04/03/2019 1041
Atrazine	ND		1	0.80	0.50	ug/L	04/03/2019 1041
Benzidine	ND		1	20	1.0	ug/L	04/03/2019 1041
Benzo(a)anthracene	ND		1	0.20	0.040	ug/L	04/03/2019 1041
Benzo(a)pyrene	ND		1	0.20	0.070	ug/L	04/03/2019 1041
Benzo(b)fluoranthene	ND		1	0.20	0.040	ug/L	04/03/2019 1041
Benzo(g,h,i)perylene	ND		1	0.20	0.040	ug/L	04/03/2019 1041
Benzo(k)fluoranthene	ND		1	0.20	0.040	ug/L	04/03/2019 1041
Butyl benzyl phthalate	ND		1	0.80	0.50	ug/L	04/03/2019 1041
Caprolactam	ND		1	1.6	1.0	ug/L	04/03/2019 1041
Carbazole	ND		1	0.80	0.50	ug/L	04/03/2019 1041
4-Chloro-3-methyl phenol	ND		1	0.80	0.50	ug/L	04/03/2019 1041
bis(2-Chloroethyl)ether	ND		1	0.80	0.50	ug/L	04/03/2019 1041
2-Chloronaphthalene	ND		1	0.80	0.50	ug/L	04/03/2019 1041
2-Chlorophenol	ND		1	0.80	0.50	ug/L	04/03/2019 1041
Chrysene	ND		1	0.20	0.030	ug/L	04/03/2019 1041
Dibenzo(a,h)anthracene	ND		1	0.20	0.030	ug/L	04/03/2019 1041
Dibenzofuran	ND		1	0.80	0.50	ug/L	04/03/2019 1041
3,3'-Dichlorobenzidine	ND		1	4.0	1.8	ug/L	04/03/2019 1041
2,4-Dichlorophenol	ND		1	1.6	1.0	ug/L	04/03/2019 1041
Diethylphthalate	ND		1	0.80	0.50	ug/L	04/03/2019 1041
Dimethyl phthalate	ND		1	0.80	0.50	ug/L	04/03/2019 1041
2,4-Dimethylphenol	ND		1	0.80	0.48	ug/L	04/03/2019 1041
Di-n-butyl phthalate	ND		1	0.80	0.50	ug/L	04/03/2019 1041
4,6-Dinitro-2-methylphenol	ND		1	4.0	1.0	ug/L	04/03/2019 1041
2,4-Dinitrotoluene	ND		1	1.6	0.50	ug/L	04/03/2019 1041
Di-n-octylphthalate	ND		1	0.80	0.50	ug/L	04/03/2019 1041
1,2-Diphenylhydrazine(as azobenzene)	ND		1	0.80	0.50	ug/L	04/03/2019 1041
bis(2-Ethylhexyl)phthalate	ND		1	4.0	0.50	ug/L	04/03/2019 1041
Fluoranthene	ND		1	0.20	0.10	ug/L	04/03/2019 1041
Fluorene	ND		1	0.20	0.030	ug/L	04/03/2019 1041
Hexachlorobenzene	ND		1	0.80	0.50	ug/L	04/03/2019 1041
Hexachlorobutadiene	ND		1	0.80	0.50	ug/L	04/03/2019 1041
Hexachlorocyclopentadiene	ND		1	4.0	2.0	ug/L	04/03/2019 1041
Hexachloroethane	ND		1	0.80	0.31	ug/L	04/03/2019 1041
Indeno(1,2,3-c,d)pyrene	ND		1	0.20	0.040	ug/L	04/03/2019 1041
Isophorone	ND		1	0.80	0.50	ug/L	04/03/2019 1041
2-Methylnaphthalene	ND		1	0.20	0.040	ug/L	04/03/2019 1041
2-Methylphenol	ND		1	0.80	0.21	ug/L	04/03/2019 1041
3+4-Methylphenol	ND		1	1.6	1.5	ug/L	04/03/2019 1041
Naphthalene	ND		1	0.20	0.050	ug/L	04/03/2019 1041

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

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

Semivolatile Organic Compounds by GC/MS - MB

Sample ID: UQ11166-001
Batch: 11166
Analytical Method: 8270D

Matrix: Aqueous
Prep Method: 3520C
Prep Date: 03/25/2019 1939

Parameter	Result	Q	Dil	LOQ	DL	Units	Analysis Date
Nitrobenzene	ND		1	0.80	0.55	ug/L	04/03/2019 1041
2-Nitrophenol	ND		1	1.6	1.0	ug/L	04/03/2019 1041
N-Nitrosodi-n-propylamine	ND		1	0.80	0.50	ug/L	04/03/2019 1041
N-Nitrosodiphenylamine (Diphenylamine)	ND		1	0.80	0.50	ug/L	04/03/2019 1041
Pentachlorophenol	ND		1	4.0	2.0	ug/L	04/03/2019 1041
Phenanthrene	ND		1	0.20	0.060	ug/L	04/03/2019 1041
Phenol	ND		1	0.80	0.50	ug/L	04/03/2019 1041
Pyrene	ND		1	0.20	0.10	ug/L	04/03/2019 1041
2,4,5-Trichlorophenol	ND		1	0.80	0.50	ug/L	04/03/2019 1041
2,4,6-Trichlorophenol	ND		1	0.80	0.50	ug/L	04/03/2019 1041

Surrogate	Q	% Rec	Acceptance Limit
2-Fluorobiphenyl		55	37-129
2-Fluorophenol		46	24-127
Nitrobenzene-d5		70	38-127
Phenol-d5		56	28-128
Terphenyl-d14		96	10-148
2,4,6-Tribromophenol		63	35-144

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the LOQ

N = Recovery is out of criteria
+ = RPD is out of criteria

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

Semivolatile Organic Compounds by GC/MS - LCS

Sample ID: UQ11166-002
Batch: 11166
Analytical Method: 8270D

Matrix: Aqueous
Prep Method: 3520C
Prep Date: 03/25/2019 1939

Parameter	Spike Amount (ug/L)	Result (ug/L)	Q	Dil	% Rec	% Rec Limit	Analysis Date
Acenaphthene	8.0	5.4		1	68	30-122	04/03/2019 1106
Acenaphthylene	8.0	5.4		1	67	30-130	04/03/2019 1106
Acetophenone	8.0	8.4		1	105	30-130	04/03/2019 1106
Anthracene	8.0	6.1		1	77	30-123	04/03/2019 1106
Atrazine	8.0	6.6		1	82	30-130	04/03/2019 1106
Benzidine	40	24		1	61	10-115	04/03/2019 1106
Benzo(a)anthracene	8.0	6.6		1	83	40-125	04/03/2019 1106
Benzo(a)pyrene	8.0	6.5		1	81	40-128	04/03/2019 1106
Benzo(b)fluoranthene	8.0	7.0		1	88	32-145	04/03/2019 1106
Benzo(g,h,i)perylene	8.0	6.8		1	86	42-128	04/03/2019 1106
Benzo(k)fluoranthene	8.0	7.0		1	87	50-135	04/03/2019 1106
Butyl benzyl phthalate	8.0	7.9		1	98	54-135	04/03/2019 1106
Caprolactam	8.0	6.2		1	78	30-130	04/03/2019 1106
Carbazole	8.0	6.7		1	83	30-130	04/03/2019 1106
4-Chloro-3-methyl phenol	8.0	5.5		1	69	30-123	04/03/2019 1106
bis(2-Chloroethyl)ether	8.0	9.2	N	1	116	35-114	04/03/2019 1106
2-Chloronaphthalene	8.0	4.8		1	60	39-128	04/03/2019 1106
2-Chlorophenol	8.0	4.6		1	57	39-115	04/03/2019 1106
Chrysene	8.0	6.6		1	83	50-130	04/03/2019 1106
Dibenzo(a,h)anthracene	8.0	7.2		1	90	30-130	04/03/2019 1106
Dibenzofuran	8.0	5.2		1	64	30-118	04/03/2019 1106
3,3'-Dichlorobenzidine	8.0	5.1		1	63	10-126	04/03/2019 1106
2,4-Dichlorophenol	8.0	4.6		1	58	30-121	04/03/2019 1106
Diethylphthalate	8.0	6.4		1	80	40-125	04/03/2019 1106
Dimethyl phthalate	8.0	5.8		1	73	40-127	04/03/2019 1106
2,4-Dimethylphenol	8.0	5.2		1	65	20-125	04/03/2019 1106
Di-n-butyl phthalate	8.0	7.6		1	95	40-127	04/03/2019 1106
4,6-Dinitro-2-methylphenol	8.0	5.5		1	68	46-134	04/03/2019 1106
2,4-Dinitrotoluene	8.0	6.0		1	75	51-128	04/03/2019 1106
Di-n-octylphthalate	8.0	7.0		1	88	55-143	04/03/2019 1106
1,2-Diphenylhydrazine(as azobenzene)	8.0	6.8		1	85	30-130	04/03/2019 1106
bis(2-Ethylhexyl)phthalate	8.0	7.9		1	99	50-133	04/03/2019 1106
Fluoranthene	8.0	6.5		1	82	40-128	04/03/2019 1106
Fluorene	8.0	5.4		1	67	30-124	04/03/2019 1106
Hexachlorobenzene	8.0	5.5		1	69	30-125	04/03/2019 1106
Hexachlorobutadiene	8.0	4.2		1	52	24-110	04/03/2019 1106
Hexachlorocyclopentadiene	40	18		1	46	22-122	04/03/2019 1106
Hexachloroethane	8.0	4.5		1	56	28-116	04/03/2019 1106
Indeno(1,2,3-c,d)pyrene	8.0	7.1		1	89	50-125	04/03/2019 1106
Isophorone	8.0	6.2		1	77	30-130	04/03/2019 1106
2-Methylnaphthalene	8.0	4.8		1	60	40-132	04/03/2019 1106
2-Methylphenol	8.0	7.5		1	94	37-115	04/03/2019 1106
3+4-Methylphenol	8.0	7.0		1	88	44-112	04/03/2019 1106
Naphthalene	8.0	5.1		1	64	40-122	04/03/2019 1106

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the LOQ

N = Recovery is out of criteria
+ = RPD is out of criteria

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

Semivolatile Organic Compounds by GC/MS - LCS

Sample ID: UQ11166-002
Batch: 11166
Analytical Method: 8270D

Matrix: Aqueous
Prep Method: 3520C
Prep Date: 03/25/2019 1939

Parameter	Spike Amount (ug/L)	Result (ug/L)	Q	Dil	% Rec	% Rec Limit	Analysis Date
Nitrobenzene	8.0	5.9		1	74	39-123	04/03/2019 1106
2-Nitrophenol	8.0	5.2		1	65	36-123	04/03/2019 1106
N-Nitrosodi-n-propylamine	8.0	9.0		1	113	39-119	04/03/2019 1106
N-Nitrosodiphenylamine (Diphenylamine)	8.0	5.7		1	71	30-123	04/03/2019 1106
Pentachlorophenol	16	11		1	67	34-137	04/03/2019 1106
Phenanthrene	8.0	6.0		1	75	40-123	04/03/2019 1106
Phenol	8.0	4.7		1	59	30-130	04/03/2019 1106
Pyrene	8.0	7.0		1	87	40-126	04/03/2019 1106
2,4,5-Trichlorophenol	8.0	4.8		1	59	30-123	04/03/2019 1106
2,4,6-Trichlorophenol	8.0	5.0		1	62	30-125	04/03/2019 1106

Surrogate	Q	% Rec	Acceptance Limit
2-Fluorobiphenyl		61	37-129
2-Fluorophenol		35	24-127
Nitrobenzene-d5		74	38-127
Phenol-d5		57	28-128
Terphenyl-d14		93	10-148
2,4,6-Tribromophenol		70	35-144

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

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

ICP-MS - MB

Sample ID: UQ11443-001
Batch: 11443
Analytical Method: 200.8

Matrix: Aqueous
Prep Method: 200.2
Prep Date: 03/27/2019 1908

Parameter	Result	Q	Dil	LOQ	DL	Units	Analysis Date
Aluminum	ND		1	40	10	ug/L	03/28/2019 1705
Antimony	ND		1	2.0	0.50	ug/L	03/28/2019 1705
Arsenic	ND		1	2.0	1.3	ug/L	03/28/2019 1705
Barium	ND		1	5.0	1.3	ug/L	03/28/2019 1705
Beryllium	ND		1	0.40	0.15	ug/L	03/28/2019 1705
Boron	25	J	1	50	6.3	ug/L	03/28/2019 1705
Cadmium	ND		1	0.50	0.13	ug/L	03/28/2019 1705
Chromium	ND		1	5.0	1.3	ug/L	03/28/2019 1705
Cobalt	ND		1	5.0	1.3	ug/L	03/28/2019 1705
Copper	1.3	J	1	5.0	1.3	ug/L	03/28/2019 1705
Iron	ND		1	50	13	ug/L	03/28/2019 1705
Lead	ND		1	1.0	0.25	ug/L	03/28/2019 1705
Magnesium	ND		1	400	50	ug/L	03/28/2019 1705
Molybdenum	ND		1	10	2.5	ug/L	03/28/2019 1705
Nickel	ND		1	5.0	1.3	ug/L	03/28/2019 1705
Selenium	ND		1	5.0	1.3	ug/L	03/28/2019 1705
Silver	ND		1	1.0	0.25	ug/L	03/28/2019 1705
Sodium	ND		1	400	150	ug/L	03/29/2019 2250
Thallium	ND		1	0.50	0.15	ug/L	03/28/2019 1705
Titanium	ND		1	5.0	1.3	ug/L	03/28/2019 1705
Vanadium	ND		1	5.0	2.5	ug/L	03/28/2019 1705
Zinc	ND		1	10	2.5	ug/L	03/28/2019 1705

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the LOQ

N = Recovery is out of criteria
+ = RPD is out of criteria

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

ICP-MS - LCS

Sample ID: UQ11443-002
Batch: 11443
Analytical Method: 200.8

Matrix: Aqueous
Prep Method: 200.2
Prep Date: 03/27/2019 1908

Parameter	Spike Amount (ug/L)	Result (ug/L)	Q	Dil	% Rec	% Rec Limit	Analysis Date
Aluminum	100	99		1	99	85-115	03/28/2019 1711
Antimony	100	97		1	97	85-115	03/28/2019 1711
Arsenic	100	97		1	97	85-115	03/28/2019 1711
Barium	100	99		1	99	85-115	03/28/2019 1711
Beryllium	100	97		1	97	85-115	03/28/2019 1711
Boron	100	110		1	107	85-115	03/28/2019 1711
Cadmium	100	97		1	97	85-115	03/28/2019 1711
Chromium	100	95		1	95	85-115	03/28/2019 1711
Cobalt	100	93		1	93	85-115	03/28/2019 1711
Copper	100	97		1	97	85-115	03/28/2019 1711
Iron	1000	1000		1	100	85-115	03/28/2019 1711
Lead	100	100		1	100	85-115	03/28/2019 1711
Magnesium	1000	1000		1	104	85-115	03/28/2019 1711
Molybdenum	100	95		1	95	85-115	03/28/2019 1711
Nickel	100	93		1	93	85-115	03/28/2019 1711
Selenium	100	100		1	102	85-115	03/28/2019 1711
Silver	100	98		1	98	85-115	03/28/2019 1711
Sodium	1000	1000		1	101	85-115	03/29/2019 2256
Thallium	100	100		1	100	85-115	03/28/2019 1711
Titanium	100	99		1	99	85-115	03/28/2019 1711
Vanadium	100	95		1	95	85-115	03/28/2019 1711
Zinc	100	93		1	93	85-115	03/28/2019 1711

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the LOQ

N = Recovery is out of criteria
+ = RPD is out of criteria

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

ICP-MS - MS

Sample ID: UC23028-002MS
Batch: 11443
Analytical Method: 200.8

Matrix: Aqueous
Prep Method: 200.2
Prep Date: 03/27/2019 1908

Parameter	Sample Amount (ug/L)	Spike Amount (ug/L)	Result (ug/L)	Q	Dil	% Rec	% Rec Limit	Analysis Date
Aluminum	16	100	120		1	103	70-130	03/30/2019 2335
Antimony	ND	100	100		1	100	70-130	03/30/2019 2335
Arsenic	ND	100	100		1	100	70-130	03/30/2019 2335
Barium	58	100	160		1	104	70-130	03/30/2019 2335
Beryllium	ND	100	85		1	85	70-130	03/30/2019 2335
Boron	14	100	100		1	87	70-130	03/30/2019 2335
Cadmium	ND	100	99		1	99	70-130	03/30/2019 2335
Chromium	ND	100	100		1	100	70-130	03/30/2019 2335
Cobalt	ND	100	98		1	98	70-130	03/30/2019 2335
Copper	ND	100	110		1	110	70-130	03/30/2019 2335
Iron	400	1000	1400		1	97	70-130	04/03/2019 1753
Lead	ND	100	99		1	99	70-130	03/30/2019 2335
Magnesium	36000	1000	37000	N	1	53	70-130	03/30/2019 2335
Molybdenum	ND	100	97		1	97	70-130	03/30/2019 2335
Nickel	1.4	100	99		1	98	70-130	03/30/2019 2335
Selenium	ND	100	100		1	102	70-130	03/30/2019 2335
Silver	ND	100	100		1	103	70-130	03/30/2019 2335
Sodium	7100	1000	8100		1	107	70-130	03/30/2019 2335
Thallium	ND	100	100		1	103	70-130	03/30/2019 2335
Titanium	2.7	100	100		1	100	70-130	03/30/2019 2335
Vanadium	ND	100	100		1	103	70-130	03/30/2019 2335
Zinc	5.4	100	110		1	100	70-130	03/30/2019 2335

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

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

ICP-MS - MS

Sample ID: UC23028-003MS
Batch: 11443
Analytical Method: 200.8

Matrix: Aqueous
Prep Method: 200.2
Prep Date: 03/27/2019 1908

Parameter	Sample Amount (ug/L)	Spike Amount (ug/L)	Result (ug/L)	Q	Dil	% Rec	% Rec Limit	Analysis Date
Aluminum	ND	100	110		1	111	70-130	03/30/2019 2347
Antimony	ND	100	100		1	102	70-130	03/30/2019 2347
Arsenic	ND	100	100		1	103	70-130	03/30/2019 2347
Barium	14	100	120		1	107	70-130	03/30/2019 2347
Beryllium	ND	100	95		1	95	70-130	03/30/2019 2347
Boron	23	100	120		1	98	70-130	03/30/2019 2347
Cadmium	ND	100	100		1	100	70-130	03/30/2019 2347
Chromium	ND	100	100		1	102	70-130	03/30/2019 2347
Cobalt	ND	100	100		1	100	70-130	03/30/2019 2347
Copper	ND	100	110		1	113	70-130	03/30/2019 2347
Iron	220	1000	1300		1	105	70-130	04/03/2019 1819
Lead	ND	100	100		1	100	70-130	03/30/2019 2347
Magnesium	17000	1000	18000	N	1	132	70-130	03/30/2019 2347
Molybdenum	ND	100	99		1	99	70-130	03/30/2019 2347
Nickel	ND	100	100		1	101	70-130	03/30/2019 2347
Selenium	ND	100	110		1	109	70-130	03/30/2019 2347
Silver	ND	100	110		1	106	70-130	03/30/2019 2347
Sodium	9000	1000	9900		1	98	70-130	03/30/2019 2347
Thallium	ND	100	110		1	105	70-130	03/30/2019 2347
Titanium	1.6	100	110		1	104	70-130	03/30/2019 2347
Vanadium	ND	100	110		1	105	70-130	03/30/2019 2347
Zinc	ND	100	100		1	104	70-130	03/30/2019 2347

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the LOQ

N = Recovery is out of criteria
+ = RPD is out of criteria

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

ICP-MS - MSD

Sample ID: UC23028-003MD	Matrix: Aqueous
Batch: 11443	Prep Method: 200.2
Analytical Method: 200.8	Prep Date: 03/27/2019 1908

Parameter	Sample Amount (ug/L)	Spike Amount (ug/L)	Result (ug/L)	Q	Dil	% Rec	% RPD	% Rec Limit	% RPD Limit	Analysis Date
Aluminum	ND	100	110		1	109	2.2	70-130	20	03/30/2019 2352
Antimony	ND	100	100		1	102	0.20	70-130	20	03/30/2019 2352
Arsenic	ND	100	100		1	101	2.1	70-130	20	03/30/2019 2352
Barium	14	100	120		1	104	2.3	70-130	20	03/30/2019 2352
Beryllium	ND	100	94		1	94	0.80	70-130	20	03/30/2019 2352
Boron	23	100	120		1	96	0.92	70-130	20	03/30/2019 2352
Cadmium	ND	100	100		1	100	0.30	70-130	20	03/30/2019 2352
Chromium	ND	100	100		1	102	0.39	70-130	20	03/30/2019 2352
Cobalt	ND	100	98		1	98	2.1	70-130	20	03/30/2019 2352
Copper	ND	100	110		1	114	0.88	70-130	20	03/30/2019 2352
Iron	220	1000	1200		1	103	1.8	70-130	20	04/03/2019 1825
Lead	ND	100	100		1	100	0.75	70-130	20	03/30/2019 2352
Magnesium	17000	1000	18000		1	114	1.0	70-130	20	03/30/2019 2352
Molybdenum	ND	100	96		1	96	3.0	70-130	20	03/30/2019 2352
Nickel	ND	100	99		1	99	2.7	70-130	20	03/30/2019 2352
Selenium	ND	100	110		1	106	2.6	70-130	20	03/30/2019 2352
Silver	ND	100	100		1	105	0.76	70-130	20	03/30/2019 2352
Sodium	9000	1000	9800		1	88	1.0	70-130	20	03/30/2019 2352
Thallium	ND	100	100		1	104	1.1	70-130	20	03/30/2019 2352
Titanium	1.6	100	100		1	103	0.95	70-130	20	03/30/2019 2352
Vanadium	ND	100	100		1	104	1.3	70-130	20	03/30/2019 2352
Zinc	ND	100	100		1	105	0.38	70-130	20	03/30/2019 2352

CVAA - MB

Sample ID: UQ11839-001
Batch: 11839
Analytical Method: 7470A

Matrix: Aqueous
Prep Method: 245.1
Prep Date: 04/01/2019 1354

Parameter	Result	Q	Dil	LOQ	DL	Units	Analysis Date
Mercury	ND		1	0.00020	0.000091	mg/L	04/01/2019 1845

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the LOQ

N = Recovery is out of criteria
\+ = RPD is out of criteria

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

CVAA - LCS

Sample ID:	UQ11839-002	Matrix:	Aqueous
Batch:	11839	Prep Method:	245.1
Analytical Method:	7470A	Prep Date:	04/01/2019 1354

Parameter	Spike Amount (mg/L)	Result (mg/L)	Q	Dil	% Rec	% Rec Limit	Analysis Date
Mercury	0.0020	0.0019		1	95	80-120	04/01/2019 1848

LOQ = Limit of Quantitation

DL = Detection Limit

LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%

J = Estimated result < LOQ and ≥ DL

ND = Not detected at or above the LOQ

N = Recovery is out of criteria

\+ = RPD is out of criteria

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

CVAA - MS

Sample ID: UC23028-003MS
Batch: 11839
Analytical Method: 7470A

Matrix: Aqueous
Prep Method: 245.1
Prep Date: 04/01/2019 1354

Parameter	Sample Amount (mg/L)	Spike Amount (mg/L)	Result (mg/L)	Q	Dil	% Rec	% Rec Limit	Analysis Date
Mercury	ND	0.0020	0.0019		1	96	85-115	04/01/2019 1913

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the LOQ

N = Recovery is out of criteria
+ = RPD is out of criteria

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

CVAA - MSD

Sample ID: UC23028-003MD
Batch: 11839
Analytical Method: 7470A

Matrix: Aqueous
Prep Method: 245.1
Prep Date: 04/01/2019 1354

Parameter	Sample Amount (mg/L)	Spike Amount (mg/L)	Result (mg/L)	Q	Dil	% Rec	% RPD	% Rec Limit	% RPD Limit	Analysis Date
Mercury	ND	0.0020	0.0019		1	97	0.80	85-115	20	04/01/2019 1916

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection
P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the LOQ
N = Recovery 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: UQ11828-001
Batch: 11828
Analytical Method: 537 Modified-ID

Matrix: Aqueous
Prep Method: 537 MOD
Prep Date: 04/01/2019 1155

Parameter	Result	Q	Dil	LOQ	Units	Analysis Date
8:2 FTS	ND		1	4.0	ng/L	04/03/2019 1301
6:2 FTS	ND		1	4.0	ng/L	04/03/2019 1301
EtFOSA	ND		1	4.0	ng/L	04/03/2019 1301
MeFOSA	ND		1	8.0	ng/L	04/03/2019 1301
PFBS	ND		1	4.0	ng/L	04/03/2019 1301
PFDS	ND		1	4.0	ng/L	04/03/2019 1301
PFHpS	ND		1	4.0	ng/L	04/03/2019 1301
PFNS	ND		1	8.0	ng/L	04/03/2019 1301
PFOSA	ND		1	4.0	ng/L	04/03/2019 1301
PFPeS	ND		1	4.0	ng/L	04/03/2019 1301
PFHxS	ND		1	4.0	ng/L	04/03/2019 1301
PFBA	ND		1	4.0	ng/L	04/03/2019 1301
PFDA	ND		1	4.0	ng/L	04/03/2019 1301
PFDoA	ND		1	4.0	ng/L	04/03/2019 1301
PFHpA	ND		1	4.0	ng/L	04/03/2019 1301
PFHxA	ND		1	4.0	ng/L	04/03/2019 1301
PFNA	ND		1	4.0	ng/L	04/03/2019 1301
PFOA	ND		1	2.0	ng/L	04/03/2019 1301
PFPeA	ND		1	4.0	ng/L	04/03/2019 1301
PFTeDA	ND		1	4.0	ng/L	04/03/2019 1301
PFTrDA	ND		1	4.0	ng/L	04/03/2019 1301
PFUdA	ND		1	4.0	ng/L	04/03/2019 1301
PFOS	ND		1	4.0	ng/L	04/03/2019 1301

Surrogate	Q	% Rec	Acceptance Limit
13C2_6:2FTS		147	50-150
13C2_8:2FTS		120	50-150
13C2_PFDoA		110	50-150
13C2_PFTeDA		104	50-150
13C3_PFBS		119	50-150
13C3_PFHxS		126	50-150
13C4_PFBA		120	50-150
13C4_PFHpA		125	50-150
13C5_PFHxA		120	50-150
13C5_PFPeA		120	50-150
13C6_PFDA		113	50-150
13C7_PFUdA		115	50-150
13C8_PFOA		129	50-150
13C8_PFOS		117	50-150
13C8_PFOSA		107	50-150
13C9_PFNA		125	50-150

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the LOQ

N = Recovery 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:	UQ11828-001	Matrix:	Aqueous
Batch:	11828	Prep Method:	537 MOD
Analytical Method:	537 Modified-ID	Prep Date:	04/01/2019 1155

Surrogate	Q	% Rec	Acceptance Limit
d-EtFOSA		75	50-150
d-MeFOSA		60	50-150

LOQ = Limit of Quantitation

DL = Detection Limit

LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%

J = Estimated result < LOQ and ≥ DL

ND = Not detected at or above the LOQ

N = Recovery 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 - LCS

Sample ID: UQ11828-002
Batch: 11828
Analytical Method: 537 Modified-ID

Matrix: Aqueous
Prep Method: 537 MOD
Prep Date: 04/01/2019 1155

Parameter	Spike Amount (ng/L)	Result (ng/L)	Q	Dil	% Rec	% Rec Limit	Analysis Date
8:2 FTS	19	17		1	90	70-150	04/03/2019 1314
6:2 FTS	19	19		1	101	70-150	04/03/2019 1314
EtFOSA	20	23		1	117	70-150	04/03/2019 1314
MeFOSA	20	20		1	100	70-150	04/03/2019 1314
PFBS	18	16		1	91	70-150	04/03/2019 1314
PFDS	19	15		1	77	70-150	04/03/2019 1314
PFHpS	19	18		1	96	70-150	04/03/2019 1314
PFNS	19	16		1	83	70-150	04/03/2019 1314
PFOSA	20	20		1	98	70-150	04/03/2019 1314
PFPeS	19	16		1	87	70-150	04/03/2019 1314
PFHxS	18	18		1	99	70-150	04/03/2019 1314
PFBA	20	19		1	97	70-150	04/03/2019 1314
PFDA	20	20		1	99	70-150	04/03/2019 1314
PFDoA	20	19		1	95	70-150	04/03/2019 1314
PFHpA	20	18		1	91	70-150	04/03/2019 1314
PFHxA	20	20		1	98	70-150	04/03/2019 1314
PFNA	20	18		1	89	70-150	04/03/2019 1314
PFOA	20	19		1	93	70-150	04/03/2019 1314
PFPeA	20	18		1	91	70-150	04/03/2019 1314
PFTeDA	20	19		1	93	70-150	04/03/2019 1314
PFTrDA	20	17		1	86	70-150	04/03/2019 1314
PFUdA	20	18		1	91	70-150	04/03/2019 1314
PFOS	19	16		1	89	70-150	04/03/2019 1314

Surrogate	Q	% Rec	Acceptance Limit
13C2_6:2FTS		150	50-150
13C2_8:2FTS		132	50-150
13C2_PFDoA		117	50-150
13C2_PFTeDA		104	50-150
13C3_PFBS		131	50-150
13C3_PFHxS		126	50-150
13C4_PFBA		129	50-150
13C4_PFHpA		135	50-150
13C5_PFHxA		132	50-150
13C5_PFPeA		129	50-150
13C6_PFDA		128	50-150
13C7_PFUdA		124	50-150
13C8_PFOA		141	50-150
13C8_PFOS		127	50-150
13C8_PFOSA		113	50-150
13C9_PFNA		137	50-150

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the LOQ

N = Recovery 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 - LCS

Sample ID: UQ11828-002
Batch: 11828
Analytical Method: 537 Modified-ID

Matrix: Aqueous
Prep Method: 537 MOD
Prep Date: 04/01/2019 1155

Surrogate	Q	% Rec	Acceptance Limit
d-EtFOSA		77	50-150
d-MeFOSA		76	50-150

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

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

PFAS by LC/MS/MS - MS

Sample ID: UC23028-003MS
Batch: 11828
Analytical Method: 537 Modified-ID

Matrix: Aqueous
Prep Method: 537 MOD
Prep Date: 04/01/2019 1155

Parameter	Sample Amount (ng/L)	Spike Amount (ng/L)	Result (ng/L)	Q	Dil	% Rec	% Rec Limit	Analysis Date
8:2 FTS	ND	17	21		1	118	70-150	04/03/2019 1441
6:2 FTS	ND	17	16		1	91	70-150	04/03/2019 1441
EtFOSA	ND	18	23		1	126	70-150	04/03/2019 1441
MeFOSA	ND	18	19		1	105	70-150	04/03/2019 1441
PFBS	26	16	41		1	92	70-150	04/03/2019 1441
PFDS	ND	18	16		1	94	70-150	04/03/2019 1441
PFHpS	78	17	95		1	93	70-150	04/03/2019 1441
PFNS	ND	17	17		1	95	70-150	04/03/2019 1441
PFOSA	ND	18	19		1	105	70-150	04/03/2019 1441
PFPeS	44	17	61		1	96	70-150	04/03/2019 1441
PFHxS	150	17	160	N	1	52	70-150	04/03/2019 1441
PFBA	6.6	18	24		1	98	70-150	04/03/2019 1441
PFDA	ND	18	18		1	99	70-150	04/03/2019 1441
PFDoA	ND	18	18		1	99	70-150	04/03/2019 1441
PFHpA	37	18	59		1	120	70-150	04/03/2019 1441
PFHxA	16	18	36		1	112	70-150	04/03/2019 1441
PFNA	ND	18	18		1	97	70-150	04/03/2019 1441
PFOA	380	18	380	N	1	-5.2	70-150	04/03/2019 1441
PFPeA	5.5	18	23		1	95	70-150	04/03/2019 1441
PFTeDA	ND	18	18		1	98	70-150	04/03/2019 1441
PFTrDA	ND	18	17		1	94	70-150	04/03/2019 1441
PFUdA	ND	18	17		1	93	70-150	04/03/2019 1441
PFOS	140	17	160		1	125	70-150	04/03/2019 1441

Surrogate	Q	% Rec	Acceptance Limit
13C2_6:2FTS		143	50-150
13C2_8:2FTS		118	50-150
13C2_PFDoA		125	50-150
13C2_PFTeDA		124	50-150
13C3_PFBS		129	50-150
13C3_PFHxS		127	50-150
13C4_PFBA		123	50-150
13C4_PFHpA		126	50-150
13C5_PFHxA		135	50-150
13C5_PFPeA		131	50-150
13C6_PFDA		125	50-150
13C7_PFUdA		128	50-150
13C8_PFOA		134	50-150
13C8_PFOS		125	50-150
13C8_PFOSA		125	50-150
13C9_PFNA		134	50-150

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the LOQ

N = Recovery 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 - MS

Sample ID: UC23028-003MS
Batch: 11828
Analytical Method: 537 Modified-ID

Matrix: Aqueous
Prep Method: 537 MOD
Prep Date: 04/01/2019 1155

Surrogate	Q	% Rec	Acceptance Limit
d-EtFOSA		77	50-150
d-MeFOSA		83	50-150

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection
P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the LOQ
N = Recovery 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 - MSD

Sample ID: UC23028-003MD
Batch: 11828
Analytical Method: 537 Modified-ID

Matrix: Aqueous
Prep Method: 537 MOD
Prep Date: 04/01/2019 1155

Parameter	Sample Amount (ng/L)	Spike Amount (ng/L)	Result (ng/L)	Q	Dil	% Rec	% RPD	% Rec Limit	% RPD Limit	Analysis Date
8:2 FTS	ND	17	15	+	1	86	32	70-150	30	04/03/2019 1453
6:2 FTS	ND	17	16		1	92	1.2	70-150	30	04/03/2019 1453
EtFOSA	ND	18	21		1	118	7.3	70-150	30	04/03/2019 1453
MeFOSA	ND	18	22		1	125	16	70-150	30	04/03/2019 1453
PFBS	26	16	38		1	74	7.3	70-150	30	04/03/2019 1453
PFDS	ND	17	14		1	81	16	70-150	30	04/03/2019 1453
PFHpS	78	17	93		1	83	1.9	70-150	30	04/03/2019 1453
PFNS	ND	17	16		1	90	7.0	70-150	30	04/03/2019 1453
PFOSA	ND	18	18		1	100	5.6	70-150	30	04/03/2019 1453
PFPeS	44	17	59		1	83	3.9	70-150	30	04/03/2019 1453
PFHxS	150	16	180		1	133	7.8	70-150	30	04/03/2019 1453
PFBA	6.6	18	24		1	95	2.8	70-150	30	04/03/2019 1453
PFDA	ND	18	17		1	93	7.0	70-150	30	04/03/2019 1453
PFDoA	ND	18	19		1	103	3.3	70-150	30	04/03/2019 1453
PFHpA	37	18	51		1	78	14	70-150	30	04/03/2019 1453
PFHxA	16	18	34		1	101	6.3	70-150	30	04/03/2019 1453
PFNA	ND	18	17		1	95	2.9	70-150	30	04/03/2019 1453
PFOA	380	18	400		1	136	6.5	70-150	30	04/03/2019 1453
PFPeA	5.5	18	22		1	90	4.4	70-150	30	04/03/2019 1453
PFTeDA	ND	18	18		1	97	1.7	70-150	30	04/03/2019 1453
PFTrDA	ND	18	17		1	94	0.79	70-150	30	04/03/2019 1453
PFUdA	ND	18	17		1	95	1.2	70-150	30	04/03/2019 1453
PFOS	140	17	150		1	109	1.8	70-150	30	04/03/2019 1453

Surrogate	Q	% Rec	Acceptance Limit
13C2_6:2FTS		149	50-150
13C2_8:2FTS		140	50-150
13C2_PFDoA		123	50-150
13C2_PFTeDA		123	50-150
13C3_PFBS		131	50-150
13C3_PFHxS		123	50-150
13C4_PFBA		125	50-150
13C4_PFHpA		136	50-150
13C5_PFHxA		134	50-150
13C5_PFPeA		132	50-150
13C6_PFDA		130	50-150
13C7_PFUdA		127	50-150
13C8_PFOA		123	50-150
13C8_PFOS		127	50-150
13C8_PFOSA		121	50-150
13C9_PFNA		139	50-150

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the LOQ

N = Recovery 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 - MSD

Sample ID: UC23028-003MD
Batch: 11828
Analytical Method: 537 Modified-ID

Matrix: Aqueous
Prep Method: 537 MOD
Prep Date: 04/01/2019 1155

Surrogate	Q	% Rec	Acceptance Limit
d-EtFOSA		83	50-150
d-MeFOSA		82	50-150

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

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

Chain of Custody
and
Miscellaneous Documents

SHEALY

Chain of Custody Record

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

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: 601 Fifth Street NW, Suite 102
Sampler's Signature: x Makayla Myers
Printed Name: Makayla Myers
Analysis (Attach list if more space is needed)
Page 1 of 1
City: Grand Rapids
State: MI
Zip Code: 49504
Project Name: 16.0062335.52 T2
Project Number: 16.0062335.52 T2
P.O No.:

UC23028

NMS

Sample ID / Description (Containers for each sample may be combined on one line)	Date	Time	G=Grab C=Composite	Aqueous	Solid	Non-Aqueous		Unpres.	H2SO4	HNO3	HCl	NaOH	H2O	MeOH	PFAS	Remarks / Cooler I.D.
				Matrix				No of Containers by Preservative Type								
HS-MW-7S	3/21/2019	11:10	G	x				2							x	
HS-MW-7SDUP	3/21/2019	11:10	G	x				2							x	
HS-MW-8 MS/MSD	3/21/2019	14:00	G	x				2							x	
HS-MW-8	3/21/2019	14:00	G	x				2							x	
EB-32019-SS	3/20/19	10:00	G	X				2							X	

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

Sample Disposal
☐ Return to Client ☒ Disposal by Lab

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

QC Requirements

	Date	Time		Date	Time
1. Relinquished by Makayla Myers	3/21/2019	9:30	1. Received by		
2. Relinquished by			2. Received by		
3. Relinquished by			3. Received by		
4. Relinquished by Fed Ex	3-23-19	0850	4. Laboratory Received by L Hite	3-23-19	0850

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

LAB USE ONLY
Received on Ice (Check) ☒ Y ☐ N ☐ Ice Pack
Receipt Temp. 4.0 °C

Document Number: ME002OW-01

SHEALY

Chain of Custody Record

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

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: 601 Fifth Street NW, Suite 102
Sampler's Signature: X Makayla Myers
Printed Name: Makayla Myers
Analysis (Attach list if more space is needed)
Page 1 of 1
City: Grand Rapids
State: MI
Zip Code: 49504
Project Name: 16.0062335.52 T2
Project Number: 16.0062335.52 T2
P.O No.:

UC23028

NMS

Sample ID / Description (Containers for each sample may be combined on one line)	Date	Time	G=Grab C=Composite	Matrix				No of Containers by Preservative Type							VOCs & SVOCs	Project List Metals, Hg, & Hardness	Chloride	Total phosphorus	Total ammonia, Nitrate/Nitrite	Sulfide	Sulfate	Total Cyanide		Remarks / Cooler I.D. Shealy Water
				Aqueous	Solid	Non-Aqueous		Unpres.	H2SO4	HNO3	HCl	NaOH	NaOH & Zn Acetate	MeOH										
HS-MW-75	3/21/2019	11:10	G	x				2	1	3	3	1	2		x	x	x	x	x	x	x	x		
HS-MW-75DUP	3/21/2019	11:10	G	x				2	1	3	3	1	2		x	x	x	x	x	x	x	x		
HS-MW-8	3/21/2019	14:00	G	x				2	1	3	3	1	2		x	x	x	x	x	x	x	x		
HS-MW-8 MS/MSD	3/21/2019	14:00	G	x				2	1	3	3	1	2		x	x	x	x	x	x	x	x		
Trip Blank	3/21/2019	8:00	G	x							2				x									Trip blank

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

Sample Disposal
☐ Return to Client ☒ Disposal by Lab

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

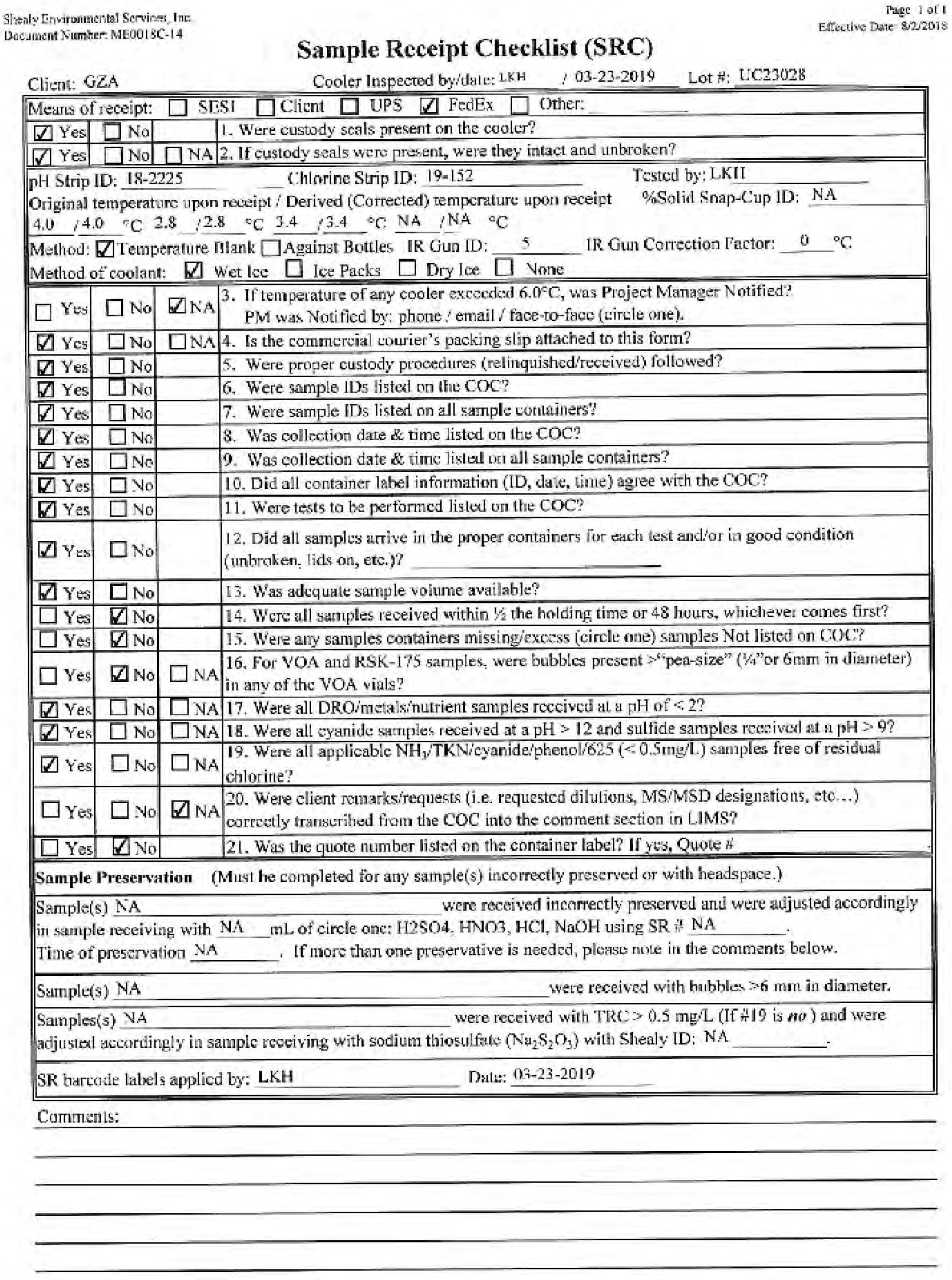
QC Requirements

Relinquished by	Date	Time	Received by	Date	Time
1. Relinquished by Makayla Myers	3/21/2019	9:30	1. Received by		
2. Relinquished by			2. Received by		
3. Relinquished by			3. Received by		
4. Relinquished by Fed Ex	3-23-19	0850	4. Laboratory Received by	3-23-19	0850

Project Metals List: Al, Sb, As, Ba, Be, B, Cd, Cr, Co, Cu, Fe, Pb, Mg, Hg, Mo, Ni, Se, Ag, Na, Ti, Tl, V, Zn.
Samples are retained for 4 weeks unless other arrangements are made.

LAB USE ONLY
Received on Ice (Check) ☑ Y ☐ N ☐ Ice Pack
Receipt Temp 2.8 °C 3.4°C

Document Number: ME002OW-01



Shealy Environmental Services, Inc.
Document Number: ME0018C-14

Page 1 of 1
Effective Date: 8/2/2018

Sample Receipt Checklist (SRC)

Client: GZA   Cooler Inspected by/date: LKH / 03-23-2019   Lot #: UC23028

Means of receipt: ☐ SESI ☐ 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: 18-2225   Chlorine Strip ID: 19-152   Tested by: LKH

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

4.0 /4.0 °C 2.8 /2.8 °C 3.4 /3.4 °C NA /NA °C

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

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

☐ Yes	☐ No	☑ NA	3. If temperature of any cooler exceeded 6.0°C, was Project Manager Notified? PM was Notified by: phone / email / face-to-face (circle one).
☑ Yes	☐ No	☐ NA	4. Is the commercial courier's packing slip attached to this form?
☑ Yes	☐ No		5. Were proper custody procedures (relinquished/received) followed?
☑ Yes	☐ No		6. Were sample IDs listed on the COC?
☑ Yes	☐ No		7. Were sample IDs listed on all sample containers?
☑ Yes	☐ No		8. Was collection date & time listed on the COC?
☑ Yes	☐ No		9. Was collection date & time listed on all sample containers?
☑ Yes	☐ No		10. Did all container label information (ID, date, time) agree with the COC?
☑ Yes	☐ No		11. Were tests to be performed listed on the COC?
☑ Yes	☐ No		12. Did all samples arrive in the proper containers for each test and/or in good condition (unbroken, lids on, etc.)?
☑ Yes	☐ No		13. Was adequate sample volume available?
☐ Yes	☑ No		14. Were all samples received within ½ the holding time or 48 hours, whichever comes first?
☐ Yes	☑ No		15. Were any samples containers missing/excess (circle one) samples Not listed on COC?
☐ Yes	☑ No	☐ NA	16. For VOA and RSK-175 samples, were bubbles present >"pea-size" (¼"or 6mm in diameter) in any of the VOA vials?
☑ Yes	☐ No	☐ NA	17. Were all DRO/metals/nutrient samples received at a pH of < 2?
☑ Yes	☐ No	☐ NA	18. Were all cyanide samples received at a pH > 12 and sulfide samples received at a pH > 9?
☑ Yes	☐ No	☐ NA	19. Were all applicable NH_3/TKN/cyanide/phenol/625 (< 0.5mg/L) samples free of residual chlorine?
☐ Yes	☐ No	☑ NA	20. Were client remarks/requests (i.e. requested dilutions, MS/MSD designations, etc...) correctly transcribed from the COC into the comment section in LIMS?
☐ Yes	☑ No		21. Was the quote number listed on the container label? If yes, Quote #

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

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

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

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

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

SR barcode labels applied by: LKH   Date: 03-23-2019

Comments:

15-Mar-2019

Nisreen Saikaly
Shealy Environmental Services, Inc.
106 Vantage Point Dr.
West Columbia, SC 29169

Re: **16.0062335.52 T2** Work Order: **1903165**

Dear Nisreen,

ALS Environmental received 8 samples on 05-Mar-2019 through 08-Mar-2019 for the analyses presented in the following report.

The analytical data provided relates directly to the samples received by ALS Environmental - Holland and for only the analyses requested.

Sample results are compliant with industry accepted practices and Quality Control results achieved laboratory specifications. Any exceptions are noted in the Case Narrative, or noted with qualifiers in the report or QC batch information. Should this laboratory report need to be reproduced, it should be reproduced in full unless written approval has been obtained from ALS Environmental. Samples will be disposed in 30 days unless storage arrangements are made.

The total number of pages in this report is 25.

If you have any questions regarding this report, please feel free to contact me:

ADDRESS: 3352 128th Avenue, Holland, MI, USA
PHONE: +1 (616) 399-6070 FAX: +1 (616) 399-6185

Sincerely,

Electronically approved by: Chad Whelton

Chad Whelton
Project Manager

Client: Shealy Environmental Services, Inc.
Project: 16.0062335.52 T2
Work Order: **1903165**

Work Order Sample Summary

Lab Samp ID	Client Sample ID	Matrix	Tag Number	Collection Date	Date Received	Hold
1903165-01	HS-MW-20S	Aqueous		3/4/2019 12:15	3/5/2019 11:05	☐
1903165-02	EB-1	Aqueous		3/4/2019 13:45	3/5/2019 11:05	☐
1903165-03	EB-2	Aqueous		3/4/2019 14:10	3/5/2019 11:05	☐
1903165-04	HS-MW-20M	Aqueous		3/6/2019 12:20	3/7/2019 09:45	☐
1903165-05	HS-MW-20D	Aqueous		3/6/2019 12:25	3/7/2019 09:45	☐
1903165-06	HS-MW-17S	Aqueous		3/6/2019 16:15	3/7/2019 09:45	☐
1903165-07	HS-MW-17M	Aqueous		3/7/2019 11:50	3/8/2019 10:50	☐
1903165-08	HS-MW-17D	Aqueous		3/7/2019 12:25	3/8/2019 10:50	☐

ALS Group, USA *Date: 15-Mar-19*

Client: Shealy Environmental Services, Inc.
Project: 16.0062335.52 T2
Work Order: 1903165

Case Narrative

Samples for the above noted Work Order were received on 03/05/2019. The attached "Sample Receipt Checklist" documents the status of custody seals, container integrity, preservation, and temperature compliance.

Samples were analyzed according to the analytical methodology previously transmitted in the "Work Order Acknowledgement". Methodologies are also documented in the "Analytical Result" section for each sample. Quality control results are listed in the "QC Report" section. Sample association for the reported quality control is located at the end of each batch summary. If applicable, results are appropriately qualified in the Analytical Result and QC Report sections. The "Qualifiers" section documents the various qualifiers, units, and acronyms utilized in reporting. A copy of the laboratory's scope of accreditation is available upon request.

With the following exceptions, all sample analyses achieved analytical criteria.

Client: Shealy Environmental Services, Inc.
Project: 16.0062335.52 T2
WorkOrder: **1903165**

QUALIFIERS, ACRONYMS, UNITS

Qualifier	Description
*	Value exceeds Regulatory Limit
**	Estimated Value
a	Analyte is non-accredited
B	Analyte detected in the associated Method Blank above the Reporting Limit
E	Value above quantitation range
H	Analyzed outside of Holding Time
Hr	BOD/CBOD - Sample was reset outside Hold Time, value should be considered estimated.
J	Analyte is present at an estimated concentration between the MDL and Report Limit
ND	Not Detected at the Reporting Limit
O	Sample amount is > 4 times amount spiked
P	Dual Column results percent difference > 40%
R	RPD above laboratory control limit
S	Spike Recovery outside laboratory control limits
U	Analyzed but not detected above the MDL
X	Analyte was detected in the Method Blank between the MDL and Reporting Limit, sample results may exhibit background or reagent contamination at the observed level.

Acronym	Description
DUP	Method Duplicate
LCS	Laboratory Control Sample
LCSD	Laboratory Control Sample Duplicate
LOD	Limit of Detection (see MDL)
LOQ	Limit of Quantitation (see PQL)
MBLK	Method Blank
MDL	Method Detection Limit
MS	Matrix Spike
MSD	Matrix Spike Duplicate
PQL	Practical Quantitation Limit
RPD	Relative Percent Difference
TDL	Target Detection Limit
TNTC	Too Numerous To Count
A	APHA Standard Methods
D	ASTM
E	EPA
SW	SW-846 Update III

Units Reported	Description
µg/L	Micrograms per Liter
mg/L	Milligrams per Liter

ALS Group, USA

Date: *15-Mar-19*

Client: Shealy Environmental Services, Inc.
Project: 16.0062335.52 T2
Work Order: 1903165
Sample ID: HS-MW-20S
Lab ID: 1903165-01
Collection Date: 3/4/2019 12:15 PM
Matrix: AQUEOUS

Analyses	Result	Qual	Report Limit	Units	Dilution Factor	Date Analyzed
ACIDS BY HPLC			**SW8300M**			Analyst: **KYM**
Acetic Acid	ND		25	mg/L	1	3/12/2019 01:08 PM
Formic Acid	ND		25	mg/L	1	3/12/2019 01:08 PM
CYANIDE, AVAILABLE			**OIA 1677**			Analyst: **MB**
Cyanide, Available	**3.3**		**2.0**	**µg/L**	1	3/5/2019 01:00 PM
CHROMIUM, HEXAVALENT			**SW7196A**			Analyst: **JEB**
Chromium, Hexavalent	ND		0.0050	mg/L	1	3/5/2019 12:14 PM

Note: See Qualifiers page for a list of qualifiers and their definitions.

ALS Group, USA

Date: *15-Mar-19*

Client: Shealy Environmental Services, Inc.
Project: 16.0062335.52 T2
Work Order: 1903165
Sample ID: EB-1
Lab ID: 1903165-02
Collection Date: 3/4/2019 01:45 PM
Matrix: AQUEOUS

Analyses	Result	Qual	Report Limit	Units	Dilution Factor	Date Analyzed
ACIDS BY HPLC			**SW8300M**			Analyst: **KYM**
Acetic Acid	ND		25	mg/L	1	3/12/2019 01:21 PM
Formic Acid	ND		25	mg/L	1	3/12/2019 01:21 PM
CYANIDE, AVAILABLE			**OIA 1677**			Analyst: **MB**
Cyanide, Available	ND		2.0	µg/L	1	3/5/2019 01:00 PM
CHROMIUM, HEXAVALENT			**SW7196A**			Analyst: **JEB**
Chromium, Hexavalent	ND		0.0050	mg/L	1	3/5/2019 12:14 PM

Note: See Qualifiers page for a list of qualifiers and their definitions.

ALS Group, USA

Date: *15-Mar-19*

Client: Shealy Environmental Services, Inc.
Project: 16.0062335.52 T2 **Work Order:** 1903165
Sample ID: EB-2 **Lab ID:** 1903165-03
Collection Date: 3/4/2019 02:10 PM **Matrix:** AQUEOUS

Analyses	Result	Qual	Report Limit	Units	Dilution Factor	Date Analyzed
ACIDS BY HPLC			**SW8300M**			Analyst: **KYM**
Acetic Acid	ND		25	mg/L	1	3/12/2019 01:34 PM
Formic Acid	ND		25	mg/L	1	3/12/2019 01:34 PM
CYANIDE, AVAILABLE			**OIA 1677**			Analyst: **MB**
Cyanide, Available	ND		2.0	µg/L	1	3/5/2019 01:00 PM
CHROMIUM, HEXAVALENT			**SW7196A**			Analyst: **JEB**
Chromium, Hexavalent	ND		0.0050	mg/L	1	3/5/2019 12:14 PM

Note: See Qualifiers page for a list of qualifiers and their definitions.

Client: Shealy Environmental Services, Inc.
Project: 16.0062335.52 T2 **Work Order:** 1903165
Sample ID: HS-MW-20M **Lab ID:** 1903165-04
Collection Date: 3/6/2019 12:20 PM **Matrix:** AQUEOUS

Analyses	Result	Qual	Report Limit	Units	Dilution Factor	Date Analyzed
ACIDS BY HPLC			**SW8300M**			Analyst: **KYM**
Acetic Acid	ND		25	mg/L	1	3/12/2019 01:47 PM
Formic Acid	ND		25	mg/L	1	3/12/2019 01:47 PM
CYANIDE, AVAILABLE			**OIA 1677**			Analyst: **MB**
Cyanide, Available	**4.6**		**2.0**	**µg/L**	1	3/8/2019 11:00 AM
CHROMIUM, HEXAVALENT			**SW7196A**			Analyst: **JEB**
Chromium, Hexavalent	ND		0.0050	mg/L	1	3/7/2019 10:20 AM

Note: See Qualifiers page for a list of qualifiers and their definitions.

Client: Shealy Environmental Services, Inc.
Project: 16.0062335.52 T2 **Work Order:** 1903165
Sample ID: HS-MW-20D **Lab ID:** 1903165-05
Collection Date: 3/6/2019 12:25 PM **Matrix:** AQUEOUS

Analyses	Result	Qual	Report Limit	Units	Dilution Factor	Date Analyzed
ACIDS BY HPLC			**SW8300M**			Analyst: **KYM**
Acetic Acid	ND		25	mg/L	1	3/12/2019 02:00 PM
Formic Acid	ND		25	mg/L	1	3/12/2019 02:00 PM
CYANIDE, AVAILABLE			**OIA 1677**			Analyst: **MB**
Cyanide, Available	ND		2.0	µg/L	1	3/8/2019 11:00 AM
CHROMIUM, HEXAVALENT			**SW7196A**			Analyst: **JEB**
Chromium, Hexavalent	ND		0.0050	mg/L	1	3/7/2019 10:20 AM

Note: See Qualifiers page for a list of qualifiers and their definitions.

Client: Shealy Environmental Services, Inc.
Project: 16.0062335.52 T2 **Work Order:** 1903165
Sample ID: HS-MW-17S **Lab ID:** 1903165-06
Collection Date: 3/6/2019 04:15 PM **Matrix:** AQUEOUS

Analyses	Result	Qual	Report Limit	Units	Dilution Factor	Date Analyzed
ACIDS BY HPLC			**SW8300M**			Analyst: **KYM**
Acetic Acid	ND		25	mg/L	1	3/12/2019 02:13 PM
Formic Acid	ND		25	mg/L	1	3/12/2019 02:13 PM
CYANIDE, AVAILABLE			**OIA 1677**			Analyst: **MB**
Cyanide, Available	ND		2.0	µg/L	1	3/8/2019 11:00 AM
CHROMIUM, HEXAVALENT			**SW7196A**			Analyst: **JEB**
Chromium, Hexavalent	ND		0.0050	mg/L	1	3/7/2019 10:20 AM

Note: See Qualifiers page for a list of qualifiers and their definitions.

Client:	Shealy Environmental Services, Inc.		
Project:	16.0062335.52 T2	**Work Order:**	1903165
Sample ID:	HS-MW-17M	**Lab ID:**	1903165-07
Collection Date:	3/7/2019 11:50 AM	**Matrix:**	AQUEOUS

Analyses	Result	Qual	Report Limit	Units	Dilution Factor	Date Analyzed
ACIDS BY HPLC			**SW8300M**			Analyst: **KYM**
Acetic Acid	ND		25	mg/L	1	3/12/2019 02:39 PM
Formic Acid	ND		25	mg/L	1	3/12/2019 02:39 PM
CYANIDE, AVAILABLE			**OIA 1677**			Analyst: **MB**
Cyanide, Available	**3.0**		**2.0**	**µg/L**	1	3/11/2019 02:00 PM
CHROMIUM, HEXAVALENT			**SW7196A**			Analyst: **JEB**
Chromium, Hexavalent	ND		0.0050	mg/L	1	3/8/2019 11:14 AM

Note: See Qualifiers page for a list of qualifiers and their definitions.

Client: Shealy Environmental Services, Inc.
Project: 16.0062335.52 T2 **Work Order:** 1903165
Sample ID: HS-MW-17D **Lab ID:** 1903165-08
Collection Date: 3/7/2019 12:25 PM **Matrix:** AQUEOUS

Analyses	Result	Qual	Report Limit	Units	Dilution Factor	Date Analyzed
ACIDS BY HPLC			**SW8300M**			Analyst: **KYM**
Acetic Acid	ND		25	mg/L	1	3/12/2019 02:52 PM
Formic Acid	ND		25	mg/L	1	3/12/2019 02:52 PM
CYANIDE, AVAILABLE			**OIA 1677**			Analyst: **MB**
Cyanide, Available	ND		2.0	µg/L	1	3/11/2019 02:00 PM
CHROMIUM, HEXAVALENT			**SW7196A**			Analyst: **JEB**
Chromium, Hexavalent	ND		0.0050	mg/L	1	3/8/2019 11:14 AM

Note: See Qualifiers page for a list of qualifiers and their definitions.

ALS Group, USA

Date: 15-Mar-19

Client: Shealy Environmental Services, Inc.
Work Order: 1903165
Project: 16.0062335.52 T2

QC BATCH REPORT

Batch ID: **R256427** Instrument ID **HPLC2** Method: **SW8300M**

MBLK Sample ID: **MBLKW1-R256427** Units: **mg/L** Analysis Date: **3/12/2019 12:16 PM**
Client ID: Run ID: **HPLC2_190312A** SeqNo: **5557672** Prep Date: **3/12/2019** DF: **1**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Acetic Acid	ND	5.0								
Formic Acid	ND	5.0								

LCS Sample ID: **LCSW1`-R256427** Units: **mg/L** Analysis Date: **3/12/2019 12:29 PM**
Client ID: Run ID: **HPLC2_190312A** SeqNo: **5557673** Prep Date: **3/12/2019** DF: **1**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Acetic Acid	525.9	5.0	500	0	105	80-120	0			
Formic Acid	517.5	5.0	500	0	104	80-120	0			

MS Sample ID: **1903165-01A MS** Units: **mg/L** Analysis Date: **3/12/2019 12:42 PM**
Client ID: **HS-MW-20S** Run ID: **HPLC2_190312A** SeqNo: **5557674** Prep Date: **3/12/2019** DF: **2**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Acetic Acid	1001	10	1000	0	100	75-125	0			
Formic Acid	985.5	10	1000	0	98.5	75-125	0			

MSD Sample ID: **1903165-01A MSD** Units: **mg/L** Analysis Date: **3/12/2019 12:55 PM**
Client ID: **HS-MW-20S** Run ID: **HPLC2_190312A** SeqNo: **5557676** Prep Date: **3/12/2019** DF: **2**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Acetic Acid	1022	10	1000	0	102	75-125	1001	2.02	20	
Formic Acid	999.4	10	1000	0	99.9	75-125	985.5	1.4	20	

The following samples were analyzed in this batch:

1903165-01A
1903165-02A
1903165-03A
1903165-04A
1903165-05A
1903165-06A
1903165-07A
1903165-08A

Note: See Qualifiers Page for a list of Qualifiers and their explanation.

QC BATCH REPORT

Batch ID: **R255929** Instrument ID **WETCHEM** Method: **SW7196A**

MBLK Sample ID: **MB-R255929-R255929** Units: **mg/L** Analysis Date: **3/5/2019 12:14 PM**
Client ID: Run ID: **WETCHEM_190305F** SeqNo: **5546238** Prep Date: DF: **1**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Chromium, Hexavalent	ND	0.0050								

LCS Sample ID: **LCS-R255929-R255929** Units: **mg/L** Analysis Date: **3/5/2019 12:14 PM**
Client ID: Run ID: **WETCHEM_190305F** SeqNo: **5546239** Prep Date: DF: **1**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Chromium, Hexavalent	0.2031	0.0050	0.2	0	102	91-113	0			

MS Sample ID: **1903165-02B MS** Units: **mg/L** Analysis Date: **3/5/2019 12:14 PM**
Client ID: **EB-1** Run ID: **WETCHEM_190305F** SeqNo: **5546242** Prep Date: DF: **1**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Chromium, Hexavalent	0.1994	0.0050	0.2	0.0003	99.6	91-113	0			

MSD Sample ID: **1903165-02B MSD** Units: **mg/L** Analysis Date: **3/5/2019 12:14 PM**
Client ID: **EB-1** Run ID: **WETCHEM_190305F** SeqNo: **5546243** Prep Date: DF: **1**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Chromium, Hexavalent	0.2119	0.0050	0.2	0.0003	106	91-113	0.1994	6.08	10	

The following samples were analyzed in this batch: 1903165-01B 1903165-02B 1903165-03B

Note: See Qualifiers Page for a list of Qualifiers and their explanation.

Batch ID: **R255940** Instrument ID **FS3100** Method: **OIA 1677**

MBLK Sample ID: **MB-R255940-R255940** Units: **µg/L** Analysis Date: **3/5/2019 01:00 PM**
Client ID: Run ID: **FS3100_190305B** SeqNo: **5546597** Prep Date: DF: **1**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Cyanide, Available	ND	2.0								

LCS Sample ID: **LCS-R255940-R255940** Units: **µg/L** Analysis Date: **3/5/2019 01:00 PM**
Client ID: Run ID: **FS3100_190305B** SeqNo: **5546598** Prep Date: DF: **1**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Cyanide, Available	42.83	2.0	50	0	85.7	82-132	0			

MS Sample ID: **1903165-02C MS** Units: **µg/L** Analysis Date: **3/5/2019 01:00 PM**
Client ID: **EB-1** Run ID: **FS3100_190305B** SeqNo: **5546601** Prep Date: DF: **1**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Cyanide, Available	49.38	2.0	50	0.55	97.7	82-130	0			

MSD Sample ID: **1903165-02C MSD** Units: **µg/L** Analysis Date: **3/5/2019 01:00 PM**
Client ID: **EB-1** Run ID: **FS3100_190305B** SeqNo: **5546602** Prep Date: DF: **1**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Cyanide, Available	51.51	2.0	50	0.55	102	82-130	49.38	4.22	11	

The following samples were analyzed in this batch: 1903165-01C 1903165-02C 1903165-03C

Client: Shealy Environmental Services, Inc.
Work Order: 1903165
Project: 16.0062335.52 T2

QC BATCH REPORT

Batch ID: **R256056** Instrument ID **WETCHEM** Method: **SW7196A**

MBLK Sample ID: **MB-R256056-R256056** Units: **mg/L** Analysis Date: **3/7/2019 10:20 AM**
Client ID: Run ID: **WETCHEM_190307E** SeqNo: **5549452** Prep Date: DF: **1**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Chromium, Hexavalent	ND	0.0050								

LCS Sample ID: **LCS-R256056-R256056** Units: **mg/L** Analysis Date: **3/7/2019 10:20 AM**
Client ID: Run ID: **WETCHEM_190307E** SeqNo: **5549453** Prep Date: DF: **1**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Chromium, Hexavalent	0.2019	0.0050	0.2	0	101	91-113	0			

MS Sample ID: **1903165-04B MS** Units: **mg/L** Analysis Date: **3/7/2019 10:20 AM**
Client ID: **HS-MW-20M** Run ID: **WETCHEM_190307E** SeqNo: **5549455** Prep Date: DF: **1**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Chromium, Hexavalent	0.1956	0.0050	0.2	0.0015	97	91-113	0			

MSD Sample ID: **1903165-04B MSD** Units: **mg/L** Analysis Date: **3/7/2019 10:20 AM**
Client ID: **HS-MW-20M** Run ID: **WETCHEM_190307E** SeqNo: **5549456** Prep Date: DF: **1**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Chromium, Hexavalent	0.2081	0.0050	0.2	0.0015	103	91-113	0.1956	6.19	10	

The following samples were analyzed in this batch: 1903165-04B 1903165-05B 1903165-06B

Note: See Qualifiers Page for a list of Qualifiers and their explanation.

Client: Shealy Environmental Services, Inc.
Work Order: 1903165
Project: 16.0062335.52 T2

QC BATCH REPORT

Batch ID: **R256144** Instrument ID **WETCHEM** Method: **SW7196A**

MBLK Sample ID: **MB-R256144-R256144** Units: **mg/L** Analysis Date: **3/8/2019 11:14 AM**
Client ID: Run ID: **WETCHEM_190308D** SeqNo: **5551328** Prep Date: DF: **1**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Chromium, Hexavalent	ND	0.0050								

LCS Sample ID: **LCS-R256144-R256144** Units: **mg/L** Analysis Date: **3/8/2019 11:14 AM**
Client ID: Run ID: **WETCHEM_190308D** SeqNo: **5551329** Prep Date: DF: **1**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Chromium, Hexavalent	0.2044	0.0050	0.2	0	102	91-113	0			

MS Sample ID: **1903165-07B MS** Units: **mg/L** Analysis Date: **3/8/2019 11:14 AM**
Client ID: **HS-MW-17M** Run ID: **WETCHEM_190308D** SeqNo: **5551331** Prep Date: DF: **1**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Chromium, Hexavalent	0.1931	0.0050	0.2	0.0003	96.4	91-113	0			

MSD Sample ID: **1903165-07B MSD** Units: **mg/L** Analysis Date: **3/8/2019 11:14 AM**
Client ID: **HS-MW-17M** Run ID: **WETCHEM_190308D** SeqNo: **5551332** Prep Date: DF: **1**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Chromium, Hexavalent	0.1994	0.0050	0.2	0.0003	99.6	91-113	0.1931	3.21	10	

The following samples were analyzed in this batch: 1903165-07B 1903165-08B

Note: See Qualifiers Page for a list of Qualifiers and their explanation.

QC BATCH REPORT

Batch ID: **R256158** Instrument ID **FS3100** Method: **OIA 1677**

MBLK Sample ID: **MB-R256158-R256158** Units: **µg/L** Analysis Date: **3/8/2019 11:00 AM**
Client ID: Run ID: **FS3100_190308A** SeqNo: **5551882** Prep Date: DF: **1**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Cyanide, Available	ND	2.0								

LCS Sample ID: **LCS-R256158-R256158** Units: **µg/L** Analysis Date: **3/8/2019 11:00 AM**
Client ID: Run ID: **FS3100_190308A** SeqNo: **5551883** Prep Date: DF: **1**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Cyanide, Available	45.59	2.0	50	0	91.2	82-132	0			

MS Sample ID: **1903235-01A MS** Units: **µg/L** Analysis Date: **3/8/2019 11:00 AM**
Client ID: Run ID: **FS3100_190308A** SeqNo: **5551888** Prep Date: DF: **1**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Cyanide, Available	33.15	2.0	50	1.15	64	82-130	0			S

MSD Sample ID: **1903235-01A MSD** Units: **µg/L** Analysis Date: **3/8/2019 11:00 AM**
Client ID: Run ID: **FS3100_190308A** SeqNo: **5551889** Prep Date: DF: **1**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Cyanide, Available	31.78	2.0	50	1.15	61.3	82-130	33.15	4.22	11	S

The following samples were analyzed in this batch: 1903165-04C 1903165-05C 1903165-06C

Note: See Qualifiers Page for a list of Qualifiers and their explanation.

Client: Shealy Environmental Services, Inc.
Work Order: 1903165
Project: 16.0062335.52 T2

QC BATCH REPORT

Batch ID: **R256274** Instrument ID **FS3100** Method: **OIA 1677**

MBLK Sample ID: **MB-R256274-R256274** Units: **µg/L** Analysis Date: **3/11/2019 02:00 PM**
Client ID: Run ID: **FS3100_190311B** SeqNo: **5554031** Prep Date: DF: **1**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Cyanide, Available	ND	2.0								

LCS Sample ID: **LCS-R256274-R256274** Units: **µg/L** Analysis Date: **3/11/2019 02:00 PM**
Client ID: Run ID: **FS3100_190311B** SeqNo: **5554032** Prep Date: DF: **1**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Cyanide, Available	46.11	2.0	50	0	92.2	82-132	0			

MS Sample ID: **1903399-01A MS** Units: **µg/L** Analysis Date: **3/11/2019 02:00 PM**
Client ID: Run ID: **FS3100_190311B** SeqNo: **5554037** Prep Date: DF: **1**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Cyanide, Available	52.19	2.0	50	0.01	104	82-130	0			

MSD Sample ID: **1903399-01A MSD** Units: **µg/L** Analysis Date: **3/11/2019 02:00 PM**
Client ID: Run ID: **FS3100_190311B** SeqNo: **5554038** Prep Date: DF: **1**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Cyanide, Available	51.95	2.0	50	0.01	104	82-130	52.19	0.461	11	

The following samples were analyzed in this batch: 1903165-07C 1903165-08C

Note: See Qualifiers Page for a list of Qualifiers and their explanation.

1903165

SHEALY

Chain of Custody Record

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

Number

Client: **Rose and Westra / GZA**

Report to Contact: Lori Powers

Telephone No. / E-mail: 616-956-6123 loretta.powers@gza.com

Quote No.: 20986

Address: 601 Fifth Street NW, Suite 102

Sampler's Signature: X

Printed Name: Jack Markosky

Analysis (Attach list if more space is needed)

Page 1 of 1

City: Grand Rapids

State: MI

Zip Code: 49504

Project Name: 16.0062335.52 T2

Laboratory Lot Number

Project Number: 16.0062335.52 T2

P.O No.

Sample ID / Description (Containers for each sample may be combined on one line)	Date	Time	G=Grab C=Composite	Matrix: Aqueous	Solid	Non-Aqueous		No of Containers by Preservative Type: Unpres.	H2SO4	HNO3	HCl	NaOH/Zn Acetate	NaOH	MeOH	Acetic Acid	Formic Acid	Available Cyanide	Hexavalent Chromium (7199)						Remarks / Cooler I.D. ALS Water
MW-20S	3/4/2019	1215	G	x				4					1		x	x	x	x						
EB-1	3/4/2019	1345	G	x				4					1		x	x	x	x						Equipment blank
EB-2	3/4/2019	1410	G	x				4					1		x	x	x	x						Equipment blank

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

Sample Disposal
☐ Return to Client ☒ Disposal by Lab

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

QC Requirements

	Date	Time		Date	Time
1. Relinquished by Jack Markosky	3/5/2019	1000	1. Received by	3/5/19	1000
2. Relinquished by	3/5/19	1105	2. Received by		
3. Relinquished by			3. Received by		
4. Relinquished by			4. Laboratory Received by		

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

LAB USE ONLY
Received on Ice (Check) ☐ Y ☐ N ☐ Ice Pack

Receipt Temp. 2.0 °C SRZ

1903165

SHEALY

Chain of Custody Record

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

Number 1903165

Client: **Rose and Westra / GZA**

Report to Contact: Lori Powers

Telephone No. / E-mail: 616-956-6123 loretta.powers@gza.com

Quote No.: 20986

Address: 601 Fifth Street NW, Suite 102

Sampler's Signature: x

Printed Name: Jack Markosky

Analysis (Attach list if more space is needed)

Page 1 of 1

City: Grand Rapids

State: MI

Zip Code: 49504

Project Name: 16.0062335.52 T2

Laboratory Lot Number

Project Number: 16.0062335.52 T2

P.O No.

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	Matrix:	No of Containers by Preservative Type: Unpres.	H2SO4	HNO3	HCl	NaOH/Zn Acetate	NaOH	MeOH	Acetic Acid	Formic Acid	Available Cyanide	Hexavalent Chromium (7199)						Remarks / Cooler I.D. ALS Water
MW-20M	3/6/2019	1220	G	x				4					1		x	x	x	x						
MW-20D	3/6/2019	1225	G	x				4					1		x	x	x	x						
MW-17S	3/6/2019	1615	G	x				4					1		x	x	x	x						

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

Sample Disposal
☐ Return to Client ☒ Disposal by Lab

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

QC Requirements

	Date	Time		Date	Time
1. Relinquished by Jack Markosky	3/7/'19	095	1. Received by		
2. Relinquished by	3/7/19	0945	2. Received by		
3. Relinquished by			3. Received by		
4. Relinquished by			4. Laboratory Received by		

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

LAB USE ONLY
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Receipt Temp. 3.4 °C SRR

Q

Document Number: ME002OW-01

1903165

SHEALY

Chain of Custody Record

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

Number

Client: **Rose and Westra / GZA**

Report to Contact: Lori Powers

Telephone No. / E-mail: 616-956-6123 loretta.powers@gza.com

Quote No.: 20986

Address: 601 Fifth Street NW, Suite 102

Sampler's Signature: X

Printed Name: Jack Markosky

Analysis (Attach list if more space is needed)

Page 1 of 1

City: Grand Rapids

State: MI

Zip Code: 49504

Project Name: 16.0062335.52 T2

Laboratory Lot Number

Project Number: 16.0062335.52 T2

P.O No.

Sample ID / Description (Containers for each sample may be combined on one line)	Date	Time	G=Grab C=Composite	Matrix				No of Containers by Preservative Type							Acetic Acid	Formic Acid	Available Cyanide	Hexavalent Chromium (7199)						Remarks / Cooler I.D. ALS Water
				Aqueous	Solid	Non-Aqueous		Unpres.	H2SO4	HNO3	HCl	NaOH/Zn Acetate	NaOH	MeOH										
·7 HS-MW-17M	3/7/2019	1150	G	x				4					1		x	x	x	x						
·8 HS-MW-17D	3/7/2019	1225	G	x				4					1		x	x	x	x						

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

Sample Disposal
☐ Return to Client ☒ Disposal by Lab

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

QC Requirements

	Date	Time		Date	Time
1. Relinquished by Jack Markosky	3/8/2019	0930	1. Received by	3/8/19	0930
2. Relinquished by	3/8/19	1050	2. Received by	3/8/19	1050
3. Relinquished by			3. Received by		
4. Relinquished by			4. Laboratory Received by		

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

LAB USE ONLY
Received on Ice (Check) ☐ Y ☐ N ☐ Ice Pack

Receipt Temp. 3.8 °C SR2
P415

SHEALY

Chain of Custody Record

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

Number

Client: **Rose and Westra / GZA**
Address: 601 Fifth Street NW, Suite 102
City: Grand Rapids
State: MI
Zip Code: 49504
Project Name: 16.0062335.52 T2
Project Number: 16.0062335.52 T2
P.O No.
Report to Contact: Lori Powers
Sampler's Signature: x
Printed Name: Jack Markosky
Telephone No. / E-mail: 616-956-6123 loretta.powers@gza.com
Analysis (Attach list if more space is needed)
Quote No.: 20986
Page 1 of 1
Laboratory Lot Number

Sample ID / Description (Containers for each sample may be combined on one line)	Date	Time	G=Grab C=Composite	Matrix				No of Containers by Preservative Type							Acetic Acid	Formic Acid	Available Cyanide	Hexavalent Chromium (7199)						Remarks / Cooler I.D. ALS Water
				Aqueous	Solid	Non-Aqueous		Unpres.	H2SO4	HNO3	HCl	NaOH/Zn Acetate	NaOH	MeOH										
HS-MW-20S	3/4/2019	1215	G	x				4					1		x	x	x	x						
EB-1	3/4/2019	1345	G	x				4					1		x	x	x	x						
EB-2	3/4/2019	1410	G	x				4					1		x	x	x	x						

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

Sample Disposal
☐ Return to Client ☒ Disposal by Lab

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

QC Requirements

1. Relinquished by Jack Markosky	Date 3/5/2019	Time	1. Received by	Date	Time
2. Relinquished by	Date	Time	2. Received by	Date	Time
3. Relinquished by	Date	Time	3. Received by	Date	Time
4. Relinquished by	Date	Time	4. Laboratory Received by	Date	Time

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

LAB USE ONLY
Received on Ice (Check) ☐ Y ☐ N ☐ Ice Pack
Receipt Temp. ________°C

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

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.: 20986
Address: 601 Fifth Street NW, Suite 102
Sampler's Signature: X
Analysis (Attach list if more space is needed)
Page 1 of 1
City: Grand Rapids
State: MI
Zip Code: 49504
Printed Name: Jack Markosky
Project Name: 16.0062335.52 T2
Laboratory Lot Number
Project Number: 16.0062335.52 T2
P.O No.

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	Matrix:	No of Containers by Preservative Type: Unpres.	H2SO4	HNO3	HCl	NaOH/Zn Acetate	NaOH	MeOH	Acetic Acid	Formic Acid	Available Cyanide	Hexavalent Chromium (7199)						Remarks / Cooler I.D. ALS Water
HS-MW-20M	3/6/2019	1220	G	x				4					1		x	x	x	x						
HS-MW-20D	3/6/2019	1225	G	x				4					1		x	x	x	x						
HS-MW-17S	3/6/2019	1615	G	x				4					1		x	x	x	x						

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

Sample Disposal
☐ Return to Client ☒ Disposal by Lab

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

QC Requirements

	Date	Time		Date	Time
1. Relinquished by Jack Markosky	3/7/2019		1. Received by		
2. Relinquished by			2. Received by		
3. Relinquished by			3. Received by		
4. Relinquished by			4. Laboratory Received by		

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

LAB USE ONLY
Received on Ice (Check) ☐ Y ☐ N ☐ Ice Pack
Receipt Temp. ________°C

ALS Group, USA

Sample Receipt Checklist

Client Name: **SHEALYENV** Date/Time Received: **05-Mar-19 11:05**

Work Order: **1903165** Received by: **DS**

Checklist completed by Diane Shaw 05-Mar-19 Reviewed by: Chad Whelton 05-Mar-19
eSignature Date eSignature Date

Matrices: Aqueous
Carrier name: ALSHN

Shipping container/cooler in good condition?	Yes ☑	No ☐	Not Present ☐
Custody seals intact on shipping container/cooler?	Yes ☐	No ☐	Not Present ☑
Custody seals intact on sample bottles?	Yes ☐	No ☐	Not Present ☑
Chain of custody present?	Yes ☑	No ☐	
Chain of custody signed when relinquished and received?	Yes ☑	No ☐	
Chain of custody agrees with sample labels?	Yes ☑	No ☐	
Samples in proper container/bottle?	Yes ☑	No ☐	
Sample containers intact?	Yes ☑	No ☐	
Sufficient sample volume for indicated test?	Yes ☑	No ☐	
All samples received within holding time?	Yes ☑	No ☐	
Container/Temp Blank temperature in compliance?	Yes ☑	No ☐	
Sample(s) received on ice?	Yes ☑	No ☐	
Temperature(s)/Thermometer(s):	2.0/2.0 c	SR2	
Cooler(s)/Kit(s):			
Date/Time sample(s) sent to storage:	3/5/2019 11:12:45 AM		
Water - VOA vials have zero headspace?	Yes ☑	No ☐	No VOA vials submitted ☐
Water - pH acceptable upon receipt?	Yes ☑	No ☐	N/A ☐
pH adjusted?	Yes ☐	No ☑	N/A ☐
pH adjusted by:	-		

Login Notes:

Client Contacted: Date Contacted: Person Contacted:

Contacted By: Regarding:

Comments:

CorrectiveAction:

28-Mar-2019

Nisreen Saikaly
Shealy Environmental Services, Inc.
106 Vantage Point Dr.
West Columbia, SC 29169

Re: **16.0062335.52 T2** Work Order: **1903547**

Dear Nisreen,

ALS Environmental received 13 samples on 12-Mar-2019 through 15-Mar-2019 for the analyses presented in the following report.

The analytical data provided relates directly to the samples received by ALS Environmental - Holland and for only the analyses requested.

Sample results are compliant with industry accepted practices and Quality Control results achieved laboratory specifications. Any exceptions are noted in the Case Narrative, or noted with qualifiers in the report or QC batch information. Should this laboratory report need to be reproduced, it should be reproduced in full unless written approval has been obtained from ALS Environmental. Samples will be disposed in 30 days unless storage arrangements are made.

The total number of pages in this report is 30.

If you have any questions regarding this report, please feel free to contact me:

ADDRESS: 3352 128th Avenue, Holland, MI, USA
PHONE: +1 (616) 399-6070 FAX: +1 (616) 399-6185

Sincerely,

Electronically approved by: Chad Whelton

Chad Whelton
Project Manager

Client: Shealy Environmental Services, Inc.
Project: 16.0062335.52 T2
Work Order: **1903547**

Work Order Sample Summary

Lab Samp ID	Client Sample ID	Matrix	Tag Number	Collection Date	Date Received	Hold
1903547-01	HS-MW-1D	Aqueous		3/11/2019 12:50	3/12/2019 10:30	☐
1903547-02	HS-MW-1S	Aqueous		3/11/2019 12:55	3/12/2019 10:30	☐
1903547-03	HS-MW-2	Aqueous		3/11/2019 14:45	3/12/2019 10:30	☐
1903547-04	HS-MW-11S	Aqueous		3/14/2019 11:50	3/15/2019 10:35	☐
1903547-05	HS-MW-11M	Aqueous		3/14/2019 11:40	3/15/2019 10:35	☐
1903547-06	HS-MW-11D	Aqueous		3/14/2019 14:50	3/15/2019 10:35	☐
1903547-07	HS-MW-5S	Aqueous		3/14/2019 11:20	3/15/2019 10:35	☐
1903547-08	HS-MW-5D	Aqueous		3/14/2019 15:50	3/15/2019 10:35	☐
1903547-09	HS-MW-3S	Aqueous		3/13/2019 14:30	3/15/2019 10:35	☐
1903547-10	HS-MW-3S DUP	Aqueous		3/13/2019 14:30	3/15/2019 10:35	☐
1903547-11	HS-MW-4	Aqueous		3/15/2019 11:10	3/15/2019 16:05	☐
1903547-12	HS-MW-3S	Aqueous		3/15/2019 13:45	3/15/2019 16:05	☐
1903547-13	HS-MW-3S DUP	Aqueous		3/15/2019 13:45	3/15/2019 16:05	☐

Client: Shealy Environmental Services, Inc.
Project: 16.0062335.52 T2
Work Order: 1903547

Case Narrative

Samples for the above noted Work Order were received on 03/12/2019. The attached "Sample Receipt Checklist" documents the status of custody seals, container integrity, preservation, and temperature compliance.

Samples were analyzed according to the analytical methodology previously transmitted in the "Work Order Acknowledgement". Methodologies are also documented in the "Analytical Result" section for each sample. Quality control results are listed in the "QC Report" section. Sample association for the reported quality control is located at the end of each batch summary. If applicable, results are appropriately qualified in the Analytical Result and QC Report sections. The "Qualifiers" section documents the various qualifiers, units, and acronyms utilized in reporting. A copy of the laboratory's scope of accreditation is available upon request.

With the following exceptions, all sample analyses achieved analytical criteria.

Wet Chemistry:

Batch R256519, Method CR6_7196_GW, Samples 1903547-04B, -05B, and -07B: Sample holding time for Hexavalent Chromium was missed due to laboratory error. Results should be considered estimated.

Client:	Shealy Environmental Services, Inc.
Project:	16.0062335.52 T2
WorkOrder:	**1903547**

QUALIFIERS, ACRONYMS, UNITS

Qualifier	Description
*	Value exceeds Regulatory Limit
**	Estimated Value
a	Analyte is non-accredited
B	Analyte detected in the associated Method Blank above the Reporting Limit
E	Value above quantitation range
H	Analyzed outside of Holding Time
Hr	BOD/CBOD - Sample was reset outside Hold Time, value should be considered estimated.
J	Analyte is present at an estimated concentration between the MDL and Report Limit
ND	Not Detected at the Reporting Limit
O	Sample amount is > 4 times amount spiked
P	Dual Column results percent difference > 40%
R	RPD above laboratory control limit
S	Spike Recovery outside laboratory control limits
U	Analyzed but not detected above the MDL
X	Analyte was detected in the Method Blank between the MDL and Reporting Limit, sample results may exhibit background or reagent contamination at the observed level.

Acronym	Description
DUP	Method Duplicate
LCS	Laboratory Control Sample
LCSD	Laboratory Control Sample Duplicate
LOD	Limit of Detection (see MDL)
LOQ	Limit of Quantitation (see PQL)
MBLK	Method Blank
MDL	Method Detection Limit
MS	Matrix Spike
MSD	Matrix Spike Duplicate
PQL	Practical Quantitation Limit
RPD	Relative Percent Difference
TDL	Target Detection Limit
TNTC	Too Numerous To Count
A	APHA Standard Methods
D	ASTM
E	EPA
SW	SW-846 Update III

Units Reported	Description
µg/L	Micrograms per Liter
mg/L	Milligrams per Liter

ALS Group, USA

Date: *28-Mar-19*

Client: Shealy Environmental Services, Inc.
Project: 16.0062335.52 T2
Work Order: 1903547
Sample ID: HS-MW-1D
Lab ID: 1903547-01
Collection Date: 3/11/2019 12:50 PM
Matrix: AQUEOUS

Analyses	Result	Qual	Report Limit	Units	Dilution Factor	Date Analyzed
ACIDS BY HPLC			**SW8300M**			Analyst: **KYM**
Acetic Acid	ND		25	mg/L	1	3/12/2019 03:05 PM
Formic Acid	ND		25	mg/L	1	3/12/2019 03:05 PM
CYANIDE, AVAILABLE			**OIA 1677**			Analyst: **MB**
Cyanide, Available	ND		2.0	µg/L	1	3/12/2019 01:00 PM
CHROMIUM, HEXAVALENT			**SW7196A**			Analyst: **JSH**
Chromium, Hexavalent	ND		0.0050	mg/L	1	3/12/2019 10:45 AM

Note: See Qualifiers page for a list of qualifiers and their definitions.

Client: Shealy Environmental Services, Inc.
Project: 16.0062335.52 T2 **Work Order:** 1903547
Sample ID: HS-MW-1S **Lab ID:** 1903547-02
Collection Date: 3/11/2019 12:55 PM **Matrix:** AQUEOUS

Analyses	Result	Qual	Report Limit	Units	Dilution Factor	Date Analyzed
ACIDS BY HPLC			**SW8300M**			Analyst: **KYM**
Acetic Acid	ND		25	mg/L	1	3/12/2019 03:18 PM
Formic Acid	ND		25	mg/L	1	3/12/2019 03:18 PM
CYANIDE, AVAILABLE			**OIA 1677**			Analyst: **MB**
Cyanide, Available	ND		2.0	µg/L	1	3/12/2019 01:00 PM
CHROMIUM, HEXAVALENT			**SW7196A**			Analyst: **JSH**
Chromium, Hexavalent	ND		0.0050	mg/L	1	3/12/2019 10:45 AM

Note: See Qualifiers page for a list of qualifiers and their definitions.

Client: Shealy Environmental Services, Inc.
Project: 16.0062335.52 T2 **Work Order:** 1903547
Sample ID: HS-MW-2 **Lab ID:** 1903547-03
Collection Date: 3/11/2019 02:45 PM **Matrix:** AQUEOUS

Analyses	Result	Qual	Report Limit	Units	Dilution Factor	Date Analyzed
ACIDS BY HPLC			**SW8300M**			Analyst: **KYM**
Acetic Acid	ND		25	mg/L	1	3/12/2019 03:31 PM
Formic Acid	ND		25	mg/L	1	3/12/2019 03:31 PM
CYANIDE, AVAILABLE			**OIA 1677**			Analyst: **MB**
Cyanide, Available	ND		2.0	µg/L	1	3/12/2019 01:00 PM
CHROMIUM, HEXAVALENT			**SW7196A**			Analyst: **JSH**
Chromium, Hexavalent	ND		0.0050	mg/L	1	3/12/2019 10:45 AM

Note: See Qualifiers page for a list of qualifiers and their definitions.

ALS Group, USA

Date: *28-Mar-19*

Client: Shealy Environmental Services, Inc.
Project: 16.0062335.52 T2
Sample ID: HS-MW-11S
Collection Date: 3/14/2019 11:50 AM
Work Order: 1903547
Lab ID: 1903547-04
Matrix: AQUEOUS

Analyses	Result	Qual	Report Limit	Units	Dilution Factor	Date Analyzed
ACIDS BY HPLC			**SW8300M**			Analyst: **KYM**
Acetic Acid	ND		25	mg/L	1	3/19/2019 05:44 PM
Formic Acid	ND		25	mg/L	1	3/19/2019 05:44 PM
CYANIDE, AVAILABLE			**OIA 1677**			Analyst: **MB**
Cyanide, Available	ND		2.0	µg/L	1	3/19/2019 11:30 AM
CHROMIUM, HEXAVALENT			**SW7196A**			Analyst: **JEB**
Chromium, Hexavalent	ND	H	0.0050	mg/L	1	3/15/2019 11:55 AM

Note: See Qualifiers page for a list of qualifiers and their definitions.

ALS Group, USA

Date: *28-Mar-19*

Client: Shealy Environmental Services, Inc.
Project: 16.0062335.52 T2
Work Order: 1903547
Sample ID: HS-MW-11M
Lab ID: 1903547-05
Collection Date: 3/14/2019 11:40 AM
Matrix: AQUEOUS

Analyses	Result	Qual	Report Limit	Units	Dilution Factor	Date Analyzed
ACIDS BY HPLC			**SW8300M**			Analyst: **KYM**
Acetic Acid	ND		25	mg/L	1	3/19/2019 05:57 PM
Formic Acid	ND		25	mg/L	1	3/19/2019 05:57 PM
CYANIDE, AVAILABLE			**OIA 1677**			Analyst: **MB**
Cyanide, Available	ND		2.0	µg/L	1	3/19/2019 11:30 AM
CHROMIUM, HEXAVALENT			**SW7196A**			Analyst: **JEB**
Chromium, Hexavalent	ND	H	0.0050	mg/L	1	3/15/2019 11:55 AM

Note: See Qualifiers page for a list of qualifiers and their definitions.

Client: Shealy Environmental Services, Inc.
Project: 16.0062335.52 T2 **Work Order:** 1903547
Sample ID: HS-MW-11D **Lab ID:** 1903547-06
Collection Date: 3/14/2019 02:50 PM **Matrix:** AQUEOUS

Analyses	Result	Qual	Report Limit	Units	Dilution Factor	Date Analyzed
ACIDS BY HPLC			**SW8300M**			Analyst: **KYM**
Acetic Acid	ND		25	mg/L	1	3/19/2019 06:10 PM
Formic Acid	ND		25	mg/L	1	3/19/2019 06:10 PM
CYANIDE, AVAILABLE			**OIA 1677**			Analyst: **MB**
Cyanide, Available	ND		2.0	µg/L	1	3/19/2019 11:30 AM
CHROMIUM, HEXAVALENT			**SW7196A**			Analyst: **JEB**
Chromium, Hexavalent	ND		0.0050	mg/L	1	3/15/2019 11:55 AM

Note: See Qualifiers page for a list of qualifiers and their definitions.

Client: Shealy Environmental Services, Inc.

Project: 16.0062335.52 T2 **Work Order:** 1903547

Sample ID: HS-MW-5S **Lab ID:** 1903547-07

Collection Date: 3/14/2019 11:20 AM **Matrix:** AQUEOUS

Analyses	Result	Qual	Report Limit	Units	Dilution Factor	Date Analyzed
ACIDS BY HPLC			**SW8300M**			Analyst: **KYM**
Acetic Acid	ND		25	mg/L	1	3/19/2019 06:23 PM
Formic Acid	ND		25	mg/L	1	3/19/2019 06:23 PM
CYANIDE, AVAILABLE			**OIA 1677**			Analyst: **MB**
Cyanide, Available	ND		2.0	µg/L	1	3/19/2019 11:30 AM
CHROMIUM, HEXAVALENT			**SW7196A**			Analyst: **JEB**
Chromium, Hexavalent	ND	H	0.0050	mg/L	1	3/15/2019 11:55 AM

Note: See Qualifiers page for a list of qualifiers and their definitions.

Client:	Shealy Environmental Services, Inc.		
Project:	16.0062335.52 T2	**Work Order:**	1903547
Sample ID:	HS-MW-5D	**Lab ID:**	1903547-08
Collection Date:	3/14/2019 03:50 PM	**Matrix:**	AQUEOUS

Analyses	Result	Qual	Report Limit	Units	Dilution Factor	Date Analyzed
ACIDS BY HPLC			**SW8300M**			Analyst: **KYM**
Acetic Acid	ND		25	mg/L	1	3/19/2019 06:36 PM
Formic Acid	ND		25	mg/L	1	3/19/2019 06:36 PM
CYANIDE, AVAILABLE			**OIA 1677**			Analyst: **MB**
Cyanide, Available	ND		2.0	µg/L	1	3/19/2019 11:30 AM
CHROMIUM, HEXAVALENT			**SW7196A**			Analyst: **JEB**
Chromium, Hexavalent	ND		0.0050	mg/L	1	3/15/2019 11:55 AM

Note: See Qualifiers page for a list of qualifiers and their definitions.

Client: Shealy Environmental Services, Inc.
Project: 16.0062335.52 T2 **Work Order:** 1903547
Sample ID: HS-MW-3S **Lab ID:** 1903547-09
Collection Date: 3/13/2019 02:30 PM **Matrix:** AQUEOUS

Analyses	Result	Qual	Report Limit	Units	Dilution Factor	Date Analyzed
ACIDS BY HPLC			**SW8300M**			Analyst: **KYM**
Acetic Acid	ND		25	mg/L	1	3/19/2019 05:31 PM
Formic Acid	ND		25	mg/L	1	3/19/2019 05:31 PM
CYANIDE, AVAILABLE			**OIA 1677**			Analyst: **MB**
Cyanide, Available	ND		2.0	µg/L	1	3/19/2019 11:30 AM

Note: See Qualifiers page for a list of qualifiers and their definitions.

Client: Shealy Environmental Services, Inc.
Project: 16.0062335.52 T2 **Work Order:** 1903547
Sample ID: HS-MW-3S DUP **Lab ID:** 1903547-10
Collection Date: 3/13/2019 02:30 PM **Matrix:** AQUEOUS

Analyses	Result	Qual	Report Limit	Units	Dilution Factor	Date Analyzed
ACIDS BY HPLC			**SW8300M**			Analyst: **KYM**
Acetic Acid	ND		25	mg/L	1	3/19/2019 07:02 PM
Formic Acid	ND		25	mg/L	1	3/19/2019 07:02 PM
CYANIDE, AVAILABLE			**OIA 1677**			Analyst: **MB**
Cyanide, Available	ND		2.0	µg/L	1	3/19/2019 11:30 AM

Note: See Qualifiers page for a list of qualifiers and their definitions.

Client:	Shealy Environmental Services, Inc.		
Project:	16.0062335.52 T2	**Work Order:**	1903547
Sample ID:	HS-MW-4	**Lab ID:**	1903547-11
Collection Date:	3/15/2019 11:10 AM	**Matrix:**	AQUEOUS

Analyses	Result	Qual	Report Limit	Units	Dilution Factor	Date Analyzed
ACIDS BY HPLC			**SW8300M**			Analyst: **KYM**
Acetic Acid	ND		25	mg/L	1	3/19/2019 07:15 PM
Formic Acid	ND		25	mg/L	1	3/19/2019 07:15 PM
CYANIDE, AVAILABLE			**OIA 1677**			Analyst: **MB**
Cyanide, Available	ND		2.0	µg/L	1	3/19/2019 11:30 AM
CHROMIUM, HEXAVALENT			**SW7196A**			Analyst: **JEB**
Chromium, Hexavalent	ND		0.0050	mg/L	1	3/16/2019 09:38 AM

Note: See Qualifiers page for a list of qualifiers and their definitions.

ALS Group, USA **Date:** *28-Mar-19*

Client:	Shealy Environmental Services, Inc.		
Project:	16.0062335.52 T2	**Work Order:**	1903547
Sample ID:	HS-MW-3S	**Lab ID:**	1903547-12
Collection Date:	3/15/2019 01:45 PM	**Matrix:**	AQUEOUS

Analyses	Result	Qual	Report Limit	Units	Dilution Factor	Date Analyzed
CHROMIUM, HEXAVALENT			**SW7196A**			Analyst: **JEB**
Chromium, Hexavalent	ND		0.0050	mg/L	1	3/16/2019 09:38 AM

Note: See Qualifiers page for a list of qualifiers and their definitions.

Client: Shealy Environmental Services, Inc.
Project: 16.0062335.52 T2 **Work Order:** 1903547
Sample ID: HS-MW-3S DUP **Lab ID:** 1903547-13
Collection Date: 3/15/2019 01:45 PM **Matrix:** AQUEOUS

Analyses	Result	Qual	Report Limit	Units	Dilution Factor	Date Analyzed
CHROMIUM, HEXAVALENT			**SW7196A**			Analyst: **JEB**
Chromium, Hexavalent	ND		0.0050	mg/L	1	3/16/2019 09:38 AM

Note: See Qualifiers page for a list of qualifiers and their definitions.

QC BATCH REPORT

Batch ID: **R256427** Instrument ID **HPLC2** Method: **SW8300M**

MBLK Sample ID: **MBLKW1-R256427** Units: **mg/L** Analysis Date: **3/12/2019 12:16 PM**
Client ID: Run ID: **HPLC2_190312A** SeqNo: **5557672** Prep Date: **3/12/2019** DF: **1**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Acetic Acid	ND	5.0								
Formic Acid	ND	5.0								

LCS Sample ID: **LCSW1`-R256427** Units: **mg/L** Analysis Date: **3/12/2019 12:29 PM**
Client ID: Run ID: **HPLC2_190312A** SeqNo: **5557673** Prep Date: **3/12/2019** DF: **1**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Acetic Acid	525.9	5.0	500	0	105	80-120	0			
Formic Acid	517.5	5.0	500	0	104	80-120	0			

MS Sample ID: **1903165-01A MS** Units: **mg/L** Analysis Date: **3/12/2019 12:42 PM**
Client ID: Run ID: **HPLC2_190312A** SeqNo: **5557674** Prep Date: **3/12/2019** DF: **2**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Acetic Acid	1001	10	1000	0	100	75-125	0			
Formic Acid	985.5	10	1000	0	98.5	75-125	0			

MSD Sample ID: **1903165-01A MSD** Units: **mg/L** Analysis Date: **3/12/2019 12:55 PM**
Client ID: Run ID: **HPLC2_190312A** SeqNo: **5557676** Prep Date: **3/12/2019** DF: **2**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Acetic Acid	1022	10	1000	0	102	75-125	1001	2.02	20	
Formic Acid	999.4	10	1000	0	99.9	75-125	985.5	1.4	20	

The following samples were analyzed in this batch: 1903547-01A 1903547-02A 1903547-03A

Note: See Qualifiers Page for a list of Qualifiers and their explanation.

Client: Shealy Environmental Services, Inc.
Work Order: 1903547
Project: 16.0062335.52 T2

QC BATCH REPORT

Batch ID: **R256885** Instrument ID **HPLC2** Method: **SW8300M**

MBLK Sample ID: **MB-R256885-R256885** Units: **mg/L** Analysis Date: **3/19/2019 04:39 PM**
Client ID: Run ID: **HPLC2_190319A** SeqNo: **5568904** Prep Date: **3/19/2019** DF: **1**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Acetic Acid	ND	5.0								
Formic Acid	ND	5.0								

LCS Sample ID: **LCS-R256885-R256885** Units: **mg/L** Analysis Date: **3/19/2019 04:52 PM**
Client ID: Run ID: **HPLC2_190319A** SeqNo: **5568905** Prep Date: **3/19/2019** DF: **1**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Acetic Acid	522.2	5.0	500	0	104	80-120	0			
Formic Acid	508.9	5.0	500	0	102	80-120	0			

MS Sample ID: **1903547-09AMS** Units: **mg/L** Analysis Date: **3/19/2019 05:05 PM**
Client ID: **HS-MW-3S** Run ID: **HPLC2_190319A** SeqNo: **5568912** Prep Date: **3/19/2019** DF: **2**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Acetic Acid	996.2	10	1000	0	99.6	75-125	0			
Formic Acid	1018	10	1000	0	102	75-125	0			

MSD Sample ID: **1903547-09AMSD** Units: **mg/L** Analysis Date: **3/19/2019 05:18 PM**
Client ID: **HS-MW-3S** Run ID: **HPLC2_190319A** SeqNo: **5568913** Prep Date: **3/19/2019** DF: **2**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Acetic Acid	1011	10	1000	0	101	75-125	996.2	1.52	20	
Formic Acid	1009	10	1000	0	101	75-125	1018	0.977	20	

The following samples were analyzed in this batch:

1903547-04A	1903547-05A	1903547-06A
1903547-07A	1903547-08A	1903547-09A
1903547-10A	1903547-11A	

Note: See Qualifiers Page for a list of Qualifiers and their explanation.

Client: Shealy Environmental Services, Inc.
Work Order: 1903547
Project: 16.0062335.52 T2

QC BATCH REPORT

Batch ID: **R256307** Instrument ID **WETCHEM** Method: **SW7196A**

MBLK Sample ID: **MB-R256307-R256307** Units: **mg/L** Analysis Date: **3/12/2019 10:45 AM**
Client ID: Run ID: **WETCHEM_190312E** SeqNo: **5554975** Prep Date: DF: **1**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Chromium, Hexavalent	ND	0.0050								

LCS Sample ID: **LCS-R256307-R256307** Units: **mg/L** Analysis Date: **3/12/2019 10:45 AM**
Client ID: Run ID: **WETCHEM_190312E** SeqNo: **5554976** Prep Date: DF: **1**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Chromium, Hexavalent	0.2019	0.0050	0.2	0	101	91-113	0			

MS Sample ID: **1903547-01B MS** Units: **mg/L** Analysis Date: **3/12/2019 10:45 AM**
Client ID: **HS-MW-1D** Run ID: **WETCHEM_190312E** SeqNo: **5554978** Prep Date: DF: **1**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Chromium, Hexavalent	0.2131	0.0050	0.2	0.0015	106	91-113	0			

MSD Sample ID: **1903547-01B MSD** Units: **mg/L** Analysis Date: **3/12/2019 10:45 AM**
Client ID: **HS-MW-1D** Run ID: **WETCHEM_190312E** SeqNo: **5554979** Prep Date: DF: **1**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Chromium, Hexavalent	0.2006	0.0050	0.2	0.0015	99.6	91-113	0.2131	6.04	10	

The following samples were analyzed in this batch: 1903547-01B 1903547-02B 1903547-03B

Note: See Qualifiers Page for a list of Qualifiers and their explanation.

Client: Shealy Environmental Services, Inc.
Work Order: 1903547
Project: 16.0062335.52 T2

QC BATCH REPORT

Batch ID: **R256315** Instrument ID **FS3100** Method: **OIA 1677**

MBLK Sample ID: **MB-R256315-R256315** Units: **µg/L** Analysis Date: **3/12/2019 01:00 PM**
Client ID: Run ID: **FS3100_190312B** SeqNo: **5555210** Prep Date: DF: **1**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Cyanide, Available	ND	2.0								

LCS Sample ID: **LCS-R256315-R256315** Units: **µg/L** Analysis Date: **3/12/2019 01:00 PM**
Client ID: Run ID: **FS3100_190312B** SeqNo: **5555211** Prep Date: DF: **1**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Cyanide, Available	44.05	2.0	50	0	88.1	82-132	0			

MS Sample ID: **1903542-01A MS** Units: **µg/L** Analysis Date: **3/12/2019 01:00 PM**
Client ID: Run ID: **FS3100_190312B** SeqNo: **5555213** Prep Date: DF: **1**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Cyanide, Available	49.41	2.0	50	1.8	95.2	82-130	0			

MSD Sample ID: **1903542-01A MSD** Units: **µg/L** Analysis Date: **3/12/2019 01:00 PM**
Client ID: Run ID: **FS3100_190312B** SeqNo: **5555214** Prep Date: DF: **1**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Cyanide, Available	51.41	2.0	50	1.8	99.2	82-130	49.41	3.97	11	

The following samples were analyzed in this batch: 1903547-01C 1903547-02C 1903547-03C

Note: See Qualifiers Page for a list of Qualifiers and their explanation.

QC BATCH REPORT

Batch ID: **R256519** Instrument ID **WETCHEM** Method: **SW7196A**

MBLK Sample ID: **MB-R256519-R256519** Units: **mg/L** Analysis Date: **3/15/2019 11:55 AM**
Client ID: Run ID: **WETCHEM_190315D** SeqNo: **5560058** Prep Date: DF: **1**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Chromium, Hexavalent	ND	0.0050								

LCS Sample ID: **LCS-R256519-R256519** Units: **mg/L** Analysis Date: **3/15/2019 11:55 AM**
Client ID: Run ID: **WETCHEM_190315D** SeqNo: **5560059** Prep Date: DF: **1**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Chromium, Hexavalent	0.2069	0.0050	0.2	0	103	91-113	0			

MS Sample ID: **1903547-05B MS** Units: **mg/L** Analysis Date: **3/15/2019 11:55 AM**
Client ID: **HS-MW-11M** Run ID: **WETCHEM_190315D** SeqNo: **5560062** Prep Date: DF: **1**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Chromium, Hexavalent	0.2069	0.0050	0.2	0.0015	103	91-113	0			

MSD Sample ID: **1903547-05B MSD** Units: **mg/L** Analysis Date: **3/15/2019 11:55 AM**
Client ID: **HS-MW-11M** Run ID: **WETCHEM_190315D** SeqNo: **5560063** Prep Date: DF: **1**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Chromium, Hexavalent	0.2106	0.0050	0.2	0.0015	105	91-113	0.2069	1.77	10	

The following samples were analyzed in this batch:

1903547-04B	1903547-05B	1903547-06B
1903547-07B	1903547-08B	

Note: See Qualifiers Page for a list of Qualifiers and their explanation.

QC BATCH REPORT

Batch ID: **R256568** Instrument ID **WETCHEM** Method: **SW7196A**

MBLK Sample ID: **MB-R256568-R256568** Units: **mg/L** Analysis Date: **3/16/2019 09:38 AM**
Client ID: Run ID: **WETCHEM_190316A** SeqNo: **5561065** Prep Date: DF: **1**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Chromium, Hexavalent	ND	0.0050								

LCS Sample ID: **LCS-R256568-R256568** Units: **mg/L** Analysis Date: **3/16/2019 09:38 AM**
Client ID: Run ID: **WETCHEM_190316A** SeqNo: **5561066** Prep Date: DF: **1**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Chromium, Hexavalent	0.2069	0.0050	0.2	0	103	91-113	0			

MS Sample ID: **1903547-12AMS** Units: **mg/L** Analysis Date: **3/16/2019 09:38 AM**
Client ID: **HS-MW-3S** Run ID: **WETCHEM_190316A** SeqNo: **5561069** Prep Date: DF: **1**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Chromium, Hexavalent	0.2044	0.0050	0.2	0.0015	101	91-113	0			

MSD Sample ID: **1903547-12AMSD** Units: **mg/L** Analysis Date: **3/16/2019 09:38 AM**
Client ID: **HS-MW-3S** Run ID: **WETCHEM_190316A** SeqNo: **5561070** Prep Date: DF: **1**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Chromium, Hexavalent	0.2069	0.0050	0.2	0.0015	103	91-113	0.2044	1.22	10	

The following samples were analyzed in this batch: 1903547-11B 1903547-12A 1903547-13A

Note: See Qualifiers Page for a list of Qualifiers and their explanation.

Client: Shealy Environmental Services, Inc.
Work Order: 1903547
Project: 16.0062335.52 T2

QC BATCH REPORT

Batch ID: **R256755** Instrument ID **FS3100** Method: **OIA 1677**

MBLK Sample ID: **MB-R256755-R256755** Units: **µg/L** Analysis Date: **3/19/2019 11:30 AM**
Client ID: Run ID: **FS3100_190319B** SeqNo: **5565369** Prep Date: DF: **1**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Cyanide, Available	ND	2.0								

LCS Sample ID: **LCS-R256755-R256755** Units: **µg/L** Analysis Date: **3/19/2019 11:30 AM**
Client ID: Run ID: **FS3100_190319B** SeqNo: **5565370** Prep Date: DF: **1**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Cyanide, Available	47.6	2.0	50	0	95.2	82-132	0			

MS Sample ID: **1903547-09BMS** Units: **µg/L** Analysis Date: **3/19/2019 11:30 AM**
Client ID: **HS-MW-3S** Run ID: **FS3100_190319B** SeqNo: **5565377** Prep Date: DF: **1**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Cyanide, Available	48.28	2.0	50	0.27	96	82-130	0			

MSD Sample ID: **1903547-09BMSD** Units: **µg/L** Analysis Date: **3/19/2019 11:30 AM**
Client ID: **HS-MW-3S** Run ID: **FS3100_190319B** SeqNo: **5565378** Prep Date: DF: **1**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Cyanide, Available	49.42	2.0	50	0.27	98.3	82-130	48.28	2.33	11	

The following samples were analyzed in this batch:

1903547-04C	1903547-05C	1903547-06C
1903547-07C	1903547-08C	1903547-09B
1903547-10B	1903547-11C	

Note: See Qualifiers Page for a list of Qualifiers and their explanation.

1903547

Chain of Custody Record

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

Number

Client: **Rose and Westra / GZA**

Report to Contact: Lori Powers

Telephone No. / E-mail: 616-956-6123 loretta.powers@gza.com

Quote No.: 20986

Address: 601 Fifth Street NW, Suite 102

Sampler's Signature: X

Printed Name: Jack Markosky

Analysis (Attach list if more space is needed)

Page 1 of 1

City: Grand Rapids | State: MI | Zip Code: 49504

Project Name: 16.0062335.52 T2

Laboratory Lot Number

Project Number: 16.0062335.52 T2

P.O No.:

Sample ID / Description (Containers for each sample may be combined on one line)	Date	Time	G=Grab C=Composite	Matrix: Aqueous	Solid	Non-Aqueous		No of Containers by Preservative Type: Unpres.	H2SO4	HNO3	HCl	NaOH/Zn Acetate	NaOH	MeOH	Acetic Acid	Formic Acid	Available Cyanide	Hexavalent Chromium (7199)						Remarks / Cooler I.D. ALS Water
HS-MW-1D	3/11/2019	1250	G	x				4					1		x	x	x	x						
HS-MW-1S	3/11/2019	1255	G	x				4					1		x	x	x	x						
HS-MW-2	3/11/2019	1445	G	x				4					1		x	x	x	x						

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

Sample Disposal
☐ Return to Client ☒ Disposal by Lab

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

QC Requirements

1. Relinquished by Jack Markosky	Date 3/12/2019	Time 0945	1. Received by	Date 3/12/19	Time 0945
2. Relinquished by	Date 3/12/19	Time 1030	2. Received by	Date	Time
3. Relinquished by	Date	Time	3. Received by	Date	Time
4. Relinquished by	Date	Time	4. Laboratory Received by	Date	Time

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

LAB USE ONLY
Received on Ice (Check) ☐ Y ☐ N ☐ Ice Pack

Receipt Temp. 3.6 °C SRZ

1903547

Chain of Custody Record

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

Number

Client: **Rose and Westra / GZA**

Report to Contact: Lori Powers

Telephone No. / E-mail: 616-956-6123 loretta.powers@gza.com

Quote No.: 20986

Address: 601 Fifth Street NW, Suite 102

Sampler's Signature: X

Printed Name: Jack Markosky

Analysis (Attach list if more space is needed)

Page 1 of 1

City: Grand Rapids

State: MI

Zip Code: 49504

Project Name: 16.0062335.52 T2

Laboratory Lot Number

Project Number: 16.0062335.52 T2

P.O No.:

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	Matrix:	No of Containers by Preservative Type: Unpres.	H2SO4	HNO3	HCl	NaOH/Zn Acetate	NaOH	MeOH	Acetic Acid	Formic Acid	Available Cyanide	Hexavalent Chromium (7199)						Remarks / Cooler I.D. ALS Water
HS-MW-11S	3/14/2019	1150	G	x				4					1		x	x	x	x						
HS-MW-11M	3/14/2019	1140	G	x				4					1		x	x	x	x						
HS-MW-11D	3/14/2019	1450	G	x				4					1		x	x	x	x						
HS-MW-5S	3/14/2019	1120	G	x				4					1		x	x	x	x						
HS-MW-5D	3/14/2019	1550	G	x				4					1		x	x	x	x						

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

Sample Disposal
☐ Return to Client ☒ Disposal by Lab

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

QC Requirements

	Date	Time		Date	Time
1. Relinquished by Jack Markosky	3/15/2019	0945	1. Received by	3/15/19	0945
2. Relinquished by	3/15/19	1035	2. Received by		
3. Relinquished by			3. Received by		
4. Relinquished by			4. Laboratory Received by		

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

LAB USE ONLY
Received on Ice (Check) ☐ Y ☐ N ☐ Ice Pack

Receipt Temp. 2.4 °C

1903547

SHEALY

Chain of Custody Record

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

Number

Client **Rose and Westra / GZA**	Report to Contact Lori Powers	Telephone No. / E-mail 616-956-6123 loretta.powers@gza.com	Quote No. 20986
Address 601 Fifth Street NW, Suite 102	Sampler's Signature X	Analysis (Attach list if more space is needed)	Page 1 of 1
City: Grand Rapids State: MI Zip Code: 49504	Printed Name Jack Markosky		
Project Name 16.0062335.52 T2			Laboratory Lot Number
Project Number 16.0062335.52 T2	P.O No.		

Sample ID / Description (Containers for each sample may be combined on one line)	Date	Time	G=Grab C=Composite	Matrix				No of Containers by Preservative Type							Acetic Acid	Formic Acid	Available Cyanide	Hexavalent Chromium (7199)						Remarks / Cooler I.D. ALS Water
				Aqueous	Solid	Non-Aqueous		Unpres.	H2SO4	HNO3	HCl	NaOH/Zn Acetate	NaOH	MeOH										
HS-MW-3D	3/13/2019	1430	G	x				3					1		x	x	x							Resampling for H. Cr.
HS-MW-3D DUP	3/13/2019	1430	G	x				3					1		x	x	x							Resampling for H. Cr.
HS-MW-3D MS/MSD	3/13/2019	1430	G	x				3					1		x	x	x							Resampling for H. Cr.

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

Sample Disposal
☐ Return to Client ☒ Disposal by Lab

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

QC Requirements

1. Relinquished by Jack Markosky	Date 3/15/2019	Time 0945	1. Received by	Date 3/15/19	Time 0945
2. Relinquished by	Date 3/15/19	Time 1035	2. Received by	Date	Time
3. Relinquished by	Date	Time	3. Received by	Date	Time
4. Relinquished by	Date	Time	4. Laboratory Received by	Date	Time

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

LAB USE ONLY
Received on Ice (Check) ☐ Y ☐ N ☐ Ice Pack

Receipt Temp. 2.4 °C SR2

1903547

SHEALY

Chain of Custody Record

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

Number

Client: **Rose and Westra / GZA**

Report to Contact: Lori Powers

Telephone No. / E-mail: 616-956-6123 loretta.powers@gza.com

Quote No.: 20986

Address: 601 Fifth Street NW, Suite 102

Sampler's Signature: X

Printed Name: Jack Markosky

Analysis (Attach list if more space is needed)

Page 1 of 1

City: Grand Rapids

State: MI

Zip Code: 49504

Project Name: 16.0062335.52 T2

Project Number: 16.0062335.52 T2

P.O No.:

Laboratory Lot Number:

Sample ID / Description (Containers for each sample may be combined on one line)	Date	Time	G=Grab C=Composite	Matrix				No of Containers by Preservative Type							Analysis									Remarks / Cooler I.D. ALS Water
				Aqueous	Solid	Non-Aqueous		Unpres.	H2SO4	HNO3	HCl	NaOH/Zn Acetate	NaOH	MeOH	Acetic Acid	Formic Acid	Available Cyanide	Hexavalent Chromium (7199)						
HS-MW-4	3/15/2019	1110	G	x				4					1		x	x	x	x						
HS-MW-3S	3/15/2019	1345	G	x				1										x						
HS-MW-3S DUP	3/15/2019	1345	G	x				1										x						
HS-MW-3S MS/MSD	3/15/2019	1345	G	x				1										x						

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

Sample Disposal
☐ Return to Client ☒ Disposal by Lab

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

QC Requirements

	Date	Time		Date	Time
1. Relinquished by Jack Markosky	3/15/2019	1515	1. Received by	3/15/19	1515
2. Relinquished by			2. Received by		
3. Relinquished by			3. Received by		
4. Relinquished by	3/15/19	1605	4. Laboratory Received by	3/15/19	1605

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

LAB USE ONLY
Received on Ice (Check) ☐ Y ☐ N ☐ Ice Pack

Receipt Temp. 2.4 °C

SHEALY

Chain of Custody Record

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

Number

Client: **Rose and Westra / GZA**

Report to Contact: Lori Powers

Telephone No. / E-mail: 616-956-6123 loretta.powers@gza.com

Quote No.: 20986

Address: 601 Fifth Street NW, Suite 102

Sampler's Signature: X

Analysis (Attach list if more space is needed)

Page 1 of 1

City: Grand Rapids

State: MI

Zip Code: 49504

Printed Name: Jack Markosky

Project Name: 16.0062335.52 T2

Laboratory Lot Number

Project Number: 16.0062335.52 T2

P.O No.

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	Matrix	No of Containers by Preservative Type: Unpres.	H2SO4	HNO3	HCl	NaOH/Zn Acetate	NaOH	MeOH	Acetic Acid	Formic Acid	Available Cyanide	Hexavalent Chromium (7199)						Remarks / Cooler I.D. ALS Water
HS-MW-3S	3/13/2019	1430	G	x				3					1		x	x	x							Resampling for H. Cr.
HS-MW-3S DUP	3/13/2019	1430	G	x				3					1		x	x	x							Resampling for H. Cr.
HS-MW-3S MS/MSD	3/13/2019	1430	G	x				3					1		x	x	x							Resampling for H. Cr.

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

Sample Disposal
☐ Return to Client ☒ Disposal by Lab

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

QC Requirements

	Date	Time		Date	Time
1. Relinquished by Jack Markosky	3/15/2019		1. Received by		
2. Relinquished by			2. Received by		
3. Relinquished by			3. Received by		
4. Relinquished by			4. Laboratory Received by		

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

LAB USE ONLY
Received on Ice (Check) ☐ Y ☐ N ☐ Ice Pack

Receipt Temp. _________°C

ALS Group, USA

Sample Receipt Checklist

Client Name: **SHEALYENV**

Date/Time Received: **12-Mar-19 10:30**

Work Order: **1903547**

Received by: **DS**

Checklist completed by Diane Shaw 12-Mar-19
eSignature Date

Reviewed by: Chad Whelton 12-Mar-19
eSignature Date

Matrices: Aqueous

Carrier name: ALSHN

Shipping container/cooler in good condition?	Yes ☑	No ☐	Not Present ☐
Custody seals intact on shipping container/cooler?	Yes ☐	No ☐	Not Present ☑
Custody seals intact on sample bottles?	Yes ☐	No ☐	Not Present ☑
Chain of custody present?	Yes ☑	No ☐	
Chain of custody signed when relinquished and received?	Yes ☑	No ☐	
Chain of custody agrees with sample labels?	Yes ☑	No ☐	
Samples in proper container/bottle?	Yes ☑	No ☐	
Sample containers intact?	Yes ☑	No ☐	
Sufficient sample volume for indicated test?	Yes ☑	No ☐	
All samples received within holding time?	Yes ☑	No ☐	
Container/Temp Blank temperature in compliance?	Yes ☑	No ☐	
Sample(s) received on ice?	Yes ☑	No ☐	

Temperature(s)/Thermometer(s): 3.6/3.6 c SR2

Cooler(s)/Kit(s):

Date/Time sample(s) sent to storage: 3/12/2019 10:32:23 AM

Water - VOA vials have zero headspace?	Yes ☑	No ☐	No VOA vials submitted ☐
Water - pH acceptable upon receipt?	Yes ☑	No ☐	N/A ☐
pH adjusted?	Yes ☐	No ☑	N/A ☐

pH adjusted by: -

Login Notes:

Client Contacted:

Date Contacted:

Person Contacted:

Contacted By:

Regarding:

Comments:

CorrectiveAction:

31-Mar-2019

Nisreen Saikaly
Shealy Environmental Services, Inc.
106 Vantage Point Dr.
West Columbia, SC 29169

Re: **16.0062335.52 T2** Work Order: **1903985**

Dear Nisreen,

ALS Environmental received 11 samples on 19-Mar-2019 through 22-Mar-2019 for the analyses presented in the following report.

The analytical data provided relates directly to the samples received by ALS Environmental - Holland and for only the analyses requested.

Sample results are compliant with industry accepted practices and Quality Control results achieved laboratory specifications. Any exceptions are noted in the Case Narrative, or noted with qualifiers in the report or QC batch information. Should this laboratory report need to be reproduced, it should be reproduced in full unless written approval has been obtained from ALS Environmental. Samples will be disposed in 30 days unless storage arrangements are made.

The total number of pages in this report is 28.

If you have any questions regarding this report, please feel free to contact me:

ADDRESS: 3352 128th Avenue, Holland, MI, USA
PHONE: +1 (616) 399-6070 FAX: +1 (616) 399-6185

Sincerely,

Electronically approved by: Chad Whelton

Chad Whelton
Project Manager

ALS Group, USA

Date: 31-Mar-19

Client: Shealy Environmental Services, Inc.
Project: 16.0062335.52 T2
Work Order: **1903985**

Work Order Sample Summary

Lab Samp ID	Client Sample ID	Matrix	Tag Number	Collection Date	Date Received	Hold
1903985-01	HS-MW-10S	Aqueous		3/18/2019 15:05	3/19/2019 11:10	☐
1903985-02	HS-MW-10M	Aqueous		3/18/2019 12:35	3/19/2019 11:10	☐
1903985-03	HS-MW-10D	Aqueous		3/18/2019 12:10	3/19/2019 11:10	☐
1903985-04	HS-MW-9D	Aqueous		3/19/2019 13:50	3/20/2019 12:00	☐
1903985-05	HS-MW-9M	Aqueous		3/19/2019 13:45	3/20/2019 12:00	☐
1903985-06	HS-MW-9S	Aqueous		3/19/2019 15:00	3/20/2019 12:00	☐
1903985-07	HS-MW-6S	Aqueous		3/20/2019 14:15	3/21/2019 12:15	☐
1903985-08	HS-MW-6D	Aqueous		3/20/2019 16:00	3/21/2019 12:15	☐
1903985-09	HS-MW-7s	Aqueous		3/21/2019 11:10	3/22/2019 11:30	☐
1903985-10	HS-MW-8	Aqueous		3/21/2019 14:00	3/22/2019 11:30	☐
1903985-11	HS-MW-8 DUP	Aqueous		3/21/2019 14:00	3/22/2019 11:30	☐

ALS Group, USA

Date: 31-Mar-19

Client: Shealy Environmental Services, Inc.
Project: 16.0062335.52 T2
Work Order: 1903985

Case Narrative

Samples for the above noted Work Order were received on 03/19/2019. The attached "Sample Receipt Checklist" documents the status of custody seals, container integrity, preservation, and temperature compliance.

Samples were analyzed according to the analytical methodology previously transmitted in the "Work Order Acknowledgement". Methodologies are also documented in the "Analytical Result" section for each sample. Quality control results are listed in the "QC Report" section. Sample association for the reported quality control is located at the end of each batch summary. If applicable, results are appropriately qualified in the Analytical Result and QC Report sections. The "Qualifiers" section documents the various qualifiers, units, and acronyms utilized in reporting. A copy of the laboratory's scope of accreditation is available upon request.

With the following exceptions, all sample analyses achieved analytical criteria.

Wet Chemistry:

Batch R257005, Method CR6_7196_GW, Sample 1903985-09B: Sample holding time for Hexavalent Chromium expired due to laboratory error. Results should be considered estimated.

Batch R257131, Method CNAV_1677_W, Sample 1903985-09CMS: The matrix spike recovery was outside of the control limit for Available Cyanide. However, the matrix spike duplicate recovery and the RPD between the MS and MSD were in control. No qualification is required.

Client: Shealy Environmental Services, Inc.
Project: 16.0062335.52 T2
WorkOrder: **1903985**

QUALIFIERS, ACRONYMS, UNITS

Qualifier	Description
*	Value exceeds Regulatory Limit
**	Estimated Value
a	Analyte is non-accredited
B	Analyte detected in the associated Method Blank above the Reporting Limit
E	Value above quantitation range
H	Analyzed outside of Holding Time
Hr	BOD/CBOD - Sample was reset outside Hold Time, value should be considered estimated.
J	Analyte is present at an estimated concentration between the MDL and Report Limit
ND	Not Detected at the Reporting Limit
O	Sample amount is > 4 times amount spiked
P	Dual Column results percent difference > 40%
R	RPD above laboratory control limit
S	Spike Recovery outside laboratory control limits
U	Analyzed but not detected above the MDL
X	Analyte was detected in the Method Blank between the MDL and Reporting Limit, sample results may exhibit background or reagent contamination at the observed level.

Acronym	Description
DUP	Method Duplicate
LCS	Laboratory Control Sample
LCSD	Laboratory Control Sample Duplicate
LOD	Limit of Detection (see MDL)
LOQ	Limit of Quantitation (see PQL)
MBLK	Method Blank
MDL	Method Detection Limit
MS	Matrix Spike
MSD	Matrix Spike Duplicate
PQL	Practical Quantitation Limit
RPD	Relative Percent Difference
TDL	Target Detection Limit
TNTC	Too Numerous To Count
A	APHA Standard Methods
D	ASTM
E	EPA
SW	SW-846 Update III

Units Reported	Description
µg/L	Micrograms per Liter
mg/L	Milligrams per Liter

ALS Group, USA

Date: *31-Mar-19*

Client:	Shealy Environmental Services, Inc.		
Project:	16.0062335.52 T2	**Work Order:**	1903985
Sample ID:	HS-MW-10S	**Lab ID:**	1903985-01
Collection Date:	3/18/2019 03:05 PM	**Matrix:**	AQUEOUS

Analyses	Result	Qual	Report Limit	Units	Dilution Factor	Date Analyzed
ACIDS BY HPLC			**SW8300M**			Analyst: **KYM**
Acetic Acid	ND		25	mg/L	1	3/19/2019 07:28 PM
Formic Acid	ND		25	mg/L	1	3/19/2019 07:28 PM
CYANIDE, AVAILABLE			**OIA 1677**			Analyst: **MB**
Cyanide, Available	ND		2.0	µg/L	1	3/22/2019 01:00 PM
CHROMIUM, HEXAVALENT			**SW7196A**			Analyst: **JEB**
Chromium, Hexavalent	ND		0.0050	mg/L	1	3/19/2019 11:35 AM

Note: See Qualifiers page for a list of qualifiers and their definitions.

Client: Shealy Environmental Services, Inc.
Project: 16.0062335.52 T2 **Work Order:** 1903985
Sample ID: HS-MW-10M **Lab ID:** 1903985-02
Collection Date: 3/18/2019 12:35 PM **Matrix:** AQUEOUS

Analyses	Result	Qual	Report Limit	Units	Dilution Factor	Date Analyzed
ACIDS BY HPLC			**SW8300M**			Analyst: **KYM**
Acetic Acid	ND		25	mg/L	1	3/19/2019 07:41 PM
Formic Acid	ND		25	mg/L	1	3/19/2019 07:41 PM
CYANIDE, AVAILABLE			**OIA 1677**			Analyst: **MB**
Cyanide, Available	ND		2.0	µg/L	1	3/22/2019 01:00 PM
CHROMIUM, HEXAVALENT			**SW7196A**			Analyst: **JEB**
Chromium, Hexavalent	ND		0.0050	mg/L	1	3/19/2019 11:35 AM

Note: See Qualifiers page for a list of qualifiers and their definitions.

ALS Group, USA

Date: *31-Mar-19*

Client: Shealy Environmental Services, Inc.
Project: 16.0062335.52 T2 **Work Order:** 1903985
Sample ID: HS-MW-10D **Lab ID:** 1903985-03
Collection Date: 3/18/2019 12:10 PM **Matrix:** AQUEOUS

Analyses	Result	Qual	Report Limit	Units	Dilution Factor	Date Analyzed
ACIDS BY HPLC			**SW8300M**			Analyst: **KYM**
Acetic Acid	ND		25	mg/L	1	3/19/2019 07:54 PM
Formic Acid	ND		25	mg/L	1	3/19/2019 07:54 PM
CYANIDE, AVAILABLE			**OIA 1677**			Analyst: **MB**
Cyanide, Available	ND		2.0	µg/L	1	3/22/2019 01:00 PM
CHROMIUM, HEXAVALENT			**SW7196A**			Analyst: **JEB**
Chromium, Hexavalent	ND		0.0050	mg/L	1	3/19/2019 11:35 AM

Note: See Qualifiers page for a list of qualifiers and their definitions.

Client:	Shealy Environmental Services, Inc.		
Project:	16.0062335.52 T2	**Work Order:**	1903985
Sample ID:	HS-MW-9D	**Lab ID:**	1903985-04
Collection Date:	3/19/2019 01:50 PM	**Matrix:**	AQUEOUS

Analyses	Result	Qual	Report Limit	Units	Dilution Factor	Date Analyzed
ACIDS BY HPLC			**SW8300M**			Analyst: **KYM**
Acetic Acid	ND		25	mg/L	1	3/25/2019 07:52 PM
Formic Acid	ND		25	mg/L	1	3/25/2019 07:52 PM
CYANIDE, AVAILABLE			**OIA 1677**			Analyst: **MB**
Cyanide, Available	ND		2.0	µg/L	1	3/22/2019 01:00 PM
CHROMIUM, HEXAVALENT			**SW7196A**			Analyst: **JEB**
Chromium, Hexavalent	ND		0.0050	mg/L	1	3/20/2019 12:58 PM

Note: See Qualifiers page for a list of qualifiers and their definitions.

Client: Shealy Environmental Services, Inc.
Project: 16.0062335.52 T2 **Work Order:** 1903985
Sample ID: HS-MW-9M **Lab ID:** 1903985-05
Collection Date: 3/19/2019 01:45 PM **Matrix:** AQUEOUS

Analyses	Result	Qual	Report Limit	Units	Dilution Factor	Date Analyzed
ACIDS BY HPLC			**SW8300M**			Analyst: **KYM**
Acetic Acid	ND		25	mg/L	1	3/25/2019 08:05 PM
Formic Acid	ND		25	mg/L	1	3/25/2019 08:05 PM
CYANIDE, AVAILABLE			**OIA 1677**			Analyst: **MB**
Cyanide, Available	ND		2.0	µg/L	1	3/22/2019 01:00 PM
CHROMIUM, HEXAVALENT			**SW7196A**			Analyst: **JEB**
Chromium, Hexavalent	ND		0.0050	mg/L	1	3/20/2019 12:58 PM

Note: See Qualifiers page for a list of qualifiers and their definitions.

ALS Group, USA

Date: *31-Mar-19*

Client: Shealy Environmental Services, Inc.
Project: 16.0062335.52 T2
Work Order: 1903985
Sample ID: HS-MW-9S
Lab ID: 1903985-06
Collection Date: 3/19/2019 03:00 PM
Matrix: AQUEOUS

Analyses	Result	Qual	Report Limit	Units	Dilution Factor	Date Analyzed
ACIDS BY HPLC			**SW8300M**			Analyst: **KYM**
Acetic Acid	ND		25	mg/L	1	3/25/2019 08:18 PM
Formic Acid	ND		25	mg/L	1	3/25/2019 08:18 PM
CYANIDE, AVAILABLE			**OIA 1677**			Analyst: **MB**
Cyanide, Available	ND		2.0	µg/L	1	3/22/2019 01:00 PM
CHROMIUM, HEXAVALENT			**SW7196A**			Analyst: **JEB**
Chromium, Hexavalent	ND		0.0050	mg/L	1	3/20/2019 12:58 PM

Note: See Qualifiers page for a list of qualifiers and their definitions.

Client:	Shealy Environmental Services, Inc.		
Project:	16.0062335.52 T2	**Work Order:**	1903985
Sample ID:	HS-MW-6S	**Lab ID:**	1903985-07
Collection Date:	3/20/2019 02:15 PM	**Matrix:**	AQUEOUS

Analyses	Result	Qual	Report Limit	Units	Dilution Factor	Date Analyzed
ACIDS BY HPLC			**SW8300M**			Analyst: **KYM**
Acetic Acid	ND		25	mg/L	1	3/25/2019 08:31 PM
Formic Acid	ND		25	mg/L	1	3/25/2019 08:31 PM
CYANIDE, AVAILABLE			**OIA 1677**			Analyst: **MB**
Cyanide, Available	ND		2.0	µg/L	1	3/22/2019 01:00 PM
CHROMIUM, HEXAVALENT			**SW7196A**			Analyst: **JEB**
Chromium, Hexavalent	ND		0.0050	mg/L	1	3/21/2019 01:01 PM

Note: See Qualifiers page for a list of qualifiers and their definitions.

Client: Shealy Environmental Services, Inc.
Project: 16.0062335.52 T2 **Work Order:** 1903985
Sample ID: HS-MW-6D **Lab ID:** 1903985-08
Collection Date: 3/20/2019 04:00 PM **Matrix:** AQUEOUS

Analyses	Result	Qual	Report Limit	Units	Dilution Factor	Date Analyzed
ACIDS BY HPLC			**SW8300M**			Analyst: **KYM**
Acetic Acid	ND		25	mg/L	1	3/25/2019 08:44 PM
Formic Acid	ND		25	mg/L	1	3/25/2019 08:44 PM
CYANIDE, AVAILABLE			**OIA 1677**			Analyst: **MB**
Cyanide, Available	ND		2.0	µg/L	1	3/22/2019 01:00 PM
CHROMIUM, HEXAVALENT			**SW7196A**			Analyst: **JEB**
Chromium, Hexavalent	ND		0.0050	mg/L	1	3/21/2019 01:01 PM

Note: See Qualifiers page for a list of qualifiers and their definitions.

ALS Group, USA

Date: *31-Mar-19*

Client:	Shealy Environmental Services, Inc.		
Project:	16.0062335.52 T2	**Work Order:**	1903985
Sample ID:	HS-MW-7s	**Lab ID:**	1903985-09
Collection Date:	3/21/2019 11:10 AM	**Matrix:**	AQUEOUS

Analyses	Result	Qual	Report Limit	Units	Dilution Factor	Date Analyzed
ACIDS BY HPLC			**SW8300M**			Analyst: **KYM**
Acetic Acid	ND		25	mg/L	1	3/25/2019 07:39 PM
Formic Acid	ND		25	mg/L	1	3/25/2019 07:39 PM
CYANIDE, AVAILABLE			**OIA 1677**			Analyst: **MB**
Cyanide, Available	ND		2.0	µg/L	1	3/25/2019 11:00 AM
CHROMIUM, HEXAVALENT			**SW7196A**			Analyst: **JEB**
Chromium, Hexavalent	ND	H	0.0050	mg/L	1	3/22/2019 12:50 PM

Note: See Qualifiers page for a list of qualifiers and their definitions.

ALS Group, USA

Date: *31-Mar-19*

Client: Shealy Environmental Services, Inc.
Project: 16.0062335.52 T2
Work Order: 1903985
Sample ID: HS-MW-8
Lab ID: 1903985-10
Collection Date: 3/21/2019 02:00 PM
Matrix: AQUEOUS

Analyses	Result	Qual	Report Limit	Units	Dilution Factor	Date Analyzed
ACIDS BY HPLC			**SW8300M**			Analyst: **KYM**
Acetic Acid	ND		25	mg/L	1	3/25/2019 09:10 PM
Formic Acid	ND		25	mg/L	1	3/25/2019 09:10 PM
CYANIDE, AVAILABLE			**OIA 1677**			Analyst: **MB**
Cyanide, Available	**2.9**		**2.0**	**µg/L**	1	3/25/2019 11:00 AM
CHROMIUM, HEXAVALENT			**SW7196A**			Analyst: **JEB**
Chromium, Hexavalent	ND		0.0050	mg/L	1	3/22/2019 12:50 PM

Note: See Qualifiers page for a list of qualifiers and their definitions.

ALS Group, USA

Date: *31-Mar-19*

Client: Shealy Environmental Services, Inc.

Project: 16.0062335.52 T2

Work Order: 1903985

Sample ID: HS-MW-8 DUP

Lab ID: 1903985-11

Collection Date: 3/21/2019 02:00 PM

Matrix: AQUEOUS

Analyses	Result	Qual	Report Limit	Units	Dilution Factor	Date Analyzed
ACIDS BY HPLC			**SW8300M**			Analyst: **KYM**
Acetic Acid	ND		25	mg/L	1	3/25/2019 09:23 PM
Formic Acid	ND		25	mg/L	1	3/25/2019 09:23 PM
CYANIDE, AVAILABLE			**OIA 1677**			Analyst: **MB**
Cyanide, Available	ND		2.0	µg/L	1	3/25/2019 11:00 AM
CHROMIUM, HEXAVALENT			**SW7196A**			Analyst: **JEB**
Chromium, Hexavalent	ND		0.0050	mg/L	1	3/22/2019 12:50 PM

Note: See Qualifiers page for a list of qualifiers and their definitions.

ALS Group, USA

Date: 31-Mar-19

Client: Shealy Environmental Services, Inc.
Work Order: 1903985
Project: 16.0062335.52 T2

QC BATCH REPORT

Batch ID: **R256885** Instrument ID **HPLC2** Method: **SW8300M**

MBLK Sample ID: **MB-R256885-R256885** Units: **mg/L** Analysis Date: **3/19/2019 04:39 PM**
Client ID: Run ID: **HPLC2_190319A** SeqNo: **5568904** Prep Date: **3/19/2019** DF: **1**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Acetic Acid	ND	5.0								
Formic Acid	ND	5.0								

LCS Sample ID: **LCS-R256885-R256885** Units: **mg/L** Analysis Date: **3/19/2019 04:52 PM**
Client ID: Run ID: **HPLC2_190319A** SeqNo: **5568905** Prep Date: **3/19/2019** DF: **1**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Acetic Acid	522.2	5.0	500	0	104	80-120	0			
Formic Acid	508.9	5.0	500	0	102	80-120	0			

MS Sample ID: **1903547-09AMS** Units: **mg/L** Analysis Date: **3/19/2019 05:05 PM**
Client ID: Run ID: **HPLC2_190319A** SeqNo: **5568912** Prep Date: **3/19/2019** DF: **2**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Acetic Acid	996.2	10	1000	0	99.6	75-125	0			
Formic Acid	1018	10	1000	0	102	75-125	0			

MSD Sample ID: **1903547-09AMSD** Units: **mg/L** Analysis Date: **3/19/2019 05:18 PM**
Client ID: Run ID: **HPLC2_190319A** SeqNo: **5568913** Prep Date: **3/19/2019** DF: **2**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Acetic Acid	1011	10	1000	0	101	75-125	996.2	1.52	20	
Formic Acid	1009	10	1000	0	101	75-125	1018	0.977	20	

The following samples were analyzed in this batch: 1903985-01A 1903985-02A 1903985-03A

Note: See Qualifiers Page for a list of Qualifiers and their explanation.

Client: Shealy Environmental Services, Inc.
Work Order: 1903985
Project: 16.0062335.52 T2

QC BATCH REPORT

Batch ID: **R257162** Instrument ID **HPLC2** Method: **SW8300M**

MBLK Sample ID: **MBLKW1-R257162** Units: **mg/L** Analysis Date: **3/25/2019 06:48 PM**
Client ID: Run ID: **HPLC2_190325A** SeqNo: **5576091** Prep Date: **3/25/2019** DF: **1**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Acetic Acid	ND	5.0								
Formic Acid	ND	5.0								

LCS Sample ID: **LCSW1-R257162** Units: **mg/L** Analysis Date: **3/25/2019 07:01 PM**
Client ID: Run ID: **HPLC2_190325A** SeqNo: **5576092** Prep Date: **3/25/2019** DF: **1**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Acetic Acid	499.7	5.0	500	0	99.9	80-120	0			
Formic Acid	505.6	5.0	500	0	101	80-120	0			

MS Sample ID: **1903985-09A MS** Units: **mg/L** Analysis Date: **3/25/2019 07:13 PM**
Client ID: **HS-MW-7s** Run ID: **HPLC2_190325A** SeqNo: **5576093** Prep Date: **3/25/2019** DF: **2**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Acetic Acid	997.9	10	1000	0	99.8	75-125	0			
Formic Acid	1010	10	1000	0	101	75-125	0			

MSD Sample ID: **1903985-09A MSD** Units: **mg/L** Analysis Date: **3/25/2019 07:26 PM**
Client ID: **HS-MW-7s** Run ID: **HPLC2_190325A** SeqNo: **5576094** Prep Date: **3/25/2019** DF: **2**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Acetic Acid	998.5	10	1000	0	99.9	75-125	997.9	0.0631	20	
Formic Acid	1005	10	1000	0	101	75-125	1010	0.493	20	

The following samples were analyzed in this batch:

1903985-04A 1903985-05A 1903985-06A
1903985-07A 1903985-08A 1903985-09A
1903985-10A 1903985-11A

Note: See Qualifiers Page for a list of Qualifiers and their explanation.

QC BATCH REPORT

Batch ID: **R256730** Instrument ID **WETCHEM** Method: **SW7196A**

MBLK Sample ID: **MB-R256730-R256730** Units: **mg/L** Analysis Date: **3/19/2019 11:35 AM**
Client ID: Run ID: **WETCHEM_190319A** SeqNo: **5564800** Prep Date: DF: **1**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Chromium, Hexavalent	ND	0.0050								

LCS Sample ID: **LCS-R256730-R256730** Units: **mg/L** Analysis Date: **3/19/2019 11:35 AM**
Client ID: Run ID: **WETCHEM_190319A** SeqNo: **5564801** Prep Date: DF: **1**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Chromium, Hexavalent	0.2069	0.0050	0.2	0	103	91-113	0			

MS Sample ID: **1903985-01B MS** Units: **mg/L** Analysis Date: **3/19/2019 11:35 AM**
Client ID: **HS-MW-10S** Run ID: **WETCHEM_190319A** SeqNo: **5564803** Prep Date: DF: **1**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Chromium, Hexavalent	0.2056	0.0050	0.2	0.0003	103	91-113	0			

MSD Sample ID: **1903985-01B MSD** Units: **mg/L** Analysis Date: **3/19/2019 11:35 AM**
Client ID: **HS-MW-10S** Run ID: **WETCHEM_190319A** SeqNo: **5564804** Prep Date: DF: **1**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Chromium, Hexavalent	0.2094	0.0050	0.2	0.0003	105	91-113	0.2056	1.83	10	

The following samples were analyzed in this batch: 1903985-01B 1903985-02B 1903985-03B

Note: See Qualifiers Page for a list of Qualifiers and their explanation.

Client: Shealy Environmental Services, Inc.
Work Order: 1903985
Project: 16.0062335.52 T2

QC BATCH REPORT

Batch ID: **R256824** Instrument ID **WETCHEM** Method: **SW7196A**

MBLK Sample ID: **MB-R256824-R256824** Units: **mg/L** Analysis Date: **3/20/2019 12:58 PM**
Client ID: Run ID: **WETCHEM_190320G** SeqNo: **5567331** Prep Date: DF: **1**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Chromium, Hexavalent	ND	0.0050								

LCS Sample ID: **LCS-R256824-R256824** Units: **mg/L** Analysis Date: **3/20/2019 12:58 PM**
Client ID: Run ID: **WETCHEM_190320G** SeqNo: **5567332** Prep Date: DF: **1**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Chromium, Hexavalent	0.2031	0.0050	0.2	0	102	91-113	0			

MS Sample ID: **1903985-06B MS** Units: **mg/L** Analysis Date: **3/20/2019 12:58 PM**
Client ID: **HS-MW-9S** Run ID: **WETCHEM_190320G** SeqNo: **5567336** Prep Date: DF: **1**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Chromium, Hexavalent	0.2019	0.0050	0.2	0.0015	100	91-113	0			

MSD Sample ID: **1903985-06B MSD** Units: **mg/L** Analysis Date: **3/20/2019 12:58 PM**
Client ID: **HS-MW-9S** Run ID: **WETCHEM_190320G** SeqNo: **5567337** Prep Date: DF: **1**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Chromium, Hexavalent	0.2031	0.0050	0.2	0.0015	101	91-113	0.2019	0.593	10	

The following samples were analyzed in this batch: 1903985-04B 1903985-05B 1903985-06B

Note: See Qualifiers Page for a list of Qualifiers and their explanation.

Batch ID: **R256911** Instrument ID **WETCHEM** Method: **SW7196A**

MBLK Sample ID: **MB-R256911-R256911** Units: **mg/L** Analysis Date: **3/21/2019 01:01 PM**
Client ID: Run ID: **WETCHEM_190321H** SeqNo: **5569509** Prep Date: DF: **1**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Chromium, Hexavalent	ND	0.0050								

LCS Sample ID: **LCS-R256911-R256911** Units: **mg/L** Analysis Date: **3/21/2019 01:01 PM**
Client ID: Run ID: **WETCHEM_190321H** SeqNo: **5569510** Prep Date: DF: **1**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Chromium, Hexavalent	0.2019	0.0050	0.2	0	101	91-113	0			

MS Sample ID: **1903985-07B MS** Units: **mg/L** Analysis Date: **3/21/2019 01:01 PM**
Client ID: **HS-MW-6S** Run ID: **WETCHEM_190321H** SeqNo: **5569512** Prep Date: DF: **1**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Chromium, Hexavalent	0.2031	0.0050	0.2	0.0015	101	91-113	0			

MSD Sample ID: **1903985-07B MSD** Units: **mg/L** Analysis Date: **3/21/2019 01:01 PM**
Client ID: **HS-MW-6S** Run ID: **WETCHEM_190321H** SeqNo: **5569513** Prep Date: DF: **1**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Chromium, Hexavalent	0.1994	0.0050	0.2	0.0015	99	91-113	0.2031	1.84	10	

The following samples were analyzed in this batch: 1903985-07B 1903985-08B

Note: See Qualifiers Page for a list of Qualifiers and their explanation.

Batch ID: **R257005** Instrument ID **WETCHEM** Method: **SW7196A**

MBLK Sample ID: **MB-R257005-R257005** Units: **mg/L** Analysis Date: **3/22/2019 12:50 PM**
Client ID: Run ID: **WETCHEM_190322G** SeqNo: **5571888** Prep Date: DF: **1**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Chromium, Hexavalent	ND	0.0050								

LCS Sample ID: **LCS-R257005-R257005** Units: **mg/L** Analysis Date: **3/22/2019 12:50 PM**
Client ID: Run ID: **WETCHEM_190322G** SeqNo: **5571889** Prep Date: DF: **1**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Chromium, Hexavalent	0.2056	0.0050	0.2	0	103	91-113	0			

MS Sample ID: **1903985-09BMS** Units: **mg/L** Analysis Date: **3/22/2019 12:50 PM**
Client ID: **HS-MW-7s** Run ID: **WETCHEM_190322G** SeqNo: **5571891** Prep Date: DF: **1**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Chromium, Hexavalent	0.2081	0.0050	0.2	-0.001	105	91-113	0			H

MSD Sample ID: **1903985-09BMSD** Units: **mg/L** Analysis Date: **3/22/2019 12:50 PM**
Client ID: **HS-MW-7s** Run ID: **WETCHEM_190322G** SeqNo: **5571892** Prep Date: DF: **1**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Chromium, Hexavalent	0.2019	0.0050	0.2	-0.001	101	91-113	0.2081	3.02	10	H

The following samples were analyzed in this batch: 1903985-09B 1903985-10B 1903985-11B

QC BATCH REPORT

Batch ID: **R257057** Instrument ID **FS3100** Method: **OIA 1677**

MBLK Sample ID: **MB-R257057-R257057** Units: **µg/L** Analysis Date: **3/22/2019 01:00 PM**
Client ID: Run ID: **FS3100_190322A** SeqNo: **5573284** Prep Date: DF: **1**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Cyanide, Available	ND	2.0								

LCS Sample ID: **LCS-R257057-R257057** Units: **µg/L** Analysis Date: **3/22/2019 01:00 PM**
Client ID: Run ID: **FS3100_190322A** SeqNo: **5573285** Prep Date: DF: **1**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Cyanide, Available	42.82	2.0	50	0	85.6	82-132	0			

MS Sample ID: **19031144-01B MS** Units: **µg/L** Analysis Date: **3/22/2019 01:00 PM**
Client ID: Run ID: **FS3100_190322A** SeqNo: **5573288** Prep Date: DF: **1**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Cyanide, Available	55.89	2.0	50	9.95	91.9	82-130	0			

MSD Sample ID: **19031144-01B MSD** Units: **µg/L** Analysis Date: **3/22/2019 01:00 PM**
Client ID: Run ID: **FS3100_190322A** SeqNo: **5573289** Prep Date: DF: **1**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Cyanide, Available	57.22	2.0	50	9.95	94.5	82-130	55.89	2.35	11	

The following samples were analyzed in this batch:

1903985-01C	1903985-02C	1903985-03C
1903985-04C	1903985-05C	1903985-06C
1903985-07C	1903985-08C	

Note: See Qualifiers Page for a list of Qualifiers and their explanation.

Client: Shealy Environmental Services, Inc.
Work Order: 1903985
Project: 16.0062335.52 T2

QC BATCH REPORT

Batch ID: **R257131** Instrument ID **FS3100** Method: **OIA 1677**

MBLK Sample ID: **MB-R257131-R257131** Units: **µg/L** Analysis Date: **3/25/2019 11:00 AM**
Client ID: Run ID: **FS3100_190325A** SeqNo: **5575091** Prep Date: DF: **1**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Cyanide, Available	ND	2.0								

LCS Sample ID: **LCS-R257131-R257131** Units: **µg/L** Analysis Date: **3/25/2019 11:00 AM**
Client ID: Run ID: **FS3100_190325A** SeqNo: **5575092** Prep Date: DF: **1**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Cyanide, Available	41.55	2.0	50	0	83.1	82-132	0			

MS Sample ID: **1903985-09CMS** Units: **µg/L** Analysis Date: **3/25/2019 11:00 AM**
Client ID: **HS-MW-7s** Run ID: **FS3100_190325A** SeqNo: **5575100** Prep Date: DF: **1**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Cyanide, Available	39.41	2.0	50	-0.26	79.3	82-130	0			S

MSD Sample ID: **1903985-09CMSD** Units: **µg/L** Analysis Date: **3/25/2019 11:00 AM**
Client ID: **HS-MW-7s** Run ID: **FS3100_190325A** SeqNo: **5575101** Prep Date: DF: **1**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Cyanide, Available	41.65	2.0	50	-0.26	83.8	82-130	39.41	5.53	11	

The following samples were analyzed in this batch: 1903985-09C 1903985-10C 1903985-11C

Note: See Qualifiers Page for a list of Qualifiers and their explanation.

190398S

SHEALY

Chain of Custody Record

Sheealy 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

Number

Client: **Rose and Westra / GZA**
Report to Contact: Loretta Powers
Telephone No. / E-mail: 616-956-6123 loretta.powers@gza.com
Quote No.: 20986
Address: 601 Fifth Street NW, Suite 102
Sampler's Signature: x Makayla Myers
Printed Name: Makayla Myers
City: Grand Rapids
State: MI
Zip Code: 49504
Analysis (Attach list if more space is needed)
Page 1 of 1
Laboratory Lot Number
Project Name: 16.0062335.52 T-2
Project Number: 16.0062335.52 T-2
P.O No.:

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/Zn Acetate	NaOH	MeOH	Acetic Acid	Formic Acid	Available Cyanide	Hexavalent Chromium (7199)						Remarks / Cooler I.D. ALS Water
HS-MW-10S	3/18/2019	15:05	G	x				5					1		x	x	x	x						
HS-MW-10M	3/18/2019	12:35	G	x				5					1		x	x	x	x						
HS-MW-10D	3/18/2019	12:10	G	x				5					1		x	x	x	x						

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

Sample Disposal
☐ Return to Client ☒ Disposal by Lab

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

QC Requirements

	Date	Time		Date	Time
1. Relinquished by Makayla Myers	3/19/19	09:00	1. Received by	3/19/19	1000
2. Relinquished by	3/19/19	1110	2. Received by		
3. Relinquished by			3. Received by		
4. Relinquished by			4. Laboratory Received by		

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

LAB USE ONLY
Received on Ice (Check) ☐ Y ☐ N ☐ Ice Pack
Receipt Temp 2.0 °C SR2

1903980

SHEALY

Chain of Custody Record

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

Number

Client: **Rose and Westra / GZA**
Report to Contact: Lori Powers
Telephone No. / E-mail: 616-956-6123 loretta.powers@gza.com
Quote No.: 20986
Address: 601 Fifth Street NW, Suite 102
Sampler's Signature: x
Analysis (Attach list if more space is needed)
Page 1 of 1
City: Grand Rapids State: MI Zip Code: 49504
Printed Name: Makayla Myers
Project Name: 16.0062335.52 T2
Laboratory Lot Number:
Project Number: 16.0062335.52 T2
P.O No.:

Sample ID / Description (Containers for each sample may be combined on one line)	Date	Time	G=Grab C=Composite	Matrix				No of Containers by Preservative Type																Remarks / Cooler I.D. ALS Water
				Aqueous	Solid	Non-Aqueous		Unpres.	H2SO4	HNO3	HCl	NaOH/Zn Acetate	NaOH	MeOH	Acetic Acid	Formic Acid	Available Cyanide	Hexavalent Chromium (7199)						
HS-MW-9D	3/19/2019	13:50	G	x				4					1		x	x	x	x						
HS-MW-9M	3/19/2019	13:45	G	x				4					1		x	x	x	x						
HS-MW-9S	3/19/2019	15:00	G	x				4					1		x	x	x	x						

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

Sample Disposal
☐ Return to Client ☒ Disposal by Lab

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

QC Requirements

	Date	Time		Date	Time
1. Relinquished by Makayla Myers	3/19/2019	0930	1. Received by	3/20/19	0945
2. Relinquished by	3/20/19	1200	2. Received by		
3. Relinquished by			3. Received by		
4. Relinquished by			4. Laboratory Received by		

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

LAB USE ONLY
Received on Ice (Check) ☐ Y ☐ N ☐ Ice Pack
Receipt Temp. 3.6 °C SR2

1903985

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West Columbia, South Carolina 29172
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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. 20986
Address 601 Fifth Street NW, Suite 102	Sampler's Signature x	Analysis (Attach list if more space is needed)	Page 1 of 1
City: Grand Rapids State: MI Zip Code: 49504	Printed Name Makayla Myers		
Project Name 16.0062335.52 T2			Laboratory Lot Number
Project Number 16.0062335.52 T2	P.O No.		

Sample ID / Description (Containers for each sample may be combined on one line)	Date	Time	G=Grab C=Composite	Matrix: Aqueous	Solid	Non-Aqueous		No of Containers by Preservative Type: Unpres.	H2SO4	HNO3	HCl	NaOH/Zn Acetate	NaOH	MeOH	Acetic Acid	Formic Acid	Available Cyanide	Hexavalent Chromium (7199)						Remarks / Cooler I.D. ALS Water
HS-MW-6S	3/20/2019	14:15	G	x				4					1		x	x	x	x						
HS-MW-6D	3/20/2019	16:00	G	x				4					1		x	x	x	x						

Turn Around Time Required (Prior lab approval required for expedited TAT) ☒ Standard ☐ Rush (Please Specify)	Sample Disposal ☐ Return to Client ☒ Disposal by Lab	Possible Hazard Identification (List any known hazards in the remarks) ☒ Non-Hazardous ☐ Flammable ☐ Skin Irritant ☐ SDS provided ☐ Unknown	QC Requirements

1. Relinquished by Makayla Myers	Date 3/21/2019	Time 8:30	1. Received by	Date 3/21/19	Time 1000
2. Relinquished by	Date 3/21/19	Time 1215	2. Received by	Date	Time
3. Relinquished by	Date	Time	3. Received by	Date	Time
4. Relinquished by	Date	Time	4. Laboratory Received by	Date	Time

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

LAB USE ONLY
Received on Ice (Check) ☐ Y ☐ N ☐ Ice Pack

Receipt Temp. 3.8 °C SR2

1903985

Number

Chain of Custody Record

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

Client **Rose and Westra / GZA**	Report to Contact Lori Powers	Telephone No. / E-mail 616-956-6123 loretta.powers@gza.com	Quote No. 20986
Address 601 Fifth Street NW, Suite 102	Sampler's Signature x Mayla Myers	Analysis (Attach list if more space is needed)	Page 1 of 1
City Grand Rapids | State MI | Zip Code 49504	Printed Name Makayla Myers		
Project Name 16.0062335.52 T2			Laboratory Lot Number
Project Number 16.0062335.52 T2	P.O No.		

	Sample ID / Description (Containers for each sample may be combined on one line)	Date	Time	G=Grab C=Composite	Matrix: Aqueous	Solid	Non-Aqueous		No of Containers by Preservative Type: Unpres.	H2SO4	HNO3	HCl	NaOH/Zn Acetate	NaOH	MeOH	Acetic Acid	Formic Acid	Available Cyanide	Hexavalent Chromium (7199)						Remarks / Cooler I.D. ALS Water
9	HS-MW-7S	3/21/2019	11:10	G	x				4					1		x	x	x	x						
10	HS-MW-8	3/21/2019	14:00	G	x				4					1		x	x	x	x						
9	HS-MW-7S MS/MSD	3/21/2019	11:10	G	x				4					1		x	x	x	x						
11	HS-MW-8 DUP	3/21/2019	14:00	G	x				4					1		x	x	x	x						

Turn Around Time Required (Prior lab approval required for expedited TAT) ☒ Standard ☐ Rush (Please Specify)	Sample Disposal ☐ Return to Client ☒ Disposal by Lab		Possible Hazard Identification (List any known hazards in the remarks) ☒ Non-Hazardous ☐ Flammable ☐ Skin Irritant ☐ SDS provided ☐ Unknown		QC Requirements
1. Relinquished by Makayla Myers	Date 3/21/2019	Time 0900	1. Received by	Date 3/21/19	Time 1000
2. Relinquished by	Date	Time	2. Received by	Date	Time
3. Relinquished by	Date	Time	3. Received by	Date	Time
4. Relinquished by	Date 3/21/19	Time 1100	4. Laboratory Received by	Date 3/21/19	Time 1130

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

LAB USE ONLY
Received on Ice (Check) ☐ Y ☐ N ☐ Ice Pack

Receipt Temp. 2.4 °C SR

ALS Group, USA

Sample Receipt Checklist

Client Name: **SHEALYENV**

Date/Time Received: **19-Mar-19 11:10**

Work Order: **1903985**

Received by: **DS**

Checklist completed by Diane Shaw eSignature 19-Mar-19 Date

Reviewed by: Alex J. Csaszar eSignature 19-Mar-19 Date

Matrices: Aqueous

Carrier name: ALSHN

Shipping container/cooler in good condition?	Yes ☑	No ☐	Not Present ☐
Custody seals intact on shipping container/cooler?	Yes ☐	No ☐	Not Present ☑
Custody seals intact on sample bottles?	Yes ☐	No ☐	Not Present ☑
Chain of custody present?	Yes ☑	No ☐	
Chain of custody signed when relinquished and received?	Yes ☑	No ☐	
Chain of custody agrees with sample labels?	Yes ☑	No ☐	
Samples in proper container/bottle?	Yes ☑	No ☐	
Sample containers intact?	Yes ☑	No ☐	
Sufficient sample volume for indicated test?	Yes ☑	No ☐	
All samples received within holding time?	Yes ☑	No ☐	
Container/Temp Blank temperature in compliance?	Yes ☑	No ☐	
Sample(s) received on ice?	Yes ☑	No ☐	
Temperature(s)/Thermometer(s):	2.0/2.0 c	SR2	
Cooler(s)/Kit(s):			
Date/Time sample(s) sent to storage:	3/19/2019 11:28:10 AM		
Water - VOA vials have zero headspace?	Yes ☑	No ☐	No VOA vials submitted ☐
Water - pH acceptable upon receipt?	Yes ☑	No ☐	N/A ☐
pH adjusted?	Yes ☐	No ☑	N/A ☐
pH adjusted by:	-		

Login Notes:

Client Contacted:

Date Contacted:

Person Contacted:

Contacted By:

Regarding:

Comments:

CorrectiveAction:

SHEALY ENVIRONMENTAL SERVICES, INC.

Report of Analysis

GZA GeoEnvironmental, Inc.
601 Fifth Street N.W., Suite 102
Grand Rapids, MI 49504
Attention: Leslie Nelson

Project Name: 16.0062335.52

Project Number: 16.0062335.52

Lot Number:**UB27031**

Date Completed:03/08/2019

N. Saikaly

03/08/2019 7:18 PM
Approved and released by:
Project Manager: Nisreen Saikaly

Shealy Environmental Services, Inc.
106 Vantage Point Drive West Columbia, SC 29172 (803) 791-9700 Fax (803) 791-9111 www.shealylab.com

Case Narrative
GZA GeoEnvironmental, Inc.
Lot Number: UB27031

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 Shealy Environmental Services, Inc. ("Shealy") Quality Assurance Management Plan (QAMP), applicable Shealy standard operating procedures (SOPs), the 2003 NELAC standard, and Shealy policies. Additionally, the DoD QSM version 5.1 has been followed for these samples, and specifically Table B-15 was followed for all PFAS samples. Any exceptions to the QAMP, SOPs, NELAC standards, the DoD QSM, or policies are qualified on the results page or discussed below.

All QC associated with these samples was in compliance with DOD QSM 5.1 table B-15 and our PFAS SOP. DoD reporting conventions and qualifiers are not utilized in this data package.

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

CF = DF * FV / Vo

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

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

$$Cs = \left(\frac{A_s}{A_{is}} - b \right) * \left(\frac{C_{is}}{a} \right)$$

Where:

A_s is peak response of target analyte in the sample
A_{is} is peak response of internal standard in the sample
C_s is concentration of target analyte in the sample
C_{is} is concentration of internal standard in the sample (1ng/mL)
a is the slope from the ICAL linear regression
b is the y-intercept from the ICAL linear regression

Sample Summary

GZA GeoEnvironmental, Inc.

Lot Number: UB27031

Sample Number	Sample ID	Matrix	Date Sampled	Date Received
001	HS-MW-14M	Aqueous	02/26/2019 1222	02/27/2019
002	HS-MW-14S	Aqueous	02/26/2019 1250	02/27/2019
003	HS-MW-14D	Aqueous	02/26/2019 1500	02/27/2019
004	HS-MW-14D DUP	Aqueous	02/26/2019 1500	02/27/2019

(4 samples)

Detection Summary

GZA GeoEnvironmental, Inc.

Lot Number: UB27031

Sample	Sample ID	Matrix	Parameter	Method	Result	Q	Units	Page

(0 detections)

PFAS by LC/MS/MS

Client: **GZA GeoEnvironmental, Inc.**
Laboratory ID: **UB27031-001**
Description: **HS-MW-14M**
Matrix: **Aqueous**
Date Sampled: **02/26/2019 1222**
Date Received: **02/27/2019**

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	537 MOD	537 Modified-ID	1	03/05/2019 2125	SES	03/04/2019 1100	99148

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	Units	Run
1H, 1H, 2H, 2H-perfluorodecane sulfonic acid (8:2 FTS)	39108-34-4	537 Modified-	ND		3.6	ng/L	1
1H, 1H, 2H, 2H-perfluorooctane sulfonic acid (6:2 FTS)	27619-97-2	537 Modified-	ND		3.6	ng/L	1
N-ethylperfluoro-1-octanesulfonamide (EtFOSA)	4151-50-2	537 Modified-	ND		3.6	ng/L	1
N-methylperfluoro-1-octanesulfonamide (MeFOSA)	31506-32-8	537 Modified-	ND		7.1	ng/L	1
Perfluoro-1-butanesulfonic acid (PFBS)	375-73-5	537 Modified-	ND		3.6	ng/L	1
Perfluoro-1-decanesulfonic acid (PFDS)	335-77-3	537 Modified-	ND		3.6	ng/L	1
Perfluoro-1-heptanesulfonic acid (PFHpS)	375-92-8	537 Modified-	ND		3.6	ng/L	1
Perfluoro-1-nonanesulfonic acid (PFNS)	68259-12-1	537 Modified-	ND		7.1	ng/L	1
Perfluoro-1-octanesulfonamide (PFOSA)	754-91-6	537 Modified-	ND		3.6	ng/L	1
Perfluoro-1-pentanesulfonic acid (PFPeS)	2706-91-4	537 Modified-	ND		3.6	ng/L	1
Perfluorohexanesulfonic acid (PFHxS)	355-46-4	537 Modified-	ND		3.6	ng/L	1
Perfluoro-n-butanoic acid (PFBA)	375-22-4	537 Modified-	ND		3.6	ng/L	1
Perfluoro-n-decanoic acid (PFDA)	335-76-2	537 Modified-	ND		3.6	ng/L	1
Perfluoro-n-dodecanoic acid (PFDoA)	307-55-1	537 Modified-	ND		3.6	ng/L	1
Perfluoro-n-heptanoic acid (PFHpA)	375-85-9	537 Modified-	ND		3.6	ng/L	1
Perfluoro-n-hexanoic acid (PFHxA)	307-24-4	537 Modified-	ND		3.6	ng/L	1
Perfluoro-n-nonanoic acid (PFNA)	375-95-1	537 Modified-	ND		3.6	ng/L	1
Perfluoro-n-octanoic acid (PFOA)	335-67-1	537 Modified-	ND		1.8	ng/L	1
Perfluoro-n-pentanoic acid (PFPeA)	2706-90-3	537 Modified-	ND		3.6	ng/L	1
Perfluoro-n-tetradecanoic acid (PFTeDA)	376-06-7	537 Modified-	ND		3.6	ng/L	1
Perfluoro-n-tridecanoic acid (PFTrDA)	72629-94-8	537 Modified-	ND		3.6	ng/L	1
Perfluoro-n-undecanoic acid (PFUdA)	2058-94-8	537 Modified-	ND		3.6	ng/L	1
Perfluorooctanesulfonic acid (PFOS)	1763-23-1	537 Modified-	ND		3.6	ng/L	1

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
13C2_6:2FTS		93	50-150
13C2_8:2FTS		106	50-150
13C2_PFDoA		106	50-150
13C2_PFTeDA		98	50-150
13C3_PFBS		111	50-150
13C3_PFHxS		113	50-150
13C4_PFBA		115	50-150
13C4_PFHpA		110	50-150
13C5_PFHxA		115	50-150
13C5_PFPeA		120	50-150
13C6_PFDA		112	50-150
13C7_PFUdA		108	50-150
13C8_PFOA		113	50-150
13C8_PFOS		110	50-150
13C8_PFOSA		105	50-150
13C9_PFNA		115	50-150
d-EtFOSA		77	50-150
d-MeFOSA		81	50-150

LOQ = Limit of Quantitation
B = Detected in the method blank
E = Quantitation of compound exceeded the calibration range
ND = Not detected at or above the LOQ
N = Recovery is out of criteria
P = The RPD between two GC columns exceeds 40%
H = Out of holding time
W = Reported on wet weight basis

PFAS by LC/MS/MS

Client: GZA GeoEnvironmental, Inc.
Laboratory ID: UB27031-002
Description: HS-MW-14S
Matrix: Aqueous
Date Sampled: 02/26/2019 1250
Date Received: 02/27/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	537 MOD	537 Modified-ID	1	03/05/2019 2138	SES	03/04/2019 1100	99148

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	Units	Run
1H, 1H, 2H, 2H-perfluorodecane sulfonic acid (8:2 FTS)	39108-34-4	537 Modified-	ND		3.6	ng/L	1
1H, 1H, 2H, 2H-perfluorooctane sulfonic acid (6:2 FTS)	27619-97-2	537 Modified-	ND		3.6	ng/L	1
N-ethylperfluoro-1-octanesulfonamide (EtFOSA)	4151-50-2	537 Modified-	ND		3.6	ng/L	1
N-methylperfluoro-1-octanesulfonamide (MeFOSA)	31506-32-8	537 Modified-	ND		7.1	ng/L	1
Perfluoro-1-butanesulfonic acid (PFBS)	375-73-5	537 Modified-	ND		3.6	ng/L	1
Perfluoro-1-decanesulfonic acid (PFDS)	335-77-3	537 Modified-	ND		3.6	ng/L	1
Perfluoro-1-heptanesulfonic acid (PFHpS)	375-92-8	537 Modified-	ND		3.6	ng/L	1
Perfluoro-1-nonanesulfonic acid (PFNS)	68259-12-1	537 Modified-	ND		7.1	ng/L	1
Perfluoro-1-octanesulfonamide (PFOSA)	754-91-6	537 Modified-	ND		3.6	ng/L	1
Perfluoro-1-pentanesulfonic acid (PFPeS)	2706-91-4	537 Modified-	ND		3.6	ng/L	1
Perfluorohexanesulfonic acid (PFHxS)	355-46-4	537 Modified-	ND		3.6	ng/L	1
Perfluoro-n-butanoic acid (PFBA)	375-22-4	537 Modified-	ND		3.6	ng/L	1
Perfluoro-n-decanoic acid (PFDA)	335-76-2	537 Modified-	ND		3.6	ng/L	1
Perfluoro-n-dodecanoic acid (PFDoA)	307-55-1	537 Modified-	ND		3.6	ng/L	1
Perfluoro-n-heptanoic acid (PFHpA)	375-85-9	537 Modified-	ND		3.6	ng/L	1
Perfluoro-n-hexanoic acid (PFHxA)	307-24-4	537 Modified-	ND		3.6	ng/L	1
Perfluoro-n-nonanoic acid (PFNA)	375-95-1	537 Modified-	ND		3.6	ng/L	1
Perfluoro-n-octanoic acid (PFOA)	335-67-1	537 Modified-	ND		1.8	ng/L	1
Perfluoro-n-pentanoic acid (PFPeA)	2706-90-3	537 Modified-	ND		3.6	ng/L	1
Perfluoro-n-tetradecanoic acid (PFTeDA)	376-06-7	537 Modified-	ND		3.6	ng/L	1
Perfluoro-n-tridecanoic acid (PFTrDA)	72629-94-8	537 Modified-	ND		3.6	ng/L	1
Perfluoro-n-undecanoic acid (PFUdA)	2058-94-8	537 Modified-	ND		3.6	ng/L	1
Perfluorooctanesulfonic acid (PFOS)	1763-23-1	537 Modified-	ND		3.6	ng/L	1

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
13C2_6:2FTS		102	50-150
13C2_8:2FTS		114	50-150
13C2_PFDoA		106	50-150
13C2_PFTeDA		102	50-150
13C3_PFBS		115	50-150
13C3_PFHxS		115	50-150
13C4_PFBA		120	50-150
13C4_PFHpA		116	50-150
13C5_PFHxA		121	50-150
13C5_PFPeA		118	50-150
13C6_PFDA		117	50-150
13C7_PFUdA		115	50-150
13C8_PFOA		116	50-150
13C8_PFOS		115	50-150
13C8_PFOSA		108	50-150
13C9_PFNA		118	50-150
d-EtFOSA		77	50-150
d-MeFOSA		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%

PFAS by LC/MS/MS

Client: GZA GeoEnvironmental, Inc.
Laboratory ID: UB27031-003
Description: HS-MW-14D
Matrix: Aqueous
Date Sampled: 02/26/2019 1500
Date Received: 02/27/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	537 MOD	537 Modified-ID	1	03/05/2019 2254	SES	03/05/2019 1110	99271

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	Units	Run
1H, 1H, 2H, 2H-perfluorodecane sulfonic acid (8:2 FTS)	39108-34-4	537 Modified-	ND		3.7	ng/L	1
1H, 1H, 2H, 2H-perfluorooctane sulfonic acid (6:2 FTS)	27619-97-2	537 Modified-	ND		3.7	ng/L	1
N-ethylperfluoro-1-octanesulfonamide (EtFOSA)	4151-50-2	537 Modified-	ND		3.7	ng/L	1
N-methylperfluoro-1-octanesulfonamide (MeFOSA)	31506-32-8	537 Modified-	ND		7.5	ng/L	1
Perfluoro-1-butanesulfonic acid (PFBS)	375-73-5	537 Modified-	ND		3.7	ng/L	1
Perfluoro-1-decanesulfonic acid (PFDS)	335-77-3	537 Modified-	ND		3.7	ng/L	1
Perfluoro-1-heptanesulfonic acid (PFHpS)	375-92-8	537 Modified-	ND		3.7	ng/L	1
Perfluoro-1-nonanesulfonic acid (PFNS)	68259-12-1	537 Modified-	ND		7.5	ng/L	1
Perfluoro-1-octanesulfonamide (PFOSA)	754-91-6	537 Modified-	ND		3.7	ng/L	1
Perfluoro-1-pentanesulfonic acid (PFPeS)	2706-91-4	537 Modified-	ND		3.7	ng/L	1
Perfluorohexanesulfonic acid (PFHxS)	355-46-4	537 Modified-	ND		3.7	ng/L	1
Perfluoro-n-butanoic acid (PFBA)	375-22-4	537 Modified-	ND		3.7	ng/L	1
Perfluoro-n-decanoic acid (PFDA)	335-76-2	537 Modified-	ND		3.7	ng/L	1
Perfluoro-n-dodecanoic acid (PFDoA)	307-55-1	537 Modified-	ND		3.7	ng/L	1
Perfluoro-n-heptanoic acid (PFHpA)	375-85-9	537 Modified-	ND		3.7	ng/L	1
Perfluoro-n-hexanoic acid (PFHxA)	307-24-4	537 Modified-	ND		3.7	ng/L	1
Perfluoro-n-nonanoic acid (PFNA)	375-95-1	537 Modified-	ND		3.7	ng/L	1
Perfluoro-n-octanoic acid (PFOA)	335-67-1	537 Modified-	ND		1.9	ng/L	1
Perfluoro-n-pentanoic acid (PFPeA)	2706-90-3	537 Modified-	ND		3.7	ng/L	1
Perfluoro-n-tetradecanoic acid (PFTeDA)	376-06-7	537 Modified-	ND		3.7	ng/L	1
Perfluoro-n-tridecanoic acid (PFTrDA)	72629-94-8	537 Modified-	ND		3.7	ng/L	1
Perfluoro-n-undecanoic acid (PFUdA)	2058-94-8	537 Modified-	ND		3.7	ng/L	1
Perfluorooctanesulfonic acid (PFOS)	1763-23-1	537 Modified-	ND		3.7	ng/L	1

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
13C2_6:2FTS		103	50-150
13C2_8:2FTS		103	50-150
13C2_PFDoA		108	50-150
13C2_PFTeDA		105	50-150
13C3_PFBS		119	50-150
13C3_PFHxS		119	50-150
13C4_PFBA		123	50-150
13C4_PFHpA		124	50-150
13C5_PFHxA		118	50-150
13C5_PFPeA		121	50-150
13C6_PFDA		116	50-150
13C7_PFUdA		115	50-150
13C8_PFOA		119	50-150
13C8_PFOS		116	50-150
13C8_PFOSA		106	50-150
13C9_PFNA		121	50-150
d-EtFOSA		77	50-150
d-MeFOSA		84	50-150

LOQ = Limit of Quantitation
B = Detected in the method blank
E = Quantitation of compound exceeded the calibration range
ND = Not detected at or above the LOQ
N = Recovery is out of criteria
P = The RPD between two GC columns exceeds 40%
H = Out of holding time
W = Reported on wet weight basis

PFAS by LC/MS/MS

Client: GZA GeoEnvironmental, Inc.
Laboratory ID: UB27031-004
Description: HS-MW-14D DUP
Matrix: Aqueous
Date Sampled: 02/26/2019 1500
Date Received: 02/27/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	537 MOD	537 Modified-ID	1	03/05/2019 2332	SES	03/05/2019 1110	99271

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	Units	Run
1H, 1H, 2H, 2H-perfluorodecane sulfonic acid (8:2 FTS)	39108-34-4	537 Modified-	ND		3.6	ng/L	1
1H, 1H, 2H, 2H-perfluorooctane sulfonic acid (6:2 FTS)	27619-97-2	537 Modified-	ND		3.6	ng/L	1
N-ethylperfluoro-1-octanesulfonamide (EtFOSA)	4151-50-2	537 Modified-	ND		3.6	ng/L	1
N-methylperfluoro-1-octanesulfonamide (MeFOSA)	31506-32-8	537 Modified-	ND		7.3	ng/L	1
Perfluoro-1-butanesulfonic acid (PFBS)	375-73-5	537 Modified-	ND		3.6	ng/L	1
Perfluoro-1-decanesulfonic acid (PFDS)	335-77-3	537 Modified-	ND		3.6	ng/L	1
Perfluoro-1-heptanesulfonic acid (PFHpS)	375-92-8	537 Modified-	ND		3.6	ng/L	1
Perfluoro-1-nonanesulfonic acid (PFNS)	68259-12-1	537 Modified-	ND		7.3	ng/L	1
Perfluoro-1-octanesulfonamide (PFOSA)	754-91-6	537 Modified-	ND		3.6	ng/L	1
Perfluoro-1-pentanesulfonic acid (PFPeS)	2706-91-4	537 Modified-	ND		3.6	ng/L	1
Perfluorohexanesulfonic acid (PFHxS)	355-46-4	537 Modified-	ND		3.6	ng/L	1
Perfluoro-n-butanoic acid (PFBA)	375-22-4	537 Modified-	ND		3.6	ng/L	1
Perfluoro-n-decanoic acid (PFDA)	335-76-2	537 Modified-	ND		3.6	ng/L	1
Perfluoro-n-dodecanoic acid (PFDoA)	307-55-1	537 Modified-	ND		3.6	ng/L	1
Perfluoro-n-heptanoic acid (PFHpA)	375-85-9	537 Modified-	ND		3.6	ng/L	1
Perfluoro-n-hexanoic acid (PFHxA)	307-24-4	537 Modified-	ND		3.6	ng/L	1
Perfluoro-n-nonanoic acid (PFNA)	375-95-1	537 Modified-	ND		3.6	ng/L	1
Perfluoro-n-octanoic acid (PFOA)	335-67-1	537 Modified-	ND		1.8	ng/L	1
Perfluoro-n-pentanoic acid (PFPeA)	2706-90-3	537 Modified-	ND		3.6	ng/L	1
Perfluoro-n-tetradecanoic acid (PFTeDA)	376-06-7	537 Modified-	ND		3.6	ng/L	1
Perfluoro-n-tridecanoic acid (PFTrDA)	72629-94-8	537 Modified-	ND		3.6	ng/L	1
Perfluoro-n-undecanoic acid (PFUdA)	2058-94-8	537 Modified-	ND		3.6	ng/L	1
Perfluorooctanesulfonic acid (PFOS)	1763-23-1	537 Modified-	ND		3.6	ng/L	1

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
13C2_6:2FTS		120	50-150
13C2_8:2FTS		117	50-150
13C2_PFDoA		107	50-150
13C2_PFTeDA		103	50-150
13C3_PFBS		113	50-150
13C3_PFHxS		114	50-150
13C4_PFBA		119	50-150
13C4_PFHpA		116	50-150
13C5_PFHxA		115	50-150
13C5_PFPeA		123	50-150
13C6_PFDA		114	50-150
13C7_PFUdA		105	50-150
13C8_PFOA		121	50-150
13C8_PFOS		112	50-150
13C8_PFOSA		105	50-150
13C9_PFNA		118	50-150
d-EtFOSA		77	50-150
d-MeFOSA		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%

QC Summary

PFAS by LC/MS/MS - MB

Sample ID: UQ99148-001
Batch: 99148
Analytical Method: 537 Modified-ID
Matrix: Aqueous
Prep Method: 537 MOD
Prep Date: 03/04/2019 1100

Parameter	Result	Q	Dil	LOQ	Units	Analysis Date
8:2 FTS	ND		1	4.0	ng/L	03/05/2019 1635
6:2 FTS	ND		1	4.0	ng/L	03/05/2019 1635
EtFOSA	ND		1	4.0	ng/L	03/05/2019 1635
MeFOSA	ND		1	8.0	ng/L	03/05/2019 1635
PFBS	ND		1	4.0	ng/L	03/05/2019 1635
PFDS	ND		1	4.0	ng/L	03/05/2019 1635
PFHpS	ND		1	4.0	ng/L	03/05/2019 1635
PFNS	ND		1	8.0	ng/L	03/05/2019 1635
PFOSA	ND		1	4.0	ng/L	03/05/2019 1635
PFPeS	ND		1	4.0	ng/L	03/05/2019 1635
PFHxS	ND		1	4.0	ng/L	03/05/2019 1635
PFBA	ND		1	4.0	ng/L	03/05/2019 1635
PFDA	ND		1	4.0	ng/L	03/05/2019 1635
PFDoA	ND		1	4.0	ng/L	03/05/2019 1635
PFHpA	ND		1	4.0	ng/L	03/05/2019 1635
PFHxA	ND		1	4.0	ng/L	03/05/2019 1635
PFNA	ND		1	4.0	ng/L	03/05/2019 1635
PFOA	ND		1	2.0	ng/L	03/05/2019 1635
PFPeA	ND		1	4.0	ng/L	03/05/2019 1635
PFTeDA	ND		1	4.0	ng/L	03/05/2019 1635
PFTrDA	ND		1	4.0	ng/L	03/05/2019 1635
PFUdA	ND		1	4.0	ng/L	03/05/2019 1635
PFOS	ND		1	4.0	ng/L	03/05/2019 1635

Surrogate	Q	% Rec	Acceptance Limit
13C2_6:2FTS		106	50-150
13C2_8:2FTS		99	50-150
13C2_PFDoA		99	50-150
13C2_PFTeDA		93	50-150
13C3_PFBS		108	50-150
13C3_PFHxS		114	50-150
13C4_PFBA		118	50-150
13C4_PFHpA		113	50-150
13C5_PFHxA		113	50-150
13C5_PFPeA		118	50-150
13C6_PFDA		107	50-150
13C7_PFUdA		107	50-150
13C8_PFOA		113	50-150
13C8_PFOS		107	50-150
13C8_PFOSA		96	50-150
13C9_PFNA		118	50-150

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the LOQ

N = Recovery 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:	UQ99148-001	Matrix:	Aqueous
Batch:	99148	Prep Method:	537 MOD
Analytical Method:	537 Modified-ID	Prep Date:	03/04/2019 1100

Surrogate	Q	% Rec	Acceptance Limit
d-EtFOSA		61	50-150
d-MeFOSA		61	50-150

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

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

PFAS by LC/MS/MS - LCS

Sample ID: UQ99148-002
Batch: 99148
Analytical Method: 537 Modified-ID

Matrix: Aqueous
Prep Method: 537 MOD
Prep Date: 03/04/2019 1100

Parameter	Spike Amount (ng/L)	Result (ng/L)	Q	Dil	% Rec	% Rec Limit	Analysis Date
8:2 FTS	19	22		1	117	70-150	03/05/2019 1647
6:2 FTS	19	19		1	98	70-150	03/05/2019 1647
EtFOSA	20	25		1	124	70-150	03/05/2019 1647
MeFOSA	20	23		1	116	70-150	03/05/2019 1647
PFBS	18	18		1	104	70-150	03/05/2019 1647
PFDS	19	17		1	89	70-150	03/05/2019 1647
PFHpS	19	18		1	93	70-150	03/05/2019 1647
PFNS	19	18		1	94	70-150	03/05/2019 1647
PFOSA	20	21		1	103	70-150	03/05/2019 1647
PFPeS	19	19		1	103	70-150	03/05/2019 1647
PFHxS	18	18		1	96	70-150	03/05/2019 1647
PFBA	20	20		1	98	70-150	03/05/2019 1647
PFDA	20	20		1	98	70-150	03/05/2019 1647
PFDoA	20	20		1	101	70-150	03/05/2019 1647
PFHpA	20	21		1	103	70-150	03/05/2019 1647
PFHxA	20	20		1	98	70-150	03/05/2019 1647
PFNA	20	20		1	101	70-150	03/05/2019 1647
PFOA	20	20		1	99	70-150	03/05/2019 1647
PFPeA	20	20		1	98	70-150	03/05/2019 1647
PFTeDA	20	20		1	101	70-150	03/05/2019 1647
PFTrDA	20	17		1	87	70-150	03/05/2019 1647
PFUdA	20	20		1	98	70-150	03/05/2019 1647
PFOS	19	18		1	97	70-150	03/05/2019 1647

Surrogate	Q	% Rec	Acceptance Limit
13C2_6:2FTS		104	50-150
13C2_8:2FTS		109	50-150
13C2_PFDoA		97	50-150
13C2_PFTeDA		75	50-150
13C3_PFBS		108	50-150
13C3_PFHxS		114	50-150
13C4_PFBA		115	50-150
13C4_PFHpA		113	50-150
13C5_PFHxA		116	50-150
13C5_PFPeA		115	50-150
13C6_PFDA		113	50-150
13C7_PFUdA		110	50-150
13C8_PFOA		114	50-150
13C8_PFOS		106	50-150
13C8_PFOSA		101	50-150
13C9_PFNA		117	50-150

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the LOQ

N = Recovery 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 - LCS

Sample ID: UQ99148-002
Batch: 99148
Analytical Method: 537 Modified-ID

Matrix: Aqueous
Prep Method: 537 MOD
Prep Date: 03/04/2019 1100

Surrogate	Q	% Rec	Acceptance Limit
d-EtFOSA		64	50-150
d-MeFOSA		69	50-150

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection
P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the LOQ
N = Recovery 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 - LCSD

Sample ID: UQ99148-003
Batch: 99148
Analytical Method: 537 Modified-ID

Matrix: Aqueous
Prep Method: 537 MOD
Prep Date: 03/04/2019 1100

Parameter	Spike Amount (ng/L)	Result (ng/L)	Q	Dil	% Rec	% RPD	% Rec Limit	% RPD Limit	Analysis Date
8:2 FTS	19	20		1	102	13	70-150	30	03/05/2019 1700
6:2 FTS	19	22		1	117	18	70-150	30	03/05/2019 1700
EtFOSA	20	23		1	115	7.3	70-150	30	03/05/2019 1700
MeFOSA	20	24		1	122	5.3	70-150	30	03/05/2019 1700
PFBS	18	19		1	110	5.7	70-150	30	03/05/2019 1700
PFDS	19	17		1	87	1.6	70-150	30	03/05/2019 1700
PFHpS	19	18		1	95	1.5	70-150	30	03/05/2019 1700
PFNS	19	17		1	90	3.8	70-150	30	03/05/2019 1700
PFOSA	20	22		1	109	5.5	70-150	30	03/05/2019 1700
PFPeS	19	20		1	107	3.4	70-150	30	03/05/2019 1700
PFHxS	18	18		1	98	1.5	70-150	30	03/05/2019 1700
PFBA	20	20		1	101	3.4	70-150	30	03/05/2019 1700
PFDA	20	19		1	96	1.4	70-150	30	03/05/2019 1700
PFDoA	20	20		1	99	1.9	70-150	30	03/05/2019 1700
PFHpA	20	21		1	103	0.063	70-150	30	03/05/2019 1700
PFHxA	20	19		1	94	3.6	70-150	30	03/05/2019 1700
PFNA	20	21		1	104	2.9	70-150	30	03/05/2019 1700
PFOA	20	20		1	102	2.9	70-150	30	03/05/2019 1700
PFPeA	20	20		1	99	0.48	70-150	30	03/05/2019 1700
PFTeDA	20	21		1	104	2.7	70-150	30	03/05/2019 1700
PFTrDA	20	17		1	87	0.017	70-150	30	03/05/2019 1700
PFUdA	20	19		1	97	1.0	70-150	30	03/05/2019 1700
PFOS	19	18		1	97	0.050	70-150	30	03/05/2019 1700

Surrogate	Q	% Rec	Acceptance Limit
13C2_6:2FTS		96	50-150
13C2_8:2FTS		97	50-150
13C2_PFDoA		95	50-150
13C2_PFTeDA		73	50-150
13C3_PFBS		101	50-150
13C3_PFHxS		106	50-150
13C4_PFBA		109	50-150
13C4_PFHpA		110	50-150
13C5_PFHxA		108	50-150
13C5_PFPeA		110	50-150
13C6_PFDA		110	50-150
13C7_PFUdA		104	50-150
13C8_PFOA		107	50-150
13C8_PFOS		103	50-150
13C8_PFOSA		91	50-150
13C9_PFNA		111	50-150

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection
P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the LOQ
N = Recovery 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 - LCSD

Sample ID:	UQ99148-003	Matrix:	Aqueous
Batch:	99148	Prep Method:	537 MOD
Analytical Method:	537 Modified-ID	Prep Date:	03/04/2019 1100

Surrogate	Q	% Rec	Acceptance Limit
d-EtFOSA		55	50-150
d-MeFOSA		55	50-150

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

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

PFAS by LC/MS/MS - MB

Sample ID: UQ99271-001
Batch: 99271
Analytical Method: 537 Modified-ID

Matrix: Aqueous
Prep Method: 537 MOD
Prep Date: 03/05/2019 1110

Parameter	Result	Q	Dil	LOQ	Units	Analysis Date
8:2 FTS	ND		1	4.0	ng/L	03/05/2019 2216
6:2 FTS	ND		1	4.0	ng/L	03/05/2019 2216
EtFOSA	ND		1	4.0	ng/L	03/05/2019 2216
MeFOSA	ND		1	8.0	ng/L	03/05/2019 2216
PFBS	ND		1	4.0	ng/L	03/05/2019 2216
PFDS	ND		1	4.0	ng/L	03/05/2019 2216
PFHpS	ND		1	4.0	ng/L	03/05/2019 2216
PFNS	ND		1	8.0	ng/L	03/05/2019 2216
PFOSA	ND		1	4.0	ng/L	03/05/2019 2216
PFPeS	ND		1	4.0	ng/L	03/05/2019 2216
PFHxS	ND		1	4.0	ng/L	03/05/2019 2216
PFBA	ND		1	4.0	ng/L	03/05/2019 2216
PFDA	ND		1	4.0	ng/L	03/05/2019 2216
PFDoA	ND		1	4.0	ng/L	03/05/2019 2216
PFHpA	ND		1	4.0	ng/L	03/05/2019 2216
PFHxA	ND		1	4.0	ng/L	03/05/2019 2216
PFNA	ND		1	4.0	ng/L	03/05/2019 2216
PFOA	ND		1	2.0	ng/L	03/05/2019 2216
PFPeA	ND		1	4.0	ng/L	03/05/2019 2216
PFTeDA	ND		1	4.0	ng/L	03/05/2019 2216
PFTrDA	ND		1	4.0	ng/L	03/05/2019 2216
PFUdA	ND		1	4.0	ng/L	03/05/2019 2216
PFOS	ND		1	4.0	ng/L	03/05/2019 2216

Surrogate	Q	% Rec	Acceptance Limit
13C2_6:2FTS		103	50-150
13C2_8:2FTS		106	50-150
13C2_PFDoA		107	50-150
13C2_PFTeDA		94	50-150
13C3_PFBS		115	50-150
13C3_PFHxS		122	50-150
13C4_PFBA		124	50-150
13C4_PFHpA		121	50-150
13C5_PFHxA		120	50-150
13C5_PFPeA		127	50-150
13C6_PFDA		121	50-150
13C7_PFUdA		115	50-150
13C8_PFOA		119	50-150
13C8_PFOS		114	50-150
13C8_PFOSA		105	50-150
13C9_PFNA		122	50-150

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the LOQ

N = Recovery 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: UQ99271-001
Batch: 99271
Analytical Method: 537 Modified-ID
Matrix: Aqueous
Prep Method: 537 MOD
Prep Date: 03/05/2019 1110

Surrogate	Q	% Rec	Acceptance Limit
d-EtFOSA		67	50-150
d-MeFOSA		72	50-150

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection
P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the LOQ
N = Recovery 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 - LCS

Sample ID:	UQ99271-002	Matrix:	Aqueous
Batch:	99271	Prep Method:	537 MOD
Analytical Method:	537 Modified-ID	Prep Date:	03/05/2019 1110

Parameter	Spike Amount (ng/L)	Result (ng/L)	Q	Dil	% Rec	% Rec Limit	Analysis Date
8:2 FTS	19	24		1	123	70-150	03/05/2019 2228
6:2 FTS	19	24		1	129	70-150	03/05/2019 2228
EtFOSA	20	23		1	115	70-150	03/05/2019 2228
MeFOSA	20	22		1	112	70-150	03/05/2019 2228
PFBS	18	18		1	103	70-150	03/05/2019 2228
PFDS	19	18		1	93	70-150	03/05/2019 2228
PFHpS	19	19		1	99	70-150	03/05/2019 2228
PFNS	19	19		1	97	70-150	03/05/2019 2228
PFOSA	20	22		1	108	70-150	03/05/2019 2228
PFPeS	19	20		1	105	70-150	03/05/2019 2228
PFHxS	18	18		1	99	70-150	03/05/2019 2228
PFBA	20	20		1	99	70-150	03/05/2019 2228
PFDA	20	20		1	99	70-150	03/05/2019 2228
PFDoA	20	21		1	105	70-150	03/05/2019 2228
PFHpA	20	21		1	105	70-150	03/05/2019 2228
PFHxA	20	19		1	94	70-150	03/05/2019 2228
PFNA	20	19		1	96	70-150	03/05/2019 2228
PFOA	20	20		1	100	70-150	03/05/2019 2228
PFPeA	20	20		1	99	70-150	03/05/2019 2228
PFTeDA	20	20		1	102	70-150	03/05/2019 2228
PFTrDA	20	19		1	94	70-150	03/05/2019 2228
PFUdA	20	20		1	100	70-150	03/05/2019 2228
PFOS	19	19		1	105	70-150	03/05/2019 2228

Surrogate	Q	% Rec	Acceptance Limit
13C2_6:2FTS		80	50-150
13C2_8:2FTS		99	50-150
13C2_PFDoA		98	50-150
13C2_PFTeDA		88	50-150
13C3_PFBS		110	50-150
13C3_PFHxS		112	50-150
13C4_PFBA		115	50-150
13C4_PFHpA		115	50-150
13C5_PFHxA		113	50-150
13C5_PFPeA		116	50-150
13C6_PFDA		109	50-150
13C7_PFUdA		110	50-150
13C8_PFOA		118	50-150
13C8_PFOS		110	50-150
13C8_PFOSA		99	50-150
13C9_PFNA		120	50-150

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the LOQ

N = Recovery 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 - LCS

Sample ID: UQ99271-002
Batch: 99271
Analytical Method: 537 Modified-ID

Matrix: Aqueous
Prep Method: 537 MOD
Prep Date: 03/05/2019 1110

Surrogate	Q	% Rec	Acceptance Limit
d-EtFOSA		60	50-150
d-MeFOSA		66	50-150

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection
P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the LOQ
N = Recovery 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 - MS

Sample ID: UB27031-003MS
Batch: 99271
Analytical Method: 537 Modified-ID

Matrix: Aqueous
Prep Method: 537 MOD
Prep Date: 03/05/2019 1110

Parameter	Sample Amount (ng/L)	Spike Amount (ng/L)	Result (ng/L)	Q	Dil	% Rec	% Rec Limit	Analysis Date
8:2 FTS	ND	18	19		1	108	70-150	03/05/2019 2306
6:2 FTS	ND	17	20		1	117	70-150	03/05/2019 2306
EtFOSA	ND	18	21		1	113	70-150	03/05/2019 2306
MeFOSA	ND	18	21		1	117	70-150	03/05/2019 2306
PFBS	ND	16	16		1	100	70-150	03/05/2019 2306
PFDS	ND	18	16		1	91	70-150	03/05/2019 2306
PFHpS	ND	17	17		1	100	70-150	03/05/2019 2306
PFNS	ND	18	18		1	101	70-150	03/05/2019 2306
PFOSA	ND	18	20		1	107	70-150	03/05/2019 2306
PFPeS	ND	17	18		1	106	70-150	03/05/2019 2306
PFHxS	ND	17	16		1	97	70-150	03/05/2019 2306
PFBA	ND	18	17		1	95	70-150	03/05/2019 2306
PFDA	ND	18	17		1	92	70-150	03/05/2019 2306
PFDoA	ND	18	18		1	98	70-150	03/05/2019 2306
PFHpA	ND	18	20		1	112	70-150	03/05/2019 2306
PFHxA	ND	18	18		1	100	70-150	03/05/2019 2306
PFNA	ND	18	17		1	95	70-150	03/05/2019 2306
PFOA	ND	18	18		1	97	70-150	03/05/2019 2306
PFPeA	ND	18	17		1	93	70-150	03/05/2019 2306
PFTeDA	ND	18	19		1	105	70-150	03/05/2019 2306
PFTrDA	ND	18	18		1	98	70-150	03/05/2019 2306
PFUdA	ND	18	19		1	104	70-150	03/05/2019 2306
PFOS	ND	17	17		1	98	70-150	03/05/2019 2306

Surrogate	Q	% Rec	Acceptance Limit
13C2_6:2FTS		95	50-150
13C2_8:2FTS		101	50-150
13C2_PFDoA		106	50-150
13C2_PFTeDA		101	50-150
13C3_PFBS		115	50-150
13C3_PFHxS		110	50-150
13C4_PFBA		119	50-150
13C4_PFHpA		110	50-150
13C5_PFHxA		115	50-150
13C5_PFPeA		120	50-150
13C6_PFDA		114	50-150
13C7_PFUdA		107	50-150
13C8_PFOA		117	50-150
13C8_PFOS		110	50-150
13C8_PFOSA		101	50-150
13C9_PFNA		118	50-150

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the LOQ

N = Recovery 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 - MS

Sample ID: UB27031-003MS
Batch: 99271
Analytical Method: 537 Modified-ID

Matrix: Aqueous
Prep Method: 537 MOD
Prep Date: 03/05/2019 1110

Surrogate	Q	% Rec	Acceptance Limit
d-EtFOSA		77	50-150
d-MeFOSA		78	50-150

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the LOQ

N = Recovery 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 - MSD

Sample ID: UB27031-003MD
Batch: 99271
Analytical Method: 537 Modified-ID

Matrix: Aqueous
Prep Method: 537 MOD
Prep Date: 03/05/2019 1110

Parameter	Sample Amount (ng/L)	Spike Amount (ng/L)	Result (ng/L)	Q	Dil	% Rec	% RPD	% Rec Limit	% RPD Limit	Analysis Date
8:2 FTS	ND	17	21		1	120	10	70-150	30	03/05/2019 2319
6:2 FTS	ND	17	21		1	123	4.9	70-150	30	03/05/2019 2319
EtFOSA	ND	18	18		1	98	14	70-150	30	03/05/2019 2319
MeFOSA	ND	18	19		1	105	11	70-150	30	03/05/2019 2319
PFBS	ND	16	17		1	108	6.9	70-150	30	03/05/2019 2319
PFDS	ND	18	17		1	97	5.7	70-150	30	03/05/2019 2319
PFHpS	ND	17	17		1	95	4.8	70-150	30	03/05/2019 2319
PFNS	ND	18	18		1	102	0.11	70-150	30	03/05/2019 2319
PFOSA	ND	18	19		1	106	0.68	70-150	30	03/05/2019 2319
PFPeS	ND	17	18		1	105	0.96	70-150	30	03/05/2019 2319
PFHxS	ND	17	16		1	98	0.44	70-150	30	03/05/2019 2319
PFBA	ND	18	18		1	101	5.6	70-150	30	03/05/2019 2319
PFDA	ND	18	17		1	94	1.5	70-150	30	03/05/2019 2319
PFDoA	ND	18	18		1	99	0.34	70-150	30	03/05/2019 2319
PFHpA	ND	18	19		1	104	7.9	70-150	30	03/05/2019 2319
PFHxA	ND	18	18		1	97	2.5	70-150	30	03/05/2019 2319
PFNA	ND	18	18		1	101	5.7	70-150	30	03/05/2019 2319
PFOA	ND	18	18		1	101	3.2	70-150	30	03/05/2019 2319
PFPeA	ND	18	18		1	97	3.8	70-150	30	03/05/2019 2319
PFTeDA	ND	18	18		1	100	5.3	70-150	30	03/05/2019 2319
PFTrDA	ND	18	17		1	93	5.8	70-150	30	03/05/2019 2319
PFUdA	ND	18	18		1	98	6.5	70-150	30	03/05/2019 2319
PFOS	ND	17	17		1	100	2.3	70-150	30	03/05/2019 2319

Surrogate	Q	% Rec	Acceptance Limit
13C2_6:2FTS		86	50-150
13C2_8:2FTS		100	50-150
13C2_PFDoA		109	50-150
13C2_PFTeDA		108	50-150
13C3_PFBS		110	50-150
13C3_PFHxS		115	50-150
13C4_PFBA		117	50-150
13C4_PFHpA		119	50-150
13C5_PFHxA		115	50-150
13C5_PFPeA		121	50-150
13C6_PFDA		114	50-150
13C7_PFUdA		113	50-150
13C8_PFOA		116	50-150
13C8_PFOS		107	50-150
13C8_PFOSA		101	50-150
13C9_PFNA		119	50-150

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

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

PFAS by LC/MS/MS - MSD

Sample ID: UB27031-003MD
Batch: 99271
Analytical Method: 537 Modified-ID

Matrix: Aqueous
Prep Method: 537 MOD
Prep Date: 03/05/2019 1110

Surrogate	Q	% Rec	Acceptance Limit
d-EtFOSA		80	50-150
d-MeFOSA		82	50-150

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

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

Chain of Custody
and
Miscellaneous Documents

SHEALY

Chain of Custody Record

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

Number

Client: **Rose and Westra / GZA**
Report to Contact: Leslie Nelson
Telephone No. / E-mail: 616-956-6123 leslie.nelson@gza.com
Quote No.: 21129
Address: 601 Fifth Street NW, Suite 102
Sampler's Signature: x
Analysis (Attach list if more space is needed)
Page 1 of 1
City: Grand Rapids State: MI Zip Code: 49504
Printed Name: Jennifer Martin
Project Name: 16.0062335.52
Project Number: 16.0062335.52
P.O No.:

UB27031

MMS

Sample ID / Description (Containers for each sample may be combined on one line)	Date	Time	G=Grab C=Composite	Matrix				No of Containers by Preservative Type																
				Aqueous	Solid	Non-Aqueous		Unpres	H2SO4	HNO3	HCl	NaOH	H2O	MeOH	PFAS									
HS-MW-14M	2/26/2019	1222	G	x				2							x									
HS-MW-14S	2/26/2019	1250	G	x				2							x									
HS-MW-14D	2/26/2019	1500	G	x				2							x									
HS-MW-14D DUP	2/26/2019	1500	G	x				2							x									
HS-MW-14D MS/MSD	2/26/2019	1500	G	x				2							x									

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

Sample Disposal
☐ Return to Client ☒ Disposal by Lab

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

QC Requirements

	Date	Time		Date	Time
1. Relinquished by Jennifer Martin	2/26/2019	1800	1. Received by		
2. Relinquished by			2. Received by		
3. Relinquished by			3. Received by		
4. Relinquished by Fed EX	2-27-19	0924	4. Laboratory Received by L Hite	2-27-19	0924

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

LAB USE ONLY
Received on ice (Check) ☑ Y ☐ N ☐ Ice Pack
Receipt Temp. 2.3 °C

Document Number: ME002OW-01

Shealy Environmental Services, Inc.
Document Number: ME0018C-14

Page 1 of 1
Effective Date: 8/2/2018

Sample Receipt Checklist (SRC)

Client: GZA

Cooler Inspected by/date: LKH / 02-27-2019

Lot #: UB27031

Means of receipt: ☐ SESI ☐ 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

2.3 / 2.3 °C NA / NA °C NA / NA °C NA / NA °C

%Solid Snap-Cup ID: NA

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

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

☐ Yes	☐ No	☑ NA	3. If temperature of any cooler exceeded 6.0°C, was Project Manager Notified? PM was Notified by: phone / email / face-to-face (circle one).
☑ Yes	☐ No	☐ NA	4. Is the commercial courier's packing slip attached to this form?
☑ Yes	☐ No		5. Were proper custody procedures (relinquished/received) followed?
☑ Yes	☐ No		6. Were sample IDs listed on the COC?
☑ Yes	☐ No		7. Were sample IDs listed on all sample containers?
☑ Yes	☐ No		8. Was collection date & time listed on the COC?
☑ Yes	☐ No		9. Was collection date & time listed on all sample containers?
☑ Yes	☐ No		10. Did all container label information (ID, date, time) agree with the COC?
☑ Yes	☐ No		11. Were tests to be performed listed on the COC?
☑ Yes	☐ No		12. Did all samples arrive in the proper containers for each test and/or in good condition (unbroken, lids on, etc.)?
☑ Yes	☐ No		13. Was adequate sample volume available?
☑ Yes	☐ No		14. Were all samples received within ½ the holding time or 48 hours, whichever comes first?
☐ Yes	☑ No		15. Were any samples containers missing/excess (circle one) samples Not listed on COC?
☐ Yes	☐ No	☑ NA	16. For VOA and RSK-175 samples, were bubbles present >"pea-size" (¼"or 6mm in diameter) in any of the VOA vials?
☐ Yes	☐ No	☑ NA	17. Were all DRO/metals/nutrient samples received at a pH of < 2?
☐ Yes	☐ No	☑ NA	18. Were all cyanide samples received at a pH > 12 and sulfide samples received at a pH > 9?
☐ Yes	☐ No	☑ NA	19. Were all applicable NH_3/TKN/cyanide/phenol/625 (< 0.5mg/L) samples free of residual chlorine?
☐ Yes	☐ No	☑ NA	20. Were client remarks/requests (i.e. requested dilutions, MS/MSD designations, etc…) correctly transcribed from the COC into the comment section in LIMS?
☐ Yes	☑ No		21. Was the quote number listed on the container label? If yes, Quote #

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

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

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

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

SR barcode labels applied by: LKH Date: 02-27-2019

Comments: