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AREA 19 (R-1)
RESPONSE ACTIVITY PLAN
North Kent Study Area

DRAFT

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

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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
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
MGDL	Michigan GIS Data Library
MS/MSD	Matrix Spike/Matrix Spike Duplicate
ng/L	Nanogram per Liter
NKLF	North Kent Landfill Area
NKSA	North Kent Study Area
PDF	Portable Document Format
PFAS	Per- and Polyfluoroalkyl Substances
PFOA	Perfluorooctanoic Acid
PFOS	Perfluorooctane Sulfonate
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
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 19 (Area R-1) investigation in the NKSA. The objective of this RAP is to define the vertical and horizontal extent of PFAS at Area 19 in compliance with the CD.

Area 19 is located northeast of the Wellington Ridge neighborhood, generally north of 11 Mile Road and south of 12 Mile Road. Area 19 includes a small detached area immediately east of US-131 (see **Figure 1**). Elevated PFOA+PFOS concentrations were measured in the Wellington Ridge neighborhood, located between 10 Mile and 11 Mile Roads, west of Wolven Avenue. The groundwater elevation and PFAS monitoring data (from both monitoring wells and residential wells) indicated flow paths from Wellington Ridge northwesterly toward the Rogue River and northeasterly toward Area 19.

Most of the Area 19 residential water wells either had no measurable PFOA+PFOS, or the PFOA+PFOS concentrations were less than 10 ng/L. In the southwest corner of Area 19, one residential well had a PFOA+PFOS concentration over 70 ng/L. PFOA+PFOS were generally not detected in the residential wells located west, northwest, and north of this location.

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 R of the CD. This RAP is organized into the following sections:

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

2.0 CONCEPTUAL SITE MODEL

The CSM (as defined in Section 4.4 of the CD) was based on interpretation of regional geology and hydrogeology, residential water well sampling data in the NKSA, and groundwater investigations performed associated with the Wolven and Jewell area. The CSM is focused on the groundwater flow from the presumed source area in the vicinity of the Wellington Ridge neighborhood to Area 19, 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 19 was evaluated and potential data gaps were identified. Two sets of permanent groundwater monitoring wells are located within Area 19: MW-WV-12 cluster (3 wells) and MW-WV-14 cluster (2 wells). There are also two well clusters within Area 19 along Summit that were installed by EGLE. See **Tables 1** and **2** for a list of residential water wells and addresses in Area 19 and their associated PFAS analytical results. **Figure 1** provides an outlined boundary for Area 19 which is a portion of the Wolven Northeast Study Area and

12 Mile Road and Summit Avenue portions of the Wolven/Jewell Study Area, which are part of the overall NKSA. The Wolven/Jewell Study Area is characterized by topographic highs and lowland areas, generally trending between ridges and hilly rolling topography.

For the purpose of this RAP, the CSM is focused on PFAS distribution in groundwater, and the fate and transport of PFAS in groundwater likely to migrate toward and within Area 19. The following sections provide discussions of source areas, hydrology, geology and hydrogeology, PFAS distribution in groundwater, groundwater flow, and PFAS transport.

2.01 WOLVEN AND JEWELL STUDY AREA AND OTHER POTENTIAL SOURCE AREAS

Figure 1 provides an outlined boundary for Area 19, which is a portion of the Wolven/Jewell Study Area. The Wolven/Jewell Study Area is characterized by topographic highs and lowland areas, generally trending between ridges and hilly rolling topography. In general, the Rogue River forms the western most, northwesterly and northeasterly boundaries of the Wolven/Jewell Study Area. The southern boundary is generally defined from west to east by 10 Mile Road and then trends to the north, east of Wolven Avenue, then trending eastward along 11 Mile Road to the Rogue River and northward to 12 Mile Road.

EGLE has alleged that there is a potential source area in the Wellington Ridge neighborhood where historic disposal of PFAS took place, but investigations have not revealed any physical evidence of a source. Historical aerial photographs suggest a portion of a former gravel pit was previously located in the area of the Lady Lauren cul-de-sac of the Wellington Ridge Development. The Wellington Ridge neighborhood is a high point within the Wolven/Jewell Study Area (approximately 860 feet AMSL) resulting in groundwater flow in multiple directions. In addition, certain PFAS have also historically been detected in the groundwater monitoring wells installed within, and adjacent to the NKLF.

The PFOA+PFOS in residential wells located northeast or east of the intersection of 11 Mile Road and Wolven Avenue likely results from PFOA+PFOS migrating from the southwest corner of Area 19, from the Wellington Ridge area to those hydraulically downgradient residences within Area 19.

Lastly, while not specifically investigated, there are other possible sources of PFAS at residential properties such as those in Area 19, 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 Wolven/Jewell Study Area has moderately undulating terrain characteristic of glacial end-moraine and pitted outwash topography. The ground surface elevations in the central portion where the Wellington Ridge neighborhood development is located range from approximately 780 feet AMSL to greater than 930 feet AMSL. Most of the neighborhoods in the eastern portion of the Wolven/Jewell Study Area are situated on topographically elevated areas sloping along surface water drainageways toward lowland areas. The terrain is sloped in various directions, to the west and northwest toward the Rogue River, and northeast toward the Rogue River. The portion of the Wolven/Jewell Study Area located west of US-131 has ground surface elevations ranging from approximately 724 to 850 feet AMSL. The lowest elevations within the Wolven/Jewell Study Area occur along the Rogue River ranging from approximately 723 feet AMSL on the western boundary to 700 feet AMSL on the eastern boundary. Area 19 has ground surface elevations ranging from approximately 700 to 910 feet AMSL.

2.03 HYDROLOGY

Based on the *Michigan's Major Watersheds – Sub-basins GIS data* (EGLE, 2019b) downloaded from MGDL, NKSA is situated within the Rogue River Basin (Basin No. 14F), which is part of the Lower Grand River watershed (HUC 0405006). The Rogue River Basin consists of 12 sub-basins, and Area 19 falls within sub-basin HUC 04050006040110. This sub-basin drains to the Rogue River, which discharges at the confluence with the Grand River to the south.

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 (Michigan State University, 2005), at the NKSA it ranged from 9 to 15 inches.

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

2.04 GEOLOGY

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

Based upon bedrock maps for the area (MDEQ, 1987), the bedrock beneath the NKSA includes the Michigan basin series. Based on GIS data from EGLE (MDEQ, 1987), Jurassic "red beds" are present in most of the site area and its vicinity, with small areas of Saginaw formation outcrops. The Jurassic "red beds" are often poorly consolidated or unconsolidated and consist primarily of clay, mudstone, siltstone, sandstone, shale, and gypsum. The "red beds" are of low permeability and are considered a confining unit. However, locally in the county, the "red beds" have been documented to supply small quantities of water (Apple & Reeves, 2007). Beneath the "red beds," bedrock in the region consists of the Mississippian-aged sandstone (Marshall formation), shale (Michigan formation), and the Bayport limestone as well as the Pennsylvanian-aged Saginaw formation. The regional dip is northeasterly toward the center of the Michigan basin.

Based on the *Hydrogeologic Atlas of Michigan* (Western Michigan University, 1981), the top of bedrock elevation ranges from 500 to 550 feet near the City of Rockford and within the Study Area.

Wolven/Jewell Study Area Geology

This summary of the geology in the Wolven/Jewell Study Area is based on borehole data collected during the subsurface exploration, groundwater monitoring well installation described in **Appendix A,** and the residential

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

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. Geologic cross-sections A-A' and B-B' (see **Figure 5** for transect locations) were created to show the general spatial variability of the depositional environment beneath the Wolven/Jewell Study Area. See **Figures 6** and **7** for geological cross-sections A-A' and B-B' respectively.

Cross-section A-A' was constructed from the northwest quadrant of the Wolven/Jewell Study Area west of US-131, trending eastward to Area 19. In general, east of US-131, finer-grained deposits comprised of clay and silt till with interbedded and discontinuous sand lenses is more predominant. West of US-131, coarser-grained deposits comprised of sand, or sand with gravel trend westward toward the Rogue River where glacial outwash sand and gravel and post-glacial alluvial deposition predominates. The thickness of clay and silt till soil varies from less than 10 feet to more than 80 feet and is sometimes interbedded above or below the coarser-grained sand, or sand with gravel in the Study Area. Clay and silt till were not observed above the sand encountered in residential wells along 11 Mile Road, where more than 100 feet of sand is present above the top of the lower clay and silt till stratum. In general, water-bearing sand and sand with gravel units were encountered below the fine-grained clay and silt till stratum or between clay/silt strata, but this varies topographically.

Cross Section B-B' is constructed from the Wellington Ridge neighborhood through the Wolven Northeast area. Fine-grained soil is predominant in the boreholes on cross-section B-B'. Water-bearing units were encountered below the clay till stratum or between clay till strata. The thickness of fine-grained soil varies from approximately 20 feet to more than 100 feet. In most of the boreholes on cross-section B-B', the top of the clay stratum was shallow, except the well at 3616 11 Mile Road, where more than 100 feet of sand were present above the top of the clay stratum, presenting a potential pathway for surface/shallow contamination to migrate to the deeper zones.

The moraine and ablation till deposits are characterized by sandy till that includes varying amounts of silt and clay and can vary from loose to medium density. Note that specific locations underlying the Wellington Ridge area, dominated by clay and silt, become very dense based on standard penetration N-values exceeding 30 blows/foot (see MW-9D), and may represent limited areas of lodgment till underlying this area. West of US-131 closer to the Rogue River, coarse-grained sand and sand with some gravel are present in stratigraphically greater thickness and are dominant in some locations. Individual borings containing only coarse-grained sand exist even in the areas where fine-grained soils are predominant. Where continuous, these more permeable strata may provide preferential migration pathways to the deeper water-bearing zone. The presence and thickness of clay and silt till deposits varies horizontally and vertically and are unstratified and appear discontinuous in the Study Area. The lithologies shown on the cross-sections are characteristic of end moraines and complex depositional mechanisms vertically and horizontally in the hillier portions of the Study Area and are characteristic of glacial outwash sand and gravel and post glacial alluvium deposition in low lying areas approaching the Rogue River. The complex depositional environment and variability horizontally and vertically affects the transmissivity of the water-bearing deposits, and therefore influences groundwater flow and contaminant transport.

2.05 HYDROGEOLOGY

NKSA Groundwater Flow

The direction of regional groundwater flow is influenced by the primary surface water features of the Rogue River and the Grand River. Streamflow data from the USGS Gaging Station indicates that the Rogue River is a gaining

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

stream, acting as a groundwater discharge zone. R&W/GZA interpolated regional groundwater flows based on the static groundwater level in the Wellogic - Statewide Wells GIS Data for Kent County (Michigan State University, 2005a through 2005d). The regional groundwater contours also indicate regional groundwater flow pattern generally follows the topography, discharging to the Rogue River and the Grand River.

Based on the static water level data and the ground surface elevation data from USGS Digital Elevation Model GIS data downloaded from MGDL, the regional groundwater elevations were estimated, and groundwater contours interpolated for Area 19 and the larger Wolven/Jewell Study Area. The groundwater flow pattern generally follows the topography in the region. Overall groundwater flows from elevated areas where the highest amounts of recharge occur, discharging to the Rogue River as the dominant receiving surface water body which flows southward to the Grand River. The combination of the Rogue River, which borders Area 19 to the east, as the controlling discharge feature and the topographical high in the Wellington Ridge neighborhood southwest of Area 19, groundwater flow from the Wellington Ridge area tends to occur in a radial pattern. The predominant groundwater directions within the Wolven/Jewell Study Area are expected to be west-northwest, north-northeast, and east-southeast toward the Rogue River.

Static water levels were collected from the monitoring wells and the staff gages. Groundwater and surface water elevations were calculated from the surveyed elevations of the top of casing for the monitoring wells or reference points for the staff gages. In addition, surface water elevations recorded at USGS Gaging Station No. 04118500 were also downloaded and converted to the same datum as the monitoring well survey. See **Table 3** 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 19.

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 Wellington Ridge neighborhood is situated at or near a groundwater divide. Groundwater predominantly flows from this area in three directions: northwest, northeast, and southeast. The hydraulic gradient to the northeast appears to be slightly higher than the gradient to the northwest.

Wolven/Jewell Study Area Groundwater Flow

As shown on **Figure 2**, the shallow groundwater flow regime in the Wolven/Jewell Study Area is characterized by a general radial pattern from topographic highs toward the Rogue River as it surrounds much of the Wolven/Jewell Study Area and represents the primary groundwater discharge feature for the region. There appears to be a groundwater divide that corresponds to a topographically elevated moraine in the Wellington Ridge neighborhood. The divide is likely a primary recharge zone and appears oriented northeast-southwest. The divide

appears to extend across 10 Mile Road to the south and includes the NKLF. Groundwater flow is predominantly to the northwest from the Wellington Ridge area across the Wolven/Jewell Study Area. However, components of flow toward the northeast and east are evident in the Wolven Northeast area, and generally eastward toward Area 19. Deep zone groundwater contours are similar to the shallow zone although the groundwater divide appears within the approximate north central portion of the Wolven/Jewell Study Area (WV-MW-5S/5D) west of the shallow groundwater flow divide by approximately 2,000 to 3,000 feet (**Figure 3**). The deeper divide is based on a limited number of data points; however, the available head data indicates that the vertical component of flow could partially account for the wider distribution of PFAS impacts throughout the Study area.

Area 19 Groundwater Flow

In Area 19, the shallow groundwater flows to the east-northeast toward the Rogue River. The deeper groundwater contours show an overall east-northeast flow toward the Rogue River, with a small southeast component in the southeast corner of Area 19. However, these contours are limited as there are minimal investigative monitoring wells within Area 19. The contours are based on well information both inside and outside of Area 19. As such, this is one of the data gaps identified in this CSM. Site-specific hydraulic conductivity values for Area 19 and the larger Wolven/Jewell Study Area are not available; as such, Area 19-specific groundwater seepage velocity is not estimated.

2.06 PFAS DISTRIBUTION IN GROUNDWATER

Distribution of PFAS in the Wolven/Jewell Study Area

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

PFAS analytical data from the groundwater monitoring wells, and residential water well samples collected until December 2019 were combined and used for the interpolation of isoconcentration maps for total PFAS (**Figure 8**), and PFOA+PFOS **(Figure 9**). Where data from multiple sampling depths or sampling events are available at one location, the maximum concentrations were used during interpolation. It is important to note that the isoconcentration maps were geostatistically interpolated from spatially distributed point data, therefore they may overestimate the concentrations or extents in areas where data points were relatively sparse. As implied by the method, the isoconcentration maps are estimations only and are not intended to represent measured or true conditions.

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

1. The Wellington Ridge neighborhood. Note that investigation of this area did not yield direct evidence of a PFAS source in soil.
2. The NKLF, where PFAS impacts do exist and a reported landfill underdrain system previously discharged to the northwest trending drainage feature that discharges under 10 Mile Road then northwest toward US-131. Both the underdrain discharge and groundwater underlying the NKLF could migrate into the Study Area and contribute to PFAS in residential wells.

The PFOA+PFOS isoconcentration map (**Figure 9**) suggests radial migration from the groundwater divide, east-northeast toward Wolven Northeast, 12 Mile Road and Summit Avenue areas, northwest across US-131 toward the Rogue River, and to the south-southeast into the North Childsdale area. Based on the groundwater flow evaluation; the PFOA+PFOS-impacted groundwater is expected to continue migrating along preferential flow paths primarily controlled by a complex depositional environment, established surface drainage and surface water features as well as topography toward the Rogue River.

Distribution of PFAS in Area 19

Within Area 19, PFOS+PFOA concentrations above 10 ng/L have been identified in approximately 16 percent of the drinking water wells sampled (see **Table 2**), but the PFOA+PFOS concentrations were less than 70 ng/L except in three locations. The majority of the residential wells (57 percent) in Area 19 did not contain detectable PFOA+PFOS.

Table 5, below, summarizes the detections, maximum concentration, and frequency of detection in groundwater samples collected in Area 19 for PFOA and PFOS analytes. Analytical data for the residential wells in Area 19 are provided in **Table 2**, and PFAS analytical results for the samples collected from the Study Area in 2019 are provided in **Table 6. Figures 8** and **9** depict total PFAS (12 compounds as previously discussed) and PFOA+PFOS in the Wolven/Jewell Study Area near Area 19, respectively.

Table 5: Summary of Combined PFOA+PFOS Data in Groundwater
2019 Area 19 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]
Combined PFOA+PFOS	30	11	5	1.11	0.070	DWC
Combined PFOA+PFOS	30	11	6	1.11	0.010	CD Value[2]

1. Discussion of criterion applicability is included in Section 2.07.
2. The listed CD value is not a state-wide criterion, but rather a negotiated value from the CD. There are currently no applicable criteria or regulations establishing 10 ng/L PFOA+PFOS

Vertically, the residential water wells in Area 19 appear to be screened at a deeper elevation than monitoring well WV-MW-14D where PFOA+PFOS was detected at concentrations greater than the Part 201 Drinking Water Criterion of 70 ppt but shallower than WV-MW-12D which has not had detected concentrations of PFOA or PFOS, as shown in both cross-sections A-A' and B-B'. The migration of PFAS and PFOA+PFOS within Area 19 remains to be further 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 19

Because only four monitoring well clusters (two installed by R&W/GZA and two installed by EGLE) are in Area 19, a 3-dimensional representation of PFAS is not practicable at this time. The possibility of 3-dimensional representation will be evaluated once the data proposed in **Section 3.0** are collected.

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

The residents in Area 19 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 19 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. In addition, 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. These are summarized in the following table. Note that the listed CD value is not a state-wide criterion, but rather a negotiated value in the CD. There are currently no applicable federal or State regulations establishing 10 ng/L as the groundwater cleanup criterion for PFOA+PFOS.

Compound	Threshold Value (µg/L)	Basis for Value
PFOA	12	GSI
PFOS	0.012	GSI
Combined PFOA+PFOS	0.070	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 April 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 and 70 ng/L. The project objectives are to monitor possible migration of PFAS/PFOA+PFOS to Area 19 and evaluate if Area 19 receptors are potentially exposed to PFOA+PFOS above 10 ng/L via groundwater ingestion.

2.08 DATA GAPS

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

- Groundwater elevation and groundwater flow patterns within Area 19;
- Potential for PFOA+PFOS-, PFAS-impacted groundwater in the shallow and deep zones migrating to Area 19; and,
- Depth to bedrock within Area 19.

R&W/GZA has identified the following areas within Area 19 where additional data is needed to further characterize the plume, meet the project objectives, and address the data gaps:

- North of 12 Mile Road and west of the Rogue River;

- In the central and eastern portions of Area 19 (near the WV-MW-12 well cluster);
- In the southern and south-central portion of Area 19 (near the WV-MW-14 well cluster); and
- In the western portion of Area 19 (east of US-131).

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 10**. Actual monitoring well locations may vary slightly from the proposed locations during installation. While the target locations are shown, limitations for access on private properties, site conditions, and utilities may require moving monitoring well locations.

- To monitor for migration from the Wellington Ridge area (Area 7) toward Area R-1 (19), four monitoring well locations, Area19-MW-13, Area19-MW-14, Area19-MW-15 and Area19-MW-16, are proposed. Existing monitoring well clusters WV-MW-14 and WV-MW-12 will be included as part of the monitoring network for Area R-1 (19).
- Three remedial investigation well cluster locations (Area19-MW-1, Area19-MW-2 and Area19-MW-10) are proposed immediately downgradient of the potential groundwater mound near the southwestern corner of Area R-1 (19). The purpose is to further evaluate the PFOA+PFOS extent and groundwater elevations in this area and the PFAS distribution east of the potential groundwater mound. Currently, one nested well set (MW-WV-14S/14D) has been installed east of this area. Area19-MW-10, Area19-MW-1 and Area19-MW-2 are proposed north, northeast and south of MW-WV-14S/14D (northeast and southeast of the potential mound) to assess downgradient PFAS concentrations and groundwater elevations.
- Two additional monitoring well clusters (Area19-MW-8 and Area19-MW-9) are proposed west-northwest, and north of the intersection of 11 Mile Road and Wolven to provide detection monitoring for the downgradient area, north and northwest of that area. Groundwater contours indicate potential migration from the groundwater mound area to the north. These monitoring well clusters will also provide better understanding of groundwater elevations and groundwater flow north and northwest of the apparent groundwater mound.
- Two remedial investigation well cluster locations (Area19-MW-3 and Area19-MW-4) are proposed near Whirlwind Road to further evaluate the PFOA+PFOS extent (PFOA+PFOS plume width).
- Three additional remedial investigation well cluster locations (Area19-MW-6 and Area19-MW-7) are proposed northwest and north of the estimated 10 ppt PFOA+PFOS contour in the east side of Area R-1 (19). The purpose is to further delineate the extent of PFOA+PFOS in the area. Based on current information, Area19-MW-6 and Area19-MW-7 are also perimeter monitoring wells for the north and west edges of the PFOA+PFOS plume.
- Three additional remedial investigation well cluster locations (Area19-MW-5, Area19-MW-11 and Area19-MW-12) are proposed near Summit Avenue. The purpose of these wells is to further characterize the PFOA+PFOS plume in the area.

4.0 INVESTIGATION METHODOLOGY

Relevant tasks performed 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 initial 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. Vertical Aquifer Profiling will be completed in accordance with *SOP A25, Vertical Aquifer Profiling* included in the QAPP. The turn-around time for laboratory samples will be approximately three weeks.

Based on the profiling data, encountered geology, and nearby drinking water well elevations, R&W/GZA will determine the depth(s) of wells installed at each 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 19 monitoring well sampling. Specific information regarding sampling procedures and analytical methods is provided in the site-specific QAPP.

Wells will be sampled as follows:

Well Type	Initial Sampling Post Installation/ Development (at least 2 weeks post development)	Annual Sampling Until Substantial Completion of Perimeter Well Network*	Quarterly sampling For One Year Once Perimeter Well Network is Substantially Complete*
Perimeter Wells**	X	X	X
RI Wells	X		

* Substantial Completion will be agreed upon by R&W/GZA and EGLE.
**Perimeter wells are defined as the wells installed at the perimeter of areas where municipal water will be installed.

The sampling will be conducted using methods established in SOPs A14, A15, A16, and B01 of the QAPP. The samples will be analyzed using DoD QSM 5.3 guidelines for PFAS by isotope dilution methodology.

5.01 SAMPLING LOCATIONS

As discussed in **Section 3.0**, the following monitoring well locations are proposed:

Grouping/Area	Well Nomenclature
Existing	MW-WV-14S/14D, WV-MW-12S/12M/12D
Evaluate groundwater flow direction further in Area 19	Area19-MW-1, Area19-MW-2, Area19-MW-10,
Evaluate groundwater flow and monitor potential migration into Area 19	Area19-MW-13, Area19-MW-14, Area19-MW-15 and Area19-MW-16
Delineation of extent of Wolven/Jewell Plume in the east and southeast portions of Area 19	Area19-MW-8, Area19-MW-9, Area19-MW-5, Area19-MW-11 and Area19-MW-12
Delineation of extent of Wolven/Jewell Plume in the central portion of Area 19	Area19-MW-3 and Area19-MW-4
Delineation of extent of Wolven/Jewell Plume in the northern portion of Area 19	Area19-MW-6 and Area19-MW-7

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 nomenclature that includes 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 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 from beneath the water table and development/purge water from the well installations and sampling will be containerized and transported to the HSDS property for staging/storage until off-site treatment/disposal or other approved handling can be arranged. Soil cuttings from above the water table will be spread near the wellhead and/or transported to another location to be used as clean fill.

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 locations and the potential impact of coronavirus disease 2019 (COVID-19). The schedule for installation of the well cluster locations will depend on R&W/GZA's ability to obtain access to the desired locations or proximate alternate locations. The following table outlines R&W/GZA's current estimates of the steps and approximate timeframes for the 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 RAP will require 16 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 six 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 SCREEN INFORMATION
Area R-1 (19)
Wolven/Jewell Area, Kent County, MI

Area	PPN	Address	Note	Well Screen Elevation (feet)
Area R-1 (19)	410626300011	3409 11 MILE RD NE	VACANT	NA
Area R-1 (19)	410635100023	3500 11 MILE RD NE	SAMPLED BY R&W/GZA	706-695
Area R-1 (19)	410635100005	3530 11 MILE RD NE	SAMPLED BY R&W/GZA	NA
Area R-1 (19)	410626300021	3535 11 MILE RD NE	SAMPLED BY R&W/GZA	806-802
Area R-1 (19)	410626300022	3599 11 MILE RD NE	SAMPLED BY R&W/GZA	694-682
Area R-1 (19)	410635201012	3616 11 MILE RD NE	SAMPLED BY R&W/GZA	686-682
Area R-1 (19)	410626400005	3617 11 MILE RD NE	SAMPLED BY R&W/GZA	NA
Area R-1 (19)	410626400004	3651 11 MILE RD NE	SAMPLED BY R&W/GZA	NA
Area R-1 (19)	410626400009	3749 11 MILE RD NE	SAMPLED BY R&W/GZA	618-608
Area R-1 (19)	410635226001	3820 11 MILE RD NE	SAMPLED BY R&W/GZA	718-713
Area R-1 (19)	410626400010	3883 11 MILE RD NE	VACANT	NA
Area R-1 (19)	410635227001	3900 11 MILE RD NE	SAMPLED BY R&W/GZA	587-552
Area R-1 (19)	410635227003	3990 11 MILE RD NE	SAMPLED BY R&W/GZA	716-706
Area R-1 (19)	410636101008	3994 11 MILE RD NE	VACANT	NA
Area R-1 (19)	410636101010	4010 11 MILE RD NE	SAMPLED BY R&W/GZA	693-688
Area R-1 (19)	410636101011	4080 11 MILE RD NE	SAMPLED BY R&W/GZA	742-737
Area R-1 (19)	410625351002	4099 11 MILE RD NE	SAMPLED BY R&W/GZA	719-714
Area R-1 (19)	410625351003	4145 11 MILE RD NE	SAMPLED BY R&W/GZA	NA
Area R-1 (19)	410636101007	4170 11 MILE RD NE	SAMPLED BY R&W/GZA	701-696
Area R-1 (19)	410625100038	4020 12 MILE RD NE	SAMPLED BY R&W/GZA	NA
Area R-1 (19)	410625100061	4050 12 MILE RD NE	SAMPLED BY R&W/GZA	NA
Area R-1 (19)	410625100060	4100 12 MILE RD NE	SAMPLED BY R&W/GZA	NA
Area R-1 (19)	410625100022	4150 12 MILE RD NE	SAMPLED BY R&W/GZA	691-687
Area R-1 (19)	410626400011	9351 ALSHIRE FARMS DR NE	SAMPLED BY R&W/GZA	NA
Area R-1 (19)	410625100042	9915 BRADLEY DR NE	SAMPLED BY R&W/GZA	NA
Area R-1 (19)	410625100043	9920 BRADLEY DR NE	SAMPLED BY R&W/GZA	NA
Area R-1 (19)	410626200037	9787 DEER TRL NE	SAMPLED BY R&W/GZA	NA
Area R-1 (19)	410626200026	9790 DEER TRL NE	SAMPLED BY R&W/GZA	NA
Area R-1 (19)	410626200024	9798 DEER TRL NE	SAMPLED BY R&W/GZA	690-685
Area R-1 (19)	410626200030	9799 DEER TRL NE	SAMPLED BY R&W/GZA	719-709
Area R-1 (19)	410626200035	9820 DEER TRL NE	SAMPLED BY R&W/GZA	693-683
Area R-1 (19)	410626200034	9831 DEER TRL NE	SAMPLED BY R&W/GZA	711-706
Area R-1 (19)	410626200036	9859 DEER TRL NE	SAMPLED BY R&W/GZA	693-681
Area R-1 (19)	410626300001	9410 ELSTNER AVE NE	VACANT	NA
Area R-1 (19)	410625100029	4350 RIVERWATCH RD NE	SAMPLED BY OTHERS	NA
Area R-1 (19)	410625100028	4320 RIVERWATCH RD NE	SAMPLED BY OTHERS	NA
Area R-1 (19)	410625100026	4325 RIVERWATCH RD NE	VACANT	NA
Area R-1 (19)	410625100027	4355 RIVERWATCH RD NE	NA	NA
Area R-1 (19)	410625451001	9220 SUMMIT AVE NE	SAMPLED BY OTHERS	NA
Area R-1 (19)	410625376003	9300 SUMMIT AVE NE	SAMPLED BY OTHERS	695-685
Area R-1 (19)	410625376002	9320 SUMMIT AVE NE	SAMPLED BY OTHERS	593-583
Area R-1 (19)	410625376001	9350 SUMMIT AVE NE	SAMPLED BY OTHERS	NA
Area R-1 (19)	410625326008	9380 SUMMIT AVE NE	SAMPLED BY OTHERS	676-671
Area R-1 (19)	410625326006	9450 SUMMIT AVE NE	SAMPLED BY OTHERS	NA
Area R-1 (19)	410625326005	9490 SUMMIT AVE NE	SAMPLED BY OTHERS	661-651
Area R-1 (19)	410625326004	9530 SUMMIT AVE NE	SAMPLED BY OTHERS	668-658
Area R-1 (19)	410625326003	9552 SUMMIT AVE NE	SAMPLED BY OTHERS	NA
Area R-1 (19)	410625326002	9558 SUMMIT AVE NE	SAMPLED BY OTHERS	NA

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Area	PPN	Address	Note	Well Screen Elevation (feet)
Area R-1 (19)	410625326001	9564 SUMMIT AVE NE	SAMPLED BY OTHERS	637-633
Area R-1 (19)	410625100044	9610 SUMMIT AVE NE	SAMPLED BY OTHERS	NA
Area R-1 (19)	410625100045	9620 SUMMIT AVE NE	SAMPLED BY OTHERS	NA
Area R-1 (19)	410625100048	9630 SUMMIT AVE NE	SAMPLED BY OTHERS	690-683
Area R-1 (19)	410625100025	9740 SUMMIT AVE NE	SAMPLED BY OTHERS	687-683
Area R-1 (19)	410625100036	9796 SUMMIT AVE NE	SAMPLED BY OTHERS	NA
Area R-1 (19)	410625100072	9800 SUMMIT AVE NE	SAMPLED BY OTHERS	674-669
Area R-1 (19)	410625100071	9908 SUMMIT AVE NE	SAMPLED BY OTHERS	641-636
Area R-1 (19)	410625100065	9924 SUMMIT AVE NE	SAMPLED BY OTHERS	676-670
Area R-1 (19)	410625100062	9958 SUMMIT AVE NE	SAMPLED BY OTHERS	691-686
Area R-1 (19)	410636101013	9105 SUMMIT AVE NE	SAMPLED BY R&W/GZA	742-738
Area R-1 (19)	410636101014	9111 SUMMIT AVE NE	SAMPLED BY R&W/GZA	NA
Area R-1 (19)	410636101012	9115 SUMMIT AVE NE	VACANT	NA
Area R-1 (19)	410636101003	9145 SUMMIT AVE NE	SAMPLED BY R&W/GZA	594-589
Area R-1 (19)	410636101002	9185 SUMMIT AVE NE	SAMPLED BY R&W/GZA	NA
Area R-1 (19)	410625376004	9200 SUMMIT AVE NE	SAMPLED BY OTHERS	NA
Area R-1 (19)	410625351001	9391 SUMMIT AVE NE	SAMPLED BY R&W/GZA	675-670
Area R-1 (19)	410625401001	9400 SUMMIT AVE NE	SAMPLED BY OTHERS	NA
Area R-1 (19)	410625326007	9410 SUMMIT AVE NE	NA	NA
Area R-1 (19)	410625315003	9489 SUMMIT AVE NE	SAMPLED BY R&W/GZA	658-654
Area R-1 (19)	410625315002	9545 SUMMIT AVE NE	SAMPLED BY R&W/GZA	NA
Area R-1 (19)	410625315001	9555 SUMMIT AVE NE	SAMPLED BY R&W/GZA	705-700
Area R-1 (19)	410625100074	9605 SUMMIT AVE NE	SAMPLED BY R&W/GZA	NA
Area R-1 (19)	410625100073	9617 SUMMIT AVE NE	VACANT	NA
Area R-1 (19)	410625100032	9737 SUMMIT AVE NE	SAMPLED BY R&W/GZA	NA
Area R-1 (19)	410625100031	9881 SUMMIT AVE NE	SAMPLED BY R&W/GZA	NA
Area R-1 (19)	410625100057	9887 SUMMIT AVE NE	SAMPLED BY R&W/GZA	677-672
Area R-1 (19)	410625100068	9900 SUMMIT AVE NE	SAMPLED BY OTHERS	NA
Area R-1 (19)	410625100056	9905 SUMMIT AVE NE	SAMPLED BY R&W/GZA	651-641
Area R-1 (19)	410625100058	9907 SUMMIT AVE NE	SAMPLED BY R&W/GZA	NA
Area R-1 (19)	410625100067	9910 SUMMIT AVE NE	SAMPLED BY OTHERS	NA
Area R-1 (19)	410625100020	9911 SUMMIT AVE NE	SAMPLED BY R&W/GZA	687-683
Area R-1 (19)	410625100069	9916 SUMMIT AVE NE	VACANT	NA
Area R-1 (19)	410625100064	9920 SUMMIT AVE NE	SAMPLED BY OTHERS	NA
Area R-1 (19)	410625100023	9933 SUMMIT AVE NE	SAMPLED BY R&W/GZA	684-679
Area R-1 (19)	410625100063	9940 SUMMIT AVE NE	SAMPLED BY OTHERS	NA
Area R-1 (19)	410625301007	4090 TRADEWIND DR NE	SAMPLED BY R&W/GZA	NA
Area R-1 (19)	410625301008	4144 TRADEWIND DR NE	SAMPLED BY R&W/GZA	710-690
Area R-1 (19)	410625301006	4155 TRADEWIND DR NE	SAMPLED BY R&W/GZA	693-683
Area R-1 (19)	410625301009	4158 TRADEWIND DR NE	SAMPLED BY R&W/GZA	NA
Area R-1 (19)	410625301010	4164 TRADEWIND DR NE	SAMPLED BY R&W/GZA	640-630
Area R-1 (19)	410625301005	4167 TRADEWIND DR NE	SAMPLED BY R&W/GZA	688-678
Area R-1 (19)	410625301011	4168 TRADEWIND DR NE	SAMPLED BY R&W/GZA	579-568
Area R-1 (19)	410625301012	4172 TRADEWIND DR NE	SAMPLED BY R&W/GZA	685-675
Area R-1 (19)	410625301004	4175 TRADEWIND DR NE	SAMPLED BY R&W/GZA	706-696
Area R-1 (19)	410625301013	4176 TRADEWIND DR NE	SAMPLED BY R&W/GZA	689-679
Area R-1 (19)	410625301003	4183 TRADEWIND DR NE	SAMPLED BY R&W/GZA	702-692
Area R-1 (19)	410625301014	4184 TRADEWIND DR NE	SAMPLED BY R&W/GZA	700-690
Area R-1 (19)	410625301002	4189 TRADEWIND DR NE	SAMPLED BY R&W/GZA	697-687

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Area	PPN	Address	Note	Well Screen Elevation (feet)
Area R-1 (19)	410625301001	4195 TRADEWIND DR NE	SAMPLED BY R&W/GZA	NA
Area R-1 (19)	410626200009	3640 VERSCHEL DR NE	SAMPLED BY R&W/GZA	635-622
Area R-1 (19)	410626200011	3725 VERSCHEL DR NE	SAMPLED BY R&W/GZA	NA
Area R-1 (19)	410626200012	3800 VERSCHEL DR NE	SAMPLED BY R&W/GZA	703-698
Area R-1 (19)	410625301040	3823 WHIRLWIND DR NE	SAMPLED BY R&W/GZA	700-690
Area R-1 (19)	410625301039	3826 WHIRLWIND DR NE	SAMPLED BY R&W/GZA	701-691
Area R-1 (19)	410625301038	3830 WHIRLWIND DR NE	SAMPLED BY R&W/GZA	719-709
Area R-1 (19)	410625301037	3848 WHIRLWIND DR NE	SAMPLED BY R&W/GZA	718-708
Area R-1 (19)	410625301041	3855 WHIRLWIND DR NE	SAMPLED BY R&W/GZA	704-694
Area R-1 (19)	410625301036	3862 WHIRLWIND DR NE	SAMPLED BY R&W/GZA	715-705
Area R-1 (19)	410625301042	3869 WHIRLWIND DR NE	SAMPLED BY R&W/GZA	NA
Area R-1 (19)	410625301035	3870 WHIRLWIND DR NE	SAMPLED BY R&W/GZA	709-699
Area R-1 (19)	410625301034	3882 WHIRLWIND DR NE	SAMPLED BY R&W/GZA	712-702
Area R-1 (19)	410625301043	3885 WHIRLWIND DR NE	SAMPLED BY R&W/GZA	698-688
Area R-1 (19)	410625301033	3900 WHIRLWIND DR NE	SAMPLED BY R&W/GZA	701-691
Area R-1 (19)	410625301044	3909 WHIRLWIND DR NE	SAMPLED BY R&W/GZA	697-687
Area R-1 (19)	410625301045	3913 WHIRLWIND DR NE	SAMPLED BY R&W/GZA	699-689
Area R-1 (19)	410625301032	3914 WHIRLWIND DR NE	SAMPLED BY R&W/GZA	NA
Area R-1 (19)	410625301046	3921 WHIRLWIND DR NE	SAMPLED BY R&W/GZA	702-692
Area R-1 (19)	410625301031	3926 WHIRLWIND DR NE	SAMPLED BY R&W/GZA	705-695
Area R-1 (19)	410625301030	3938 WHIRLWIND DR NE	SAMPLED BY R&W/GZA	696-686
Area R-1 (19)	410625301047	3945 WHIRLWIND DR NE	SAMPLED BY R&W/GZA	691-681
Area R-1 (19)	410625301029	3950 WHIRLWIND DR NE	SAMPLED BY R&W/GZA	692-682
Area R-1 (19)	410625301048	3963 WHIRLWIND DR NE	SAMPLED BY OTHERS	707-697
Area R-1 (19)	410625301028	3966 WHIRLWIND DR NE	SAMPLED BY R&W/GZA	693-683
Area R-1 (19)	410625301049	3975 WHIRLWIND DR NE	SAMPLED BY R&W/GZA	693-688
Area R-1 (19)	410625301027	3980 WHIRLWIND DR NE	SAMPLED BY R&W/GZA	701-691
Area R-1 (19)	410625301050	3983 WHIRLWIND DR NE	SAMPLED BY R&W/GZA	694-684
Area R-1 (19)	410625301051	3989 WHIRLWIND DR NE	SAMPLED BY R&W/GZA	693-683
Area R-1 (19)	410625301052	3991 WHIRLWIND DR NE	SAMPLED BY R&W/GZA	691-681
Area R-1 (19)	410625301026	3998 WHIRLWIND DR NE	SAMPLED BY R&W/GZA	702-692
Area R-1 (19)	410625301053	4011 WHIRLWIND DR NE	SAMPLED BY R&W/GZA	689-679
Area R-1 (19)	410625301025	4020 WHIRLWIND DR NE	SAMPLED BY R&W/GZA	718-708
Area R-1 (19)	410625301054	4029 WHIRLWIND DR NE	SAMPLED BY R&W/GZA	678-668
Area R-1 (19)	410625301024	4036 WHIRLWIND DR NE	SAMPLED BY R&W/GZA	697-687
Area R-1 (19)	410625301023	4050 WHIRLWIND DR NE	SAMPLED BY R&W/GZA	712-702
Area R-1 (19)	410625301022	4064 WHIRLWIND DR NE	SAMPLED BY R&W/GZA	708-698
Area R-1 (19)	410625301055	4065 WHIRLWIND DR NE	SAMPLED BY R&W/GZA	702-692
Area R-1 (19)	410625301021	4078 WHIRLWIND DR NE	SAMPLED BY R&W/GZA	702-692
Area R-1 (19)	410625301056	4079 WHIRLWIND DR NE	SAMPLED BY R&W/GZA	720-710
Area R-1 (19)	410625301057	4095 WHIRLWIND DR NE	SAMPLED BY R&W/GZA	699-689
Area R-1 (19)	410625301020	4096 WHIRLWIND DR NE	SAMPLED BY R&W/GZA	702-692
Area R-1 (19)	410625301019	4112 WHIRLWIND DR NE	SAMPLED BY R&W/GZA	NA
Area R-1 (19)	410625301058	4117 WHIRLWIND DR NE	SAMPLED BY R&W/GZA	714-704
Area R-1 (19)	410625301018	4124 WHIRLWIND DR NE	NO RESPONSE TO SAMPLING REQUEST	673-663
Area R-1 (19)	410625301059	4125 WHIRLWIND DR NE	SAMPLED BY R&W/GZA	696-686
Area R-1 (19)	410625301060	4139 WHIRLWIND DR NE	SAMPLED BY R&W/GZA	711-701
Area R-1 (19)	410625301017	4140 WHIRLWIND DR NE	SAMPLED BY R&W/GZA	665-655
Area R-1 (19)	410625301016	4154 WHIRLWIND DR NE	SAMPLED BY R&W/GZA	704-694

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Area R-1 (19)
Wolven/Jewell Area, Kent County, MI

Area	PPN	Address	Note	Well Screen Elevation (feet)
Area R-1 (19)	410625301061	4155 WHIRLWIND DR NE	SAMPLED BY R&W/GZA	722-712
Area R-1 (19)	410625301015	4168 WHIRLWIND DR NE	SAMPLED BY R&W/GZA	694-684
Area R-1 (19)	410626300019	9300 WINZER CT NE	SAMPLED BY R&W/GZA	NA
Area R-1 (19)	410626300020	9269 WINZER CT NE	SAMPLED BY R&W/GZA	NA
Area R-1 (19)	410626300025	9313 WINZER CT NE	VACANT	NA
Area R-1 (19)	410626300026	9322 WINZER CT NE	VACANT	NA
Area R-1 (19)	410626300023	9345 WINZER CT NE	SAMPLED BY R&W/GZA	NA
Area R-1 (19)	410626300024	9350 WINZER CT NE	VACANT	NA
Area R-1 (19)	410626300031	9244 WOLVEN AVE NE	SAMPLED BY R&W/GZA	703-696
Area R-1 (19)	410626300016	9280 WOLVEN AVE NE	SAMPLED BY R&W/GZA	NA
Area R-1 (19)	410626300009	9300 WOLVEN AVE NE	SAMPLED BY R&W/GZA	788-784
Area R-1 (19)	410626300008	9350 WOLVEN AVE NE	SAMPLED BY R&W/GZA	565-558
Area R-1 (19)	410626300028	9400 WOLVEN AVE NE	SAMPLED BY R&W/GZA	549-526
Area R-1 (19)	410626300014	9524 WOLVEN AVE NE	SAMPLED BY R&W/GZA	708-703
Area R-1 (19)	410626300015	9550 WOLVEN AVE NE	SAMPLED BY R&W/GZA	705-700
Area R-1 (19)	410626300003	9590 WOLVEN AVE NE	SAMPLED BY R&W/GZA	NA
Area R-1 (19)	410626100014	9612 WOLVEN AVE NE	SAMPLED BY R&W/GZA	776-772
Area R-1 (19)	410626100016	9620 WOLVEN AVE NE	SAMPLED BY R&W/GZA	NA
Area R-1 (19)	410626100043	9680 WOLVEN AVE NE	SAMPLED BY R&W/GZA	778-773
Area R-1 (19)	410626100033	9684 WOLVEN AVE NE	VACANT	NA
Area R-1 (19)	410626200010	9688 WOLVEN AVE NE	VACANT	NA
Area R-1 (19)	410626100058	9691 WOLVEN AVE NE	SAMPLED BY R&W/GZA	795-785
Area R-1 (19)	410626100059	9693 WOLVEN AVE NE	SAMPLED BY R&W/GZA	694-686
Area R-1 (19)	410626100048	9715 WOLVEN AVE NE	SAMPLED BY R&W/GZA	702-697
Area R-1 (19)	410626100051	9740 WOLVEN AVE NE	SAMPLED BY R&W/GZA	791-786
Area R-1 (19)	410626100049	9754 WOLVEN AVE NE	SAMPLED BY R&W/GZA	775-765
Area R-1 (19)	410626100034	9766 WOLVEN AVE NE	SAMPLED BY R&W/GZA	713-708
Area R-1 (19)	410626100032	9776 WOLVEN AVE NE	VACANT	NA
Area R-1 (19)	410626100029	9789 WOLVEN AVE NE	SAMPLED BY R&W/GZA	690-686
Area R-1 (19)	410625100053	4100 WRENS WAY CT NE	SAMPLED BY R&W/GZA	623-613
Area R-1 (19)	410625100049	4101 WRENS WAY CT NE	SAMPLED BY R&W/GZA	NA
Area R-1 (19)	410625100050	4117 WRENS WAY CT NE	SAMPLED BY R&W/GZA	NA
Area R-1 (19)	410625100051	4133 WRENS WAY CT NE	SAMPLED BY R&W/GZA	NA
Area R-1 (19)	410625100052	4159 WRENS WAY CT NE	SAMPLED BY R&W/GZA	NA

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 SAMPLE ANALYSIS - PFAS
Area R-1 (19)
Wolven/Jewell Area, Kent County, MI

Area	Part 201 Generic Residential Groundwater Cleanup Criteria – Drinking Water[2]	Proposed MCL[3]	Area R-1 (19)	Area R-1 (19)	Area R-1 (19)	Area R-1 (19)	Area R-1 (19)	Area R-1 (19)	Area R-1 (19)	Area R-1 (19)	Area R-1 (19)	Area R-1 (19)	Area R-1 (19)	Area R-1 (19)	Area R-1 (19)	Area R-1 (19)	Area R-1 (19)
PPN			**410635100023**	**410626300022**	**410626300031**	**410626300031**	**410626300016**	**410626300009**	**410626300008**	**410635100005**	**410626300021**	**410626300020**	**410626300023**	**410626300019**	**410625100062**	**410625326005**	**410625100045**	**410625326002**
Address			**3500 11 MILE RD NE**	**3599 11 MILE RD NE**	**9244 WOLVEN AVE NE**	**9244 WOLVEN AVE NE**	**9280 WOLVEN AVE NE**	**9300 WOLVEN AVE NE**	**9350 WOLVEN AVE NE**	**3530 11 MILE RD NE**	**3535 11 MILE RD NE**	**9269 WINZER CT NE**	**9345 WINZER CT NE**	**9300 WINZER CT NE**	**9958 SUMMIT AVE NE**	**9490 SUMMIT AVE NE**	**9620 SUMMIT AVE NE**	**9558 SUMMIT AVE NE**
Sample Name			**3500 11 Mile Rd NE**	**3599 11 Mile Rd NE**	**9260 Wolven Ave**	**9270 Wolven Ave**	**9280 Wolven Ave**	**9300 Wolven Ave**	**9350 Wolven Ave**	**3530 11 Mile NE**	**3535 11 Mile NE**	**9269 11 Mile NE**	**3541 Winzer Ct**	**3593 11 Mile Rd NE**	**WR1712040920MK**	**WR1712040940MK**	**WR1712041005MK**	**WR1712041035MK**
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			**K1712649-012**	**K1712649-013**	**K1712649-006**	**K1712649-007**	**K1712649-008**	**K1712649-009**	**K1712649-010**	**K1712639-009**	**K1712639-011**	**K1712639-008**	**K1712651-001**	**K1712947-008**	**1701862-01**	**1701862-02**	**1701862-03**	**1701862-05**
Sample Date			**11/17/2017**	**11/17/2017**	**11/17/2017**	**11/17/2017**	**11/17/2017**	**11/17/2017**	**11/17/2017**	**11/20/2017**	**11/20/2017**	**11/20/2017**	**11/20/2017**	**11/30/2017**	**12/04/2017**	**12/04/2017**	**12/04/2017**	**12/04/2017**
Parameter (µg/L)																		
8:2 Fluorotelomer sulfonic acid (8:2 FTS)	NCL	NA	<0.0044	<0.0044	<0.0045	<0.0043	<0.0044	<0.0044	<0.0043	<0.0043	<0.0043	<0.0043	<0.0043	<0.0077	<0.00242	<0.00254	<0.00247	<0.00254
6:2 Fluorotelomer sulfonic acid (6:2 FTS)	NCL	NA	<0.0044	<0.0044	<0.0045	<0.0043	<0.0044	<0.0044	<0.0043	<0.0043	<0.0043	<0.0043	<0.0043	<0.034	<0.00242	<0.00254	<0.00247	<0.00254
N-Ethyl perfluorooctane sulfonamide (EtFOSA)	NCL	NA	<0.0044	<0.0044	<0.0045	<0.0043	<0.0044	<0.0044	<0.0043	<0.0043	<0.0043	<0.0043	<0.0043	<0.0041	-	-	-	-
N-ethylperfluoro-1-octanesulfonamidoacetic acid (EtFOSAA)	NCL	NA	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
N-Ethyl perfluorooctane sulfonamidoethanol (N-EtFOSE)	NCL	NA	<0.0044	<0.0044	<0.0045	<0.0043	<0.0044	<0.0044	<0.0043	<0.0043	<0.0043	<0.0043	<0.0043	<0.0041	-	-	-	-
N-Methyl perfluorooctane sulfonamide (MeFOSA)	NCL	NA	<0.0044	<0.0044	<0.0045	<0.0043	<0.0044	<0.0044	<0.0043	<0.0043	<0.0043	<0.0043	<0.0043	<0.0041	-	-	-	-
N-methylperfluoro-1-octanesulfonamidoacetic acid (MeFOSAA)	NCL	NA	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
N-Methyl perfluorooctane sulfonamidoethanol (N-MeFOSE)	NCL	NA	<0.0044	<0.0044	<0.0045	<0.0043	<0.0044	<0.0044	<0.0043	<0.0043	<0.0043	<0.0043	<0.0043	<0.0041	-	-	-	-
Perfluorobutane sulfonic acid (PFBS)	NCL	0.42	<0.0044	<0.0044	<0.0045	<0.0043	<0.0044	<0.0044	<0.0043	<0.0043	0.011	<0.0043	<0.0043	<0.0041	0.012	0.0147	0.0247	0.00655
Perfluorodecane sulfonic acid (PFDS)	NCL	NA	<0.0044	<0.0044	<0.0045	<0.0043	<0.0044	<0.0044	<0.0043	<0.0043	<0.0043	<0.0043	<0.0043	<0.0041	<0.00242	<0.00254	<0.00247	<0.00254
Perfluorooctadecanoic acid (PFODA)	NCL	NA	-	-	-	-	-	-	-	-	-	-	-	-	<0.00727	<0.00762	<0.00741	<0.00762
Perfluoroheptane sulfonic acid (PFHpS)	NCL	NA	<0.0044	<0.0044	<0.0045	<0.0043	<0.0044	<0.0044	<0.0043	<0.0043	<0.0043	<0.0043	<0.0043	<0.0041	0.00254	<0.00254	0.00261	<0.00254
Perfluorooctane sulfonamide (FOSA)	NCL	NA	<0.0044	<0.0044	<0.0045	<0.0043	<0.0044	<0.0044	<0.0043	<0.0043	<0.0043	<0.0043	<0.0043	<0.0041	<0.00242	<0.00254	<0.00247	<0.00254
Perfluorohexane sulfonic acid (PFHxS)	NCL	0.051	<0.0044	<0.0044	<0.0045	<0.0043	<0.0044	<0.0044	<0.0043	<0.0043	0.006	<0.0043	<0.0043	<0.0041	0.00752	0.00418	0.021	0.00206
Perfluorobutanoic acid (PFBA)	NCL	NA	<0.0088	<0.0088	<0.009	<0.0086	<0.0088	<0.0088	<0.0086	<0.0087	<0.0087	<0.0086	<0.0087	<0.0081	0.00153	0.00142	0.00235	<0.00254
Perfluorodecanoic acid (PFDA)	NCL	NA	<0.0044	<0.0044	<0.0045	<0.0043	<0.0044	<0.0044	<0.0043	<0.0043	<0.0043	<0.0043	<0.0043	<0.0041	<0.00242	<0.00254	<0.00247	<0.00254
Perfluorododecanoic acid (PFDoDA)	NCL	NA	<0.0044	<0.0044	<0.0045	<0.0043	<0.0044	<0.0044	<0.0043	<0.0043	<0.0043	<0.0043	<0.0043	<0.0041	<0.00242	<0.00254	<0.00247	<0.00254
Perfluoroheptanoic acid (PFHpA)	NCL	NA	<0.0044	<0.0044	<0.0045	<0.0043	<0.0044	<0.0044	<0.0043	<0.0043	<0.0043	<0.0043	<0.0043	<0.0041	0.00204	0.00062	0.00421	<0.00254
Perfluorohexanoic acid (PFHxA)	NCL	400	<0.0044	<0.0044	<0.0045	<0.0043	<0.0044	<0.0044	<0.0043	<0.0043	<0.0043	<0.0043	<0.0043	<0.0041	<0.00242	<0.00254	0.003	<0.00254
Perfluorononanoic acid (PFNA)	NCL	0.006	<0.0044	<0.0044	<0.0045	<0.0043	<0.0044	<0.0044	<0.0043	<0.0043	<0.0043	<0.0043	<0.0043	<0.0041	<0.00242	<0.00254	<0.00247	<0.00254
Perfluorooctanoic acid (PFOA)	0.07 (JJ)	0.008	<0.0018	<0.0018	<0.0018	<0.0017	<0.0018	<0.0018	<0.0017	<0.0017	0.011	<0.0017	<0.0017	<0.0016	0.0148	0.00263	0.0259	<0.00254
Perfluorooctane sulfonic acid (PFOS)	0.07 (JJ)	0.016	<0.0044	<0.0044	<0.0045	<0.0043	<0.0044	<0.0044	<0.0043	<0.0043	<0.0043	<0.0043	<0.0043	<0.0041	0.0124	<0.00254	0.00525	<0.00254
PFOA + PFOS (Calculated)	0.07	NA	ND	ND	ND	ND	ND	ND	ND	ND	0.011	ND	ND	ND	0.027	0.0026	0.031	ND
Perfluoropentanoic acid (PFPeA)	NCL	NA	<0.0044	<0.0044	<0.0045	<0.0043	<0.0044	<0.0044	<0.0043	<0.0043	<0.0043	<0.0043	<0.0043	<0.0041	0.00102	<0.00254	0.00202	<0.00254
Perfluorotetradecanoic acid (PFTeDA)	NCL	NA	<0.0044	<0.0044	<0.0045	<0.0043	<0.0044	<0.0044	<0.0043	<0.0043	<0.0043	<0.0043	<0.0043	<0.0041	<0.00242	<0.00254	<0.00247	<0.00254
Perfluorotridecanoic acid (PFTrDA)	NCL	NA	<0.0044	<0.0044	<0.0045	<0.0043	<0.0044	<0.0044	<0.0043	<0.0043	<0.0043	<0.0043	<0.0043	<0.0041	<0.00242	<0.00254	<0.00247	<0.00254
Perfluoroundecanoic acid (PFUnDA)	NCL	NA	<0.0044	<0.0044	<0.0045	<0.0043	<0.0044	<0.0044	<0.0043	<0.0043	<0.0043	<0.0043	<0.0043	<0.0041	<0.00242	<0.00254	<0.00247	<0.00254
Perfluorohexadecanoic acid (PFHxDA)	NCL	NA	-	-	-	-	-	-	-	-	-	-	-	-	<0.00242	<0.00254	<0.00247	<0.00254
Total PFAS (Calculated)	NCL	NA	ND	ND	ND	ND	ND	ND	ND	ND	0.028	ND	ND	ND	0.054	0.024	0.091	0.0086

TABLE 2
SUMMARY OF DRINKING WATER SAMPLE ANALYSIS - PFAS
Area R-1 (19)
Wolven/Jewell Area, Kent County, MI

Area	Part 201 Generic Residential Groundwater Cleanup Criteria – Drinking Water[2]	Proposed MCL[3]	Area R-1 (19)	Area R-1 (19)	Area R-1 (19)	Area R-1 (19)	Area R-1 (19)	Area R-1 (19)	Area R-1 (19)	Area R-1 (19)	Area R-1 (19)	Area R-1 (19)	Area R-1 (19)	Area R-1 (19)	Area R-1 (19)	Area R-1 (19)	Area R-1 (19)
PPN			410625376002	410625376003	410625100048	410625100071	410625326003	410625100044	410625326008	410625100065	410625100036	410625376001	410625100072	410625100029	410625326004	410625451001	410625100025	410625326006
Address			9320 SUMMIT AVE NE	9300 SUMMIT AVE NE	9630 SUMMIT AVE NE	9908 SUMMIT AVE NE	9552 SUMMIT AVE NE	9610 SUMMIT AVE NE	9380 SUMMIT AVE NE	9924 SUMMIT AVE NE	9796 SUMMIT AVE NE	9350 SUMMIT AVE NE	9800 SUMMIT AVE NE	4350 RIVERWATCH RD NE	9530 SUMMIT AVE NE	9220 SUMMIT AVE NE	9740 SUMMIT AVE NE	9450 SUMMIT AVE NE
Sample Name			WR17120411 15MK	WR17120411 30MK	WR17120413 15MK	WR17120413 40MK	WT17120414 05MK	WT17120415 45MK	WR17120516 10JNR	WR17120417 50MK	WR17120418 10MK	WR17120516 25JNR	WR17120709 30JLB	WR17120815 10JLB	WR17120815 25JLB	WR17121213 05MK	WT17121213 30MK	WT17122017 05MK
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			1701862-06	1701862-11	1701862-07	1701862-08	1701862-09	1701862-10	1701862-16	1701862-12	1701862-13	1701862-14	1701905-04	1701930-01	1701930-02	1701971-13	1701971-14	1702001-17
Sample Date			12/04/2017	12/04/2017	12/04/2017	12/04/2017	12/04/2017	12/04/2017	12/04/2017	12/04/2017	12/04/2017	12/05/2017	12/07/2017	12/08/2017	12/08/2017	12/12/2017	12/12/2017	12/20/2017
Parameter (µg/L)																		
8:2 Fluorotelomer sulfonic acid (8:2 FTS)	NCL	NA	<0.00267	<0.0024	<0.00241	<0.00251	<0.00251	<0.00247	<0.00239	<0.00254	<0.00248	<0.0024	<0.0023	<0.00245	<0.00239	<0.0024	<0.00243	<0.00231
6:2 Fluorotelomer sulfonic acid (6:2 FTS)	NCL	NA	0.00117	<0.0024	<0.00241	0.00101	<0.00251	<0.00247	<0.00239	<0.00254	<0.00248	0.00118	<0.0023	<0.00245	<0.00239	<0.0024	<0.00243	<0.00231
N-Ethyl perfluorooctane sulfonamide (EtFOSA)	NCL	NA	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
N-ethylperfluoro-1-octanesulfonamidoacetic acid (EtFOSAA)	NCL	NA	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
N-Ethyl perfluorooctane sulfonamidoethanol (N-EtFOSE)	NCL	NA	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
N-Methyl perfluorooctane sulfonamide (MeFOSA)	NCL	NA	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
N-methylperfluoro-1-octanesulfonamidoacetic acid (MeFOSAA)	NCL	NA	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
N-Methyl perfluorooctane sulfonamidoethanol (N-MeFOSE)	NCL	NA	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Perfluorobutane sulfonic acid (PFBS)	NCL	0.42	0.00314	0.0145	0.0123	0.00138	0.0119	0.00912	0.0154	0.00363	0.00349	0.0158	0.00726	<0.00245	0.0199	<0.0024	0.016	0.0155
Perfluorodecane sulfonic acid (PFDS)	NCL	NA	<0.00267	<0.0024	<0.00241	<0.00251	<0.00251	<0.00247	<0.00239	<0.00254	<0.00248	<0.0024	<0.0023	<0.00245	<0.00239	<0.0024	<0.00243	<0.00231
Perfluorooctadecanoic acid (PFODA)	NCL	NA	<0.00801	<0.00721	<0.00724	<0.00753	<0.00753	<0.00741	<0.00716	<0.00762	<0.00744	<0.00721	<0.00689	<0.00735	<0.00718	<0.00721	<0.0073	<0.00692
Perfluoroheptane sulfonic acid (PFHpS)	NCL	NA	<0.00267	<0.0024	<0.00241	<0.00251	0.00182	0.00327	0.00141	<0.00254	<0.00248	0.00152	<0.0023	0.00126	<0.00239	0.00113	0.00303	<0.00231
Perfluorooctane sulfonamide (FOSA)	NCL	NA	<0.00267	<0.0024	<0.00241	<0.00251	<0.00251	<0.00247	<0.00239	<0.00254	<0.00248	<0.0024	<0.0023	<0.00245	<0.00239	<0.0024	<0.00243	<0.00231
Perfluorohexane sulfonic acid (PFHxS)	NCL	0.051	<0.00267	0.00771	0.0119	0.00059	0.00891	0.00525	0.00844	0.00108	0.0014	0.00921	0.00487	<0.00245	0.00489	<0.0024	0.0118	0.00711
Perfluorobutanoic acid (PFBA)	NCL	NA	<0.00267	0.00343	0.00185	<0.00251	0.00132	0.003	0.00254	<0.00254	<0.00248	0.0023	0.00074	<0.00245	0.00283	<0.0024	0.00159	0.00119
Perfluorodecanoic acid (PFDA)	NCL	NA	<0.00267	<0.0024	<0.00241	<0.00251	<0.00251	<0.00247	<0.00239	<0.00254	<0.00248	<0.0024	<0.0023	<0.00245	<0.00239	<0.0024	<0.00243	<0.00231
Perfluorododecanoic acid (PFDoDA)	NCL	NA	<0.00267	<0.0024	<0.00241	<0.00251	<0.00251	<0.00247	<0.00239	<0.00254	<0.00248	<0.0024	<0.0023	<0.00245	<0.00239	<0.0024	<0.00243	<0.00231
Perfluoroheptanoic acid (PFHpA)	NCL	NA	<0.00267	0.00378	0.00434	<0.00251	0.00122	0.00238	0.00253	<0.00254	<0.00248	0.00255	0.0003	<0.00245	0.00242	<0.0024	0.00128	<0.00231
Perfluorohexanoic acid (PFHxA)	NCL	400	<0.00267	0.00561	0.00356	<0.00251	<0.00251	0.00305	0.00302	<0.00254	<0.00248	0.00225	<0.0023	<0.00245	0.00593	<0.0024	<0.00243	0.00156
Perfluorononanoic acid (PFNA)	NCL	0.006	<0.00267	<0.0024	<0.00241	<0.00251	<0.00251	<0.00247	<0.00239	<0.00254	<0.00248	<0.0024	<0.0023	<0.00245	<0.00239	<0.0024	<0.00243	<0.00231
Perfluorooctanoic acid (PFOA)	0.07 (JJ)	0.008	0.00037	0.0173	0.0399	0.00034	0.0141	0.0167	0.0101	0.00244	0.00091	0.0163	0.00408	<0.00245	0.00696	<0.0024	0.0232	0.00628
Perfluorooctane sulfonic acid (PFOS)	0.07 (JJ)	0.016	<0.00267	<0.0024	0.00934	<0.00251	0.00126	0.0198	0.00205	<0.00254	<0.00248	0.00344	0.00913	<0.00245	<0.00239	<0.0024	0.022	0.00114
PFOA + PFOS (Calculated)	0.07	NA	0.00037	0.017	0.049	0.00034	0.015	0.037	0.012	0.0024	0.00091	0.02	0.013	ND	0.007	ND	0.045	0.0074
Perfluoropentanoic acid (PFPeA)	NCL	NA	<0.00267	0.0033	0.002	<0.00251	<0.00251	0.00139	<0.00239	<0.00254	<0.00248	<0.0024	<0.0023	<0.00245	0.0044	<0.0024	<0.00243	<0.00231
Perfluorotetradecanoic acid (PFTeDA)	NCL	NA	<0.00267	<0.0024	<0.00241	<0.00251	<0.00251	<0.00247	<0.00239	<0.00254	<0.00248	<0.0024	<0.0023	<0.00245	<0.00239	<0.0024	<0.00243	<0.00231
Perfluorotridecanoic acid (PFTrDA)	NCL	NA	<0.00267	<0.0024	<0.00241	<0.00251	<0.00251	<0.00247	<0.00239	<0.00254	<0.00248	<0.0024	<0.0023	<0.00245	<0.00239	<0.0024	<0.00243	<0.00231
Perfluoroundecanoic acid (PFUnDA)	NCL	NA	<0.00267	<0.0024	<0.00241	<0.00251	<0.00251	<0.00247	<0.00239	<0.00254	<0.00248	<0.0024	<0.0023	<0.00245	<0.00239	<0.0024	<0.00243	<0.00231
Perfluorohexadecanoic acid (PFHxDA)	NCL	NA	<0.00267	<0.0024	<0.00241	<0.00251	<0.00251	<0.00247	<0.00239	<0.00254	<0.00248	<0.0024	<0.0023	<0.00245	<0.00239	<0.0024	<0.00243	<0.00231
Total PFAS (Calculated)	NCL	NA	0.0047	0.056	0.085	0.0033	0.041	0.064	0.045	0.0072	0.0058	0.055	0.026	0.0013	0.047	0.0011	0.079	0.033

TABLE 2
SUMMARY OF DRINKING WATER SAMPLE ANALYSIS - PFAS
Area R-1 (19)
Wolven/Jewell Area, Kent County, MI

Area	Part 201 Generic Residential Groundwater Cleanup Criteria – Drinking Water[2]	Proposed MCL[3]	Area R-1 (19)	Area R-1 (19)	Area R-1 (19)	Area R-1 (19)	Area R-1 (19)	Area R-1 (19)	Area R-1 (19)	Area R-1 (19)	Area R-1 (19)	Area R-1 (19)	Area R-1 (19)	Area R-1 (19)	Area R-1 (19)	Area R-1 (19)	Area R-1 (19)	Area R-1 (19)
PPN			410625326001	410626300021	410625301039	410625301038	410625301037	410625301041	410625301042	410625301043	410625301033	410625301032	410625301046	410625301031	410625301030	410625301047	410625301027	410625301050
Address			9564 SUMMIT AVE NE	3535 11 MILE RD NE	3826 WHIRLWIND DR NE	3830 WHIRLWIND DR NE	3848 WHIRLWIND DR NE	3855 WHIRLWIND DR NE	3869 WHIRLWIND DR NE	3885 WHIRLWIND DR NE	3900 WHIRLWIND DR NE	3914 WHIRLWIND DR NE	3921 WHIRLWIND DR NE	3926 WHIRLWIND DR NE	3938 WHIRLWIND DR NE	3945 WHIRLWIND DR NE	3980 WHIRLWIND DR NE	3983 WHIRLWIND DR NE
Sample Name			WR18011609350KA	3535 11 Mile-IN-1/23 Grab Potable Water	3826 Whirlwinn Dr. NE	3830 Whirlwinn Dr. NE	3848 Whirlwinn Dr. NE	3855 Whirlwinn Dr. NE	3869 Whirlwind Dr NE	3885 Whirlwind Dr NE	3900 Whirlwinn Dr. NE	3914 Whirlwinn Dr. NE	3921 Whirlwind Dr NE	3926 Whirlwinn Dr. NE	3938 Whirlwinn Dr. NE	3945 Whirlwind Dr NE	3980 Whirlwind Dr NE	3983 Whirlwind Dr NE
Matrix			Drinking Water	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	Drinking Water
Laboratory ID			1800135-01	9423879	K1801248-008	K1801248-007	K1801248-006	K1801248-009	K1801252-013	K1801252-011	K1801248-005	K1801248-003	K1801252-010	K1801248-002	K1801248-001	K1801252-009	K1801252-012	K1801252-008
Sample Date			01/16/2018	01/23/2018	02/07/2018	02/07/2018	02/07/2018	02/07/2018	02/07/2018	02/07/2018	02/07/2018	02/07/2018	02/07/2018	02/07/2018	02/07/2018	02/07/2018	02/07/2018	02/07/2018
Parameter (µg/L)																		
8:2 Fluorotelomer sulfonic acid (8:2 FTS)	NCL	NA	<0.00243	<0.005	<0.0044	<0.0044	<0.0046	<0.0045	<0.0047	<0.0047	<0.0044	<0.0046	<0.0047	<0.0044	<0.0044	<0.0045	<0.0046	<0.0044
6:2 Fluorotelomer sulfonic acid (6:2 FTS)	NCL	NA	<0.00243	<0.008	<0.0044	<0.0044	<0.0046	<0.0045	<0.0047	<0.0047	<0.0044	<0.0046	<0.0047	<0.0044	<0.0044	<0.0045	<0.0046	<0.0044
N-Ethyl perfluorooctane sulfonamide (EtFOSA)	NCL	NA	-	<0.008	<0.0044	<0.0044	<0.0046	<0.0045	<0.0047	<0.0047	<0.0044	<0.0046	<0.0047	<0.0044	<0.0044	<0.0045	<0.0046	<0.0044
N-ethylperfluoro-1-octanesulfonamidoacetic acid (EtFOSAA)	NCL	NA	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
N-Ethyl perfluorooctane sulfonamidoethanol (N-EtFOSE)	NCL	NA	-	<0.003	<0.0044	<0.0044	<0.0046	<0.0045	<0.0047	<0.0047	<0.0044	<0.0046	<0.0047	<0.0044	<0.0044	<0.0045	<0.0046	<0.0044
N-Methyl perfluorooctane sulfonamide (MeFOSA)	NCL	NA	-	<0.008	<0.0044	<0.0044	<0.0046	<0.0045	<0.0047	<0.0047	<0.0044	<0.0046	<0.0047	<0.0044	<0.0044	<0.0045	<0.0046	<0.0044
N-methylperfluoro-1-octanesulfonamidoacetic acid (MeFOSAA)	NCL	NA	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
N-Methyl perfluorooctane sulfonamidoethanol (N-MeFOSE)	NCL	NA	-	<0.003	<0.0044	<0.0044	<0.0046	<0.0045	<0.0047	<0.0047	<0.0044	<0.0046	<0.0047	<0.0044	<0.0044	<0.0045	<0.0046	<0.0044
Perfluorobutane sulfonic acid (PFBS)	NCL	0.42	0.00894	0.014	0.026	0.0092	0.0054	0.0063	0.0051	<0.0047	0.0061	<0.0046	<0.0047	<0.0044	<0.0044	<0.0045	<0.0046	<0.0044
Perfluorodecane sulfonic acid (PFDS)	NCL	NA	<0.00243	<0.002	<0.0044	<0.0044	<0.0046	<0.0045	<0.0047	<0.0047	<0.0044	<0.0046	<0.0047	<0.0044	<0.0044	<0.0045	<0.0046	<0.0044
Perfluorooctadecanoic acid (PFODA)	NCL	NA	<0.0073	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Perfluoroheptane sulfonic acid (PFHpS)	NCL	NA	0.00048	0.0006 J	<0.0044	<0.0044	<0.0046	<0.0045	<0.0047	<0.0047	<0.0044	<0.0046	<0.0047	<0.0044	<0.0044	<0.0045	<0.0046	<0.0044
Perfluorooctane sulfonamide (FOSA)	NCL	NA	<0.00243	<0.003	<0.0044	<0.0044	<0.0046	<0.0045	<0.0047	<0.0047	<0.0044	<0.0046	<0.0047	<0.0044	<0.0044	<0.0045	<0.0046	<0.0044
Perfluorohexane sulfonic acid (PFHxS)	NCL	0.051	0.00474	0.007	0.021	<0.0044	<0.0046	<0.0045	<0.0047	<0.0047	<0.0044	<0.0046	<0.0047	<0.0044	<0.0044	<0.0045	<0.0046	<0.0044
Perfluorobutanoic acid (PFBA)	NCL	NA	<0.00243	0.002 J	<0.0089	<0.0089	<0.0092	<0.0091	<0.0094	<0.0094	<0.0089	<0.0092	<0.0094	<0.0089	<0.0089	<0.0091	<0.0092	<0.0089
Perfluorodecanoic acid (PFDA)	NCL	NA	<0.00243	<0.002	<0.0044	<0.0044	<0.0046	<0.0045	<0.0047	<0.0047	<0.0044	<0.0046	<0.0047	<0.0044	<0.0044	<0.0045	<0.0046	<0.0044
Perfluorododecanoic acid (PFDoDA)	NCL	NA	<0.00243	<0.0009	<0.0044	<0.0044	<0.0046	<0.0045	<0.0047	<0.0047	<0.0044	<0.0046	<0.0047	<0.0044	<0.0044	<0.0045	<0.0046	<0.0044
Perfluoroheptanoic acid (PFHpA)	NCL	NA	<0.00243	0.002	0.041	0.0057	<0.0046	<0.0045	<0.0047	<0.0047	<0.0044	<0.0046	<0.0047	<0.0044	<0.0044	<0.0045	<0.0046	<0.0044
Perfluorohexanoic acid (PFHxA)	NCL	400	<0.00243	0.002	0.025	0.0056	<0.0046	0.0048	<0.0047	<0.0047	0.0091	<0.0046	<0.0047	<0.0044	<0.0044	<0.0045	<0.0046	<0.0044
Perfluorononanoic acid (PFNA)	NCL	0.006	<0.00243	<0.002	<0.0044	<0.0044	<0.0046	<0.0045	<0.0047	<0.0047	<0.0044	<0.0046	<0.0047	<0.0044	<0.0044	<0.0045	<0.0046	<0.0044
Perfluorooctanoic acid (PFOA)	0.07 (JJ)	0.008	0.00337	0.011	***0.079***	0.013	0.0028	<0.0018	<0.0019	<0.0019	0.012	<0.0018	<0.0019	<0.0018	<0.0018	<0.0018	<0.0018	<0.0018
Perfluorooctane sulfonic acid (PFOS)	0.07 (JJ)	0.016	<0.00243	0.006	<0.0044	<0.0044	<0.0046	<0.0045	<0.0047	<0.0047	0.013	<0.0046	<0.0047	<0.0044	<0.0044	<0.0045	<0.0046	<0.0044
PFOA + PFOS (Calculated)	0.07	NA	0.0034	0.017	***0.079***	0.013	0.0028	ND	ND	ND	0.025	ND	ND	ND	ND	ND	ND	ND
Perfluoropentanoic acid (PFPeA)	NCL	NA	<0.00243	<0.005	0.01	<0.0044	<0.0046	<0.0045	<0.0047	<0.0047	0.011	<0.0046	<0.0047	<0.0044	<0.0044	<0.0045	<0.0046	<0.0044
Perfluorotetradecanoic acid (PFTeDA)	NCL	NA	<0.00243	<0.0009	<0.0044	<0.0044	<0.0046	<0.0045	<0.0047	<0.0047	<0.0044	<0.0046	<0.0047	<0.0044	<0.0044	<0.0045	<0.0046	<0.0044
Perfluorotridecanoic acid (PFTrDA)	NCL	NA	<0.00243	<0.0009	<0.0044	<0.0044	<0.0046	<0.0045	<0.0047	<0.0047	<0.0044	<0.0046	<0.0047	<0.0044	<0.0044	<0.0045	<0.0046	<0.0044
Perfluoroundecanoic acid (PFUnDA)	NCL	NA	<0.00243	<0.002	<0.0044	<0.0044	<0.0046	<0.0045	<0.0047	<0.0047	<0.0044	<0.0046	<0.0047	<0.0044	<0.0044	<0.0045	<0.0046	<0.0044
Perfluorohexadecanoic acid (PFHxDA)	NCL	NA	<0.00243	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total PFAS (Calculated)	NCL	NA	0.018	0.042	0.2	0.034	0.0082	0.011	0.0051	ND	0.051	ND	ND	ND	ND	ND	ND	ND

TABLE 2
SUMMARY OF DRINKING WATER SAMPLE ANALYSIS - PFAS
Area R-1 (19)
Wolven/Jewell Area, Kent County, MI

Area	Part 201 Generic Residential Groundwater Cleanup Criteria – Drinking Water[2]	Proposed MCL[3]	Area R-1 (19)	Area R-1 (19)	Area R-1 (19)	Area R-1 (19)	Area R-1 (19)	Area R-1 (19)	Area R-1 (19)	Area R-1 (19)	Area R-1 (19)	Area R-1 (19)	Area R-1 (19)	Area R-1 (19)	Area R-1 (19)	Area R-1 (19)	Area R-1 (19)
PPN			410625301051	410625301025	410625301054	410625301024	410625301021	410625301056	410625301020	410625301019	410625301058	410625301061	410625301015	410626100059	410626400004	410626400009	410626400011	410626200026
Address			3989 WHIRLWIND DR NE	4020 WHIRLWIND DR NE	4029 WHIRLWIND DR NE	4036 WHIRLWIND DR NE	4078 WHIRLWIND DR NE	4079 WHIRLWIND DR NE	4096 WHIRLWIND DR NE	4112 WHIRLWIND DR NE	4117 WHIRLWIND DR NE	4155 WHIRLWIND DR NE	4168 WHIRLWIND DR NE	9693 WOLVEN AVE NE	3651 11 MILE RD NE	3749 11 MILE RD NE	9351 ALSHIRE FARMS DR NE	9790 DEER TRL NE
Sample Name			3989 Whirlwind Dr NE	4020 Whirlwind Dr NE	4029 Whirlwind Dr NE	4036 Whirlwind Dr NE	4078 Whirlwinn Dr. NE	4079 Whirlwind Dr NE	4096 Whirlwinn Dr. NE	4112 Whirlwinn Dr. NE	4117 Whirlwind Dr NE	4155 Whirlwind Dr NE	4168 Whirlwinn Dr. NE	9695 Woven Ave NE	3651 11 Mile Rd NE	3749 11 Mile Rd NE	9351 Alshire Farms Dr NE	9790 Deer Trl 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			K1801252-007	K1801252-015	K1801252-006	K1801252-014	K1801248-013	K1801252-004	K1801248-012	K1801248-011	K1801252-003	K1801252-002	K1801248-010	K1801252-001	K1801319-014	K1801319-016	K1801319-015	K1801319-011
Sample Date			02/07/2018	02/07/2018	02/07/2018	02/07/2018	02/07/2018	02/07/2018	02/07/2018	02/07/2018	02/07/2018	02/07/2018	02/07/2018	02/07/2018	02/08/2018	02/08/2018	02/08/2018	02/08/2018
Parameter (µg/L)																		
8:2 Fluorotelomer sulfonic acid (8:2 FTS)	NCL	NA	<0.0046	<0.0046	<0.0045	<0.0045	<0.0044	<0.0045	<0.0044	<0.0046	<0.0045	<0.0046	<0.0044	<0.0045	<0.0048	<0.0048	<0.0049	<0.0046
6:2 Fluorotelomer sulfonic acid (6:2 FTS)	NCL	NA	<0.0046	<0.0046	<0.0045	<0.0045	<0.0044	<0.0045	<0.0044	<0.0046	<0.0045	<0.0046	<0.0044	<0.0045	<0.0048	<0.0048	<0.0049	<0.0046
N-Ethyl perfluorooctane sulfonamide (EtFOSA)	NCL	NA	<0.0046	<0.0046	<0.0045	<0.0045	<0.0044	<0.0045	<0.0044	<0.0046	<0.0045	<0.0046	<0.0044	<0.0045	<0.0048	<0.0048	<0.0049	<0.0046
N-ethylperfluoro-1-octanesulfonamidoacetic acid (EtFOSAA)	NCL	NA	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
N-Ethyl perfluorooctane sulfonamidoethanol (N-EtFOSE)	NCL	NA	<0.0046	<0.0046	<0.0045	<0.0045	<0.0044	<0.0045	<0.0044	<0.0046	<0.0045	<0.0046	<0.0044	<0.0045	<0.0048	<0.0048	<0.0049	<0.0046
N-Methyl perfluorooctane sulfonamide (MeFOSA)	NCL	NA	<0.0046	<0.0046	<0.0045	<0.0045	<0.0044	<0.0045	<0.0044	<0.0046	<0.0045	<0.0046	<0.0044	<0.0045	<0.0048	<0.0048	<0.0049	<0.0046
N-methylperfluoro-1-octanesulfonamidoacetic acid (MeFOSAA)	NCL	NA	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
N-Methyl perfluorooctane sulfonamidoethanol (N-MeFOSE)	NCL	NA	<0.0046	<0.0046	<0.0045	<0.0045	<0.0044	<0.0045	<0.0044	<0.0046	<0.0045	<0.0046	<0.0044	<0.0045	<0.0048	<0.0048	<0.0049	<0.0046
Perfluorobutane sulfonic acid (PFBS)	NCL	0.42	<0.0046	<0.0046	<0.0045	<0.0045	0.0081	<0.0045	0.018	0.021	0.015	0.014	0.026	<0.0045	<0.0048	<0.0048	<0.0049	<0.0046
Perfluorodecane sulfonic acid (PFDS)	NCL	NA	<0.0046	<0.0046	<0.0045	<0.0045	<0.0044	<0.0045	<0.0044	<0.0046	<0.0045	<0.0046	<0.0044	<0.0045	<0.0048	<0.0048	<0.0049	<0.0046
Perfluorooctadecanoic acid (PFODA)	NCL	NA	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Perfluoroheptane sulfonic acid (PFHpS)	NCL	NA	<0.0046	<0.0046	<0.0045	<0.0045	<0.0044	<0.0045	<0.0044	<0.0046	<0.0045	<0.0046	<0.0044	<0.0045	<0.0048	<0.0048	<0.0049	<0.0046
Perfluorooctane sulfonamide (FOSA)	NCL	NA	<0.0046	<0.0046	<0.0045	<0.0045	<0.0044	<0.0045	<0.0044	<0.0046	<0.0045	<0.0046	<0.0044	<0.0045	<0.0048	<0.0048	<0.0049	<0.0046
Perfluorohexane sulfonic acid (PFHxS)	NCL	0.051	<0.0046	<0.0046	<0.0045	<0.0045	0.0049	<0.0045	0.01	0.013	0.0048	0.0082	0.011	<0.0045	<0.0048	<0.0048	<0.0049	<0.0046
Perfluorobutanoic acid (PFBA)	NCL	NA	<0.0092	<0.0092	<0.0091	<0.0091	<0.0089	<0.0091	<0.0089	<0.0092	<0.0091	<0.0092	<0.0089	<0.0091	<0.0096	<0.0096	<0.0098	<0.0093
Perfluorodecanoic acid (PFDA)	NCL	NA	<0.0046	<0.0046	<0.0045	<0.0045	<0.0044	<0.0045	<0.0044	<0.0046	<0.0045	<0.0046	<0.0044	<0.0045	<0.0048	<0.0048	<0.0049	<0.0046
Perfluorododecanoic acid (PFDoDA)	NCL	NA	<0.0046	<0.0046	<0.0045	<0.0045	<0.0044	<0.0045	<0.0044	<0.0046	<0.0045	<0.0046	<0.0044	<0.0045	<0.0048	<0.0048	<0.0049	<0.0046
Perfluoroheptanoic acid (PFHpA)	NCL	NA	<0.0046	<0.0046	<0.0045	<0.0045	<0.0044	<0.0045	<0.0044	<0.0046	<0.0045	<0.0046	<0.0044	<0.0045	<0.0048	<0.0048	<0.0049	<0.0046
Perfluorohexanoic acid (PFHxA)	NCL	400	<0.0046	<0.0046	<0.0045	<0.0045	<0.0044	<0.0045	<0.0044	<0.0046	<0.0045	<0.0046	<0.0044	<0.0045	<0.0048	<0.0048	<0.0049	<0.0046
Perfluorononanoic acid (PFNA)	NCL	0.006	<0.0046	<0.0046	<0.0045	<0.0045	<0.0044	<0.0045	<0.0044	<0.0046	<0.0045	<0.0046	<0.0044	<0.0045	<0.0048	<0.0048	<0.0049	<0.0046
Perfluorooctanoic acid (PFOA)	0.07 (JJ)	0.008	<0.0018	<0.0018	<0.0018	<0.0018	<0.0018	<0.0018	<0.0018	<0.0018	0.005	0.0047	0.005	<0.0018	<0.0019	0.0035	<0.002	<0.0019
Perfluorooctane sulfonic acid (PFOS)	0.07 (JJ)	0.016	<0.0046	<0.0046	<0.0045	<0.0045	<0.0044	<0.0045	<0.0044	<0.0046	<0.0045	<0.0046	<0.0044	<0.0045	<0.0048	<0.0048	<0.0049	<0.0046
PFOA + PFOS (Calculated)	0.07	NA	ND	ND	ND	ND	ND	ND	ND	ND	0.005	0.0047	0.005	ND	ND	0.0035	ND	ND
Perfluoropentanoic acid (PFPeA)	NCL	NA	<0.0046	<0.0046	<0.0045	<0.0045	<0.0044	<0.0045	<0.0044	<0.0046	<0.0045	<0.0046	<0.0044	<0.0045	<0.0048	<0.0048	<0.0049	<0.0046
Perfluorotetradecanoic acid (PFTeDA)	NCL	NA	<0.0046	<0.0046	<0.0045	<0.0045	<0.0044	<0.0045	<0.0044	<0.0046	<0.0045	<0.0046	<0.0044	<0.0045	<0.0048	<0.0048	<0.0049	<0.0046
Perfluorotridecanoic acid (PFTrDA)	NCL	NA	<0.0046	<0.0046	<0.0045	<0.0045	<0.0044	<0.0045	<0.0044	<0.0046	<0.0045	<0.0046	<0.0044	<0.0045	<0.0048	<0.0048	<0.0049	<0.0046
Perfluoroundecanoic acid (PFUnDA)	NCL	NA	<0.0046	<0.0046	<0.0045	<0.0045	<0.0044	<0.0045	<0.0044	<0.0046	<0.0045	<0.0046	<0.0044	<0.0045	<0.0048	<0.0048	<0.0049	<0.0046
Perfluorohexadecanoic acid (PFHxDA)	NCL	NA	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total PFAS (Calculated)	NCL	NA	ND	ND	ND	ND	0.013	ND	0.028	0.034	0.025	0.027	0.042	ND	ND	0.0035	ND	ND

TABLE 2
SUMMARY OF DRINKING WATER SAMPLE ANALYSIS - PFAS
Area R-1 (19)
Wolven/Jewell Area, Kent County, MI

Area	Part 201 Generic Residential Groundwater Cleanup Criteria – Drinking Water[2]	Proposed MCL[3]	Area R-1 (19)	Area R-1 (19)	Area R-1 (19)	Area R-1 (19)	Area R-1 (19)	Area R-1 (19)	Area R-1 (19)	Area R-1 (19)	Area R-1 (19)	Area R-1 (19)	Area R-1 (19)	Area R-1 (19)	Area R-1 (19)	Area R-1 (19)	Area R-1 (19)
PPN			410626200024	410626200030	410625100074	410625100032	410625100031	410625301007	410625301010	410625301004	410625301002	410625301001	410626200009	410626200012	410625301040	410625301028	410625301023	410625301022
Address			9798 DEER TRL NE	9799 DEER TRL NE	9605 SUMMIT AVE NE	9737 SUMMIT AVE NE	9881 SUMMIT AVE NE	4090 TRADEWIND DR NE	4164 TRADEWIND DR NE	4175 TRADEWIND DR NE	4189 TRADEWIND DR NE	4195 TRADEWIND DR NE	3640 VERSCHEL DR NE	3800 VERSCHEL DR NE	3823 WHIRLWIND DR NE	3966 WHIRLWIND DR NE	4050 WHIRLWIND DR NE	4064 WHIRLWIND DR NE
Sample Name			9798 Deer Trl NE	9799 Deer Trl NE	9605 Summit Ave NE	9737 Summit Ave NE	9881 Summit Ave NE	4090 Tradewind Dr NE	4164 Tradewind Dr NE	4175 Tradewind Dr NE	4189 Tradewind Dr NE	4195 Tradewind Dr NE	3640 Verschel Dr NE	3800 Verschel Dr NE	3823 Whirlwind Dr NE	3966 Whirlwind Dr NE	4050 Whirlwind Dr NE	4064 Whirlwind 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			K1801319-013	K1801319-012	K1801319-008	K1801319-009	K1801319-010	K1801319-006	K1801319-007	K1801319-004	K1801317-003	K1801319-003	K1801317-006	K1801317-004	K1801319-001	K1801319-002	K1801317-001	K1801317-002
Sample Date			02/08/2018	02/08/2018	02/08/2018	02/08/2018	02/08/2018	02/08/2018	02/08/2018	02/08/2018	02/08/2018	02/08/2018	02/08/2018	02/08/2018	02/08/2018	02/08/2018	02/08/2018	02/08/2018
Parameter (µg/L)																		
8:2 Fluorotelomer sulfonic acid (8:2 FTS)	NCL	NA	<0.0048	<0.0046	<0.0047	<0.0047	<0.0046	<0.0047	<0.0048	<0.0049	<0.0048	<0.005	<0.0049	<0.005	<0.0047	<0.0048	<0.0048	<0.0049
6:2 Fluorotelomer sulfonic acid (6:2 FTS)	NCL	NA	<0.0048	<0.0046	<0.0047	<0.0047	<0.0046	<0.0047	<0.0048	<0.0049	<0.0048	<0.005	<0.0049	<0.005	<0.0047	<0.0048	<0.0048	<0.0049
N-Ethyl perfluorooctane sulfonamide (EtFOSA)	NCL	NA	<0.0048	<0.0046	<0.0047	<0.0047	<0.0046	<0.0047	<0.0048	<0.0049	<0.0048	<0.005	<0.0049	<0.005	<0.0047	<0.0048	<0.0048	<0.0049
N-ethylperfluoro-1-octanesulfonamidoacetic acid (EtFOSAA)	NCL	NA	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
N-Ethyl perfluorooctane sulfonamidoethanol (N-EtFOSE)	NCL	NA	<0.0048	<0.0046	<0.0047	<0.0047	<0.0046	<0.0047	<0.0048	<0.0049	<0.0048	<0.005	<0.0049	<0.005	<0.0047	<0.0048	<0.0048	<0.0049
N-Methyl perfluorooctane sulfonamide (MeFOSA)	NCL	NA	<0.0048	<0.0046	<0.0047	<0.0047	<0.0046	<0.0047	<0.0048	<0.0049	<0.0048	<0.005	<0.0049	<0.005	<0.0047	<0.0048	<0.0048	<0.0049
N-methylperfluoro-1-octanesulfonamidoacetic acid (MeFOSAA)	NCL	NA	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
N-Methyl perfluorooctane sulfonamidoethanol (N-MeFOSE)	NCL	NA	<0.0048	<0.0046	<0.0047	<0.0047	<0.0046	<0.0047	<0.0048	<0.0049	<0.0048	<0.005	<0.0049	<0.005	<0.0047	<0.0048	<0.0048	<0.0049
Perfluorobutane sulfonic acid (PFBS)	NCL	0.42	0.025	<0.0046	0.042	0.025	0.019	<0.0047	<0.0048	<0.0049	0.014	0.015	0.0081	<0.005	0.029	<0.0048	0.007	0.01
Perfluorodecane sulfonic acid (PFDS)	NCL	NA	<0.0048	<0.0046	<0.0047	<0.0047	<0.0046	<0.0047	<0.0048	<0.0049	<0.0048	<0.005	<0.0049	<0.005	<0.0047	<0.0048	<0.0048	<0.0049
Perfluorooctadecanoic acid (PFODA)	NCL	NA	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Perfluoroheptane sulfonic acid (PFHpS)	NCL	NA	<0.0048	<0.0046	<0.0047	<0.0047	<0.0046	<0.0047	<0.0048	<0.0049	<0.0048	0.0097	<0.0049	<0.005	<0.0047	<0.0048	<0.0048	<0.0049
Perfluorooctane sulfonamide (FOSA)	NCL	NA	<0.0048	<0.0046	<0.0047	<0.0047	<0.0046	<0.0047	<0.0048	<0.0049	<0.0048	<0.005	<0.0049	<0.005	<0.0047	<0.0048	<0.0048	<0.0049
Perfluorohexane sulfonic acid (PFHxS)	NCL	0.051	0.028	<0.0046	0.0093	0.019	0.0068	<0.0047	<0.0048	<0.0049	0.0088	0.0098	0.0054	<0.005	0.041	<0.0048	<0.0048	<0.0049
Perfluorobutanoic acid (PFBA)	NCL	NA	<0.0096	<0.0093	<0.0094	<0.0094	<0.0093	<0.0094	<0.0096	<0.0098	<0.0096	<0.01	<0.0098	<0.01	0.0097	<0.0096	<0.0096	<0.0098
Perfluorodecanoic acid (PFDA)	NCL	NA	<0.0048	<0.0046	<0.0047	<0.0047	<0.0046	<0.0047	<0.0048	<0.0049	<0.0048	<0.005	<0.0049	<0.005	<0.0047	<0.0048	<0.0048	<0.0049
Perfluorododecanoic acid (PFDoDA)	NCL	NA	<0.0048	<0.0046	<0.0047	<0.0047	<0.0046	<0.0047	<0.0048	<0.0049	<0.0048	<0.005	<0.0049	<0.005	<0.0047	<0.0048	<0.0048	<0.0049
Perfluoroheptanoic acid (PFHpA)	NCL	NA	0.044	<0.0046	<0.0047	<0.0047	<0.0046	<0.0047	<0.0048	<0.0049	<0.0048	0.0059	<0.0049	<0.005	0.056	<0.0048	<0.0048	<0.0049
Perfluorohexanoic acid (PFHxA)	NCL	400	0.023	<0.0046	0.0049	<0.0047	<0.0046	<0.0047	<0.0048	<0.0049	<0.0048	<0.005	<0.0049	<0.005	0.024	<0.0048	<0.0048	<0.0049
Perfluorononanoic acid (PFNA)	NCL	0.006	<0.0048	<0.0046	<0.0047	<0.0047	<0.0046	<0.0047	<0.0048	<0.0049	<0.0048	<0.005	<0.0049	<0.005	<0.0047	<0.0048	<0.0048	<0.0049
Perfluorooctanoic acid (PFOA)	0.07 (JJ)	0.008	0.059	<0.0019	0.021	0.015	<0.0019	<0.0019	<0.0019	<0.002	0.022	0.033	0.0038	<0.002	***0.083***	<0.0019	<0.0019	<0.002
Perfluorooctane sulfonic acid (PFOS)	0.07 (JJ)	0.016	<0.0048	<0.0046	0.027	0.0064	<0.0046	<0.0047	<0.0048	<0.0049	0.024	0.018	<0.0049	<0.005	<0.0047	<0.0048	<0.0048	<0.0049
PFOA + PFOS (Calculated)	0.07	NA	0.059	ND	0.048	0.021	ND	ND	ND	ND	0.046	0.051	0.0038	ND	***0.083***	ND	ND	ND
Perfluoropentanoic acid (PFPeA)	NCL	NA	0.012	<0.0046	<0.0047	<0.0047	<0.0046	<0.0047	<0.0048	<0.0049	<0.0048	<0.005	<0.0049	<0.005	0.013	<0.0048	<0.0048	<0.0049
Perfluorotetradecanoic acid (PFTeDA)	NCL	NA	<0.0048	<0.0046	<0.0047	<0.0047	<0.0046	<0.0047	<0.0048	<0.0049	<0.0048	<0.005	<0.0049	<0.005	<0.0047	<0.0048	<0.0048	<0.0049
Perfluorotridecanoic acid (PFTrDA)	NCL	NA	<0.0048	<0.0046	<0.0047	<0.0047	<0.0046	<0.0047	<0.0048	<0.0049	<0.0048	<0.005	<0.0049	<0.005	<0.0047	<0.0048	<0.0048	<0.0049
Perfluoroundecanoic acid (PFUnDA)	NCL	NA	<0.0048	<0.0046	<0.0047	<0.0047	<0.0046	<0.0047	<0.0048	<0.0049	<0.0048	<0.005	<0.0049	<0.005	<0.0047	<0.0048	<0.0048	<0.0049
Perfluorohexadecanoic acid (PFHxDA)	NCL	NA	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total PFAS (Calculated)	NCL	NA	0.19	ND	0.1	0.065	0.026	ND	ND	ND	0.069	0.091	0.017	ND	0.26	ND	0.007	0.01

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Area R-1 (19)
Wolven/Jewell Area, Kent County, MI

Area	Part 201 Generic Residential Groundwater Cleanup Criteria – Drinking Water[2]	Proposed MCL[3]	Area R-1 (19)	Area R-1 (19)	Area R-1 (19)	Area R-1 (19)	Area R-1 (19)	Area R-1 (19)	Area R-1 (19)	Area R-1 (19)	Area R-1 (19)	Area R-1 (19)	Area R-1 (19)	Area R-1 (19)	Area R-1 (19)	Area R-1 (19)	Area R-1 (19)
PPN			410625301017	410626100043	410626100048	410626100034	410625100053	410625100049	410625100050	410625351001	410625315001	410625301008	410625301006	410625301009	410625301014	410626200011	410625301036	410625301045
Address			4140 WHIRLWIND DR NE	9680 WOLVEN AVE NE	9715 WOLVEN AVE NE	9766 WOLVEN AVE NE	4100 WRENS WAY CT NE	4101 WRENS WAY CT NE	4117 WRENS WAY CT NE	9391 SUMMIT AVE NE	9555 SUMMIT AVE NE	4144 TRADEWIND DR NE	4155 TRADEWIND DR NE	4158 TRADEWIND DR NE	4184 TRADEWIND DR NE	3725 VERSCHEL DR NE	3862 WHIRLWIND DR NE	3913 WHIRLWIND DR NE
Sample Name			4140 Whirlwind Dr NE	9680 Wolven Ave NE	9715 Wolven Ave NE	9766 Wolven Ave NE	4100 Wrens Way Ct NE	4101 Wrens Way Ct NE	4117 Wrens Way Ct NE	9391 Summit Ave NE	9555 Summit Ave NE	4144 Tradewind Dr NE	4155 Tradewind Dr NE	4158 Tradewind Dr NE	4184 Tradewind	3725 Verschel Dr NE	3862 Whirlwinn Dr NE	3913 Whirlwinn 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			K1801317-013	K1801317-009	K1801317-008	K1801317-007	K1801317-012	K1801317-010	K1801317-011	K1801316-003	K1801316-004	K1801316-008	K1801316-009	K1801316-007	K1801316-006	K1801316-010	K1801316-001	K1801316-002
Sample Date			02/08/2018	02/08/2018	02/08/2018	02/08/2018	02/08/2018	02/08/2018	02/08/2018	02/09/2018	02/09/2018	02/09/2018	02/09/2018	02/09/2018	02/09/2018	02/09/2018	02/09/2018	02/09/2018
Parameter (µg/L)																		
8:2 Fluorotelomer sulfonic acid (8:2 FTS)	NCL	NA	<0.005	<0.0048	<0.0047	<0.005	<0.0049	<0.0048	<0.0048	<0.0048	<0.0048	<0.0048	<0.005	<0.0048	<0.0048	<0.0046	<0.0049	<0.0048
6:2 Fluorotelomer sulfonic acid (6:2 FTS)	NCL	NA	<0.005	<0.0048	<0.0047	<0.005	<0.0049	<0.0048	<0.0048	<0.0048	<0.0048	<0.0048	<0.005	<0.0048	<0.0048	<0.0046	<0.0049	<0.0048
N-Ethyl perfluorooctane sulfonamide (EtFOSA)	NCL	NA	<0.005	<0.0048	<0.0047	<0.005	<0.0049	<0.0048	<0.0048	<0.0048	<0.0048	<0.0048	<0.005	<0.0048	<0.0048	<0.0046	<0.0049	<0.0048
N-ethylperfluoro-1-octanesulfonamidoacetic acid (EtFOSAA)	NCL	NA	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
N-Ethyl perfluorooctane sulfonamidoethanol (N-EtFOSE)	NCL	NA	<0.005	<0.0048	<0.0047	<0.005	<0.0049	<0.0048	<0.0048	<0.0048	<0.0048	<0.0048	<0.005	<0.0048	<0.0048	<0.0046	<0.0049	<0.0048
N-Methyl perfluorooctane sulfonamide (MeFOSA)	NCL	NA	<0.005	<0.0048	<0.0047	<0.005	<0.0049	<0.0048	<0.0048	<0.0048	<0.0048	<0.0048	<0.005	<0.0048	<0.0048	<0.0046	<0.0049	<0.0048
N-methylperfluoro-1-octanesulfonamidoacetic acid (MeFOSAA)	NCL	NA	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
N-Methyl perfluorooctane sulfonamidoethanol (N-MeFOSE)	NCL	NA	<0.005	<0.0048	<0.0047	<0.005	<0.0049	<0.0048	<0.0048	<0.0048	<0.0048	<0.0048	<0.005	<0.0048	<0.0048	<0.0046	<0.0049	<0.0048
Perfluorobutane sulfonic acid (PFBS)	NCL	0.42	0.02	0.0059	<0.0047	0.0077	<0.0049	<0.0048	<0.0048	0.029	0.013	<0.0048	<0.005	<0.0048	0.01	<0.0046	<0.0049	<0.0048
Perfluorodecane sulfonic acid (PFDS)	NCL	NA	<0.005	<0.0048	<0.0047	<0.005	<0.0049	<0.0048	<0.0048	<0.0048	<0.0048	<0.0048	<0.005	<0.0048	<0.0048	<0.0046	<0.0049	<0.0048
Perfluorooctadecanoic acid (PFODA)	NCL	NA	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Perfluoroheptane sulfonic acid (PFHpS)	NCL	NA	<0.005	<0.0048	<0.0047	<0.005	<0.0049	<0.0048	<0.0048	0.0054	<0.0048	<0.0048	<0.005	<0.0048	<0.0048	<0.0046	<0.0049	<0.0048
Perfluorooctane sulfonamide (FOSA)	NCL	NA	<0.005	<0.0048	<0.0047	<0.005	<0.0049	<0.0048	<0.0048	<0.0048	<0.0048	<0.0048	<0.005	<0.0048	<0.0048	<0.0046	<0.0049	<0.0048
Perfluorohexane sulfonic acid (PFHxS)	NCL	0.051	0.0084	<0.0048	<0.0047	<0.005	<0.0049	<0.0048	<0.0048	0.02	0.0054	<0.0048	<0.005	<0.0048	0.0082	<0.0046	<0.0049	<0.0048
Perfluorobutanoic acid (PFBA)	NCL	NA	<0.01	<0.0096	<0.0094	<0.01	<0.0098	<0.0096	<0.0096	<0.0096	<0.0096	<0.0096	<0.01	<0.0096	<0.0096	<0.0093	<0.0098	<0.0096
Perfluorodecanoic acid (PFDA)	NCL	NA	<0.005	<0.0048	<0.0047	<0.005	<0.0049	<0.0048	<0.0048	<0.0048	<0.0048	<0.0048	<0.005	<0.0048	<0.0048	<0.0046	<0.0049	<0.0048
Perfluorododecanoic acid (PFDoDA)	NCL	NA	<0.005	<0.0048	<0.0047	<0.005	<0.0049	<0.0048	<0.0048	<0.0048	<0.0048	<0.0048	<0.005	<0.0048	<0.0048	<0.0046	<0.0049	<0.0048
Perfluoroheptanoic acid (PFHpA)	NCL	NA	<0.005	<0.0048	<0.0047	<0.005	<0.0049	0.0052	<0.0048	0.0074	<0.0048	<0.0048	<0.005	<0.0048	<0.0048	<0.0046	<0.0049	<0.0048
Perfluorohexanoic acid (PFHxA)	NCL	400	<0.005	<0.0048	<0.0047	<0.005	<0.0049	0.0053	<0.0048	0.0074	<0.0048	<0.0048	<0.005	<0.0048	<0.0048	<0.0046	<0.0049	<0.0048
Perfluorononanoic acid (PFNA)	NCL	0.006	<0.005	<0.0048	<0.0047	<0.005	<0.0049	<0.0048	<0.0048	<0.0048	<0.0048	<0.0048	<0.005	<0.0048	<0.0048	<0.0046	<0.0049	<0.0048
Perfluorooctanoic acid (PFOA)	0.07 (JJ)	0.008	<0.002	<0.0019	<0.0019	<0.002	<0.002	<0.0019	<0.0019	0.035	0.0056	<0.0019	<0.002	<0.0019	0.0042	<0.0019	<0.002	<0.0019
Perfluorooctane sulfonic acid (PFOS)	0.07 (JJ)	0.016	<0.005	<0.0048	<0.0047	<0.005	<0.0049	<0.0048	<0.0048	0.021	<0.0048	<0.0048	<0.005	<0.0048	<0.0048	<0.0046	<0.0049	<0.0048
PFOA + PFOS (Calculated)	0.07	NA	ND	ND	ND	ND	ND	ND	ND	0.056	0.0056	ND	ND	ND	0.0042	ND	ND	ND
Perfluoropentanoic acid (PFPeA)	NCL	NA	<0.005	<0.0048	<0.0047	<0.005	<0.0049	<0.0048	<0.0048	<0.0048	<0.0048	<0.0048	<0.005	<0.0048	<0.0048	<0.0046	<0.0049	<0.0048
Perfluorotetradecanoic acid (PFTeDA)	NCL	NA	<0.005	<0.0048	<0.0047	<0.005	<0.0049	<0.0048	<0.0048	<0.0048	<0.0048	<0.0048	<0.005	<0.0048	<0.0048	<0.0046	<0.0049	<0.0048
Perfluorotridecanoic acid (PFTrDA)	NCL	NA	<0.005	<0.0048	<0.0047	<0.005	<0.0049	<0.0048	<0.0048	<0.0048	<0.0048	<0.0048	<0.005	<0.0048	<0.0048	<0.0046	<0.0049	<0.0048
Perfluoroundecanoic acid (PFUnDA)	NCL	NA	<0.005	<0.0048	<0.0047	<0.005	<0.0049	<0.0048	<0.0048	<0.0048	<0.0048	<0.0048	<0.005	<0.0048	<0.0048	<0.0046	<0.0049	<0.0048
Perfluorohexadecanoic acid (PFHxDA)	NCL	NA	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total PFAS (Calculated)	NCL	NA	0.028	0.0059	ND	0.0077	ND	0.011	ND	0.13	0.024	ND	ND	ND	0.022	ND	ND	ND

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PPN			410626300014	410626100058	410625100051	410625100052	410626100049	410626400005	410625351003	410625315002	410625100031	410625301012	410625301013	410625301035	410625301029	410625301026	410625301053	410625301055
Address			9524 WOLVEN AVE NE	9691 WOLVEN AVE NE	4133 WRENS WAY CT NE	4159 WRENS WAY CT NE	9754 WOLVEN AVE NE	3617 11 MILE RD NE	4145 11 MILE RD NE	9545 SUMMIT AVE NE	9881 SUMMIT AVE NE	4172 TRADEWIND DR NE	4176 TRADEWIND DR NE	3870 WHIRLWIND DR NE	3950 WHIRLWIND DR NE	3998 WHIRLWIND DR NE	4011 WHIRLWIND DR NE	4065 WHIRLWIND DR NE
Sample Name			9524 Wolven Ave NE	9691 Wolven Ave NE	4133 Wrens Way Ct NE	4159 Wrens Way Ct NE	9754 Wolven Ave NE	3617 11 Mile Rd NE	4145 11 Mile Rd NE	9545 Summit Dr Ne	9881 Summit Ave PB	4172 Tradewind Dr NE	4176 Tradewind Dr NE	3870 Whirlwind Dr NE	3950 Whirlwind Dr NE	3998 Whirlwind Dr NE	4011 Whirlwind Dr NE	4065 Whirlwind 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			K1801316-011	K1801316-014	K1801316-013	K1801316-012	K1801510-001	K1801596-012	K1801596-010	K1801596-009	K1801594-002	K1801596-011	K1801596-008	K1801596-003	K1801596-007	K1801596-001	K1801596-004	K1801596-005
Sample Date			02/09/2018	02/09/2018	02/09/2018	02/09/2018	02/12/2018	02/15/2018	02/15/2018	02/15/2018	02/15/2018	02/15/2018	02/15/2018	02/15/2018	02/15/2018	02/15/2018	02/15/2018	02/15/2018
Parameter (µg/L)																		
8:2 Fluorotelomer sulfonic acid (8:2 FTS)	NCL	NA	0.04	<0.0049	<0.0049	<0.0049	<0.0045	<0.0048	<0.0048	<0.0047	<0.0047	<0.0051	<0.0046	<0.0046	<0.0046	<0.0046	<0.0047	<0.0046
6:2 Fluorotelomer sulfonic acid (6:2 FTS)	NCL	NA	0.048	<0.0049	<0.0049	<0.0049	<0.0045	<0.0048	<0.0048	<0.0047	<0.0047	<0.0051	<0.0046	<0.0046	<0.0046	<0.0046	<0.0047	<0.0046
N-Ethyl perfluorooctane sulfonamide (EtFOSA)	NCL	NA	<0.0048	<0.0049	<0.0049	<0.0049	<0.0045	<0.0048	<0.0048	<0.0047	<0.0047	<0.0051	<0.0046	<0.0046	<0.0046	<0.0046	<0.0047	<0.0046
N-ethylperfluoro-1-octanesulfonamidoacetic acid (EtFOSAA)	NCL	NA	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
N-Ethyl perfluorooctane sulfonamidoethanol (N-EtFOSE)	NCL	NA	<0.0048	<0.0049	<0.0049	<0.0049	<0.0045	<0.0048	<0.0048	<0.0047	<0.0047	<0.0051	<0.0046	<0.0046	<0.0046	<0.0046	<0.0047	<0.0046
N-Methyl perfluorooctane sulfonamide (MeFOSA)	NCL	NA	<0.0048	<0.0049	<0.0049	<0.0049	<0.0045	<0.0048	<0.0048	<0.0047	<0.0047	<0.0051	<0.0046	<0.0046	<0.0046	<0.0046	<0.0047	<0.0046
N-methylperfluoro-1-octanesulfonamidoacetic acid (MeFOSAA)	NCL	NA	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
N-Methyl perfluorooctane sulfonamidoethanol (N-MeFOSE)	NCL	NA	<0.0048	<0.0049	<0.0049	<0.0049	<0.0045	<0.0048	<0.0048	<0.0047	<0.0047	<0.0051	<0.0046	<0.0046	<0.0046	<0.0046	<0.0047	<0.0046
Perfluorobutane sulfonic acid (PFBS)	NCL	0.42	<0.0048	<0.0049	0.021	0.011	<0.0045	<0.0048	0.026	0.012	0.026	0.0052	<0.0046	<0.0046	<0.0046	<0.0046	<0.0047	<0.0046
Perfluorodecane sulfonic acid (PFDS)	NCL	NA	<0.0048	<0.0049	<0.0049	<0.0049	<0.0045	<0.0048	<0.0048	<0.0047	<0.0047	<0.0051	<0.0046	<0.0046	<0.0046	<0.0046	<0.0047	<0.0046
Perfluorooctadecanoic acid (PFODA)	NCL	NA	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Perfluoroheptane sulfonic acid (PFHpS)	NCL	NA	<0.0048	<0.0049	<0.0049	<0.0049	<0.0045	<0.0048	<0.0048	<0.0047	<0.0047	<0.0051	<0.0046	<0.0046	<0.0046	<0.0046	<0.0047	<0.0046
Perfluorooctane sulfonamide (FOSA)	NCL	NA	<0.0048	<0.0049	<0.0049	<0.0049	<0.0045	<0.0048	<0.0048	<0.0047	<0.0047	<0.0051	<0.0046	<0.0046	<0.0046	<0.0046	<0.0047	<0.0046
Perfluorohexane sulfonic acid (PFHxS)	NCL	0.051	<0.0048	<0.0049	0.01	0.0067	<0.0045	<0.0048	0.013	0.0085	0.019	<0.0051	<0.0046	<0.0046	<0.0046	<0.0046	<0.0047	<0.0046
Perfluorobutanoic acid (PFBA)	NCL	NA	<0.0096	<0.0098	<0.0098	<0.0098	<0.0091	<0.0096	<0.0096	<0.0094	<0.0094	<0.01	<0.0093	<0.0093	<0.0093	<0.0093	<0.0094	<0.0093
Perfluorodecanoic acid (PFDA)	NCL	NA	<0.0048	<0.0049	<0.0049	<0.0049	<0.0045	<0.0048	<0.0048	<0.0047	<0.0047	<0.0051	<0.0046	<0.0046	<0.0046	<0.0046	<0.0047	<0.0046
Perfluorododecanoic acid (PFDoDA)	NCL	NA	<0.0048	<0.0049	<0.0049	<0.0049	<0.0045	<0.0048	<0.0048	<0.0047	<0.0047	<0.0051	<0.0046	<0.0046	<0.0046	<0.0046	<0.0047	<0.0046
Perfluoroheptanoic acid (PFHpA)	NCL	NA	<0.0048	<0.0049	<0.0049	<0.0049	<0.0045	<0.0048	0.0063	<0.0047	<0.0047	<0.0051	<0.0046	<0.0046	<0.0046	<0.0046	<0.0047	<0.0046
Perfluorohexanoic acid (PFHxA)	NCL	400	<0.0048	<0.0049	0.0082	<0.0049	<0.0045	<0.0048	0.0067	<0.0047	<0.0047	<0.0051	<0.0046	<0.0046	<0.0046	<0.0046	<0.0047	<0.0046
Perfluorononanoic acid (PFNA)	NCL	0.006	<0.0048	<0.0049	<0.0049	<0.0049	<0.0045	<0.0048	<0.0048	<0.0047	<0.0047	<0.0051	<0.0046	<0.0046	<0.0046	<0.0046	<0.0047	<0.0046
Perfluorooctanoic acid (PFOA)	0.07 (JJ)	0.008	0.0029	<0.002	0.021	0.0026	0.004	<0.0019	0.022	0.024	0.0082	0.0025	<0.0019	<0.0019	<0.0019	<0.0019	<0.0019	<0.0019
Perfluorooctane sulfonic acid (PFOS)	0.07 (JJ)	0.016	<0.0048	<0.0049	0.011	<0.0049	<0.0045	<0.0048	0.012	0.026	0.0058	<0.0051	<0.0046	<0.0046	<0.0046	<0.0046	<0.0047	<0.0046
PFOA + PFOS (Calculated)	0.07	NA	0.0029	ND	0.032	0.0026	0.004	ND	0.034	0.05	0.014	0.0025	ND	ND	ND	ND	ND	ND
Perfluoropentanoic acid (PFPeA)	NCL	NA	<0.0048	<0.0049	0.0063	<0.0049	<0.0045	<0.0048	<0.0048	<0.0047	<0.0047	<0.0051	<0.0046	<0.0046	<0.0046	<0.0046	<0.0047	<0.0046
Perfluorotetradecanoic acid (PFTeDA)	NCL	NA	0.0049	<0.0049	<0.0049	<0.0049	<0.0045	<0.0048	<0.0048	<0.0047	<0.0047	<0.0051	<0.0046	<0.0046	<0.0046	<0.0046	<0.0047	<0.0046
Perfluorotridecanoic acid (PFTrDA)	NCL	NA	<0.0048	<0.0049	<0.0049	<0.0049	<0.0045	<0.0048	<0.0048	<0.0047	<0.0047	<0.0051	<0.0046	<0.0046	<0.0046	<0.0046	<0.0047	<0.0046
Perfluoroundecanoic acid (PFUnDA)	NCL	NA	<0.0048	<0.0049	<0.0049	<0.0049	<0.0045	<0.0048	<0.0048	<0.0047	<0.0047	<0.0051	<0.0046	<0.0046	<0.0046	<0.0046	<0.0047	<0.0046
Perfluorohexadecanoic acid (PFHxDA)	NCL	NA	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total PFAS (Calculated)	NCL	NA	0.096	ND	0.078	0.02	0.004	ND	0.086	0.071	0.059	0.0077	ND	ND	ND	ND	ND	ND

TABLE 2
SUMMARY OF DRINKING WATER SAMPLE ANALYSIS - PFAS
Area R-1 (19)
Wolven/Jewell Area, Kent County, MI

Area	Part 201 Generic Residential Groundwater Cleanup Criteria – Drinking Water[2]	Proposed MCL[3]	Area R-1 (19)	Area R-1 (19)	Area R-1 (19)	Area R-1 (19)	Area R-1 (19)	Area R-1 (19)	Area R-1 (19)	Area R-1 (19)	Area R-1 (19)	Area R-1 (19)	Area R-1 (19)	Area R-1 (19)	Area R-1 (19)	Area R-1 (19)	Area R-1 (19)
PPN			410625301060	410626100029	410626300028	410626300015	410626300003	410626100016	410626100051	410625301049	410625301059	410626200036	410625301052	410626100014	410626200034	410625301011	410625301003	410625301034
Address			4139 WHIRLWIND DR NE	9789 WOLVEN AVE NE	9400 WOLVEN AVE NE	9550 WOLVEN AVE NE	9590 WOLVEN AVE NE	9620 WOLVEN AVE NE	9740 WOLVEN AVE NE	3975 WHIRLWIND DR NE	4125 WHIRLWIND DR NE	9859 DEER TRL NE	3991 WHIRLWIND DR NE	9612 WOLVEN AVE NE	9831 DEER TRL NE	4168 TRADEWIND DR NE	4183 TRADEWIND DR NE	3882 WHIRLWIND DR NE
Sample Name			4139 Whirlwind Dr NE	9789 Wolven Ave	9400 Wolven Ave	9550 Wolven Ave	9590 Wolven Ave	9620 Wolven Ave	9740 Wolven Ave	3975 Whirlwind Dr NE	4125 Whirlwind Dr NE	9859 Deer TRL NE	3991 Whirlwind Dr NE	9612 Wolven	9831 Deer TRL	4168 Tradewind	4183 Tradewind	3882 Whirlwind Dr
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			K1801596-006	K1801594-003	K1801595-004	K1801595-002	K1801595-006	K1801595-001	K1801595-005	K1801675-003	K1801675-001	K1801708-003	K1801708-004	K1801708-001	K1801777-004	K1801777-003	K1801777-001	K1801777-006
Sample Date			02/15/2018	02/15/2018	02/16/2018	02/16/2018	02/16/2018	02/16/2018	02/16/2018	02/19/2018	02/19/2018	02/21/2018	02/21/2018	02/21/2018	02/22/2018	02/22/2018	02/22/2018	02/22/2018
Parameter (µg/L)																		
8:2 Fluorotelomer sulfonic acid (8:2 FTS)	NCL	NA	<0.0048	<0.0047	<0.0049	<0.0051	<0.0046	<0.0049	<0.0046	<0.0046	<0.0046	<0.0045	<0.0046	<0.0045	<0.0051	<0.0045	<0.0045	<0.0046
6:2 Fluorotelomer sulfonic acid (6:2 FTS)	NCL	NA	<0.0048	<0.0047	<0.0049	<0.0051	<0.0046	<0.0049	<0.0046	<0.0046	<0.0046	<0.0045	<0.0046	<0.0045	<0.0051	<0.0045	<0.0045	<0.0046
N-Ethyl perfluorooctane sulfonamide (EtFOSA)	NCL	NA	<0.0048	<0.0047	<0.0049	<0.0051	<0.0046	<0.0049	<0.0046	<0.0046	<0.0046	<0.0045	<0.0046	<0.0045	<0.0051	<0.0045	<0.0045	<0.0046
N-ethylperfluoro-1-octanesulfonamidoacetic acid (EtFOSAA)	NCL	NA	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
N-Ethyl perfluorooctane sulfonamidoethanol (N-EtFOSE)	NCL	NA	<0.0048	<0.0047	<0.0049	<0.0051	<0.0046	<0.0049	<0.0046	<0.0046	<0.0046	<0.0045	<0.0046	<0.0045	<0.0051	<0.0045	<0.0045	<0.0046
N-Methyl perfluorooctane sulfonamide (MeFOSA)	NCL	NA	<0.0048	<0.0047	<0.0049	<0.0051	<0.0046	<0.0049	<0.0046	<0.0046	<0.0046	<0.0045	<0.0046	<0.0045	<0.0051	<0.0045	<0.0045	<0.0046
N-methylperfluoro-1-octanesulfonamidoacetic acid (MeFOSAA)	NCL	NA	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
N-Methyl perfluorooctane sulfonamidoethanol (N-MeFOSE)	NCL	NA	<0.0048	<0.0047	<0.0049	<0.0051	<0.0046	<0.0049	<0.0046	<0.0046	<0.0046	<0.0045	<0.0046	<0.0045	<0.0051	<0.0045	<0.0045	<0.0046
Perfluorobutane sulfonic acid (PFBS)	NCL	0.42	0.018	<0.0047	<0.0049	<0.0051	<0.0046	<0.0049	<0.0046	<0.0046	0.0085	<0.0045	<0.0046	0.0059	<0.0051	0.02	0.0067	<0.0046
Perfluorodecane sulfonic acid (PFDS)	NCL	NA	<0.0048	<0.0047	<0.0049	<0.0051	<0.0046	<0.0049	<0.0046	<0.0046	<0.0046	<0.0045	<0.0046	<0.0045	<0.0051	<0.0045	<0.0045	<0.0046
Perfluorooctadecanoic acid (PFODA)	NCL	NA	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Perfluoroheptane sulfonic acid (PFHpS)	NCL	NA	<0.0048	<0.0047	<0.0049	<0.0051	<0.0046	<0.0049	<0.0046	<0.0046	<0.0046	<0.0045	<0.0046	<0.0045	<0.0051	<0.0045	<0.0045	<0.0046
Perfluorooctane sulfonamide (FOSA)	NCL	NA	<0.0048	<0.0047	<0.0049	<0.0051	<0.0046	<0.0049	<0.0046	<0.0046	<0.0046	<0.0045	<0.0046	<0.0045	<0.0051	<0.0045	<0.0045	<0.0046
Perfluorohexane sulfonic acid (PFHxS)	NCL	0.051	0.0067	<0.0047	<0.0049	<0.0051	<0.0046	<0.0049	<0.0046	<0.0046	0.0051	<0.0045	<0.0046	<0.0045	<0.0051	0.012	<0.0045	<0.0046
Perfluorobutanoic acid (PFBA)	NCL	NA	<0.0096	<0.0094	<0.0098	<0.01	<0.0093	<0.0098	<0.0093	<0.0093	<0.0093	<0.0091	<0.0093	<0.0091	<0.01	<0.0091	<0.0091	<0.0093
Perfluorodecanoic acid (PFDA)	NCL	NA	<0.0048	<0.0047	<0.0049	<0.0051	<0.0046	<0.0049	<0.0046	<0.0046	<0.0046	<0.0045	<0.0046	<0.0045	<0.0051	<0.0045	<0.0045	<0.0046
Perfluorododecanoic acid (PFDoDA)	NCL	NA	<0.0048	<0.0047	<0.0049	<0.0051	<0.0046	<0.0049	<0.0046	<0.0046	<0.0046	<0.0045	<0.0046	<0.0045	<0.0051	<0.0045	<0.0045	<0.0046
Perfluoroheptanoic acid (PFHpA)	NCL	NA	<0.0048	<0.0047	<0.0049	<0.0051	<0.0046	<0.0049	<0.0046	<0.0046	<0.0046	<0.0045	<0.0046	<0.0045	<0.0051	<0.0045	<0.0045	<0.0046
Perfluorohexanoic acid (PFHxA)	NCL	400	<0.0048	<0.0047	<0.0049	<0.0051	<0.0046	<0.0049	<0.0046	<0.0046	<0.0046	<0.0045	<0.0046	<0.0045	<0.0051	0.005	<0.0045	<0.0046
Perfluorononanoic acid (PFNA)	NCL	0.006	<0.0048	<0.0047	<0.0049	<0.0051	<0.0046	<0.0049	<0.0046	<0.0046	<0.0046	<0.0045	<0.0046	<0.0045	<0.0051	<0.0045	<0.0045	<0.0046
Perfluorooctanoic acid (PFOA)	0.07 (JJ)	0.008	0.0036	<0.0019	<0.002	<0.002	<0.0019	<0.002	<0.0019	<0.0019	<0.0019	<0.0018	<0.0019	<0.0018	<0.002	0.012	<0.0018	<0.0019
Perfluorooctane sulfonic acid (PFOS)	0.07 (JJ)	0.016	<0.0048	<0.0047	<0.0049	<0.0051	<0.0046	<0.0049	<0.0046	<0.0046	<0.0046	<0.0045	<0.0046	<0.0045	<0.0051	<0.0045	<0.0045	<0.0046
PFOA + PFOS (Calculated)	0.07	NA	0.0036	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.012	ND	ND
Perfluoropentanoic acid (PFPeA)	NCL	NA	<0.0048	<0.0047	<0.0049	<0.0051	<0.0046	<0.0049	<0.0046	<0.0046	<0.0046	<0.0045	<0.0046	<0.0045	<0.0051	<0.0045	<0.0045	<0.0046
Perfluorotetradecanoic acid (PFTeDA)	NCL	NA	<0.0048	<0.0047	<0.0049	<0.0051	<0.0046	<0.0049	<0.0046	<0.0046	<0.0046	<0.0045	<0.0046	<0.0045	<0.0051	<0.0045	<0.0045	<0.0046
Perfluorotridecanoic acid (PFTrDA)	NCL	NA	<0.0048	<0.0047	<0.0049	<0.0051	<0.0046	<0.0049	<0.0046	<0.0046	<0.0046	<0.0045	<0.0046	<0.0045	<0.0051	<0.0045	<0.0045	<0.0046
Perfluoroundecanoic acid (PFUnDA)	NCL	NA	<0.0048	<0.0047	<0.0049	<0.0051	<0.0046	<0.0049	<0.0046	<0.0046	<0.0046	<0.0045	<0.0046	<0.0045	<0.0051	<0.0045	<0.0045	<0.0046
Perfluorohexadecanoic acid (PFHxDA)	NCL	NA	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total PFAS (Calculated)	NCL	NA	0.028	ND	ND	ND	ND	ND	ND	ND	0.014	ND	ND	0.0059	ND	0.049	0.0067	ND

TABLE 2
SUMMARY OF DRINKING WATER SAMPLE ANALYSIS - PFAS
Area R-1 (19)
Wolven/Jewell Area, Kent County, MI

Area	Part 201 Generic Residential Groundwater Cleanup Criteria – Drinking Water[2]	Proposed MCL[3]	Area R-1 (19)	Area R-1 (19)	Area R-1 (19)	Area R-1 (19)	Area R-1 (19)	Area R-1 (19)	Area R-1 (19)	Area R-1 (19)	Area R-1 (19)	Area R-1 (19)	Area R-1 (19)	Area R-1 (19)	Area R-1 (19)	Area R-1 (19)	Area R-1 (19)
PPN			410625301016	410625351002	410626200035	410625301057	410625301005	410636101011	410636101013	410635226001	410636101007	410636101014	410636101002	410625301039	410635227001	410625301044	410636101010	410635227003
Address			4154 WHIRLWIND DR NE	4099 11 MILE RD NE	9820 DEER TRL NE	4095 WHIRLWIND DR NE	4167 TRADEWIND DR NE	4080 11 MILE RD NE	9105 SUMMIT AVE NE	3820 11 MILE RD NE	4170 11 MILE RD NE	9111 SUMMIT AVE NE	9185 SUMMIT AVE NE	3826 WHIRLWIND DR NE	3900 11 MILE RD NE	3909 WHIRLWIND DR NE	4010 11 MILE RD NE	3990 11 MILE RD NE
Sample Name			4154 Whirlwind Dr	4099 11 Mile Rd	9820 Deer Trail-3/6	4095 Whirlwind Dr-3/6	4167 Tradewind	4080 11 Mile	9105 Summit	3820 11 Mile	4170 11 Mile	9111 Summit	9185 Summit	3826 Whirlwind-IN-3/30 Grab Potable Water	3900 11 Mile	3909 Whirlwind Dr	4010 11 Mile Rd	3990 11 Mile
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	Drinking Water	Drinking Water	Drinking Water	Drinking Water
Laboratory ID			K1801777-007	K1801906-001	K1802092-003	K1802092-001	K1802386-001	K1802892-001	K1802892-003	K1802955-005	K1802959-002	K1802959-004	K1802959-003	9536044	K1803217-002	K1803377-001	K1803487-002	K1803486-001
Sample Date			02/22/2018	02/27/2018	03/06/2018	03/06/2018	03/12/2018	03/28/2018	03/28/2018	03/29/2018	03/29/2018	03/29/2018	03/29/2018	03/30/2018	04/02/2018	04/09/2018	04/12/2018	04/13/2018
Parameter (µg/L)																		
8:2 Fluorotelomer sulfonic acid (8:2 FTS)	NCL	NA	<0.0045	<0.0045	<0.0048	<0.0048	<0.0047	<0.0047	<0.0051	<0.0051	<0.0047	<0.0047	<0.005	<0.0055	<0.0047	<0.0047	<0.0046	<0.0049
6:2 Fluorotelomer sulfonic acid (6:2 FTS)	NCL	NA	<0.0045	<0.0045	<0.0048	<0.0048	<0.0047	<0.0047	<0.0051	<0.0051	<0.0047	<0.0047	<0.005	<0.0083	<0.0047	<0.0047	<0.0046	<0.0049
N-Ethyl perfluorooctane sulfonamide (EtFOSA)	NCL	NA	<0.0045	<0.0045	<0.0048	<0.0048	<0.0047	<0.0047	<0.0051	<0.0051	<0.0047	<0.0047	<0.005	<0.0083	<0.0047	<0.0047	<0.0046	<0.0049
N-ethylperfluoro-1-octanesulfonamidoacetic acid (EtFOSAA)	NCL	NA	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
N-Ethyl perfluorooctane sulfonamidoethanol (N-EtFOSE)	NCL	NA	<0.0045	<0.0045	<0.0048	<0.0048	<0.0047	<0.0047	<0.0051	<0.0051	<0.0047	<0.0047	<0.005	<0.0028	<0.0047	<0.0047	<0.0046	<0.0049
N-Methyl perfluorooctane sulfonamide (MeFOSA)	NCL	NA	<0.0045	<0.0045	<0.0048	<0.0048	<0.0047	<0.0047	<0.0051	<0.0051	<0.0047	<0.0047	<0.005	<0.0083	<0.0047	<0.0047	<0.0046	<0.0049
N-methylperfluoro-1-octanesulfonamidoacetic acid (MeFOSAA)	NCL	NA	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
N-Methyl perfluorooctane sulfonamidoethanol (N-MeFOSE)	NCL	NA	<0.0045	<0.0045	<0.0048	<0.0048	<0.0047	<0.0047	<0.0051	<0.0051	<0.0047	<0.0047	<0.005	<0.0028	<0.0047	<0.0047	<0.0046	<0.0049
Perfluorobutane sulfonic acid (PFBS)	NCL	0.42	0.033	0.028	<0.0048	<0.0048	<0.0047	0.021	0.012	<0.0051	0.021	<0.0047	<0.005	0.023	<0.0047	<0.0047	0.04	0.022
Perfluorodecane sulfonic acid (PFDS)	NCL	NA	<0.0045	<0.0045	<0.0048	<0.0048	<0.0047	<0.0047	<0.0051	<0.0051	<0.0047	<0.0047	<0.005	<0.0018	<0.0047	<0.0047	<0.0046	<0.0049
Perfluorooctadecanoic acid (PFODA)	NCL	NA	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Perfluoroheptane sulfonic acid (PFHpS)	NCL	NA	<0.0045	<0.0045	<0.0048	<0.0048	<0.0047	<0.0047	<0.0051	<0.0051	<0.0047	<0.0047	<0.005	<0.0018	<0.0047	<0.0047	<0.0046	<0.0049
Perfluorooctane sulfonamide (FOSA)	NCL	NA	<0.0045	<0.0045	<0.0048	<0.0048	<0.0047	<0.0047	<0.0051	<0.0051	<0.0047	<0.0047	<0.005	<0.0028	<0.0047	<0.0047	<0.0046	<0.0049
Perfluorohexane sulfonic acid (PFHxS)	NCL	0.051	0.011	0.024	<0.0048	<0.0048	<0.0047	0.016	0.015	<0.0051	0.017	<0.0047	<0.005	0.022	<0.0047	<0.0047	0.011	<0.0049
Perfluorobutanoic acid (PFBA)	NCL	NA	<0.0091	<0.0091	<0.0096	<0.0096	<0.0094	<0.0094	<0.01	<0.01	<0.0094	<0.0094	<0.01	0.0077	<0.0094	<0.0094	<0.0093	<0.0098
Perfluorodecanoic acid (PFDA)	NCL	NA	<0.0045	<0.0045	<0.0048	<0.0048	<0.0047	<0.0047	<0.0051	<0.0051	<0.0047	<0.0047	<0.005	<0.0018	<0.0047	<0.0047	<0.0046	<0.0049
Perfluorododecanoic acid (PFDoDA)	NCL	NA	<0.0045	<0.0045	<0.0048	<0.0048	<0.0047	<0.0047	<0.0051	<0.0051	<0.0047	<0.0047	<0.005	<0.00092	<0.0047	<0.0047	<0.0046	<0.0049
Perfluoroheptanoic acid (PFHpA)	NCL	NA	<0.0045	<0.0045	<0.0048	<0.0048	<0.0047	0.0097	0.0084	<0.0051	0.0062	<0.0047	<0.005	0.03	<0.0047	<0.0047	<0.0046	<0.0049
Perfluorohexanoic acid (PFHxA)	NCL	400	<0.0045	<0.0045	<0.0048	<0.0048	<0.0047	0.014	0.0084	<0.0051	0.0054	<0.0047	<0.005	0.019	<0.0047	<0.0047	0.0055	<0.0049
Perfluorononanoic acid (PFNA)	NCL	0.006	<0.0045	<0.0045	<0.0048	<0.0048	<0.0047	<0.0047	<0.0051	<0.0051	<0.0047	<0.0047	<0.005	<0.0018	<0.0047	<0.0047	<0.0046	<0.0049
Perfluorooctanoic acid (PFOA)	0.07 (JJ)	0.008	0.004	0.0055	<0.0019	<0.0019	<0.0019	0.045	0.037	<0.002	0.034	<0.0019	<0.002	0.065	<0.0019	<0.0019	0.0069	<0.002
Perfluorooctane sulfonic acid (PFOS)	0.07 (JJ)	0.016	<0.0045	<0.0045	<0.0048	<0.0048	<0.0047	0.015	0.018	<0.0051	0.019	<0.0047	<0.005	0.0022	<0.0047	<0.0047	<0.0046	<0.0049
PFOA + PFOS (Calculated)	0.07	NA	0.004	0.0055	ND	ND	ND	0.06	0.055	ND	0.053	ND	ND	0.067	ND	ND	0.0069	ND
Perfluoropentanoic acid (PFPeA)	NCL	NA	<0.0045	<0.0045	<0.0048	<0.0048	<0.0047	0.0087	<0.0051	<0.0051	<0.0047	<0.0047	<0.005	0.0083	<0.0047	<0.0047	<0.0046	<0.0049
Perfluorotetradecanoic acid (PFTeDA)	NCL	NA	<0.0045	<0.0045	<0.0048	<0.0048	<0.0047	<0.0047	<0.0051	<0.0051	<0.0047	<0.0047	<0.005	<0.00092	<0.0047	<0.0047	<0.0046	<0.0049
Perfluorotridecanoic acid (PFTrDA)	NCL	NA	<0.0045	<0.0045	<0.0048	<0.0048	<0.0047	<0.0047	<0.0051	<0.0051	<0.0047	<0.0047	<0.005	<0.00092	<0.0047	<0.0047	<0.0046	<0.0049
Perfluoroundecanoic acid (PFUnDA)	NCL	NA	<0.0045	<0.0045	<0.0048	<0.0048	<0.0047	<0.0047	<0.0051	<0.0051	<0.0047	<0.0047	<0.005	<0.0018	<0.0047	<0.0047	<0.0046	<0.0049
Perfluorohexadecanoic acid (PFHxDA)	NCL	NA	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total PFAS (Calculated)	NCL	NA	0.048	0.058	ND	ND	ND	0.13	0.099	ND	0.1	ND	ND	0.18	ND	ND	0.063	0.022

TABLE 2
SUMMARY OF DRINKING WATER SAMPLE ANALYSIS - PFAS
Area R-1 (19)
Wolven/Jewell Area, Kent County, MI

Area	Part 201 Generic Residential Groundwater Cleanup Criteria – Drinking Water[2]	Proposed MCL[3]	Area R-1 (19)	Area R-1 (19)	Area R-1 (19)	Area R-1 (19)	Area R-1 (19)	Area R-1 (19)	Area R-1 (19)	Area R-1 (19)	Area R-1 (19)	Area R-1 (19)	Area R-1 (19)	Area R-1 (19)	Area R-1 (19)	Area R-1 (19)	Area R-1 (19)	Area R-1 (19)
PPN			410626200009	410635201012	410625315003	410626200037	410625301040	410625100060	410625100058	410625100020	410636101003	410625100022	410625100042	410625100043	410625100038	410625100061	410625100057	410625100023
Address			3640 VERSCHEL DR NE	3616 11 MILE RD NE	9489 SUMMIT AVE NE	9787 DEER TRL NE	3823 WHIRLWIND DR NE	4100 12 MILE RD NE	9907 SUMMIT AVE NE	9911 SUMMIT AVE NE	9145 SUMMIT AVE NE	4150 12 MILE RD NE	9915 BRADLEY DR NE	9920 BRADLEY DR NE	4020 12 MILE RD NE	4050 12 MILE RD NE	9887 SUMMIT AVE NE	9933 SUMMIT AVE NE
Sample Name			3640 Verschel	3616 11 Mile Rd	9489 Summit Ave NE-4/24	9787 Deer Trl NE-5/3	3823 Whirlwind DR NE-IN-5/14	4100 12 Mile-5/30	9907 Summit-5/30	9911 Summit-5/30	9145 Summit Ave-6/1	4150 12 Mile-6/6	9915 Bradley-6/6	9920 Bradley-6/6	4020 12 Mile-6/14	4050 12 Mile-6/14	9887 Summit-6/14	9933 Summit-6/14
Matrix			Drinking Water	Drinking Water	Drinking Water	Drinking Water	POET Influent	Drinking Water	Drinking Water	Drinking Water	Drinking Water	Drinking Water	Drinking Water	Drinking Water	Drinking Water	Drinking Water	Drinking Water	Drinking Water
Laboratory ID			K1803645-001	K1803741-002	K1803877-001	TE05011-001	TE17027-004	TE31013-003	TE31013-002	TE31013-001	TF02016-001	TF07018-001	TF07027-002	TF07027-001	TF15025-001	TF15025-002	TF15025-004	TF15025-003
Sample Date			04/16/2018	04/19/2018	04/24/2018	05/03/2018	05/14/2018	05/30/2018	05/30/2018	05/30/2018	06/01/2018	06/06/2018	06/06/2018	06/06/2018	06/14/2018	06/14/2018	06/14/2018	06/14/2018
Parameter (µg/L)																		
8:2 Fluorotelomer sulfonic acid (8:2 FTS)	NCL	NA	<0.0046	<0.0045	<0.0047	-	-	-	-	-	-	-	-	-	-	-	-	-
6:2 Fluorotelomer sulfonic acid (6:2 FTS)	NCL	NA	<0.0046	<0.0045	<0.0047	-	-	-	-	-	-	-	-	-	-	-	-	-
N-Ethyl perfluorooctane sulfonamide (EtFOSA)	NCL	NA	<0.0046	<0.0045	<0.0047	-	-	-	-	-	-	-	-	-	-	-	-	-
N-ethylperfluoro-1-octanesulfonamidoacetic acid (EtFOSAA)	NCL	NA	-	-	-	<0.0034	<0.0037	<0.0035	<0.0033	<0.0034	<0.0035	<0.0034	<0.0036	<0.0035	<0.0036	<0.0034	<0.0036	<0.0035
N-Ethyl perfluorooctane sulfonamidoethanol (N-EtFOSE)	NCL	NA	<0.0046	<0.0045	<0.0047	-	-	-	-	-	-	-	-	-	-	-	-	-
N-Methyl perfluorooctane sulfonamide (MeFOSA)	NCL	NA	<0.0046	<0.0045	<0.0047	-	-	-	-	-	-	-	-	-	-	-	-	-
N-methylperfluoro-1-octanesulfonamidoacetic acid (MeFOSAA)	NCL	NA	-	-	-	<0.0034	<0.0037	<0.0035	<0.0033	<0.0034	<0.0035	<0.0034	<0.0036	<0.0035	<0.0036	<0.0034	<0.0036	<0.0035
N-Methyl perfluorooctane sulfonamidoethanol (N-MeFOSE)	NCL	NA	<0.0046	<0.0045	<0.0047	-	-	-	-	-	-	-	-	-	-	-	-	-
Perfluorobutane sulfonic acid (PFBS)	NCL	0.42	0.0098	0.069	0.012	<0.0034	0.024	<0.0035	<0.0033	0.0055	<0.0035	0.0062	<0.0036	<0.0035	<0.0036	<0.0034	0.012	<0.0035
Perfluorodecane sulfonic acid (PFDS)	NCL	NA	<0.0046	<0.0045	<0.0047	-	-	-	-	-	-	-	-	-	-	-	-	-
Perfluorooctadecanoic acid (PFODA)	NCL	NA	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Perfluoroheptane sulfonic acid (PFHpS)	NCL	NA	<0.0046	<0.0045	<0.0047	-	-	-	-	-	-	-	-	-	-	-	-	-
Perfluorooctane sulfonamide (FOSA)	NCL	NA	<0.0046	<0.0045	<0.0047	-	-	-	-	-	-	-	-	-	-	-	-	-
Perfluorohexane sulfonic acid (PFHxS)	NCL	0.051	0.0073	0.095	0.01	<0.0034	0.028	<0.0035	<0.0033	<0.0034	<0.0035	0.0055	<0.0036	<0.0035	<0.0036	<0.0034	<0.0036	<0.0035
Perfluorobutanoic acid (PFBA)	NCL	NA	<0.0093	0.025	<0.0094	-	-	-	-	-	-	-	-	-	-	-	-	-
Perfluorodecanoic acid (PFDA)	NCL	NA	<0.0046	<0.0045	<0.0047	<0.0034	<0.0037	<0.0035	<0.0033	<0.0034	<0.0035	<0.0034	<0.0036	<0.0035	<0.0036	<0.0034	<0.0036	<0.0035
Perfluorododecanoic acid (PFDoDA)	NCL	NA	<0.0046	<0.0045	<0.0047	<0.0034	<0.0037	<0.0035	<0.0033	<0.0034	<0.0035	<0.0034	<0.0036	<0.0035	<0.0036	<0.0034	<0.0036	<0.0035
Perfluoroheptanoic acid (PFHpA)	NCL	NA	<0.0046	0.17	<0.0047	<0.0034	0.045	<0.0035	<0.0033	<0.0034	<0.0035	<0.0034	<0.0036	<0.0035	<0.0036	<0.0034	<0.0036	<0.0035
Perfluorohexanoic acid (PFHxA)	NCL	400	<0.0046	0.088	<0.0047	<0.0034	0.022	<0.0035	<0.0033	<0.0034	<0.0035	0.0074	<0.0036	<0.0035	<0.0036	<0.0034	<0.0036	<0.0035
Perfluorononanoic acid (PFNA)	NCL	0.006	<0.0046	<0.0045	<0.0047	<0.0034	<0.0037	<0.0035	<0.0033	<0.0034	<0.0035	<0.0034	<0.0036	<0.0035	<0.0036	<0.0034	<0.0036	<0.0035
Perfluorooctanoic acid (PFOA)	0.07 (JJ)	0.008	0.0031	***0.31***	0.028	<0.0034	***0.1***	<0.0035	<0.0033	<0.0034	<0.0035	0.014	<0.0036	<0.0035	<0.0036	<0.0034	<0.0036	<0.0035
Perfluorooctane sulfonic acid (PFOS)	0.07 (JJ)	0.016	<0.0046	<0.0045	0.015	<0.0034	<0.0037	<0.0035	<0.0033	<0.0034	<0.0035	0.0097	<0.0036	<0.0035	<0.0036	<0.0034	<0.0036	<0.0035
PFOA + PFOS (Calculated)	0.07	NA	0.0031	***0.31***	0.043	ND	***0.1***	ND	ND	ND	ND	0.024	ND	ND	ND	ND	ND	ND
Perfluoropentanoic acid (PFPeA)	NCL	NA	<0.0046	0.029	<0.0047	-	-	-	-	-	-	-	-	-	-	-	-	-
Perfluorotetradecanoic acid (PFTeDA)	NCL	NA	<0.0046	<0.0045	<0.0047	<0.0034	<0.0037	<0.0035	<0.0033	<0.0034	<0.0035	<0.0034	<0.0036	<0.0035	<0.0036	<0.0034	<0.0036	<0.0035
Perfluorotridecanoic acid (PFTrDA)	NCL	NA	<0.0046	<0.0045	<0.0047	<0.0034	<0.0037	<0.0035	<0.0033	<0.0034	<0.0035	<0.0034	<0.0036	<0.0035	<0.0036	<0.0034	<0.0036	<0.0035
Perfluoroundecanoic acid (PFUnDA)	NCL	NA	<0.0046	<0.0045	<0.0047	<0.0034	<0.0037	<0.0035	<0.0033	<0.0034	<0.0035	<0.0034	<0.0036	<0.0035	<0.0036	<0.0034	<0.0036	<0.0035
Perfluorohexadecanoic acid (PFHxDA)	NCL	NA	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total PFAS (Calculated)	NCL	NA	0.02	0.79	0.065	ND	0.22	ND	ND	0.0055	ND	0.043	ND	ND	ND	ND	0.012	ND

TABLE 2
SUMMARY OF DRINKING WATER SAMPLE ANALYSIS - PFAS
Area R-1 (19)
Wolven/Jewell Area, Kent County, MI

Area	Part 201 Generic Residential Groundwater Cleanup Criteria – Drinking Water[2]	Proposed MCL[3]	Area R-1 (19)	Area R-1 (19)	Area R-1 (19)	Area R-1 (19)	Area R-1 (19)	Area R-1 (19)	Area R-1 (19)	Area R-1 (19)	Area R-1 (19)	Area R-1 (19)	Area R-1 (19)	Area R-1 (19)	Area R-1 (19)	Area R-1 (19)	Area R-1 (19)
PPN			410625301039	410626300021	410635201012	410625301039	410635201012	410625301039	410626300021	410625301056	410625301058	410625301016	410626200026	410625100057	410635227001	410625315002	410625315001	410625301012
Address			3826 WHIRLWIND DR NE	3535 11 MILE RD NE	3616 11 MILE RD NE	3826 WHIRLWIND DR NE	3616 11 MILE RD NE	3826 WHIRLWIND DR NE	3535 11 MILE RD NE	4079 WHIRLWIND DR NE	4117 WHIRLWIND DR NE	4154 WHIRLWIND DR NE	9790 DEER TRL NE	9887 SUMMIT AVE NE	3900 11 MILE RD NE	9545 SUMMIT AVE NE	9555 SUMMIT AVE NE	4172 TRADEWIND DR NE
Sample Name			3826 Whirlwind-IN-6/29	3535 11 Mile-IN-7/24	3616 11 MILE RD NE-IN-9/21	3826 WHIRLWIND DR NE-IN-9/28	3616 11 Mile Rd NE-IN-12/17	3826 Whirlwind Dr-IN-12/19	3535 11 Mile-IN-1/22	4079 Whirlwind 21119	4117 Whirlwind 21119	4154 Whirlwind 21119	9790 Deertrail 21319	9887 Summit 21319	3900 11 Mile 21419	9545 Summit 21419	9555 Summit 21419	4172 Tradewind 21419
Matrix			POET Influent	POET Influent	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			TF30011-003	TG25024-002	L1837878-02	L1839193-05	TL21034-001	TL21036-002	UA24005-005	UB14077-012	UB14077-011	UB14077-010	UB16024-006	UB16024-009	UB16024-013	UB16024-016	UB16024-011	UB16024-014
Sample Date			06/29/2018	07/24/2018	09/21/2018	09/28/2018	12/17/2018	12/19/2018	01/22/2019	02/11/2019	02/11/2019	02/11/2019	02/13/2019	02/13/2019	02/14/2019	02/14/2019	02/14/2019	02/14/2019
Parameter (µg/L)																		
8:2 Fluorotelomer sulfonic acid (8:2 FTS)	NCL	NA	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
6:2 Fluorotelomer sulfonic acid (6:2 FTS)	NCL	NA	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
N-Ethyl perfluorooctane sulfonamide (EtFOSA)	NCL	NA	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
N-ethylperfluoro-1-octanesulfonamidoacetic acid (EtFOSAA)	NCL	NA	<0.0036	<0.0036	<0.0037	<0.00402	<0.0037	<0.004	<0.004	<0.0035	<0.0034	<0.0035	<0.0035	<0.0034	<0.0035	<0.0035	<0.0035	<0.0034
N-Ethyl perfluorooctane sulfonamidoethanol (N-EtFOSE)	NCL	NA	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
N-Methyl perfluorooctane sulfonamide (MeFOSA)	NCL	NA	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
N-methylperfluoro-1-octanesulfonamidoacetic acid (MeFOSAA)	NCL	NA	<0.0036	<0.0036	<0.0037	<0.00402	<0.0037	<0.004	<0.004	<0.0035	<0.0034	<0.0035	<0.0035	<0.0034	<0.0035	<0.0035	<0.0035	<0.0034
N-Methyl perfluorooctane sulfonamidoethanol (N-MeFOSE)	NCL	NA	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Perfluorobutane sulfonic acid (PFBS)	NCL	0.42	0.019	0.0083	0.0881	0.0204	0.076	0.02	0.01	<0.0035	0.0092	0.019	<0.0035	0.0097	<0.0035	0.0096	0.0091	0.0048
Perfluorodecane sulfonic acid (PFDS)	NCL	NA	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Perfluorooctadecanoic acid (PFODA)	NCL	NA	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Perfluoroheptane sulfonic acid (PFHpS)	NCL	NA	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Perfluorooctane sulfonamide (FOSA)	NCL	NA	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Perfluorohexane sulfonic acid (PFHxS)	NCL	0.051	0.018	0.006	0.105	0.0194	0.093	0.017	0.006	<0.0035	0.0053	0.0078	<0.0035	<0.0034	<0.0035	0.0071	0.0048	<0.0034
Perfluorobutanoic acid (PFBA)	NCL	NA	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Perfluorodecanoic acid (PFDA)	NCL	NA	<0.0036	<0.0036	<0.0037	<0.00402	<0.0037	<0.004	<0.004	<0.0035	<0.0034	<0.0035	<0.0035	<0.0034	<0.0035	<0.0035	<0.0035	<0.0034
Perfluorododecanoic acid (PFDoDA)	NCL	NA	<0.0036	<0.0036	<0.0037	<0.00402	<0.0037	<0.004	<0.004	<0.0035	<0.0034	<0.0035	<0.0035	<0.0034	<0.0035	<0.0035	<0.0035	<0.0034
Perfluoroheptanoic acid (PFHpA)	NCL	NA	0.026	<0.0036	0.153	0.028	0.13	0.025	<0.004	<0.0035	<0.0034	<0.0035	<0.0035	<0.0034	<0.0035	<0.0035	<0.0035	<0.0034
Perfluorohexanoic acid (PFHxA)	NCL	400	0.016	<0.0036	0.0899	0.0182	0.077	0.013	<0.004	<0.0035	<0.0034	<0.0035	<0.0035	<0.0034	<0.0035	<0.0035	<0.0035	<0.0034
Perfluorononanoic acid (PFNA)	NCL	0.006	<0.0036	<0.0036	<0.0037	<0.00402	<0.0037	<0.004	<0.004	<0.0035	<0.0034	<0.0035	<0.0035	<0.0034	<0.0035	<0.0035	<0.0035	<0.0034
Perfluorooctanoic acid (PFOA)	0.07 (JJ)	0.008	0.065	0.014	***0.288***	0.0586	***0.3***	0.057	0.017	<0.0035	0.0034	0.0043	<0.0035	<0.0034	<0.0035	0.023	0.0046	<0.0034
Perfluorooctane sulfonic acid (PFOS)	0.07 (JJ)	0.016	<0.0036	<0.0036	<0.0037	<0.00402	<0.0037	<0.004	<0.004	<0.0035	0.0034	<0.0035	<0.0035	<0.0034	<0.0035	0.023	0.0043	<0.0034
PFOA + PFOS (Calculated)	0.07	NA	0.065	0.014	***0.29***	0.059	***0.3***	0.057	0.017	ND	0.0068	0.0043	ND	ND	ND	0.046	0.0089	ND
Perfluoropentanoic acid (PFPeA)	NCL	NA	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Perfluorotetradecanoic acid (PFTeDA)	NCL	NA	<0.0036	<0.0036	<0.0037	<0.00402	<0.0037	<0.004	<0.004	<0.0035	<0.0034	<0.0035	<0.0035	<0.0034	<0.0035	<0.0035	<0.0035	<0.0034
Perfluorotridecanoic acid (PFTrDA)	NCL	NA	<0.0036	<0.0036	<0.0037	<0.00402	<0.0037	<0.004	<0.004	<0.0035	<0.0034	<0.0035	<0.0035	<0.0034	<0.0035	<0.0035	<0.0035	<0.0034
Perfluoroundecanoic acid (PFUnDA)	NCL	NA	<0.0036	<0.0036	<0.0037	<0.00402	<0.0037	<0.004	<0.004	<0.0035	<0.0034	<0.0035	<0.0035	<0.0034	<0.0035	<0.0035	<0.0035	<0.0034
Perfluorohexadecanoic acid (PFHxDA)	NCL	NA	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total PFAS (Calculated)	NCL	NA	0.14	0.028	0.72	0.14	0.68	0.13	0.033	ND	0.021	0.031	ND	0.0097	ND	0.063	0.023	0.0048

TABLE 2
SUMMARY OF DRINKING WATER SAMPLE ANALYSIS - PFAS
Area R-1 (19)
Wolven/Jewell Area, Kent County, MI

Area	Part 201 Generic Residential Groundwater Cleanup Criteria – Drinking Water[2]	Proposed MCL[3]	Area R-1 (19)	Area R-1 (19)	Area R-1 (19)	Area R-1 (19)	Area R-1 (19)	Area R-1 (19)	Area R-1 (19)	Area R-1 (19)	Area R-1 (19)	Area R-1 (19)	Area R-1 (19)	Area R-1 (19)	Area R-1 (19)	Area R-1 (19)	Area R-1 (19)
PPN			410625301001	410626100034	410625100032	410625301014	410625301002	410625301017	410625100050	410636101010	410625301004	410625301038	410625301023	410625100052	410626200024	410636101002	410625315003	410625100058
Address			4195 TRADEWIND DR NE	9766 WOLVEN AVE NE	9737 SUMMIT AVE NE	4184 TRADEWIND DR NE	4189 TRADEWIND DR NE	4140 WHIRLWIND DR NE	4117 WRENS WAY CT NE	4010 11 MILE RD NE	4175 TRADEWIND DR NE	3830 WHIRLWIND DR NE	4050 WHIRLWIND DR NE	4159 WRENS WAY CT NE	9798 DEER TRL NE	9185 SUMMIT AVE NE	9489 SUMMIT AVE NE	9907 SUMMIT AVE NE
Sample Name			4195 Tradewind 21419	9766 Wolven 21419	9737 Summitt Ave NE	4184 Tradewind DR NE	4189 Tradewind DR NE	4140 Whirlwind DR NE	4117 Wrens Way CT NE	4010 11 Mile Rd NE	4175 Tradewind Dr NE	3830 Whirlwind Dr NE	4050 Whirlwind Dr NE	4159 Wrens Way CT NE	9798 Deer Trl NE	9185 Summit Ave NE	9489 Summit Ave NE	9907 Summit Ave
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			UB16024-015	UB16024-017	UB21031-003	UB21031-005	UB21031-001	UB21031-004	UB21031-007	UB21032-006	UB21032-004	UB21032-005	UB21032-001	UB21032-007	UB21033-003	UB21033-008	UB21033-009	UB21033-007
Sample Date			02/14/2019	02/14/2019	02/18/2019	02/18/2019	02/18/2019	02/18/2019	02/18/2019	02/19/2019	02/19/2019	02/19/2019	02/19/2019	02/19/2019	02/20/2019	02/20/2019	02/20/2019	02/20/2019
Parameter (µg/L)																		
8:2 Fluorotelomer sulfonic acid (8:2 FTS)	NCL	NA	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
6:2 Fluorotelomer sulfonic acid (6:2 FTS)	NCL	NA	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
N-Ethyl perfluorooctane sulfonamide (EtFOSA)	NCL	NA	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
N-ethylperfluoro-1-octanesulfonamidoacetic acid (EtFOSAA)	NCL	NA	<0.0035	<0.0034	<0.0035	<0.0041	<0.0035	<0.0036	<0.0035	<0.0037	<0.0034	<0.0036	<0.0037	<0.0036	<0.0036	<0.0036	<0.0035	<0.0034
N-Ethyl perfluorooctane sulfonamidoethanol (N-EtFOSE)	NCL	NA	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
N-Methyl perfluorooctane sulfonamide (MeFOSA)	NCL	NA	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
N-methylperfluoro-1-octanesulfonamidoacetic acid (MeFOSAA)	NCL	NA	<0.0035	<0.0034	<0.0035	<0.0041	<0.0035	<0.0036	<0.0035	<0.0037	<0.0034	<0.0036	<0.0037	<0.0036	<0.0036	<0.0036	<0.0035	<0.0034
N-Methyl perfluorooctane sulfonamidoethanol (N-MeFOSE)	NCL	NA	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Perfluorobutane sulfonic acid (PFBS)	NCL	0.42	0.016	0.006	0.022	0.012	0.011	0.02	<0.0035	0.029	<0.0034	0.0078	0.0082	0.011	0.018	<0.0036	0.0097	<0.0034
Perfluorodecane sulfonic acid (PFDS)	NCL	NA	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Perfluorooctadecanoic acid (PFODA)	NCL	NA	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Perfluoroheptane sulfonic acid (PFHpS)	NCL	NA	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Perfluorooctane sulfonamide (FOSA)	NCL	NA	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Perfluorohexane sulfonic acid (PFHxS)	NCL	0.051	0.0086	<0.0034	0.015	0.0078	0.0073	0.0098	<0.0035	0.0081	<0.0034	<0.0036	0.0042	0.0054	0.014	<0.0036	0.0085	<0.0034
Perfluorobutanoic acid (PFBA)	NCL	NA	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Perfluorodecanoic acid (PFDA)	NCL	NA	<0.0035	<0.0034	<0.0035	<0.0041	<0.0035	<0.0036	<0.0035	<0.0037	<0.0034	<0.0036	<0.0037	<0.0036	<0.0036	<0.0036	<0.0035	<0.0034
Perfluorododecanoic acid (PFDoDA)	NCL	NA	<0.0035	<0.0034	<0.0035	<0.0041	<0.0035	<0.0036	<0.0035	<0.0037	<0.0034	<0.0036	<0.0037	<0.0036	<0.0036	<0.0036	<0.0035	<0.0034
Perfluoroheptanoic acid (PFHpA)	NCL	NA	<0.0035	<0.0034	<0.0035	<0.0041	<0.0035	<0.0036	<0.0035	<0.0037	<0.0034	0.0047	<0.0037	<0.0036	0.024	<0.0036	<0.0035	<0.0034
Perfluorohexanoic acid (PFHxA)	NCL	400	0.0038	<0.0034	<0.0035	<0.0041	<0.0035	<0.0036	<0.0035	0.0038	<0.0034	0.004	<0.0037	<0.0036	0.014	<0.0036	<0.0035	<0.0034
Perfluorononanoic acid (PFNA)	NCL	0.006	<0.0035	<0.0034	<0.0035	<0.0041	<0.0035	<0.0036	<0.0035	<0.0037	<0.0034	<0.0036	<0.0037	<0.0036	<0.0036	<0.0036	<0.0035	<0.0034
Perfluorooctanoic acid (PFOA)	0.07 (JJ)	0.008	0.036	<0.0034	0.015	<0.0041	0.022	<0.0036	<0.0035	0.0053	<0.0034	0.0049	<0.0037	<0.0036	0.044	<0.0036	0.021	<0.0034
Perfluorooctane sulfonic acid (PFOS)	0.07 (JJ)	0.016	0.012	<0.0034	0.006	0.005	0.019	<0.0036	<0.0035	<0.0037	<0.0034	<0.0036	<0.0037	0.0052	<0.0036	<0.0036	0.011	<0.0034
PFOA + PFOS (Calculated)	0.07	NA	0.048	ND	0.021	0.005	0.041	ND	ND	0.0053	ND	0.0049	ND	0.0052	0.044	ND	0.032	ND
Perfluoropentanoic acid (PFPeA)	NCL	NA	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Perfluorotetradecanoic acid (PFTeDA)	NCL	NA	<0.0035	<0.0034	<0.0035	<0.0041	<0.0035	<0.0036	<0.0035	<0.0037	<0.0034	<0.0036	<0.0037	<0.0036	<0.0036	<0.0036	<0.0035	<0.0034
Perfluorotridecanoic acid (PFTrDA)	NCL	NA	<0.0035	<0.0034	<0.0035	<0.0041	<0.0035	<0.0036	<0.0035	<0.0037	<0.0034	<0.0036	<0.0037	<0.0036	<0.0036	<0.0036	<0.0035	<0.0034
Perfluoroundecanoic acid (PFUnDA)	NCL	NA	<0.0035	<0.0034	<0.0035	<0.0041	<0.0035	<0.0036	<0.0035	<0.0037	<0.0034	<0.0036	<0.0037	<0.0036	<0.0036	<0.0036	<0.0035	<0.0034
Perfluorohexadecanoic acid (PFHxDA)	NCL	NA	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total PFAS (Calculated)	NCL	NA	0.076	0.006	0.058	0.025	0.059	0.03	ND	0.046	ND	0.021	0.012	0.022	0.11	ND	0.05	ND

TABLE 2
SUMMARY OF DRINKING WATER SAMPLE ANALYSIS - PFAS
Area R-1 (19)
Wolven/Jewell Area, Kent County, MI

Area	Part 201 Generic Residential Groundwater Cleanup Criteria – Drinking Water[2]	Proposed MCL[3]	Area R-1 (19)	Area R-1 (19)	Area R-1 (19)	Area R-1 (19)	Area R-1 (19)	Area R-1 (19)	Area R-1 (19)	Area R-1 (19)	Area R-1 (19)	Area R-1 (19)	Area R-1 (19)	Area R-1 (19)	Area R-1 (19)	Area R-1 (19)	Area R-1 (19)
PPN			410626200009	410626200009	410625301015	410636101011	410625100043	410636101003	410625301003	410626200011	410625301037	410625301042	410625301022	410625301055	410625301021	410625100053	410625100051	410635227003
Address			3640 VERSCHEL DR NE	3640 VERSCHEL DR NE	4168 WHIRLWIND DR NE	4080 11 MILE RD NE	9920 BRADLEY DR NE	9145 SUMMIT AVE NE	4183 TRADEWIND DR NE	3725 VERSCHEL DR NE	3848 WHIRLWIND DR NE	3869 WHIRLWIND DR NE	4064 WHIRLWIND DR NE	4065 WHIRLWIND DR NE	4078 WHIRLWIND DR NE	4100 WRENS WAY CT NE	4133 WRENS WAY CT NE	3990 11 MILE RD NE
Sample Name			3640 Verschel Dr NE	3640 Verschel-Deep	4168 Whirlwind Dr NE	4080 11 Mile Rd NE	9920 Bradley Dr NE	9145 Summit Ave NE	4183 Tradewind Dr NE	3725 Verschel Dr NE	3848 Whirlwind Dr NE	3869 Whirlwind Dr NE	4064 WHirlwind Dr NE	4065 WHirlwind Dr NE	4078 Whirlwind Dr NE	4100 Wrens Way CT NE	4133 Wrens Way CT NE	3990 11 Mile
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			UB21033-011	UB21033-001	UB21033-005	UB23018-009	UB23018-007	UB23018-015	UB23018-008	UB23018-013	UB23018-002	UB23018-003	UB23018-005	UB23018-004	UB23018-014	UB23018-001	UB23018-012	UB27002-004
Sample Date			02/20/2019	02/20/2019	02/20/2019	02/21/2019	02/21/2019	02/21/2019	02/21/2019	02/21/2019	02/21/2019	02/21/2019	02/21/2019	02/21/2019	02/21/2019	02/21/2019	02/21/2019	02/25/2019
Parameter (µg/L)																		
8:2 Fluorotelomer sulfonic acid (8:2 FTS)	NCL	NA	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
6:2 Fluorotelomer sulfonic acid (6:2 FTS)	NCL	NA	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
N-Ethyl perfluorooctane sulfonamide (EtFOSA)	NCL	NA	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
N-ethylperfluoro-1-octanesulfonamidoacetic acid (EtFOSAA)	NCL	NA	<0.0035	<0.0034	<0.0038	<0.0034	<0.0034	<0.0037	<0.0035	<0.0039	<0.0035	<0.0034	<0.0035	<0.0035	<0.0035	<0.0034	<0.0038	<0.0035
N-Ethyl perfluorooctane sulfonamidoethanol (N-EtFOSE)	NCL	NA	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
N-Methyl perfluorooctane sulfonamide (MeFOSA)	NCL	NA	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
N-methylperfluoro-1-octanesulfonamidoacetic acid (MeFOSAA)	NCL	NA	<0.0035	<0.0034	<0.0038	<0.0034	<0.0034	<0.0037	<0.0035	<0.0039	<0.0035	<0.0034	<0.0035	<0.0035	<0.0035	<0.0034	<0.0038	<0.0035
N-Methyl perfluorooctane sulfonamidoethanol (N-MeFOSE)	NCL	NA	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Perfluorobutane sulfonic acid (PFBS)	NCL	0.42	0.0069	0.0067	0.02	0.019	<0.0034	<0.0037	0.0067	<0.0039	0.0052	0.0055	0.0097	0.0055	0.01	<0.0034	0.017	0.019
Perfluorodecane sulfonic acid (PFDS)	NCL	NA	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Perfluorooctadecanoic acid (PFODA)	NCL	NA	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Perfluoroheptane sulfonic acid (PFHpS)	NCL	NA	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Perfluorooctane sulfonamide (FOSA)	NCL	NA	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Perfluorohexane sulfonic acid (PFHxS)	NCL	0.051	0.0037	<0.0034	0.0093	0.016	<0.0034	<0.0037	<0.0035	<0.0039	<0.0035	<0.0034	0.0045	<0.0035	0.0053	<0.0034	0.0094	0.004
Perfluorobutanoic acid (PFBA)	NCL	NA	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Perfluorodecanoic acid (PFDA)	NCL	NA	<0.0035	<0.0034	<0.0038	<0.0034	<0.0034	<0.0037	<0.0035	<0.0039	<0.0035	<0.0034	<0.0035	<0.0035	<0.0035	<0.0034	<0.0038	<0.0035
Perfluorododecanoic acid (PFDoDA)	NCL	NA	<0.0035	<0.0034	<0.0038	<0.0034	<0.0034	<0.0037	<0.0035	<0.0039	<0.0035	<0.0034	<0.0035	<0.0035	<0.0035	<0.0034	<0.0038	<0.0035
Perfluoroheptanoic acid (PFHpA)	NCL	NA	<0.0035	<0.0034	<0.0038	0.0083	<0.0034	<0.0037	<0.0035	<0.0039	<0.0035	<0.0034	<0.0035	<0.0035	<0.0035	<0.0034	0.0055	<0.0035
Perfluorohexanoic acid (PFHxA)	NCL	400	<0.0035	<0.0034	<0.0038	0.012	<0.0034	<0.0037	<0.0035	<0.0039	<0.0035	<0.0034	<0.0035	<0.0035	<0.0035	<0.0034	0.013	<0.0035
Perfluorononanoic acid (PFNA)	NCL	0.006	<0.0035	<0.0034	<0.0038	<0.0034	<0.0034	<0.0037	<0.0035	<0.0039	<0.0035	<0.0034	<0.0035	<0.0035	<0.0035	<0.0034	<0.0038	<0.0035
Perfluorooctanoic acid (PFOA)	0.07 (JJ)	0.008	<0.0035	<0.0034	0.0059	0.037	<0.0034	<0.0037	<0.0035	<0.0039	0.0035	<0.0034	<0.0035	0.0043	<0.0035	<0.0034	0.027	<0.0035
Perfluorooctane sulfonic acid (PFOS)	0.07 (JJ)	0.016	<0.0035	<0.0034	<0.0038	0.017	<0.0034	<0.0037	<0.0035	<0.0039	<0.0035	<0.0034	<0.0035	<0.0035	<0.0035	<0.0034	0.0097	<0.0035
PFOA + PFOS (Calculated)	0.07	NA	ND	ND	0.0059	0.054	ND	ND	ND	ND	0.0035	ND	ND	0.0043	ND	ND	0.037	ND
Perfluoropentanoic acid (PFPeA)	NCL	NA	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Perfluorotetradecanoic acid (PFTeDA)	NCL	NA	<0.0035	<0.0034	<0.0038	<0.0034	<0.0034	<0.0037	<0.0035	<0.0039	<0.0035	<0.0034	<0.0035	<0.0035	<0.0035	<0.0034	<0.0038	<0.0035
Perfluorotridecanoic acid (PFTrDA)	NCL	NA	<0.0035	<0.0034	<0.0038	<0.0034	<0.0034	<0.0037	<0.0035	<0.0039	<0.0035	<0.0034	<0.0035	<0.0035	<0.0035	<0.0034	<0.0038	<0.0035
Perfluoroundecanoic acid (PFUnDA)	NCL	NA	<0.0035	<0.0034	<0.0038	<0.0034	<0.0034	<0.0037	<0.0035	<0.0039	<0.0035	<0.0034	<0.0035	<0.0035	<0.0035	<0.0034	<0.0038	<0.0035
Perfluorohexadecanoic acid (PFHxDA)	NCL	NA	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total PFAS (Calculated)	NCL	NA	0.011	0.0067	0.035	0.11	ND	ND	0.0067	ND	0.0087	0.0055	0.014	0.0098	0.015	ND	0.082	0.023

TABLE 2
SUMMARY OF DRINKING WATER SAMPLE ANALYSIS - PFAS
Area R-1 (19)
Wolven/Jewell Area, Kent County, MI

Area	Part 201 Generic Residential Groundwater Cleanup Criteria – Drinking Water[2]	Proposed MCL[3]	Area R-1 (19)	Area R-1 (19)	Area R-1 (19)	Area R-1 (19)	Area R-1 (19)	Area R-1 (19)	Area R-1 (19)	Area R-1 (19)	Area R-1 (19)	Area R-1 (19)	Area R-1 (19)	Area R-1 (19)	Area R-1 (19)	Area R-1 (19)	Area R-1 (19)
PPN			410626200030	410625100023	410625301007	410625301006	410625301020	410625301019	410626200036	410625100020	410625100056	410635100005	410635201012	410624400009	410625301036	410625301040	410626100043	410625301039
Address			9799 DEER TRL NE	9933 SUMMIT AVE NE	4090 TRADEWIND DR NE	4155 TRADEWIND DR NE	4096 WHIRLWIND DR NE	4112 WHIRLWIND DR NE	9859 DEER TRL NE	9911 SUMMIT AVE NE	9905 SUMMIT AVE NE	3530 11 MILE RD NE	3616 11 MILE RD NE	3749 11 MILE RD NE	3862 WHIRLWIND DR NE	3823 WHIRLWIND DR NE	9680 WOLVEN AVE NE	3826 WHIRLWIND DR NE
Sample Name			9799 Deer Trl	9933 Summit	4090 Tradewind	4155 Tradewind	4096 Whirlwind	4112 Whirlwind	9859 Deer Trl	9911 Summit	9905 Summit Ave	3530 11 Mile	3616 11 Mile-IN-3/19	3749 11 Mile Rd	3862 Whirlwind	3823 Whirlwind-IN-3/21	9680 Wolven	3826 Whirlwind-IN-3/29
Matrix			Drinking Water	Drinking Water	Drinking Water	Drinking Water	Drinking Water	Drinking Water	Drinking Water	Drinking Water	Drinking Water	Drinking Water	POET Influent	Drinking Water	Drinking Water	POET Influent	Drinking Water	POET Influent
Laboratory ID			UB27002-002	UB27002-003	UB27002-007	UB27002-009	UB27002-006	UB27002-001	UB27002-011	UC07049-005	UC14023-001	UC21018-003	UC21025-001	UC21018-001	UC21018-002	UC23025-003	UC23034-001	UC30010-002
Sample Date			02/25/2019	02/25/2019	02/25/2019	02/25/2019	02/25/2019	02/25/2019	02/26/2019	03/06/2019	03/11/2019	03/19/2019	03/19/2019	03/19/2019	03/19/2019	03/21/2019	03/21/2019	03/29/2019
Parameter (µg/L)																		
8:2 Fluorotelomer sulfonic acid (8:2 FTS)	NCL	NA	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
6:2 Fluorotelomer sulfonic acid (6:2 FTS)	NCL	NA	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
N-Ethyl perfluorooctane sulfonamide (EtFOSA)	NCL	NA	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
N-ethylperfluoro-1-octanesulfonamidoacetic acid (EtFOSAA)	NCL	NA	<0.0035	<0.0035	<0.0034	<0.0034	<0.0035	<0.0034	<0.0035	<0.0035	<0.0035	<0.0034	<0.0036	<0.0034	<0.0035	<0.0038	<0.0035	<0.0036
N-Ethyl perfluorooctane sulfonamidoethanol (N-EtFOSE)	NCL	NA	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
N-Methyl perfluorooctane sulfonamide (MeFOSA)	NCL	NA	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
N-methylperfluoro-1-octanesulfonamidoacetic acid (MeFOSAA)	NCL	NA	<0.0035	<0.0035	<0.0034	<0.0034	<0.0035	<0.0034	<0.0035	<0.0035	<0.0035	<0.0034	<0.0036	<0.0034	<0.0035	<0.0038	<0.0035	<0.0036
N-Methyl perfluorooctane sulfonamidoethanol (N-MeFOSE)	NCL	NA	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Perfluorobutane sulfonic acid (PFBS)	NCL	0.42	<0.0035	0.014	<0.0034	0.0069	0.013	0.017	<0.0035	<0.0035	<0.0035	<0.0034	0.078	0.0054	<0.0035	0.024	0.0051	0.022
Perfluorodecane sulfonic acid (PFDS)	NCL	NA	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Perfluorooctadecanoic acid (PFODA)	NCL	NA	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Perfluoroheptane sulfonic acid (PFHpS)	NCL	NA	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Perfluorooctane sulfonamide (FOSA)	NCL	NA	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Perfluorohexane sulfonic acid (PFHxS)	NCL	0.051	<0.0035	0.006	<0.0034	0.0043	0.0079	0.0092	<0.0035	<0.0035	<0.0035	<0.0034	0.1	<0.0034	<0.0035	0.031	0.0036	0.021
Perfluorobutanoic acid (PFBA)	NCL	NA	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Perfluorodecanoic acid (PFDA)	NCL	NA	<0.0035	<0.0035	<0.0034	<0.0034	<0.0035	<0.0034	<0.0035	<0.0035	<0.0035	<0.0034	<0.0036	<0.0034	<0.0035	<0.0038	<0.0035	<0.0036
Perfluorododecanoic acid (PFDoDA)	NCL	NA	<0.0035	<0.0035	<0.0034	<0.0034	<0.0035	<0.0034	<0.0035	<0.0035	<0.0035	<0.0034	<0.0036	<0.0034	<0.0035	<0.0038	<0.0035	<0.0036
Perfluoroheptanoic acid (PFHpA)	NCL	NA	<0.0035	0.0091	<0.0034	<0.0034	<0.0035	<0.0034	<0.0035	<0.0035	<0.0035	<0.0034	0.12	0.0038	<0.0035	0.038	<0.0035	0.03
Perfluorohexanoic acid (PFHxA)	NCL	400	<0.0035	0.0062	<0.0034	<0.0034	<0.0035	<0.0034	<0.0035	<0.0035	<0.0035	<0.0034	0.066	<0.0034	<0.0035	0.022	<0.0035	0.019
Perfluorononanoic acid (PFNA)	NCL	0.006	<0.0035	<0.0035	<0.0034	<0.0034	<0.0035	<0.0034	<0.0035	<0.0035	<0.0035	<0.0034	<0.0036	<0.0034	<0.0035	<0.0038	<0.0035	<0.0036
Perfluorooctanoic acid (PFOA)	0.07 (JJ)	0.008	<0.0035	0.014	<0.0034	<0.0034	<0.0035	<0.0034	<0.0035	<0.0035	<0.0035	<0.0034	***0.28***	0.0074	<0.0035	***0.099***	<0.0035	0.061
Perfluorooctane sulfonic acid (PFOS)	0.07 (JJ)	0.016	<0.0035	0.0041	<0.0034	<0.0034	<0.0035	<0.0034	<0.0035	<0.0035	<0.0035	<0.0034	<0.0036	<0.0034	<0.0035	<0.0038	<0.0035	<0.0036
PFOA + PFOS (Calculated)	0.07	NA	ND	0.018	ND	ND	ND	ND	ND	ND	ND	ND	***0.28***	0.0074	ND	***0.099***	ND	0.061
Perfluoropentanoic acid (PFPeA)	NCL	NA	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Perfluorotetradecanoic acid (PFTeDA)	NCL	NA	<0.0035	<0.0035	<0.0034	<0.0034	<0.0035	<0.0034	<0.0035	<0.0035	<0.0035	<0.0034	<0.0036	<0.0034	<0.0035	<0.0038	<0.0035	<0.0036
Perfluorotridecanoic acid (PFTrDA)	NCL	NA	<0.0035	<0.0035	<0.0034	<0.0034	<0.0035	<0.0034	<0.0035	<0.0035	<0.0035	<0.0034	<0.0036	<0.0034	<0.0035	<0.0038	<0.0035	<0.0036
Perfluoroundecanoic acid (PFUnDA)	NCL	NA	<0.0035	<0.0035	<0.0034	<0.0034	<0.0035	<0.0034	<0.0035	<0.0035	<0.0035	<0.0034	<0.0036	<0.0034	<0.0035	<0.0038	<0.0035	<0.0036
Perfluorohexadecanoic acid (PFHxDA)	NCL	NA	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total PFAS (Calculated)	NCL	NA	ND	0.053	ND	0.011	0.021	0.026	ND	ND	ND	ND	0.64	0.017	ND	0.21	0.0087	0.15

TABLE 2
SUMMARY OF DRINKING WATER SAMPLE ANALYSIS - PFAS
Area R-1 (19)
Wolven/Jewell Area, Kent County, MI

Area	Part 201 Generic Residential Groundwater Cleanup Criteria – Drinking Water[2]	Proposed MCL[3]	Area R-1 (19)	Area R-1 (19)	Area R-1 (19)	Area R-1 (19)	Area R-1 (19)	Area R-1 (19)	Area R-1 (19)	Area R-1 (19)	Area R-1 (19)	Area R-1 (19)	Area R-1 (19)	Area R-1 (19)
PPN			410625301057	410625301060	410635201012	410625301040	410625301039	410626300021	410625301040	410625301039	410625301039	410635201012	410625301040	410626300021
Address			4095 WHIRLWIND DR NE	4139 WHIRLWIND DR NE	3616 11 MILE RD NE	3823 WHIRLWIND DR NE	3826 WHIRLWIND DR NE	3535 11 MILE RD NE	3823 WHIRLWIND DR NE	3826 WHIRLWIND DR NE	3826 WHIRLWIND DR NE	3616 11 MILE RD NE	3823 WHIRLWIND DR NE	3535 11 MILE RD NE
Sample Name			4095 Whirlwind	4139 Whirlwind Dr NE	3616 11 Mile-IN-6/18	3823 Whirlwind-IN-6/18	3826 Whirlwind-IN-6/21	3535 11 Mile-IN-7/30	3823 Whirlwind-IN-9/24	3826 Whirlwind-IN-9/24	3826 Whirlwind-IN-12/10	3616 11 Mile-IN-12/17	3823 Whirlwind-IN-12/19	3535 11 Mile-IN-1/28
Matrix			Drinking Water	Drinking Water	POET Influent	POET Influent	POET Influent	POET Influent	POET Influent	POET Influent	POET Influent	POET Influent	POET Influent	POET Influent
Laboratory ID			UC30006-001	UE25006-001	UF20010-001	UF20010-002	UF22006-001	UH01060-002	UI26022-004	UI26022-002	UL12030-002	UL19092-004	UL21013-002	VA30036-003
Sample Date			03/29/2019	05/24/2019	06/18/2019	06/18/2019	06/20/2019	07/30/2019	09/24/2019	09/24/2019	12/10/2019	12/17/2019	12/19/2019	01/28/2020
Parameter (µg/L)														
8:2 Fluorotelomer sulfonic acid (8:2 FTS)	NCL	NA	-	-	-	-	-	-	-	-	-	-	-	-
6:2 Fluorotelomer sulfonic acid (6:2 FTS)	NCL	NA	-	-	-	-	-	-	-	-	-	-	-	-
N-Ethyl perfluorooctane sulfonamide (EtFOSA)	NCL	NA	-	-	-	-	-	-	-	-	-	-	-	-
N-ethylperfluoro-1-octanesulfonamidoacetic acid (EtFOSAA)	NCL	NA	<0.0035	<0.0035	<0.0038	<0.004	<0.0037	<0.0038	<0.0043	<0.0038	<0.0036	<0.0037	<0.0039	<0.0038
N-Ethyl perfluorooctane sulfonamidoethanol (N-EtFOSE)	NCL	NA	-	-	-	-	-	-	-	-	-	-	-	-
N-Methyl perfluorooctane sulfonamide (MeFOSA)	NCL	NA	-	-	-	-	-	-	-	-	-	-	-	-
N-methylperfluoro-1-octanesulfonamidoacetic acid (MeFOSAA)	NCL	NA	<0.0035	<0.0035	<0.0038	<0.004	<0.0037	<0.0038	<0.0043	<0.0038	<0.0036	<0.0037	<0.0039	<0.0038
N-Methyl perfluorooctane sulfonamidoethanol (N-MeFOSE)	NCL	NA	-	-	-	-	-	-	-	-	-	-	-	-
Perfluorobutane sulfonic acid (PFBS)	NCL	0.42	<0.0035	0.013	0.093	0.03	0.024	0.017	0.022	0.02	0.021	0.065	0.025	0.017
Perfluorodecane sulfonic acid (PFDS)	NCL	NA	-	-	-	-	-	-	-	-	-	-	-	-
Perfluorooctadecanoic acid (PFODA)	NCL	NA	-	-	-	-	-	-	-	-	-	-	-	-
Perfluoroheptane sulfonic acid (PFHpS)	NCL	NA	-	-	-	-	-	-	-	-	-	-	-	-
Perfluorooctane sulfonamide (FOSA)	NCL	NA	-	-	-	-	-	-	-	-	-	-	-	-
Perfluorohexane sulfonic acid (PFHxS)	NCL	0.051	<0.0035	0.0071	0.12	0.036	0.022	0.0096	0.028	0.023	0.021	0.091	0.029	0.0099
Perfluorobutanoic acid (PFBA)	NCL	NA	-	-	-	-	-	-	-	-	-	-	-	-
Perfluorodecanoic acid (PFDA)	NCL	NA	<0.0035	<0.0035	<0.0038	<0.004	<0.0037	<0.0038	<0.0043	<0.0038	<0.0036	<0.0037	<0.0039	<0.0038
Perfluorododecanoic acid (PFDoDA)	NCL	NA	<0.0035	<0.0035	<0.0038	<0.004	<0.0037	<0.0038	<0.0043	<0.0038	<0.0036	<0.0037	<0.0039	<0.0038
Perfluoroheptanoic acid (PFHpA)	NCL	NA	<0.0035	<0.0035	0.14	0.04	0.033	<0.0038	0.034	0.026	0.028	0.11	0.036	<0.0038
Perfluorohexanoic acid (PFHxA)	NCL	400	<0.0035	<0.0035	0.079	0.026	0.02	<0.0038	0.02	0.016	0.014	0.063	0.022	<0.0038
Perfluorononanoic acid (PFNA)	NCL	0.006	<0.0035	<0.0035	<0.0038	<0.004	<0.0037	<0.0038	<0.0043	<0.0038	<0.0036	<0.0037	<0.0039	<0.0038
Perfluorooctanoic acid (PFOA)	0.07 (JJ)	0.008	<0.0035	0.0035	***0.35***	***0.11***	***0.093***	0.02	***0.093 E***	***0.074***	0.066	***0.26***	***0.1***	0.015
Perfluorooctane sulfonic acid (PFOS)	0.07 (JJ)	0.016	<0.0035	<0.0035	<0.0038	<0.004	<0.0037	0.0041	<0.0043	<0.0038	<0.0036	<0.0037	<0.0039	<0.0038
PFOA + PFOS (Calculated)	0.07	NA	ND	0.0035	***0.35***	***0.11***	***0.093***	0.024	***0.093***	***0.074***	0.066	***0.26***	***0.1***	0.015
Perfluoropentanoic acid (PFPeA)	NCL	NA	-	-	-	-	-	-	-	-	-	-	-	-
Perfluorotetradecanoic acid (PFTeDA)	NCL	NA	<0.0035	<0.0035	<0.0038	<0.004	<0.0037	<0.0038	<0.0043	<0.0038	<0.0036	<0.0037	<0.0039	<0.0038
Perfluorotridecanoic acid (PFTrDA)	NCL	NA	<0.0035	<0.0035	<0.0038	<0.004	<0.0037	<0.0038	<0.0043	<0.0038	<0.0036	<0.0037	<0.0039	<0.0038
Perfluoroundecanoic acid (PFUnDA)	NCL	NA	<0.0035	<0.0035	<0.0038	<0.004	<0.0037	<0.0038	<0.0043	<0.0038	<0.0036	<0.0037	<0.0039	<0.0038
Perfluorohexadecanoic acid (PFHxDA)	NCL	NA	-	-	-	-	-	-	-	-	-	-	-	-
Total PFAS (Calculated)	NCL	NA	ND	0.024	0.78	0.24	0.19	0.051	0.2	0.16	0.15	0.59	0.21	0.042

TABLE 2 NOTES
Area R-1 (19)
Wolven/Jewell Area, 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; updated June 25, 2018.
   Abbreviations Include:
   "NCL" indicates no criterion listed in EGLE Table 1.
   Footnotes Include:
   (JJ) - Compliance with the drinking water criteria shall require comparing the sum of the PFOA and PFOS groundwater concentrations to the drinking water criterion of 0.07 µg/L.
3. Proposed Maxium Contaminant Levels (MCLs) were published by EGLE on October 11, 2019. These are included for reference.
   Abbreviations Include:
   "NA" indicates no Proposed MCL listed.
4. Bold, italic number with thick line border or italic parameter name indicates that parameter was detected above the Michigan Part 201 Groundwater Cleanup Criteria listed. Proposed MCLs are provided for reference only and results detected above the Proposed MCLs are not bolded or italicized.
5. 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.
   "E" indicates the quantitation of the compound exceeded the calibration range.

TABLE 3
MONITORING WELL INSTALLATION INFORMATION
Area R-1 (19)
Wolven/Jewell Area, 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 R-1 (19)
Wolven/Jewell Area, 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 R-1 (19)
Wolven/Jewell Area, 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 R-1 (19)
Wolven/Jewell Area, 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

TABLE 4
MONITORING WELL STATIC WATER LEVELS
Area R-1 (19)
Wolven/Jewell Area, Kent County, MI

Site Location	Well Field ID	November 4, 2019 Static Water Level Elevation (ft)
House Street	HS-MW-27D	645.74
House Street	HS-MW-27E	645.61
House Street	HS-MW-28A	629.35
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

TABLE 4
MONITORING WELL STATIC WATER LEVELS
Area R-1 (19)
Wolven/Jewell Area, Kent County, MI

Site Location	Well Field ID	November 4, 2019 Static Water Level Elevation (ft)
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
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
Area R-1 (19)
Wolven/Jewell Area, 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]	EGLE Residential Recommended Volatilization to Indoor Air Interim Action Screening Level - Groundwater[3]	U.S. EPA Residential Tap Water Regional Removal Management Levels[4]	WV-MW-1	WV-MW-1	WV-MW-1	WV-MW-1	WV-MW-2D	WV-MW-2D	WV-MW-2D	WV-MW-2D	WV-MW-2S	WV-MW-2S	WV-MW-2S	WV-MW-2S	WV-MW-3D
Sample Name						MW-WV-1	WV-GW-MW1	WV-GW-MW1	WV-GW-MW-1	MW-WV-2D	WV-GW-MW2D	WV-GW-MW2D	WV-GW-MW-2D	MW-WV-2S	WV-GW-MW2S	WV-GW-MW2S	WV-GW-MW-2S	MW-WV-3D
Well Screen Interval (Feet below ground surface)						137.8-142.8	137.8-142.8	137.8-142.8	137.8-142.8	30.2-35.2	30.2-35.2	30.2-35.2	30.2-35.2	20.2-25.2	20.2-25.2	20.2-25.2	20.2-25.2	57.5-62.5
Laboratory Sample ID(s)						UB20051-010	UE09028-012	UI05007-008	UK13023-002	UB20051-002	UE09028-013	UI05007-005	UK07051-005	UB20051-001	UE09028-014	UI05007-004	UK07051-004	UB16022-008
Sample Date						02/20/2019	05/10/2019	09/04/2019	11/12/2019	02/18/2019	05/10/2019	09/03/2019	11/05/2019	02/18/2019	05/10/2019	09/03/2019	11/05/2019	02/15/2019
Parameter (µg/L)																		
8:2 Fluorotelomer sulfonic acid (8:2 FTS)	NCL	NCL	NCL	NCL	NCL	<0.0035	<0.0036	<0.0034	<0.0035	<0.0036	<0.0036	<0.0036	<0.0038	<0.0036	<0.0037	<0.0036	<0.0036	<0.0038
6:2 Fluorotelomer sulfonic acid (6:2 FTS)	NCL	NCL	NCL	NCL	NCL	<0.0035	<0.0036	<0.0034	<0.0035	<0.0036	<0.0036	<0.0036	<0.0038	<0.0036	<0.0037	<0.0036	<0.0036	<0.0038
N-Ethyl perfluorooctane sulfonamide (EtFOSA)	NCL	NCL	NCL	NCL	NCL	<0.0035	<0.0036	<0.0034	<0.0035	<0.0036	<0.0036	<0.0036	<0.0038	<0.0036	<0.0037	<0.0036	<0.0036	<0.0038
N-Methyl perfluorooctane sulfonamide (MeFOSA)	NCL	NCL	NCL	NCL	NCL	<0.007	<0.0071	<0.0067	<0.007	<0.0071	<0.0072	<0.0072	<0.0077	<0.0071	<0.0073	<0.0071	<0.0073	<0.0076
Perfluorobutane sulfonic acid (PFBS)	NCL	NCL	NCL	NCL	1,200	0.032	0.0072	0.048	0.041	0.051	0.046	0.045	0.042	0.014	0.013	0.016	0.013	0.006
Perfluorodecane sulfonic acid (PFDS)	NCL	NCL	NCL	NCL	NCL	<0.0035	<0.0036	<0.0034	<0.0035	<0.0036	<0.0036	<0.0036	<0.0038	<0.0036	<0.0037	<0.0036	<0.0036	<0.0038
Perfluoroheptane sulfonic acid (PFHpS)	NCL	NCL	NCL	NCL	NCL	0.17	0.071	0.25	0.22	0.016	0.016	0.022	0.016	0.062	0.047	0.054	0.049	<0.0038
Perfluorononane sulfonic acid (PFNS)	NCL	NCL	NCL	NCL	NCL	<0.007	<0.0071	<0.0067	<0.007	<0.0071	<0.0072	<0.0072	<0.0077	<0.0071	<0.0073	<0.0071	<0.0073	<0.0076
Perfluorooctane sulfonamide (FOSA)	NCL	NCL	NCL	NCL	NCL	<0.0035	0.0099	<0.0034	<0.0035	<0.0036	<0.0036	<0.0036	<0.0038	<0.0036	<0.0037	<0.0036	<0.0036	<0.0038
Perfluoropentane sulfonic acid (PFPeS)	NCL	NCL	NCL	NCL	NCL	0.1	0.022	0.14	0.12	0.14	0.12	0.13	0.13	0.015	0.016	0.02	0.017	<0.0038
Perfluorohexane sulfonic acid (PFHxS)	NCL	NCL	NCL	NCL	NCL	0.81	0.18	1.1	0.77	0.32	0.28	0.26	0.28	0.065	0.052	0.065	0.061	0.004
Perfluorobutanoic acid (PFBA)	NCL	NCL	NCL	NCL	NCL	0.022	0.0059	0.037	0.029	0.022	0.02	0.017	0.019	0.0081	0.0074	0.0096	0.0081	<0.0038
Perfluorodecanoic acid (PFDA)	NCL	NCL	NCL	NCL	NCL	<0.0035	<0.0036	<0.0034	<0.0035	<0.0036	<0.0036	<0.0036	<0.0038	<0.0036	<0.0037	<0.0036	<0.0036	<0.0038
Perfluorododecanoic acid (PFDoDA)	NCL	NCL	NCL	NCL	NCL	<0.0035	<0.0036	<0.0034	<0.0035	<0.0036	<0.0036	<0.0036	<0.0038	<0.0036	<0.0037	<0.0036	<0.0036	<0.0038
Perfluoroheptanoic acid (PFHpA)	NCL	NCL	NCL	NCL	NCL	0.17	0.035	0.26	0.22	0.14	0.13	0.12	0.12	0.024	0.022	0.032	0.023	<0.0038
Perfluorohexanoic acid (PFHxA)	NCL	NCL	NCL	NCL	NCL	0.065	0.014	0.11	0.095	0.068	0.061	0.055	0.057	0.016	0.015	0.017	0.013	<0.0038
Perfluorononanoic acid (PFNA)	NCL	NCL	NCL	NCL	NCL	0.01	0.0049	0.017	0.013	<0.0036	<0.0036	<0.0036	<0.0038	0.0059	0.006	0.0071	0.0059	<0.0038
Perfluorooctanoic acid (PFOA)	0.07 (JJ)	12	ID	NCL	NCL	***2.8***	***0.57***	***4.3***	***2.9***	***1.1***	***1***	***0.89***	***0.92***	***0.29***	***0.27***	***0.32***	***0.27***	<0.0019
Perfluorooctane sulfonic acid (PFOS)	0.07 (JJ)	0.012	NLV	NCL	NCL	***6.1***	***3.7***	***10***	***6.7***	***0.064***	***0.077***	***0.15***	***0.11***	***3.8***	***3.4***	***3.8***	***3.1***	<0.0038
PFOA + PFOS (Calculated)	0.07	NCL	NCL	NCL	NCL	***8.9***	***4.3***	***14***	***9.6***	***1.2***	***1.1***	***1***	***1***	***4.1***	***3.7***	***4.1***	***3.4***	ND
Perfluoropentanoic acid (PFPeA)	NCL	NCL	NCL	NCL	NCL	0.025	0.0057	0.037	0.036	0.027	0.026	0.025	0.026	0.0093	0.0083	0.0089	0.0079	<0.0038
Perfluorotetradecanoic acid (PFTeDA)	NCL	NCL	NCL	NCL	NCL	<0.0035	<0.0036	<0.0034	<0.0035	<0.0036	<0.0036	<0.0036	<0.0038	<0.0036	<0.0037	<0.0036	<0.0036	<0.0038
Perfluorotridecanoic acid (PFTrDA)	NCL	NCL	NCL	NCL	NCL	<0.0035	<0.0036	<0.0034	<0.0035	<0.0036	<0.0036	<0.0036	<0.0038	<0.0036	<0.0037	<0.0036	<0.0036	<0.0038
Perfluoroundecanoic acid (PFUnDA)	NCL	NCL	NCL	NCL	NCL	<0.0035	<0.0036	<0.0034	<0.0035	<0.0036	<0.0036	<0.0036	<0.0038	<0.0036	<0.0037	<0.0036	<0.0036	<0.0038
Total PFAS (Calculated)	NCL	NCL	NCL	NCL	NCL	10	4.6	16	11	1.9	1.8	1.7	1.7	4.3	3.9	4.3	3.6	0.01

TABLE 6
SUMMARY OF GROUNDWATER SAMPLE ANALYSIS - PFAS
Area R-1 (19)
Wolven/Jewell Area, 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]	EGLE Residential Recommended Volatilization to Indoor Air Interim Action Screening Level - Groundwater[3]	U.S. EPA Residential Tap Water Regional Removal Management Levels[4]	WV-MW-3D	WV-MW-3D	WV-MW-3D	WV-MW-3S	WV-MW-3S	WV-MW-3S	WV-MW-3S	WV-MW-4	WV-MW-4	WV-MW-4	WV-MW-4	WV-MW-5D	WV-MW-5D
Sample Name						WV-GW-MW3D	WV-GW-MW3D	WV-GW-MW-3D	MW-WV-3S	WV-GW-MW3S	WV-GW-MW3S	WV-GW-MW-3S	MW-WV-4	WV-GW-MW4	WV-GW-MW4	WV-GW-MW-4	MW-WV-5D	MW-WV-5D DUP
Well Screen Interval (Feet below ground surface)						57.5-62.5	57.5-62.5	57.5-62.5	5.1-10.1	5.1-10.1	5.1-10.1	5.1-10.1	130.2-135.2	130.2-135.2	130.2-135.2	130.2-135.2	68.7-73.7	68.7-73.7
Laboratory Sample ID(s)						UE09028-018	UI05007-010	UK07025-005	UB16022-007	UE09028-022	UI05007-011	UK07025-004	UB20051-013	UE16022-001	UI05007-002	UK19013-002	UB16022-003	UB16022-005
Sample Date						05/09/2019	09/04/2019	11/06/2019	02/15/2019	05/09/2019	09/04/2019	11/06/2019	02/21/2019	05/13/2019	09/03/2019	11/13/2019	02/14/2019	02/14/2019
Parameter (µg/L)																		
8:2 Fluorotelomer sulfonic acid (8:2 FTS)	NCL	NCL	NCL	NCL	NCL	<0.0037	<0.0037	<0.0039	<0.0037	<0.0037	<0.0035	<0.0037	<0.0035	<0.0036	<0.0035	<0.0037	<0.0037	<0.0038
6:2 Fluorotelomer sulfonic acid (6:2 FTS)	NCL	NCL	NCL	NCL	NCL	<0.0037	<0.0037	0.0049	<0.0037	<0.0037	<0.0035	<0.0037	<0.0035	<0.0036	<0.0035	<0.0037	<0.0037	<0.0038
N-Ethyl perfluorooctane sulfonamide (EtFOSA)	NCL	NCL	NCL	NCL	NCL	<0.0037	<0.0037	<0.0039	<0.0037	<0.0037	<0.0035	<0.0037	<0.0035	<0.0036	<0.0035	<0.0037	<0.0037	<0.0038
N-Methyl perfluorooctane sulfonamide (MeFOSA)	NCL	NCL	NCL	NCL	NCL	<0.0074	<0.0073	<0.0078	<0.0075	<0.0074	<0.0071	<0.0075	<0.007	<0.0071	<0.0069	<0.0074	<0.0073	<0.0076
Perfluorobutane sulfonic acid (PFBS)	NCL	NCL	NCL	NCL	1,200	0.0051	0.006	0.0054	0.006	0.0068	0.0082	0.0074	<0.0035	<0.0036	<0.0035	<0.0037	0.0077	0.0074
Perfluorodecane sulfonic acid (PFDS)	NCL	NCL	NCL	NCL	NCL	<0.0037	<0.0037	<0.0039	<0.0037	<0.0037	<0.0035	<0.0037	<0.0035	<0.0036	<0.0035	<0.0037	<0.0037	<0.0038
Perfluoroheptane sulfonic acid (PFHpS)	NCL	NCL	NCL	NCL	NCL	<0.0037	<0.0037	<0.0039	0.0044	<0.0037	0.0041	<0.0037	<0.0035	<0.0036	<0.0035	<0.0037	<0.0037	<0.0038
Perfluorononane sulfonic acid (PFNS)	NCL	NCL	NCL	NCL	NCL	<0.0074	<0.0073	<0.0078	<0.0075	<0.0074	<0.0071	<0.0075	<0.007	<0.0071	<0.0069	<0.0074	<0.0073	<0.0076
Perfluorooctane sulfonamide (FOSA)	NCL	NCL	NCL	NCL	NCL	<0.0037	<0.0037	<0.0039	<0.0037	<0.0037	<0.0035	<0.0037	<0.0035	<0.0036	<0.0035	<0.0037	<0.0037	<0.0038
Perfluoropentane sulfonic acid (PFPeS)	NCL	NCL	NCL	NCL	NCL	<0.0037	<0.0037	<0.0039	0.0052	0.0053	0.0074	0.0054	<0.0035	<0.0036	<0.0035	<0.0037	<0.0037	<0.0038
Perfluorohexane sulfonic acid (PFHxS)	NCL	NCL	NCL	NCL	NCL	<0.0037	0.004	0.0039	0.018	0.014	0.024	0.015	<0.0035	<0.0036	<0.0035	<0.0037	<0.0037	0.0038
Perfluorobutanoic acid (PFBA)	NCL	NCL	NCL	NCL	NCL	<0.0037	<0.0037	<0.0039	0.008	0.0081	0.0097	0.0085	<0.0035	<0.0036	<0.0035	<0.0037	<0.0037	<0.0038
Perfluorodecanoic acid (PFDA)	NCL	NCL	NCL	NCL	NCL	<0.0037	<0.0037	<0.0039	<0.0037	<0.0037	<0.0035	<0.0037	<0.0035	<0.0036	<0.0035	<0.0037	<0.0037	<0.0038
Perfluorododecanoic acid (PFDoDA)	NCL	NCL	NCL	NCL	NCL	<0.0037	<0.0037	<0.0039	<0.0037	<0.0037	<0.0035	<0.0037	<0.0035	<0.0036	<0.0035	<0.0037	<0.0037	<0.0038
Perfluoroheptanoic acid (PFHpA)	NCL	NCL	NCL	NCL	NCL	<0.0037	<0.0037	<0.0039	0.0097	0.009	0.014	0.0089	<0.0035	<0.0036	<0.0035	<0.0037	<0.0037	<0.0038
Perfluorohexanoic acid (PFHxA)	NCL	NCL	NCL	NCL	NCL	<0.0037	<0.0037	<0.0039	0.007	0.008	0.0083	0.0063	<0.0035	<0.0036	<0.0035	<0.0037	<0.0037	<0.0038
Perfluorononanoic acid (PFNA)	NCL	NCL	NCL	NCL	NCL	<0.0037	<0.0037	<0.0039	<0.0037	<0.0037	<0.0035	<0.0037	<0.0035	<0.0036	<0.0035	<0.0037	<0.0037	<0.0038
Perfluorooctanoic acid (PFOA)	0.07 (JJ)	12	ID	NCL	NCL	<0.0018	0.0019	<0.0019	***0.082***	0.063	***0.099***	0.06	<0.0017	<0.0018	<0.0017	<0.0019	0.0027	0.0027
Perfluorooctane sulfonic acid (PFOS)	0.07 (JJ)	0.012	NLV	NCL	NCL	<0.0037	<0.0037	<0.0039	***0.15***	***0.11***	***0.15***	***0.095***	<0.0035	<0.0036	<0.0035	<0.0037	<0.0037	<0.0038
PFOA + PFOS (Calculated)	0.07	NCL	NCL	NCL	NCL	ND	0.0019	ND	***0.23***	***0.17***	***0.25***	***0.16***	ND	ND	ND	ND	0.0027	0.0027
Perfluoropentanoic acid (PFPeA)	NCL	NCL	NCL	NCL	NCL	<0.0037	<0.0037	<0.0039	<0.0037	<0.0037	0.0049	<0.0037	<0.0035	<0.0036	<0.0035	<0.0037	<0.0037	<0.0038
Perfluorotetradecanoic acid (PFTeDA)	NCL	NCL	NCL	NCL	NCL	<0.0037	<0.0037	<0.0039	<0.0037	<0.0037	<0.0035	<0.0037	<0.0035	<0.0036	<0.0035	<0.0037	<0.0037	<0.0038
Perfluorotridecanoic acid (PFTrDA)	NCL	NCL	NCL	NCL	NCL	<0.0037	<0.0037	<0.0039	<0.0037	<0.0037	<0.0035	<0.0037	<0.0035	<0.0036	<0.0035	<0.0037	<0.0037	<0.0038
Perfluoroundecanoic acid (PFUnDA)	NCL	NCL	NCL	NCL	NCL	<0.0037	<0.0037	<0.0039	<0.0037	<0.0037	<0.0035	<0.0037	<0.0035	<0.0036	<0.0035	<0.0037	<0.0037	<0.0038
Total PFAS (Calculated)	NCL	NCL	NCL	NCL	NCL	0.0051	0.012	0.014	0.29	0.22	0.33	0.21	ND	ND	ND	ND	0.01	0.014

TABLE 6
SUMMARY OF GROUNDWATER SAMPLE ANALYSIS - PFAS
Area R-1 (19)
Wolven/Jewell Area, 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]	EGLE Residential Recommended Volatilization to Indoor Air Interim Action Screening Level - Groundwater[3]	U.S. EPA Residential Tap Water Regional Removal Management Levels[4]	WV-MW-5D	WV-MW-5D	WV-MW-5D	WV-MW-5S	WV-MW-5S	WV-MW-5S	WV-MW-5S	WV-MW-6D	WV-MW-6D	WV-MW-6D	WV-MW-6D	WV-MW-6S	WV-MW-6S
Sample Name						WV-GW-MW5D	WV-GW-MW5D	WV-GW-MW-5D	MW-WV-5S	WV-GW-MW5S	WV-GW-MW5S	WV-GW-MW-5S	MW-WV-6D	VW-GW-MW-6D	WV-GW-MW6D	WV-GW-MW6D	MW-WV-6S	VW-GW-MW-6S
Well Screen Interval (Feet below ground surface)						68.7-73.7	68.7-73.7	68.7-73.7	61.5-66.5	61.5-66.5	61.5-66.5	61.5-66.5	99.1-104.1	99.1-104.1	99.1-104.1	99.1-104.1	13.3-18.3	13.3-18.3
Laboratory Sample ID(s)						UE09028-017	UI05007-001	UK19013-003	UB16022-004	UE09028-016	UI05007-003	UK19013-004	UB20051-005	UK09009-004	UE02030-010	UH29005-021	UB20051-004	UK09009-003
Sample Date						05/09/2019	09/03/2019	11/13/2019	02/14/2019	05/09/2019	09/03/2019	11/13/2019	02/19/2019	11/08/2019	05/02/2019	08/28/2019	02/19/2019	11/08/2019
Parameter (µg/L)																		
8:2 Fluorotelomer sulfonic acid (8:2 FTS)	NCL	NCL	NCL	NCL	NCL	<0.0035	<0.0034	<0.0036	<0.0037	<0.0036	<0.0035	<0.0038	<0.0036	<0.0036	<0.0036	<0.0033	<0.0036	<0.0036
6:2 Fluorotelomer sulfonic acid (6:2 FTS)	NCL	NCL	NCL	NCL	NCL	<0.0035	<0.0034	<0.0036	<0.0037	<0.0036	<0.0035	<0.0038	<0.0036	<0.0036	<0.0036	<0.0033	<0.0036	<0.0036
N-Ethyl perfluorooctane sulfonamide (EtFOSA)	NCL	NCL	NCL	NCL	NCL	<0.0035	<0.0034	<0.0036	<0.0037	<0.0036	<0.0035	<0.0038	<0.0036	<0.0036	<0.0036	<0.0033	<0.0036	<0.0036
N-Methyl perfluorooctane sulfonamide (MeFOSA)	NCL	NCL	NCL	NCL	NCL	<0.007	<0.0069	<0.0072	<0.0073	<0.0072	<0.007	<0.0077	<0.0072	<0.0072	<0.0072	<0.0067	<0.0071	<0.0072
Perfluorobutane sulfonic acid (PFBS)	NCL	NCL	NCL	NCL	1,200	0.0074	0.0086	0.009	0.0088	0.0075	0.0087	0.0074	0.016	0.017	0.016	0.017	0.0076	0.0093
Perfluorodecane sulfonic acid (PFDS)	NCL	NCL	NCL	NCL	NCL	<0.0035	<0.0034	<0.0036	<0.0037	<0.0036	<0.0035	<0.0038	<0.0036	<0.0036	<0.0036	<0.0033	<0.0036	<0.0036
Perfluoroheptane sulfonic acid (PFHpS)	NCL	NCL	NCL	NCL	NCL	<0.0035	<0.0034	<0.0036	<0.0037	<0.0036	<0.0035	<0.0038	<0.0036	<0.0036	<0.0036	<0.0033	<0.0036	<0.0036
Perfluorononane sulfonic acid (PFNS)	NCL	NCL	NCL	NCL	NCL	<0.007	<0.0069	<0.0072	<0.0073	<0.0072	<0.007	<0.0077	<0.0072	<0.0072	<0.0072	<0.0067	<0.0071	<0.0072
Perfluorooctane sulfonamide (FOSA)	NCL	NCL	NCL	NCL	NCL	<0.0035	<0.0034	<0.0036	<0.0037	<0.0036	<0.0035	<0.0038	<0.0036	<0.0036	<0.0036	<0.0033	<0.0036	<0.0036
Perfluoropentane sulfonic acid (PFPeS)	NCL	NCL	NCL	NCL	NCL	<0.0035	<0.0034	<0.0036	<0.0037	<0.0036	<0.0035	<0.0038	<0.0036	<0.0036	<0.0036	<0.0033	<0.0036	<0.0036
Perfluorohexane sulfonic acid (PFHxS)	NCL	NCL	NCL	NCL	NCL	0.0039	0.0037	0.0036	<0.0037	<0.0036	0.004	<0.0038	<0.0036	<0.0036	<0.0036	<0.0033	<0.0036	0.0039
Perfluorobutanoic acid (PFBA)	NCL	NCL	NCL	NCL	NCL	0.005	0.0041	<0.0036	<0.0037	<0.0036	<0.0035	<0.0038	0.0047	0.0053	0.0049	0.0055	0.0072	0.0098
Perfluorodecanoic acid (PFDA)	NCL	NCL	NCL	NCL	NCL	<0.0035	<0.0034	<0.0036	<0.0037	<0.0036	<0.0035	<0.0038	<0.0036	<0.0036	<0.0036	<0.0033	<0.0036	<0.0036
Perfluorododecanoic acid (PFDoDA)	NCL	NCL	NCL	NCL	NCL	<0.0035	<0.0034	<0.0036	<0.0037	<0.0036	<0.0035	<0.0038	<0.0036	<0.0036	<0.0036	<0.0033	<0.0036	<0.0036
Perfluoroheptanoic acid (PFHpA)	NCL	NCL	NCL	NCL	NCL	<0.0035	<0.0034	<0.0036	<0.0037	<0.0036	<0.0035	<0.0038	<0.0036	<0.0036	<0.0036	<0.0033	0.0039	0.0036
Perfluorohexanoic acid (PFHxA)	NCL	NCL	NCL	NCL	NCL	<0.0035	0.0051	0.0046	0.004	<0.0036	<0.0035	<0.0038	<0.0036	<0.0036	<0.0036	<0.0033	0.0063	0.0066
Perfluorononanoic acid (PFNA)	NCL	NCL	NCL	NCL	NCL	<0.0035	<0.0034	<0.0036	<0.0037	<0.0036	<0.0035	<0.0038	<0.0036	<0.0036	<0.0036	<0.0033	<0.0036	<0.0036
Perfluorooctanoic acid (PFOA)	0.07 (JJ)	12	ID	NCL	NCL	0.0055	0.0082	0.0061	0.005	0.0047	0.0061	0.0026	0.0027	0.0035	0.0027	0.0034	0.019	0.024
Perfluorooctane sulfonic acid (PFOS)	0.07 (JJ)	0.012	NLV	NCL	NCL	<0.0035	<0.0034	<0.0036	<0.0037	<0.0036	<0.0035	<0.0038	<0.0036	<0.0036	<0.0036	<0.0033	0.0044	0.0089
PFOA + PFOS (Calculated)	0.07	NCL	NCL	NCL	NCL	0.0055	0.0082	0.0061	0.005	0.0047	0.0061	0.0026	0.0027	0.0035	0.0027	0.0034	0.023	0.033
Perfluoropentanoic acid (PFPeA)	NCL	NCL	NCL	NCL	NCL	<0.0035	<0.0034	<0.0036	<0.0037	<0.0036	<0.0035	<0.0038	<0.0036	<0.0036	<0.0036	<0.0033	<0.0036	<0.0036
Perfluorotetradecanoic acid (PFTeDA)	NCL	NCL	NCL	NCL	NCL	<0.0035	<0.0034	<0.0036	<0.0037	<0.0036	<0.0035	<0.0038	<0.0036	<0.0036	<0.0036	<0.0033	<0.0036	<0.0036
Perfluorotridecanoic acid (PFTrDA)	NCL	NCL	NCL	NCL	NCL	<0.0035	<0.0034	<0.0036	<0.0037	<0.0036	<0.0035	<0.0038	<0.0036	<0.0036	<0.0036	<0.0033	<0.0036	<0.0036
Perfluoroundecanoic acid (PFUnDA)	NCL	NCL	NCL	NCL	NCL	<0.0035	<0.0034	<0.0036	<0.0037	<0.0036	<0.0035	<0.0038	<0.0036	<0.0036	<0.0036	<0.0033	<0.0036	<0.0036
Total PFAS (Calculated)	NCL	NCL	NCL	NCL	NCL	0.022	0.03	0.023	0.018	0.012	0.019	0.01	0.023	0.026	0.024	0.026	0.048	0.066

TABLE 6
SUMMARY OF GROUNDWATER SAMPLE ANALYSIS - PFAS
Area R-1 (19)
Wolven/Jewell Area, 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]	EGLE Residential Recommended Volatilization to Indoor Air Interim Action Screening Level - Groundwater[3]	U.S. EPA Residential Tap Water Regional Removal Management Levels[4]	WV-MW-6S	WV-MW-6S	WV-MW-7D	WV-MW-7D	WV-MW-7D	WV-MW-7D	WV-MW-7M	WV-MW-7M	WV-MW-7M	WV-MW-7S	WV-MW-7S	WV-MW-7S	WV-MW-7S
Sample Name						WV-GW-MW6S	WV-GW-MW6S	MW-WV-7D	WV-GW-MW 7D	WV-GW-MW7D	WV-GW-MW-7D	WV-GW-MW 7M	WV-GW-MW7M	WV-GW-MW-7M	MW-WV-7S	WV-GW-MW 7S	WV-GW-MW7S	WV-GW-MW-7S
Well Screen Interval (Feet below ground surface)						13.3-18.3	13.3-18.3	89.5-94.5	89.5-94.5	89.5-94.5	89.5-94.5	49.9-54.9	49.9-54.9	49.9-54.9	16.1-21.1	16.1-21.1	16.1-21.1	16.1-21.1
Laboratory Sample ID(s)						UE02030-011	UH29005-020	UB14084-007	UH29005-001	UE02030-009	UK07051-003	UH29005-003	UE02030-008	UK07051-002	UB14084-005	UH29005-002	UE02030-007	UK07051-001
Sample Date						05/02/2019	08/28/2019	02/13/2019	08/26/2019	05/03/2019	11/05/2019	08/26/2019	05/03/2019	11/05/2019	02/13/2019	08/26/2019	05/03/2019	11/05/2019
Parameter (µg/L)																		
8:2 Fluorotelomer sulfonic acid (8:2 FTS)	NCL	NCL	NCL	NCL	NCL	<0.0036	<0.0034	<0.0038	<0.0036	<0.0036	<0.0039	<0.0035	<0.0036	<0.0038	<0.0039	<0.0034	<0.0035	<0.0039
6:2 Fluorotelomer sulfonic acid (6:2 FTS)	NCL	NCL	NCL	NCL	NCL	<0.0036	<0.0034	<0.0038	<0.0036	<0.0036	<0.0039	<0.0035	<0.0036	<0.0038	<0.0039	<0.0034	<0.0035	<0.0039
N-Ethyl perfluorooctane sulfonamide (EtFOSA)	NCL	NCL	NCL	NCL	NCL	<0.0036	<0.0034	<0.0038	<0.0036	<0.0036	<0.0039	<0.0035	<0.0036	<0.0038	<0.0039	<0.0034	<0.0035	<0.0039
N-Methyl perfluorooctane sulfonamide (MeFOSA)	NCL	NCL	NCL	NCL	NCL	<0.0071	<0.0069	<0.0077	<0.0071	<0.0072	<0.0078	<0.007	<0.0072	<0.0076	<0.0078	<0.0068	<0.0071	<0.0078
Perfluorobutane sulfonic acid (PFBS)	NCL	NCL	NCL	NCL	1,200	0.0082	0.0086	0.012	0.011	0.01	0.0097	0.01	0.0083	0.0091	0.0039	<0.0034	<0.0035	<0.0039
Perfluorodecane sulfonic acid (PFDS)	NCL	NCL	NCL	NCL	NCL	<0.0036	<0.0034	<0.0038	<0.0036	<0.0036	<0.0039	<0.0035	<0.0036	<0.0038	<0.0039	<0.0034	<0.0035	<0.0039
Perfluoroheptane sulfonic acid (PFHpS)	NCL	NCL	NCL	NCL	NCL	<0.0036	<0.0034	0.013	0.013	0.013	0.012	0.011	0.01	0.0097	<0.0039	<0.0034	<0.0035	<0.0039
Perfluorononane sulfonic acid (PFNS)	NCL	NCL	NCL	NCL	NCL	<0.0071	<0.0069	<0.0077	<0.0071	<0.0072	<0.0078	<0.007	<0.0072	<0.0076	<0.0078	<0.0068	<0.0071	<0.0078
Perfluorooctane sulfonamide (FOSA)	NCL	NCL	NCL	NCL	NCL	<0.0036	<0.0034	<0.0038	<0.0036	<0.0036	<0.0039	<0.0035	<0.0036	<0.0038	<0.0039	<0.0034	<0.0035	<0.0039
Perfluoropentane sulfonic acid (PFPeS)	NCL	NCL	NCL	NCL	NCL	<0.0036	<0.0034	0.0092	0.0069	0.0078	0.0077	0.0053	0.0046	0.0053	<0.0039	<0.0034	<0.0035	<0.0039
Perfluorohexane sulfonic acid (PFHxS)	NCL	NCL	NCL	NCL	NCL	<0.0036	<0.0034	0.041	0.034	0.035	0.033	0.022	0.024	0.024	0.0044	0.0065	<0.0035	<0.0039
Perfluorobutanoic acid (PFBA)	NCL	NCL	NCL	NCL	NCL	0.0056	0.0036	0.0056	0.0055	0.0054	0.0052	0.0043	0.004	0.0042	0.0047	0.028	<0.0035	0.0053
Perfluorodecanoic acid (PFDA)	NCL	NCL	NCL	NCL	NCL	<0.0036	<0.0034	<0.0038	<0.0036	<0.0036	<0.0039	<0.0035	<0.0036	<0.0038	<0.0039	<0.0034	<0.0035	<0.0039
Perfluorododecanoic acid (PFDoDA)	NCL	NCL	NCL	NCL	NCL	<0.0036	<0.0034	<0.0038	<0.0036	<0.0036	<0.0039	<0.0035	<0.0036	<0.0038	<0.0039	<0.0034	<0.0035	<0.0039
Perfluoroheptanoic acid (PFHpA)	NCL	NCL	NCL	NCL	NCL	<0.0036	<0.0034	0.012	0.011	0.012	0.01	0.0078	0.0073	0.0074	<0.0039	0.016	<0.0035	0.0054
Perfluorohexanoic acid (PFHxA)	NCL	NCL	NCL	NCL	NCL	<0.0036	<0.0034	0.011	0.0095	0.0097	0.0081	0.0061	0.0066	0.0059	0.011	0.028	<0.0035	0.0079
Perfluorononanoic acid (PFNA)	NCL	NCL	NCL	NCL	NCL	<0.0036	<0.0034	<0.0038	<0.0036	<0.0036	<0.0039	<0.0035	<0.0036	<0.0038	<0.0039	<0.0034	<0.0035	<0.0039
Perfluorooctanoic acid (PFOA)	0.07 (JJ)	12	ID	NCL	NCL	0.013	0.0066	***0.11***	***0.12***	***0.1***	***0.095***	***0.077***	0.067	***0.076***	0.011	0.026	0.011	0.011
Perfluorooctane sulfonic acid (PFOS)	0.07 (JJ)	0.012	NLV	NCL	NCL	0.0046	0.0066	***0.14***	***0.2***	***0.16***	***0.17***	***0.28***	***0.27***	***0.3***	<0.0039	<0.0034	0.0036	<0.0039
PFOA + PFOS (Calculated)	0.07	NCL	NCL	NCL	NCL	0.018	0.013	***0.25***	***0.32***	***0.26***	***0.27***	***0.36***	***0.34***	***0.38***	0.011	0.026	0.015	0.011
Perfluoropentanoic acid (PFPeA)	NCL	NCL	NCL	NCL	NCL	<0.0036	<0.0034	0.0049	0.005	0.0052	0.0046	0.0039	0.0038	<0.0038	0.0091	0.031	<0.0035	0.0069
Perfluorotetradecanoic acid (PFTeDA)	NCL	NCL	NCL	NCL	NCL	<0.0036	<0.0034	<0.0038	<0.0036	<0.0036	<0.0039	<0.0035	<0.0036	<0.0038	<0.0039	<0.0034	<0.0035	<0.0039
Perfluorotridecanoic acid (PFTrDA)	NCL	NCL	NCL	NCL	NCL	<0.0036	<0.0034	<0.0038	<0.0036	<0.0036	<0.0039	<0.0035	<0.0036	<0.0038	<0.0039	<0.0034	<0.0035	<0.0039
Perfluoroundecanoic acid (PFUnDA)	NCL	NCL	NCL	NCL	NCL	<0.0036	<0.0034	<0.0038	<0.0036	<0.0036	<0.0039	<0.0035	<0.0036	<0.0038	<0.0039	<0.0034	<0.0035	<0.0039
Total PFAS (Calculated)	NCL	NCL	NCL	NCL	NCL	0.031	0.025	0.36	0.42	0.36	0.36	0.43	0.41	0.44	0.044	0.14	0.015	0.037

TABLE 6
SUMMARY OF GROUNDWATER SAMPLE ANALYSIS - PFAS
Area R-1 (19)
Wolven/Jewell Area, 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]	EGLE Residential Recommended Volatilization to Indoor Air Interim Action Screening Level - Groundwater[3]	U.S. EPA Residential Tap Water Regional Removal Management Levels[4]	WV-MW-8D	WV-MW-8D	WV-MW-8D	WV-MW-8M	WV-MW-8M	WV-MW-8M	WV-MW-8M	WV-MW-8S	WV-MW-8S	WV-MW-8S	WV-MW-8S	WV-MW-8S	WV-MW-9
Sample Name						MW-WV-8D	VW-GW-MW-8D	WV-GW-MW 8D	MW-WV-8M	WV-GW-MW 8M	WV-GW-MW8M	WV-GW-MW-8M	MW-WV-8S	WV-GW-MW 8S	WV-GW-MW8S	WV-GW-MW8SDUP	WV-GW-MW-8S	MW-WV-9
Well Screen Interval (Feet below ground surface)						117.2-122.2	117.2-122.2	117.2-122.2	60-65	60-65	60-65	60-65	30-35	30-35	30-35	30-35	30-35	92.3-97.3
Laboratory Sample ID(s)						UB16022-009	UK09009-001	UH29005-004	UB14084-002	UH29005-005	UE02030-003	UK07025-007	UB14084-001	UH29005-006	UE02030-004	UE02030-005	UK07025-006	UB20051-012
Sample Date						02/15/2019	11/08/2019	08/26/2019	02/12/2019	08/26/2019	05/01/2019	11/06/2019	02/12/2019	08/26/2019	05/01/2019	05/01/2019	11/06/2019	02/21/2019
Parameter (µg/L)																		
8:2 Fluorotelomer sulfonic acid (8:2 FTS)	NCL	NCL	NCL	NCL	NCL	<0.0035	<0.0037	<0.0034	<0.0038	<0.0036	<0.0036	<0.0039	<0.0037	<0.0034	<0.0036	<0.0036	<0.0037	<0.0034
6:2 Fluorotelomer sulfonic acid (6:2 FTS)	NCL	NCL	NCL	NCL	NCL	<0.0035	<0.0037	<0.0034	<0.0038	<0.0036	<0.0036	<0.0039	<0.0037	<0.0034	<0.0036	<0.0036	<0.0037	<0.0034
N-Ethyl perfluorooctane sulfonamide (EtFOSA)	NCL	NCL	NCL	NCL	NCL	<0.0035	<0.0037	<0.0034	<0.0038	<0.0036	<0.0036	<0.0039	<0.0037	<0.0034	<0.0036	<0.0036	<0.0037	<0.0034
N-Methyl perfluorooctane sulfonamide (MeFOSA)	NCL	NCL	NCL	NCL	NCL	<0.007	<0.0075	<0.0069	<0.0075	<0.0071	<0.0072	<0.0078	<0.0074	<0.0068	<0.0073	<0.0072	<0.0074	<0.0069
Perfluorobutane sulfonic acid (PFBS)	NCL	NCL	NCL	NCL	1,200	<0.0035	<0.0037	0.0034	0.083	0.092	0.081	0.08	0.021	0.015	0.012	0.014	0.013	0.014
Perfluorodecane sulfonic acid (PFDS)	NCL	NCL	NCL	NCL	NCL	<0.0035	<0.0037	<0.0034	<0.0038	<0.0036	<0.0036	<0.0039	<0.0037	<0.0034	<0.0036	<0.0036	<0.0037	<0.0034
Perfluoroheptane sulfonic acid (PFHpS)	NCL	NCL	NCL	NCL	NCL	<0.0035	<0.0037	<0.0034	<0.0038	<0.0036	<0.0036	<0.0039	<0.0037	<0.0034	<0.0036	<0.0036	<0.0037	0.023
Perfluorononane sulfonic acid (PFNS)	NCL	NCL	NCL	NCL	NCL	<0.007	<0.0075	<0.0069	<0.0075	<0.0071	<0.0072	<0.0078	<0.0074	<0.0068	<0.0073	<0.0072	<0.0074	<0.0069
Perfluorooctane sulfonamide (FOSA)	NCL	NCL	NCL	NCL	NCL	<0.0035	<0.0037	<0.0034	<0.0038	<0.0036	<0.0036	<0.0039	<0.0037	<0.0034	<0.0036	<0.0036	<0.0037	0.032
Perfluoropentane sulfonic acid (PFPeS)	NCL	NCL	NCL	NCL	NCL	<0.0035	<0.0037	<0.0034	<0.0038	<0.0036	<0.0036	<0.0039	0.0042	0.0037	0.0042	0.0043	0.0037	0.036
Perfluorohexane sulfonic acid (PFHxS)	NCL	NCL	NCL	NCL	NCL	<0.0035	<0.0037	<0.0034	0.012	0.011	0.01	0.01	0.019	0.017	0.016	0.016	0.02	0.13
Perfluorobutanoic acid (PFBA)	NCL	NCL	NCL	NCL	NCL	<0.0035	<0.0037	<0.0034	0.0097	0.011	0.01	0.0099	0.0069	0.0061	0.0062	0.0063	0.0056	0.0075
Perfluorodecanoic acid (PFDA)	NCL	NCL	NCL	NCL	NCL	<0.0035	<0.0037	<0.0034	<0.0038	<0.0036	<0.0036	<0.0039	<0.0037	<0.0034	<0.0036	<0.0036	<0.0037	<0.0034
Perfluorododecanoic acid (PFDoDA)	NCL	NCL	NCL	NCL	NCL	<0.0035	<0.0037	<0.0034	<0.0038	<0.0036	<0.0036	<0.0039	<0.0037	<0.0034	<0.0036	<0.0036	<0.0037	<0.0034
Perfluoroheptanoic acid (PFHpA)	NCL	NCL	NCL	NCL	NCL	<0.0035	<0.0037	<0.0034	0.0052	0.0055	0.0046	0.0049	0.0048	0.0054	0.0047	0.005	0.007	0.047
Perfluorohexanoic acid (PFHxA)	NCL	NCL	NCL	NCL	NCL	<0.0035	<0.0037	<0.0034	0.011	0.012	0.011	0.011	0.0038	0.004	0.0042	<0.0036	0.0057	0.022
Perfluorononanoic acid (PFNA)	NCL	NCL	NCL	NCL	NCL	<0.0035	<0.0037	<0.0034	<0.0038	<0.0036	<0.0036	<0.0039	<0.0037	<0.0034	<0.0036	<0.0036	<0.0037	<0.0034
Perfluorooctanoic acid (PFOA)	0.07 (JJ)	12	ID	NCL	NCL	0.0048	0.0057	0.0052	0.03	0.033	0.03	0.031	0.055	0.066	0.052	0.051	***0.092***	***0.53***
Perfluorooctane sulfonic acid (PFOS)	0.07 (JJ)	0.012	NLV	NCL	NCL	<0.0035	<0.0037	<0.0034	0.0065	0.0052	0.005	0.0055	***0.058***	***0.042***	***0.046***	***0.048***	***0.034***	***0.54***
PFOA + PFOS (Calculated)	0.07	NCL	NCL	NCL	NCL	0.0048	0.0057	0.0052	0.037	0.038	0.035	0.037	***0.11***	***0.11***	***0.098***	***0.099***	***0.13***	***1.1***
Perfluoropentanoic acid (PFPeA)	NCL	NCL	NCL	NCL	NCL	<0.0035	<0.0037	<0.0034	0.0093	0.0096	0.0086	0.009	<0.0037	<0.0034	<0.0036	<0.0036	<0.0037	0.0083
Perfluorotetradecanoic acid (PFTeDA)	NCL	NCL	NCL	NCL	NCL	<0.0035	<0.0037	<0.0034	<0.0038	<0.0036	<0.0036	<0.0039	<0.0037	<0.0034	<0.0036	<0.0036	<0.0037	<0.0034
Perfluorotridecanoic acid (PFTrDA)	NCL	NCL	NCL	NCL	NCL	<0.0035	<0.0037	<0.0034	<0.0038	<0.0036	<0.0036	<0.0039	<0.0037	<0.0034	<0.0036	<0.0036	<0.0037	<0.0034
Perfluoroundecanoic acid (PFUnDA)	NCL	NCL	NCL	NCL	NCL	<0.0035	<0.0037	<0.0034	<0.0038	<0.0036	<0.0036	<0.0039	<0.0037	<0.0034	<0.0036	<0.0036	<0.0037	<0.0034
Total PFAS (Calculated)	NCL	NCL	NCL	NCL	NCL	0.0048	0.0057	0.0086	0.17	0.18	0.16	0.16	0.17	0.16	0.15	0.14	0.18	1.4

TABLE 6
SUMMARY OF GROUNDWATER SAMPLE ANALYSIS - PFAS
Area R-1 (19)
Wolven/Jewell Area, 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]	EGLE Residential Recommended Volatilization to Indoor Air Interim Action Screening Level - Groundwater[3]	U.S. EPA Residential Tap Water Regional Removal Management Levels[4]	WV-MW-9	WV-MW-9	WV-MW-9	WV-MW-10D	WV-MW-10D	WV-MW-10D	WV-MW-10M	WV-MW-10M	WV-MW-10M	WV-MW-10S	WV-MW-10S	WV-MW-10S	WV-MW-11D
Sample Name						WV-GW-MW9	WV-GW-MW9	WV-GW-MW9	WV-GW-MW10D	WV-GW-MW10D	WV-GW-MW10D	WV-GW-MW10M	WV-GW-MW10M	WV-GW-MW10M	WV-GW-MW10S	WV-GW-MW10S	WV-GW-MW10S	MW-WV-11D
Well Screen Interval (Feet below ground surface)						92.3-97.3	92.3-97.3	92.3-97.3	165-170	165-170	165-170	69.9-74.9	69.9-74.9	69.9-74.9	7-12	7-12	7-12	158.9-163.9
Laboratory Sample ID(s)						UE09028-015	UI05007-009	UK13023-011	UE09028-004	UH29005-011	UK07025-003	UE02030-002	UH29005-009	UK07025-002	UE02030-001	UH29005-010	UK07025-001	UB16022-001
Sample Date						05/10/2019	09/04/2019	11/11/2019	05/08/2019	08/27/2019	11/06/2019	04/30/2019	08/27/2019	11/06/2019	04/30/2019	08/27/2019	11/06/2019	02/14/2019
Parameter (µg/L)																		
8:2 Fluorotelomer sulfonic acid (8:2 FTS)	NCL	NCL	NCL	NCL	NCL	<0.0035	<0.0037	<0.0038	<0.0036	<0.0036	<0.0039	<0.0036	<0.0036	<0.0037	<0.0037	<0.0035	<0.0035	<0.0037
6:2 Fluorotelomer sulfonic acid (6:2 FTS)	NCL	NCL	NCL	NCL	NCL	<0.0035	<0.0037	<0.0038	<0.0036	<0.0036	<0.0039	<0.0036	<0.0036	<0.0037	<0.0037	<0.0035	<0.0035	<0.0037
N-Ethyl perfluorooctane sulfonamide (EtFOSA)	NCL	NCL	NCL	NCL	NCL	<0.0035	<0.0037	<0.0038	<0.0036	<0.0036	<0.0039	<0.0036	<0.0036	<0.0037	<0.0037	<0.0035	<0.0035	<0.0037
N-Methyl perfluorooctane sulfonamide (MeFOSA)	NCL	NCL	NCL	NCL	NCL	<0.0071	<0.0075	<0.0077	<0.0072	<0.0071	<0.0078	<0.0071	<0.0072	<0.0074	<0.0073	<0.0071	<0.007	<0.0073
Perfluorobutane sulfonic acid (PFBS)	NCL	NCL	NCL	NCL	1,200	0.012	0.014	0.015	0.0039	0.0042	0.0039	<0.0036	<0.0036	<0.0037	0.011	0.013	0.009	<0.0037
Perfluorodecane sulfonic acid (PFDS)	NCL	NCL	NCL	NCL	NCL	<0.0035	<0.0037	<0.0038	<0.0036	<0.0036	<0.0039	<0.0036	<0.0036	<0.0037	<0.0037	<0.0035	<0.0035	<0.0037
Perfluoroheptane sulfonic acid (PFHpS)	NCL	NCL	NCL	NCL	NCL	0.026	0.047	0.038	<0.0036	<0.0036	<0.0039	<0.0036	<0.0036	<0.0037	0.014	0.014	0.016	<0.0037
Perfluorononane sulfonic acid (PFNS)	NCL	NCL	NCL	NCL	NCL	<0.0071	<0.0075	<0.0077	<0.0072	<0.0071	<0.0078	<0.0071	<0.0072	<0.0074	<0.0073	<0.0071	<0.007	<0.0073
Perfluorooctane sulfonamide (FOSA)	NCL	NCL	NCL	NCL	NCL	0.027	0.025	0.021	<0.0036	<0.0036	<0.0039	<0.0036	<0.0036	<0.0037	<0.0037	<0.0035	<0.0035	<0.0037
Perfluoropentane sulfonic acid (PFPeS)	NCL	NCL	NCL	NCL	NCL	0.035	0.039	0.043	<0.0036	<0.0036	<0.0039	<0.0036	<0.0036	<0.0037	0.0057	0.006	0.0044	<0.0037
Perfluorohexane sulfonic acid (PFHxS)	NCL	NCL	NCL	NCL	NCL	0.13	0.18	0.21	<0.0036	<0.0036	<0.0039	<0.0036	<0.0036	<0.0037	0.023	0.029	0.021	<0.0037
Perfluorobutanoic acid (PFBA)	NCL	NCL	NCL	NCL	NCL	0.0081	0.0099	0.011	<0.0036	<0.0036	<0.0039	<0.0036	<0.0036	<0.0037	0.0037	0.01	0.0051	<0.0037
Perfluorodecanoic acid (PFDA)	NCL	NCL	NCL	NCL	NCL	<0.0035	<0.0037	<0.0038	<0.0036	<0.0036	<0.0039	<0.0036	<0.0036	<0.0037	<0.0037	<0.0035	<0.0035	<0.0037
Perfluorododecanoic acid (PFDoDA)	NCL	NCL	NCL	NCL	NCL	<0.0035	<0.0037	<0.0038	<0.0036	<0.0036	<0.0039	<0.0036	<0.0036	<0.0037	<0.0037	<0.0035	<0.0035	<0.0037
Perfluoroheptanoic acid (PFHpA)	NCL	NCL	NCL	NCL	NCL	0.049	0.062	0.067	<0.0036	<0.0036	<0.0039	<0.0036	<0.0036	<0.0037	0.0053	0.012	0.0081	<0.0037
Perfluorohexanoic acid (PFHxA)	NCL	NCL	NCL	NCL	NCL	0.025	0.03	0.029	<0.0036	<0.0036	<0.0039	<0.0036	<0.0036	<0.0037	<0.0037	0.013	0.0048	<0.0037
Perfluorononanoic acid (PFNA)	NCL	NCL	NCL	NCL	NCL	<0.0035	<0.0037	<0.0038	<0.0036	<0.0036	<0.0039	<0.0036	<0.0036	<0.0037	<0.0037	<0.0035	<0.0035	<0.0037
Perfluorooctanoic acid (PFOA)	0.07 (JJ)	12	ID	NCL	NCL	***0.54***	***0.73***	***0.77***	0.0027	0.0029	0.0026	<0.0018	<0.0018	<0.0018	0.061	***0.11***	***0.092***	<0.0018
Perfluorooctane sulfonic acid (PFOS)	0.07 (JJ)	0.012	NLV	NCL	NCL	***0.47***	***0.47***	***0.48***	<0.0036	<0.0036	<0.0039	<0.0036	<0.0036	<0.0037	***0.49***	***1***	***0.69***	<0.0037
PFOA + PFOS (Calculated)	0.07	NCL	NCL	NCL	NCL	***1***	***1.2***	***1.3***	0.0027	0.0029	0.0026	ND	ND	ND	***0.55***	***1.1***	***0.78***	ND
Perfluoropentanoic acid (PFPeA)	NCL	NCL	NCL	NCL	NCL	0.0086	0.01	0.011	<0.0036	<0.0036	<0.0039	<0.0036	<0.0036	<0.0037	<0.0037	0.0092	<0.0035	<0.0037
Perfluorotetradecanoic acid (PFTeDA)	NCL	NCL	NCL	NCL	NCL	<0.0035	<0.0037	<0.0038	<0.0036	<0.0036	<0.0039	<0.0036	<0.0036	<0.0037	<0.0037	<0.0035	<0.0035	<0.0037
Perfluorotridecanoic acid (PFTrDA)	NCL	NCL	NCL	NCL	NCL	<0.0035	<0.0037	<0.0038	<0.0036	<0.0036	<0.0039	<0.0036	<0.0036	<0.0037	<0.0037	<0.0035	<0.0035	<0.0037
Perfluoroundecanoic acid (PFUnDA)	NCL	NCL	NCL	NCL	NCL	<0.0035	<0.0037	<0.0038	<0.0036	<0.0036	<0.0039	<0.0036	<0.0036	<0.0037	<0.0037	<0.0035	<0.0035	<0.0037
Total PFAS (Calculated)	NCL	NCL	NCL	NCL	NCL	1.3	1.6	1.7	0.0066	0.0071	0.0065	ND	ND	ND	0.61	1.2	0.85	ND

TABLE 6
SUMMARY OF GROUNDWATER SAMPLE ANALYSIS - PFAS
Area R-1 (19)
Wolven/Jewell Area, 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]	EGLE Residential Recommended Volatilization to Indoor Air Interim Action Screening Level - Groundwater[3]	U.S. EPA Residential Tap Water Regional Removal Management Levels[4]	WV-MW-11D	WV-MW-11D	WV-MW-11D	WV-MW-11D	WV-MW-11S	WV-MW-11S	WV-MW-11S	WV-MW-11S	WV-MW-12D	WV-MW-12D	WV-MW-12D	WV-MW-12D	WV-MW-12M
Sample Name						WV-GW-MW11D	WV-GW-MW11D	WV-GW-MW11D	WV-GW-MW11D DUP	MW-WV-11S	WV-GW-MW11S	WV-GW-MW11S	WV-GW-MW11S	MW-WV-12D	WV-GW-MW12D	WV-GW-MW12D	WV-GW-MW-12D	MW-WV-12M
Well Screen Interval (Feet below ground surface)						158.9-163.9	158.9-163.9	158.9-163.9	158.9-163.9	29.4-34.4	29.4-34.4	29.4-34.4	29.4-34.4	179.2-184.2	179.2-184.2	179.2-184.2	179.2-184.2	146.6-151.6
Laboratory Sample ID(s)						UE02030-012	UH29005-012	UK07051-006	UK07051-007	UB16022-002	UE02030-013	UH29005-013	UK07051-008	UB14084-006	UE09028-006	UH31001-004	UK09008-003	UB14084-004
Sample Date						05/02/2019	08/27/2019	11/05/2019	11/05/2019	02/14/2019	05/02/2019	08/27/2019	11/05/2019	02/13/2019	05/07/2019	08/29/2019	11/07/2019	02/13/2019
Parameter (µg/L)																		
8:2 Fluorotelomer sulfonic acid (8:2 FTS)	NCL	NCL	NCL	NCL	NCL	<0.0036	<0.004	<0.0037	<0.0037	<0.0036	<0.0036	<0.0036	<0.0036	<0.0037	<0.0035	<0.0035	<0.0035	<0.0037
6:2 Fluorotelomer sulfonic acid (6:2 FTS)	NCL	NCL	NCL	NCL	NCL	<0.0036	<0.004	<0.0037	<0.0037	<0.0036	<0.0036	<0.0036	<0.0036	<0.0037	<0.0035	<0.0035	<0.0035	<0.0037
N-Ethyl perfluorooctane sulfonamide (EtFOSA)	NCL	NCL	NCL	NCL	NCL	<0.0036	<0.004	<0.0037	<0.0037	<0.0036	<0.0036	<0.0036	<0.0036	<0.0037	<0.0035	<0.0035	<0.0035	<0.0037
N-Methyl perfluorooctane sulfonamide (MeFOSA)	NCL	NCL	NCL	NCL	NCL	<0.0072	<0.0081	<0.0074	<0.0074	<0.0072	<0.0072	<0.0071	<0.0072	<0.0074	<0.0071	<0.007	<0.0071	<0.0074
Perfluorobutane sulfonic acid (PFBS)	NCL	NCL	NCL	NCL	1,200	<0.0036	<0.004	<0.0037	<0.0037	<0.0036	<0.0036	<0.0036	<0.0036	<0.0037	<0.0035	<0.0035	<0.0035	<0.0037
Perfluorodecane sulfonic acid (PFDS)	NCL	NCL	NCL	NCL	NCL	<0.0036	<0.004	<0.0037	<0.0037	<0.0036	<0.0036	<0.0036	<0.0036	<0.0037	<0.0035	<0.0035	<0.0035	<0.0037
Perfluoroheptane sulfonic acid (PFHpS)	NCL	NCL	NCL	NCL	NCL	<0.0036	<0.004	<0.0037	<0.0037	<0.0036	<0.0036	<0.0036	<0.0036	<0.0037	<0.0035	<0.0035	<0.0035	<0.0037
Perfluorononane sulfonic acid (PFNS)	NCL	NCL	NCL	NCL	NCL	<0.0072	<0.0081	<0.0074	<0.0074	<0.0072	<0.0072	<0.0071	<0.0072	<0.0074	<0.0071	<0.007	<0.0071	<0.0074
Perfluorooctane sulfonamide (FOSA)	NCL	NCL	NCL	NCL	NCL	<0.0036	<0.004	<0.0037	<0.0037	<0.0036	<0.0036	<0.0036	<0.0036	<0.0037	<0.0035	<0.0035	<0.0035	<0.0037
Perfluoropentane sulfonic acid (PFPeS)	NCL	NCL	NCL	NCL	NCL	<0.0036	<0.004	<0.0037	<0.0037	<0.0036	<0.0036	<0.0036	<0.0036	<0.0037	<0.0035	<0.0035	<0.0035	<0.0037
Perfluorohexane sulfonic acid (PFHxS)	NCL	NCL	NCL	NCL	NCL	<0.0036	<0.004	<0.0037	<0.0037	<0.0036	<0.0036	<0.0036	<0.0036	<0.0037	<0.0035	<0.0035	<0.0035	<0.0037
Perfluorobutanoic acid (PFBA)	NCL	NCL	NCL	NCL	NCL	<0.0036	<0.004	<0.0037	<0.0037	<0.0036	<0.0036	<0.0036	<0.0036	<0.0037	<0.0035	<0.0035	<0.0035	<0.0037
Perfluorodecanoic acid (PFDA)	NCL	NCL	NCL	NCL	NCL	<0.0036	<0.004	<0.0037	<0.0037	<0.0036	<0.0036	<0.0036	<0.0036	<0.0037	<0.0035	<0.0035	<0.0035	<0.0037
Perfluorododecanoic acid (PFDoDA)	NCL	NCL	NCL	NCL	NCL	<0.0036	<0.004	<0.0037	<0.0037	<0.0036	<0.0036	<0.0036	<0.0036	<0.0037	<0.0035	<0.0035	<0.0035	<0.0037
Perfluoroheptanoic acid (PFHpA)	NCL	NCL	NCL	NCL	NCL	<0.0036	<0.004	<0.0037	<0.0037	<0.0036	<0.0036	<0.0036	<0.0036	<0.0037	<0.0035	<0.0035	<0.0035	<0.0037
Perfluorohexanoic acid (PFHxA)	NCL	NCL	NCL	NCL	NCL	<0.0036	<0.004	<0.0037	<0.0037	<0.0036	<0.0036	<0.0036	<0.0036	<0.0037	<0.0035	<0.0035	<0.0035	<0.0037
Perfluorononanoic acid (PFNA)	NCL	NCL	NCL	NCL	NCL	<0.0036	<0.004	<0.0037	<0.0037	<0.0036	<0.0036	<0.0036	<0.0036	<0.0037	<0.0035	<0.0035	<0.0035	<0.0037
Perfluorooctanoic acid (PFOA)	0.07 (JJ)	12	ID	NCL	NCL	<0.0018	<0.002	<0.0019	<0.0018	<0.0018	<0.0018	<0.0018	<0.0018	<0.0018	<0.0018	<0.0017	<0.0018	<0.0018
Perfluorooctane sulfonic acid (PFOS)	0.07 (JJ)	0.012	NLV	NCL	NCL	<0.0036	<0.004	<0.0037	<0.0037	<0.0036	<0.0036	<0.0036	<0.0036	<0.0037	<0.0035	<0.0035	<0.0035	<0.0037
PFOA + PFOS (Calculated)	0.07	NCL	NCL	NCL	NCL	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Perfluoropentanoic acid (PFPeA)	NCL	NCL	NCL	NCL	NCL	<0.0036	<0.004	<0.0037	<0.0037	<0.0036	<0.0036	<0.0036	<0.0036	<0.0037	<0.0035	<0.0035	<0.0035	<0.0037
Perfluorotetradecanoic acid (PFTeDA)	NCL	NCL	NCL	NCL	NCL	<0.0036	<0.004	<0.0037	<0.0037	<0.0036	<0.0036	<0.0036	<0.0036	<0.0037	<0.0035	<0.0035	<0.0035	<0.0037
Perfluorotridecanoic acid (PFTrDA)	NCL	NCL	NCL	NCL	NCL	<0.0036	<0.004	<0.0037	<0.0037	<0.0036	<0.0036	<0.0036	<0.0036	<0.0037	<0.0035	<0.0035	<0.0035	<0.0037
Perfluoroundecanoic acid (PFUnDA)	NCL	NCL	NCL	NCL	NCL	<0.0036	<0.004	<0.0037	<0.0037	<0.0036	<0.0036	<0.0036	<0.0036	<0.0037	<0.0035	<0.0035	<0.0035	<0.0037
Total PFAS (Calculated)	NCL	NCL	NCL	NCL	NCL	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND

TABLE 6
SUMMARY OF GROUNDWATER SAMPLE ANALYSIS - PFAS
Area R-1 (19)
Wolven/Jewell Area, 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]	EGLE Residential Recommended Volatilization to Indoor Air Interim Action Screening Level - Groundwater[3]	U.S. EPA Residential Tap Water Regional Removal Management Levels[4]	WV-MW-12M	WV-MW-12M	WV-MW-12M	WV-MW-12S	WV-MW-12S	WV-MW-12S	WV-MW-12S	WV-MW-13D	WV-MW-13D	WV-MW-13D	WV-MW-13M	WV-MW-13M	WV-MW-13M
Sample Name						WV-GW-MW12M	WV-GW-MW12M	WV-GW-MW-12M	MW-WV-12S	WV-GW-MW12S	WV-GW-MW12S	WV-GW-MW-12S	WV-GW-MW13D	WV-GW-MW13D	WV-GW-MW-13D	WV-GW-MW13M	WV-GW-MW13M	WV-GW-MW-13M
Well Screen Interval (Feet below ground surface)						146.6-151.6	146.6-151.6	146.6-151.6	75.8-80.8	75.8-80.8	75.8-80.8	75.8-80.8	58.8-63.8	58.8-63.8	58.8-63.8	18.1-23.1	18.1-23.1	18.1-23.1
Laboratory Sample ID(s)						UE09028-007	UH31001-007	UK09008-002	UB14084-003	UE09028-008	UH31001-003	UK09008-001	UE09028-002	UH29005-017	UK09008-006	UE09028-001	UH29005-019	UK09008-005
Sample Date						05/07/2019	08/30/2019	11/07/2019	02/12/2019	05/07/2019	08/29/2019	11/07/2019	05/08/2019	08/28/2019	11/07/2019	05/08/2019	08/28/2019	11/07/2019
Parameter (µg/L)																		
8:2 Fluorotelomer sulfonic acid (8:2 FTS)	NCL	NCL	NCL	NCL	NCL	<0.0037	<0.0034	<0.0034	<0.0036	<0.0035	<0.0036	<0.004	<0.0036	<0.0036	<0.0038	<0.0035	<0.0036	<0.0036
6:2 Fluorotelomer sulfonic acid (6:2 FTS)	NCL	NCL	NCL	NCL	NCL	<0.0037	<0.0034	<0.0034	<0.0036	<0.0035	<0.0036	<0.004	<0.0036	<0.0036	<0.0038	<0.0035	<0.0036	<0.0036
N-Ethyl perfluorooctane sulfonamide (EtFOSA)	NCL	NCL	NCL	NCL	NCL	<0.0037	<0.0034	<0.0034	<0.0036	<0.0035	<0.0036	<0.004	<0.0036	<0.0036	<0.0038	<0.0035	<0.0036	<0.0036
N-Methyl perfluorooctane sulfonamide (MeFOSA)	NCL	NCL	NCL	NCL	NCL	<0.0074	<0.0068	<0.0068	<0.0072	<0.0071	<0.0072	<0.0079	<0.0072	<0.0073	<0.0076	<0.007	<0.0072	<0.0072
Perfluorobutane sulfonic acid (PFBS)	NCL	NCL	NCL	NCL	1,200	<0.0037	<0.0034	<0.0034	<0.0036	<0.0035	<0.0036	<0.004	0.01	0.01	0.0098	0.0052	0.0047	0.005
Perfluorodecane sulfonic acid (PFDS)	NCL	NCL	NCL	NCL	NCL	<0.0037	<0.0034	<0.0034	<0.0036	<0.0035	<0.0036	<0.004	<0.0036	<0.0036	<0.0038	<0.0035	<0.0036	<0.0036
Perfluoroheptane sulfonic acid (PFHpS)	NCL	NCL	NCL	NCL	NCL	<0.0037	<0.0034	<0.0034	<0.0036	<0.0035	<0.0036	<0.004	<0.0036	<0.0036	<0.0038	<0.0035	<0.0036	<0.0036
Perfluorononane sulfonic acid (PFNS)	NCL	NCL	NCL	NCL	NCL	<0.0074	<0.0068	<0.0068	<0.0072	<0.0071	<0.0072	<0.0079	<0.0072	<0.0073	<0.0076	<0.007	<0.0072	<0.0072
Perfluorooctane sulfonamide (FOSA)	NCL	NCL	NCL	NCL	NCL	<0.0037	<0.0034	<0.0034	<0.0036	<0.0035	<0.0036	<0.004	<0.0036	<0.0036	<0.0038	<0.0035	<0.0036	<0.0036
Perfluoropentane sulfonic acid (PFPeS)	NCL	NCL	NCL	NCL	NCL	<0.0037	<0.0034	<0.0034	<0.0036	<0.0035	<0.0036	<0.004	<0.0036	<0.0036	<0.0038	<0.0035	<0.0036	<0.0036
Perfluorohexane sulfonic acid (PFHxS)	NCL	NCL	NCL	NCL	NCL	<0.0037	<0.0034	<0.0034	<0.0036	<0.0035	<0.0036	<0.004	<0.0036	<0.0036	0.0038	0.005	0.0048	0.0056
Perfluorobutanoic acid (PFBA)	NCL	NCL	NCL	NCL	NCL	<0.0037	<0.0034	<0.0034	<0.0036	<0.0035	<0.0036	<0.004	<0.0036	<0.0036	<0.0038	0.0052	0.0066	0.0062
Perfluorodecanoic acid (PFDA)	NCL	NCL	NCL	NCL	NCL	<0.0037	<0.0034	<0.0034	<0.0036	<0.0035	<0.0036	<0.004	<0.0036	<0.0036	<0.0038	<0.0035	<0.0036	<0.0036
Perfluorododecanoic acid (PFDoDA)	NCL	NCL	NCL	NCL	NCL	<0.0037	<0.0034	<0.0034	<0.0036	<0.0035	<0.0036	<0.004	<0.0036	<0.0036	<0.0038	<0.0035	<0.0036	<0.0036
Perfluoroheptanoic acid (PFHpA)	NCL	NCL	NCL	NCL	NCL	<0.0037	<0.0034	<0.0034	<0.0036	<0.0035	<0.0036	<0.004	<0.0036	<0.0036	<0.0038	<0.0035	<0.0036	<0.0036
Perfluorohexanoic acid (PFHxA)	NCL	NCL	NCL	NCL	NCL	<0.0037	<0.0034	<0.0034	<0.0036	<0.0035	<0.0036	<0.004	<0.0036	<0.0036	<0.0038	<0.0035	<0.0036	<0.0036
Perfluorononanoic acid (PFNA)	NCL	NCL	NCL	NCL	NCL	<0.0037	<0.0034	<0.0034	<0.0036	<0.0035	<0.0036	<0.004	<0.0036	<0.0036	<0.0038	<0.0035	<0.0036	<0.0036
Perfluorooctanoic acid (PFOA)	0.07 (JJ)	12	ID	NCL	NCL	<0.0018	<0.0017	<0.0017	<0.0018	<0.0018	<0.0018	<0.002	0.0027	0.0031	0.003	0.012	0.016	0.015
Perfluorooctane sulfonic acid (PFOS)	0.07 (JJ)	0.012	NLV	NCL	NCL	<0.0037	<0.0034	<0.0034	<0.0036	<0.0035	<0.0036	<0.004	<0.0036	<0.0036	<0.0038	***0.016***	***0.017***	***0.017***
PFOA + PFOS (Calculated)	0.07	NCL	NCL	NCL	NCL	ND	ND	ND	ND	ND	ND	ND	0.0027	0.0031	0.003	0.028	0.033	0.032
Perfluoropentanoic acid (PFPeA)	NCL	NCL	NCL	NCL	NCL	<0.0037	<0.0034	<0.0034	<0.0036	<0.0035	<0.0036	<0.004	<0.0036	<0.0036	<0.0038	<0.0035	<0.0036	<0.0036
Perfluorotetradecanoic acid (PFTeDA)	NCL	NCL	NCL	NCL	NCL	<0.0037	<0.0034	<0.0034	<0.0036	<0.0035	<0.0036	<0.004	<0.0036	<0.0036	<0.0038	<0.0035	<0.0036	<0.0036
Perfluorotridecanoic acid (PFTrDA)	NCL	NCL	NCL	NCL	NCL	<0.0037	<0.0034	<0.0034	<0.0036	<0.0035	<0.0036	<0.004	<0.0036	<0.0036	<0.0038	<0.0035	<0.0036	<0.0036
Perfluoroundecanoic acid (PFUnDA)	NCL	NCL	NCL	NCL	NCL	<0.0037	<0.0034	<0.0034	<0.0036	<0.0035	<0.0036	<0.004	<0.0036	<0.0036	<0.0038	<0.0035	<0.0036	<0.0036
Total PFAS (Calculated)	NCL	NCL	NCL	NCL	NCL	ND	ND	ND	ND	ND	ND	ND	0.013	0.013	0.017	0.043	0.049	0.049

TABLE 6
SUMMARY OF GROUNDWATER SAMPLE ANALYSIS - PFAS
Area R-1 (19)
Wolven/Jewell Area, 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]	EGLE Residential Recommended Volatilization to Indoor Air Interim Action Screening Level - Groundwater[3]	U.S. EPA Residential Tap Water Regional Removal Management Levels[4]	WV-MW-13S	WV-MW-13S	WV-MW-13S	WV-MW-14D	WV-MW-14D	WV-MW-14S	WV-MW-14S	WV-MW-15A	WV-MW-15B	WV-MW-15C	WV-MW-15D	WV-MW-15D	WV-MW-16D
Sample Name						WV-GW-MW13S	WV-GW-MW13S	WV-GW-MW-13S	VW-GW-MW-14D	WV-GW-MW14D	WV-GW-MW14S	WV-GW-MW-14S	WV-GW-MW-15A	WV-GW-MW-15B	WV-GW-MW-15C	WV-GW-MW-15D	WV-GW-MW-15D DUP	WV-GW-MW16D
Well Screen Interval (Feet below ground surface)						1.7-6.7	1.7-6.7	1.7-6.7	142.3-147.3	142.3-147.3	8.9-13.9	8.9-13.9	9-14	33.1-38.1	43.7-48.5	135.1-137.8	135.1-137.8	91.7-96.7
Laboratory Sample ID(s)						UE09028-003	UH29005-016	UK09008-004	UK09009-002	UH29005-018	UH29005-015	UK09008-007	UK13023-008	UK13023-009	UK13023-010	UK13023-013	UK13023-014	UE09028-005
Sample Date						05/08/2019	08/28/2019	11/07/2019	11/08/2019	08/28/2019	08/28/2019	11/07/2019	11/11/2019	11/11/2019	11/11/2019	11/11/2019	11/11/2019	05/08/2019
Parameter (µg/L)																		
8:2 Fluorotelomer sulfonic acid (8:2 FTS)	NCL	NCL	NCL	NCL	NCL	<0.0036	<0.0036	<0.0038	<0.0035	<0.0034	<0.0034	<0.0038	<0.0038	<0.0038	<0.0037	<0.0037	<0.0038	<0.0037
6:2 Fluorotelomer sulfonic acid (6:2 FTS)	NCL	NCL	NCL	NCL	NCL	<0.0036	<0.0036	<0.0038	<0.0035	<0.0034	<0.0034	<0.0038	<0.0038	<0.0038	<0.0037	<0.0037	<0.0038	<0.0037
N-Ethyl perfluorooctane sulfonamide (EtFOSA)	NCL	NCL	NCL	NCL	NCL	<0.0036	<0.0036	<0.0038	<0.0035	<0.0034	<0.0034	<0.0038	<0.0038	<0.0038	<0.0037	<0.0037	<0.0038	<0.0037
N-Methyl perfluorooctane sulfonamide (MeFOSA)	NCL	NCL	NCL	NCL	NCL	<0.0072	<0.0072	<0.0076	<0.007	<0.0068	<0.0068	<0.0076	<0.0077	<0.0076	<0.0074	<0.0074	<0.0075	<0.0074
Perfluorobutane sulfonic acid (PFBS)	NCL	NCL	NCL	NCL	1,200	<0.0036	<0.0036	<0.0038	0.03	0.029	0.015	0.008	<0.0038	<0.0038	<0.0037	<0.0037	<0.0038	<0.0037
Perfluorodecane sulfonic acid (PFDS)	NCL	NCL	NCL	NCL	NCL	<0.0036	<0.0036	<0.0038	<0.0035	<0.0034	<0.0034	<0.0038	<0.0038	<0.0038	<0.0037	<0.0037	<0.0038	<0.0037
Perfluoroheptane sulfonic acid (PFHpS)	NCL	NCL	NCL	NCL	NCL	<0.0036	<0.0036	<0.0038	0.0036	0.0035	<0.0034	<0.0038	<0.0038	<0.0038	<0.0037	<0.0037	<0.0038	<0.0037
Perfluorononane sulfonic acid (PFNS)	NCL	NCL	NCL	NCL	NCL	<0.0072	<0.0072	<0.0076	<0.007	<0.0068	<0.0068	<0.0076	<0.0077	<0.0076	<0.0074	<0.0074	<0.0075	<0.0074
Perfluorooctane sulfonamide (FOSA)	NCL	NCL	NCL	NCL	NCL	<0.0036	<0.0036	<0.0038	<0.0035	<0.0034	<0.0034	<0.0038	<0.0038	<0.0038	<0.0037	<0.0037	<0.0038	<0.0037
Perfluoropentane sulfonic acid (PFPeS)	NCL	NCL	NCL	NCL	NCL	<0.0036	<0.0036	<0.0038	0.07	0.064	<0.0034	<0.0038	<0.0038	<0.0038	<0.0037	<0.0037	<0.0038	<0.0037
Perfluorohexane sulfonic acid (PFHxS)	NCL	NCL	NCL	NCL	NCL	<0.0036	<0.0036	0.004	0.16	0.17	0.0085	0.01	<0.0038	<0.0038	<0.0037	<0.0037	<0.0038	<0.0037
Perfluorobutanoic acid (PFBA)	NCL	NCL	NCL	NCL	NCL	0.0045	0.0076	0.0078	0.0099	0.011	<0.0034	<0.0038	<0.0038	<0.0038	<0.0037	<0.0037	<0.0038	<0.0037
Perfluorodecanoic acid (PFDA)	NCL	NCL	NCL	NCL	NCL	<0.0036	<0.0036	<0.0038	<0.0035	<0.0034	<0.0034	<0.0038	<0.0038	<0.0038	<0.0037	<0.0037	<0.0038	<0.0037
Perfluorododecanoic acid (PFDoDA)	NCL	NCL	NCL	NCL	NCL	<0.0036	<0.0036	<0.0038	<0.0035	<0.0034	<0.0034	<0.0038	<0.0038	<0.0038	<0.0037	<0.0037	<0.0038	<0.0037
Perfluoroheptanoic acid (PFHpA)	NCL	NCL	NCL	NCL	NCL	<0.0036	<0.0036	<0.0038	0.076	0.083	<0.0034	<0.0038	<0.0038	<0.0038	<0.0037	<0.0037	<0.0038	<0.0037
Perfluorohexanoic acid (PFHxA)	NCL	NCL	NCL	NCL	NCL	<0.0036	<0.0036	<0.0038	0.033	0.033	<0.0034	<0.0038	<0.0038	<0.0038	<0.0037	<0.0037	<0.0038	<0.0037
Perfluorononanoic acid (PFNA)	NCL	NCL	NCL	NCL	NCL	<0.0036	<0.0036	<0.0038	<0.0035	<0.0034	<0.0034	<0.0038	<0.0038	<0.0038	<0.0037	<0.0037	<0.0038	<0.0037
Perfluorooctanoic acid (PFOA)	0.07 (JJ)	12	ID	NCL	NCL	0.011	0.014	0.018	***0.52***	***0.54***	0.0065	0.013	<0.0019	<0.0019	<0.0019	<0.0018	<0.0019	<0.0019
Perfluorooctane sulfonic acid (PFOS)	0.07 (JJ)	0.012	NLV	NCL	NCL	***0.022***	***0.041***	***0.085***	0.0074	0.007	<0.0034	0.009	<0.0038	<0.0038	<0.0037	<0.0037	<0.0038	<0.0037
PFOA + PFOS (Calculated)	0.07	NCL	NCL	NCL	NCL	0.033	0.055	***0.1***	***0.53***	***0.55***	0.0065	0.022	ND	ND	ND	ND	ND	ND
Perfluoropentanoic acid (PFPeA)	NCL	NCL	NCL	NCL	NCL	<0.0036	<0.0036	<0.0038	0.012	0.012	<0.0034	<0.0038	<0.0038	<0.0038	<0.0037	<0.0037	<0.0038	<0.0037
Perfluorotetradecanoic acid (PFTeDA)	NCL	NCL	NCL	NCL	NCL	<0.0036	<0.0036	<0.0038	<0.0035	<0.0034	<0.0034	<0.0038	<0.0038	<0.0038	<0.0037	<0.0037	<0.0038	<0.0037
Perfluorotridecanoic acid (PFTrDA)	NCL	NCL	NCL	NCL	NCL	<0.0036	<0.0036	<0.0038	<0.0035	<0.0034	<0.0034	<0.0038	<0.0038	<0.0038	<0.0037	<0.0037	<0.0038	<0.0037
Perfluoroundecanoic acid (PFUnDA)	NCL	NCL	NCL	NCL	NCL	<0.0036	<0.0036	<0.0038	<0.0035	<0.0034	<0.0034	<0.0038	<0.0038	<0.0038	<0.0037	<0.0037	<0.0038	<0.0037
Total PFAS (Calculated)	NCL	NCL	NCL	NCL	NCL	0.038	0.063	0.11	0.92	0.95	0.03	0.04	ND	ND	ND	ND	ND	ND

TABLE 6
SUMMARY OF GROUNDWATER SAMPLE ANALYSIS - PFAS
Area R-1 (19)
Wolven/Jewell Area, 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]	EGLE Residential Recommended Volatilization to Indoor Air Interim Action Screening Level - Groundwater[3]	U.S. EPA Residential Tap Water Regional Removal Management Levels[4]	WV-MW-16D	WV-MW-16D	WV-MW-16S	WV-MW-16S	WV-MW-16S	WV-MW-16S
Sample Name						**WV-GW-MW16D**	**WV-GW-MW16D**	**WV-GW-MW16S**	**WV-GW-MW16S**	**WV-GW-MW16S DUP**	**WV-GW-MW16S**
Well Screen Interval (Feet below ground surface)						**91.7-96.7**	**91.7-96.7**	**17.5-22.5**	**17.5-22.5**	**17.5-22.5**	**17.5-22.5**
Laboratory Sample ID(s)						**UH31001-005**	**UK13023-001**	**UE02030-006**	**UH31001-001**	**UH31001-002**	**UK19013-001**
Sample Date						**08/29/2019**	**11/12/2019**	**05/03/2019**	**08/29/2019**	**08/29/2019**	**11/13/2019**
Parameter (µg/L)											
8:2 Fluorotelomer sulfonic acid (8:2 FTS)	NCL	NCL	NCL	NCL	NCL	<0.0036	<0.0035	<0.0036	<0.0035	<0.0037	<0.0037
6:2 Fluorotelomer sulfonic acid (6:2 FTS)	NCL	NCL	NCL	NCL	NCL	<0.0036	<0.0035	<0.0036	<0.0035	<0.0037	<0.0037
N-Ethyl perfluorooctane sulfonamide (EtFOSA)	NCL	NCL	NCL	NCL	NCL	<0.0036	<0.0035	<0.0036	<0.0035	<0.0037	<0.0037
N-Methyl perfluorooctane sulfonamide (MeFOSA)	NCL	NCL	NCL	NCL	NCL	<0.0072	<0.007	<0.0071	<0.007	<0.0074	<0.0074
Perfluorobutane sulfonic acid (PFBS)	NCL	NCL	NCL	NCL	1,200	<0.0036	<0.0035	0.0073	0.016	0.018	0.016
Perfluorodecane sulfonic acid (PFDS)	NCL	NCL	NCL	NCL	NCL	<0.0036	<0.0035	<0.0036	<0.0035	<0.0037	<0.0037
Perfluoroheptane sulfonic acid (PFHpS)	NCL	NCL	NCL	NCL	NCL	<0.0036	<0.0035	<0.0036	<0.0035	<0.0037	<0.0037
Perfluorononane sulfonic acid (PFNS)	NCL	NCL	NCL	NCL	NCL	<0.0072	<0.007	<0.0071	<0.007	<0.0074	<0.0074
Perfluorooctane sulfonamide (FOSA)	NCL	NCL	NCL	NCL	NCL	<0.0036	<0.0035	<0.0036	<0.0035	<0.0037	<0.0037
Perfluoropentane sulfonic acid (PFPeS)	NCL	NCL	NCL	NCL	NCL	<0.0036	<0.0035	<0.0036	<0.0035	0.004	<0.0037
Perfluorohexane sulfonic acid (PFHxS)	NCL	NCL	NCL	NCL	NCL	<0.0036	<0.0035	<0.0036	0.0068	0.007	0.0072
Perfluorobutanoic acid (PFBA)	NCL	NCL	NCL	NCL	NCL	<0.0036	<0.0035	0.0074	0.028	0.029	0.02
Perfluorodecanoic acid (PFDA)	NCL	NCL	NCL	NCL	NCL	<0.0036	<0.0035	<0.0036	<0.0035	<0.0037	<0.0037
Perfluorododecanoic acid (PFDoDA)	NCL	NCL	NCL	NCL	NCL	<0.0036	<0.0035	<0.0036	<0.0035	<0.0037	<0.0037
Perfluoroheptanoic acid (PFHpA)	NCL	NCL	NCL	NCL	NCL	<0.0036	<0.0035	<0.0036	0.0076	0.0085	0.0054
Perfluorohexanoic acid (PFHxA)	NCL	NCL	NCL	NCL	NCL	<0.0036	<0.0035	0.0061	0.023	0.023	0.013
Perfluorononanoic acid (PFNA)	NCL	NCL	NCL	NCL	NCL	<0.0036	<0.0035	<0.0036	<0.0035	<0.0037	<0.0037
Perfluorooctanoic acid (PFOA)	0.07 (JJ)	12	ID	NCL	NCL	<0.0018	<0.0018	0.0094	0.026	0.029	0.021
Perfluorooctane sulfonic acid (PFOS)	0.07 (JJ)	0.012	NLV	NCL	NCL	<0.0036	<0.0035	***0.026***	***0.023***	***0.025***	***0.027***
PFOA + PFOS (Calculated)	0.07	NCL	NCL	NCL	NCL	ND	ND	0.035	0.049	0.054	0.048
Perfluoropentanoic acid (PFPeA)	NCL	NCL	NCL	NCL	NCL	<0.0036	<0.0035	<0.0036	0.0097	0.011	0.007
Perfluorotetradecanoic acid (PFTeDA)	NCL	NCL	NCL	NCL	NCL	<0.0036	<0.0035	<0.0036	<0.0035	<0.0037	<0.0037
Perfluorotridecanoic acid (PFTrDA)	NCL	NCL	NCL	NCL	NCL	<0.0036	<0.0035	<0.0036	<0.0035	<0.0037	<0.0037
Perfluoroundecanoic acid (PFUnDA)	NCL	NCL	NCL	NCL	NCL	<0.0036	<0.0035	<0.0036	<0.0035	<0.0037	<0.0037
Total PFAS (Calculated)	NCL	NCL	NCL	NCL	NCL	ND	ND	0.056	0.14	0.15	0.12

TABLE 6 NOTES
Area R-1 (19)
Wolven/Jewell ARea, 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; updated June 25, 2018.
   Abbreviations Include:
   "ID" indicates insufficient data to develop criterion.
   "NA" indicates a criterion or value is not available or, in the case of background, not applicable.
   "NCL" indicates no criterion listed in EGLE Table 1.
   "NLV" indicates the substance is not likely to volatilize under most conditions.
   Footnotes Include:
   (A) - The criterion is the State of Michigan drinking water standard.
   (D) - The calculated criterion exceeds 100 percent, hence it is reduced to 100 percent or 1.0E+9 ppb.
   (E) - Criterion is the aesthetic drinking water value.
   (F) - Criterion is based on adverse impacts to plant life and phytotoxicity.
   (G) - Groundwater surface water interface (GSI) criterion depends on the pH or water hardness, or both, of the receiving surface water.
   EGLE's Footnote (G) GSI/GSIPC Calculation spreadsheet was utilized to calculate GSI criterion presented. The Rogue River is the receiving surface water for the Site. Hardness (220 mg $CaCO_3$/L) and pH (7.5 standard units) used in the calculations were the lowest (most-conservative) of the calculated mean and median of the Rogue River surface water samples collected in Rockford, MI at the former tannery (TA-SW-01, TA-SW-02, TA-SW-03, TA-SW-05, and TA-SW-07) rounded to two significant digits and water hardness or pH for the Rogue River near Rockford published in United States Geological Survey Circular 323, "Water Resources of the Grand Rapids Area, Michigan," Table 1, 1954.
   (L) - Criteria for lead are derived using a biologically based model. The generic residential drinking water criterion of 4 µg/L is linked to the generic residential soil direct contact criterion of 400 mg/kg.
   (M) - Calculated criterion is below the analytical target detection limit, therefore, the criterion defaults to the target detection limit.
   (N) - The concentrations of all potential sources of nitrate-nitrogen (e.g., ammonia-N, nitrite-N, nitrate-N) in groundwater that is used as a source of drinking water shall not, when added together, exceed the nitrate drinking water criterion of 10,000 ug/L.
   (P) - Amenable cyanide methods or method OIA-1677 shall be used to quantify cyanide concentrations for compliance with all groundwater criteria.
   (S) - Criterion defaults to the hazardous substance-specific water solubility limit.
   (V) - Criterion is the aesthetic drinking water value.
   (W) - Concentrations of trihalomethanes in groundwater shall be added together to determine compliance with the Michigan drinking water standard of 80 µg/L.
   (AA) - Use 10,000 µg/L where groundwater enters a structure through the use of a water well, sump or other device. Use 28,000 µg/L for all other uses.
   (CC) - The generic GSI criteria are based on the toxicity of unionized ammonia (NH_3); the criteria are 29 µg/L and 53 µg/L for cold water and warm water surface water, respectively. As a result, the GSI criterion shall be compared to the percent of the total ammonia concentration in the groundwater that will become NH_3 in the surface water. This percent NH_3 is a function of the pH and temperature of the receiving surface water and was estimated using the table of this footnote titled "Percent NH_3 in Aqueous Ammonia Solutions for 0-30°C and pH 6-10." This approach uses a default temperature of 68°F and 85°F for cold water and warm water surface water, respectively. The percent conversion factor in the table for cold water (20°C or 68°F) and pH (8.0 standard units) is 3.82%.
   (EE) - The applicable GSI criteria for phosphorus is 1,000 µg/L.
   (FF) - The chloride GSI criteria shall not apply for surface waters of the state that are not designated as a public water supply source.
   (JJ) - Compliance with the drinking water criteria shall require comparing the sum of the PFOA and PFOS groundwater concentrations to the drinking water criterion of 0.07 µg/L.
3. 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.
   Footnotes Include:
   (M) - Site-specific criterion may be below target detection limits (TDL).
4. U.S. EPA Residential Tap Water Regional Removal Management Levels (RMLs) were based on "Generic RML Tables," updated November 2018.
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 or Media-Specific Interim Action Screening Levels. U.S. EPA RMLs are provided for reference only and results detected above the EPA RMLs are not bolded or italicized.
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.
   "B" indicates the parameter was also detected in the method blank.
   "H" indicates the sample wasa analyzed out of holding time.
   "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.
7. 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.
8. Well screen interval presented is the top of the well screen to the bottom of the well screen in feet below ground surface.

FIGURES

NOTES:
1. LOCATIONS AND SITE FEATURES ARE APPROXIMATE.

LEGEND

- AREA 19
- AREA 6
- APPROXIMATE HOUSE ST SITE BOUNDARY
- NORTH KENT LANDFILL
- NORTH KENT LANDFILL STUDY AREA
- NORTH KENT STUDY AREA OUTLINE

AREA 19

NORTH KENT LANDFILL

NORTH KENT LANDFILL STUDY AREA

AREA 6

HOUSE STREET SITE

N

0 1,000 2,000 4,000
Scale in Feet

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

NORTH KENT STUDY AREA
GROUNDWATER INVESTIGATION AREAS
AREA 19 RAP

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Engineers and Scientists
www.gza.com

PREPARED FOR:
WN&J/WWW

PROJ MGR: LIP	REVIEWED BY: LIP	CHECKED BY: JC	FIGURE 1
DESIGNED BY: KHM	DRAWN BY: ADM	SCALE: 1 inch = 2,000 feet	
DATE: 6/15/2020	PROJECT NO. 16.0062961.10	REVISION NO.	

NOTES:
1. LOCATIONS AND SITE FEATURES ARE APPROXIMATE.

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

LEGEND

- Area 19
- GZA WOLVEN JEWELL MONITORING WELL LOCATION
- NORTH KENT LANDFILL (NKLF) MONITORING WELL LOCATION
- SHALLOW GROUNDWATER CONTOUR (FT) - NOVEMBER 2019
- HIGHWAY
- PRIMARY COUNTY ROAD
- OTHER ROAD
- RIVER OR STREAM
- SURFACE WATER
- APPROXIMATE HOUSE ST SITE BOUNDARY
- NORTH KENT LANDFILL
- NORTH KENT LANDFILL STUDY AREA
- NORTH KENT STUDY AREA OUTLINE

Area 19

NORTH KENT LANDFILL

NORTH KENT LANDFILL STUDY AREA

HOUSE STREET SITE

12 MILE RD NE
11 MILE RD NE
10 MILE RD NE
W DIVISION ST NE
E DIVISION ST NE
E MAIN
FONGER ST NE
KIKI RUN NE
OAKWOODS TRL NE
CLEARWATER CT NE
BRENT DR
HOUSE ST NE
WANA BE LN NE
VALLEY VIEW CT NE
FRISKE DR NE
RIVER BLUFF DR NE
SUNSET RIDGE DR NE
VERSCHEL DR NE
DEER TRL NE
SUSSEX CT NE
RIVERWATCH RD NE
TRADWIND DR NE
WHIRLWIND DR NE
SUMMIT AVE NE
WINZER CT NE
ORCHARD DR
ROCKVIEW DR NE
ROCK HOLLOW DR
GLENEAGLE DR NE
HIGHLAND DR NE
RIVERCHASE DR NE
GLENARBOR DR NE
GLENCARIN DR NE
ASHRIDGE DR
SPRING ST NE
PROSPECT ST NE
COURTLAND ST NE
W BRIDGE ST NE
E BRIDGE ST NE
MAPLE ST NE
HIGHLANDER DR NE
CORAL AVE NE
GIBRALTAR AVE NE
SHALE CT
CHILDSDALE AVE NE
CAHILL DR NE
GAYLORD DR NE
HELEN DR NE
OAK ST NE
JAMES ST NE
LONGVIEW DR NE
S MAIN ST NE
N MAIN ST NE
WHITE PINE
WOLVERINE ST NE
LEWIS ST NE
ADOLPH ST NE
ELIZABETH ST NE
DONALD ST NE
WINDMILL DR NE
BYRNE INDUSTRIAL DR NE
ERINE BLVD NE
GRANGE AVE NE
ALGOMA AVE NE
ROUGE WOOD AVE NE
GARDEN GATE DR NE
DIMICK DR NE
EDGERTON AVE NE
WOLVEN AVE NE
ELSTNER AVE NE
LADY LAUREN DR NE
BENT TREE RDG NE
STONERIDGE DR NE
JEWELL DR NE
SQUIRE WOOD DR
HERRINGTON AVE NE
GRAPHIC DR NE
BELMONT AVE NE
N US 131
S US 131

700 705 710 715 720 725 730 735 740 695 710 710 825 865 860 855 850 845 840 835 830 800 795 790 785 780 775 770 765 760 755 750 745 820 815 810 805 865 860 850 845 840 835 830 695 700 675 680

0 750 1,500 3,000
Scale in Feet

N

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NORTH KENT STUDY AREA
SHALLOW GROUNDWATER ELEVATION CONTOURS - NOVEMBER 2019
AREA 19 RAP

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PREPARED FOR: WN&J/WWW

PROJ MGR: LIP	REVIEWED BY: LIP	CHECKED BY: JC	FIGURE 2
DESIGNED BY: KHM	DRAWN BY: ADM	SCALE: 1 inch = 1,500 feet	
DATE: **6/15/2020**	PROJECT NO. **16.0062961.10**	REVISION NO.	

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NOTES:
1. LOCATIONS AND SITE FEATURES ARE APPROXIMATE.

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

LEGEND

- GZA WOLVEN JEWELL MONITORING WELL LOCATION
- NORTH KENT LANDFILL (NKLF) MONITORING WELL LOCATION
- DEEP GROUNDWATER CONTOUR (FT) - NOVEMBER 2019
- HIGHWAY
- PRIMARY COUNTY ROAD
- OTHER ROAD
- RIVER OR STREAM
- SURFACE WATER
- AREA 19
- APPROXIMATE HOUSE ST SITE BOUNDARY
- NORTH KENT LANDFILL
- NORTH KENT LANDFILL STUDY AREA
- NORTH KENT STUDY AREA OUTLINE

AREA 19

NORTH KENT LANDFILL

NORTH KENT LANDFILL STUDY AREA

HOUSE STREET SITE

12 MILE RD NE
11 MILE RD NE
10 MILE RD NE
W DIVISION ST NE
E DIVISION ST NE
FONGER ST NE
COURTLAND ST NE
W BRIDGE ST NE
E BRIDGE ST NE
LEWIS ST NE
MAPLE ST NE
ORCHARD DR
GLENEAGLE DR NE
WHIRLWIND DR NE
TRADWIND DR NE
VERSCHEL DR NE
RIVERWATCH RD NE
DEER TRL NE
SUSSEX CT NE
VALLEY VIEW CT NE
FRISKE DR NE
RIVER BLUFF DR NE
SUNSET RIDGE DR NE
EDGERTON AVE NE
WANA BE LN NE
GRANGE AVE NE
ALGOMA AVE NE
ROUGEWOOD AVE NE
KIKI RUN NE
GARDEN GATE DR NE
DIMICK DR NE
OAKWOODS TRL NE
CLEARWATER CT NE
JEWELL DR NE
LAUREN DR NE
ELSTNER AVE NE
WOLVEN AVE NE
BENT TREE RDG NE
STONERIDGE DR NE
WINZER CT NE
ROCK HOLLOW DR
ROCKVIEW DR NE
GLENARBOR DR NE
GLENCARIN DR NE
HIGHLAND DR NE
SUMMIT AVE NE
RIVERCHASE DR NE
HIGHLANDER DR NE
GIBRALTAR CT NE
SHALE CT NE
ASHRIDGE DR
SPRING ST NE
PROSPECT ST NE
N MAIN ST NE
N MONROE ST NE
S MAIN ST NE
S MONROE ST NE
ADOLPH ST NE
ELIZABETH ST NE
DONALD ST NE
WINDMILL DR NE
BYRNE INDUSTRIAL DR NE
WHITE PINE
WOLVERINE ST NE
CHILDSDALE AVE NE
CAHILL DR NE
HELEN DR NE
GAYLORD DR NE
LONGVIEW DR NE
JAMES ST NE
RICHO AVE NE
SQUIRE WOOD DR
HERRINGTON AVE NE
GRAPHIC DR NE
BELMONT AVE NE
BRENT DR
HOUSE ST NE

780 785 795 800 790 775 770 765 760 755 750 745 740 735 730 725 720 715 710 705 700 695 690 685 680 675 670

0 750 1,500 3,000
Scale in Feet

N

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NORTH KENT STUDY AREA
DEEP GROUNDWATER ELEVATION CONTOURS - NOVEMBER 2019
AREA 19 RAP

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PREPARED FOR: WN&J/WWW

PROJ MGR: LIP	REVIEWED BY: LIP	CHECKED BY: JC	FIGURE 3
DESIGNED BY: KHM	DRAWN BY: ADM	SCALE: 1 inch = 1,500 feet	
DATE: 6/15/2020	PROJECT NO. 16.0062961.10	REVISION NO.	

NOTES:
1. LOCATIONS AND SITE FEATURES ARE APPROXIMATE.

LEGEND

- SAMPLED RESIDENTIAL WELLS
- GZA WOLVEN JEWELL MONITORING WELL LOCATION
- NORTH KENT LANDFILL (NKLF) MONITORING WELL LOCATION
- AREA 19
- APPROXIMATE HOUSE ST SITE BOUNDARY
- NORTH KENT LANDFILL
- NORTH KENT LANDFILL STUDY AREA
- NORTH KENT STUDY AREA OUTLINE

AREA 19

NORTH KENT LANDFILL

NORTH KENT LANDFILL STUDY AREA

HOUSE STREET SITE

12 MILE ROAD

11 MILE ROAD

10 MILE ROAD

FONGER STREET

GRANGE AVE

ALGOMA AVE

JEWELL AVENUE

WOLVEN AVE

ALGOMA

ROCKFORD

Clear Bottom Lake

Rest Area

Gravel Pit

Oil Well

Sewage Disposal

Radio Tower

Valley View Sch

Blessed Virgin Sch

High Sch

Cem

BM B20

0 750 1,500 3,000
Scale in Feet

N

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NORTH KENT STUDY AREA
MONITORING & RESIDENTIAL WELL LOCATIONS
AREA 19 RAP

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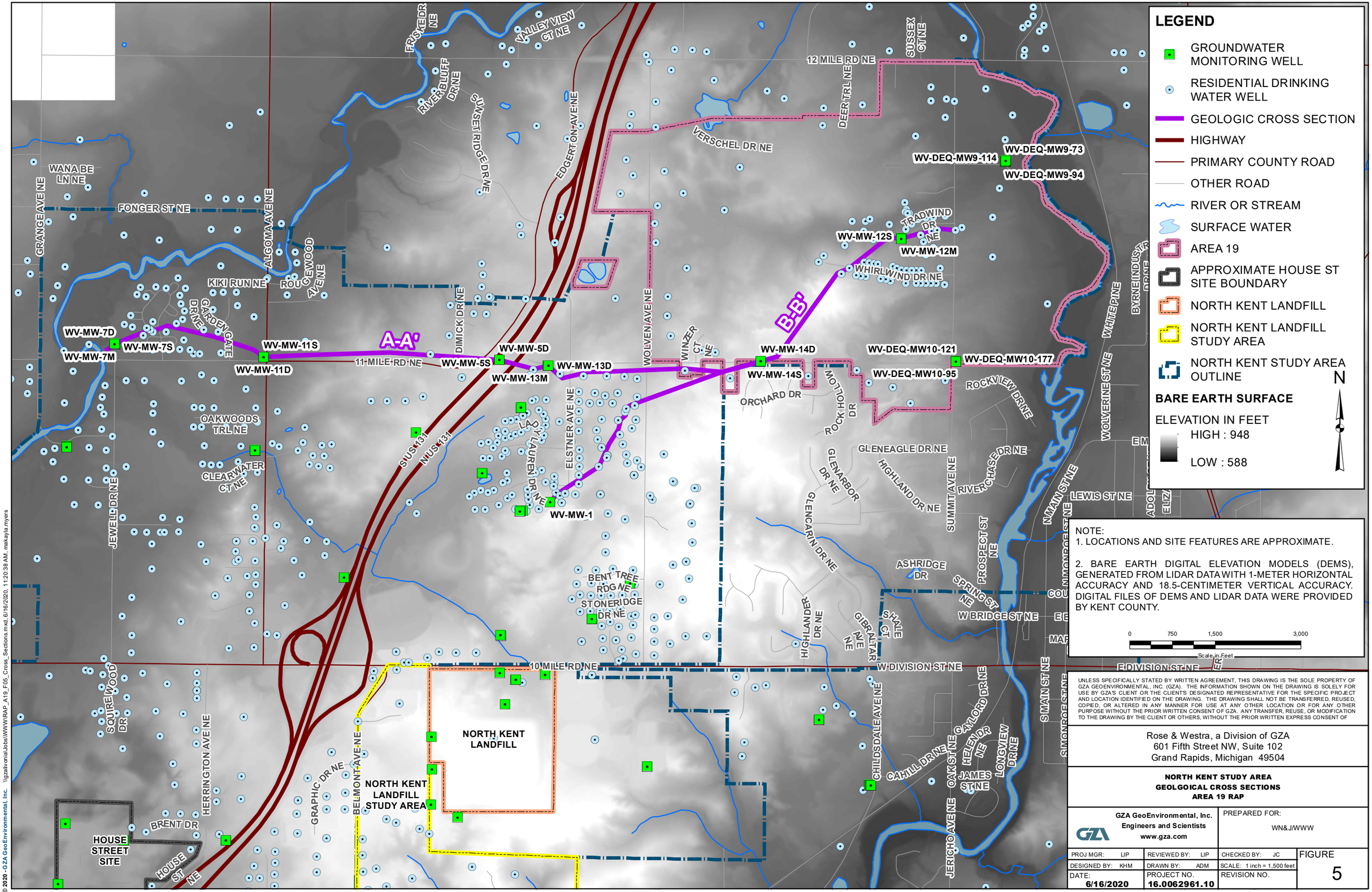
PREPARED FOR: WN&J/WWW

PROJ MGR: LIP	REVIEWED BY: LIP	CHECKED BY: JC	FIGURE 4
DESIGNED BY: KHM	DRAWN BY: ADM	SCALE: 1 inch = 1,500 feet	
DATE: 6/15/2020	PROJECT NO. 16.0062961.10	REVISION NO.	



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NORTH KENT STUDY AREA
GEOLGOICAL CROSS SECTIONS
AREA 19 RAP

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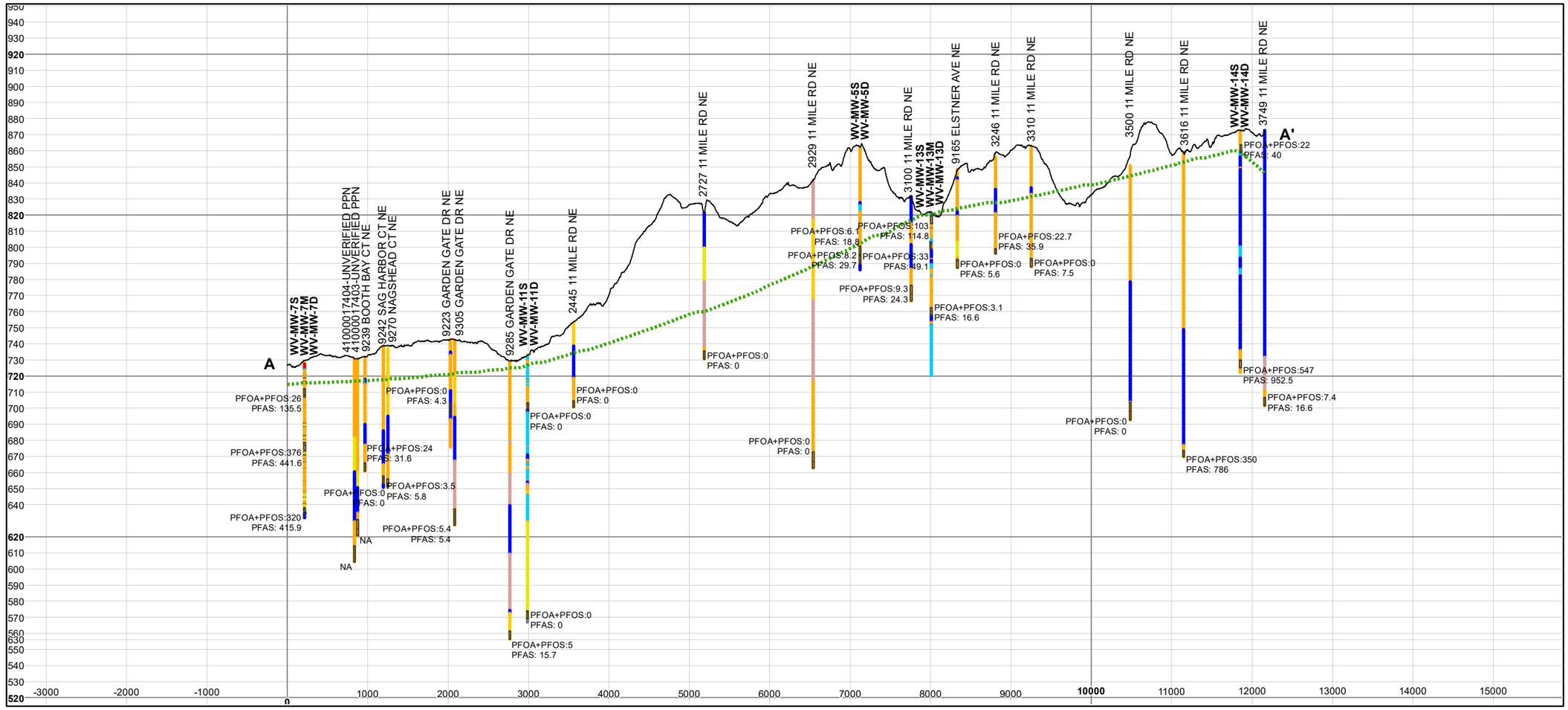
PREPARED FOR: WN&J/WWW

PROJ MGR: LIP	REVIEWED BY: LIP	CHECKED BY: JC	FIGURE
DESIGNED BY: KHM	DRAWN BY: ADM	SCALE: 1 inch = 1,500 feet	5
DATE: 6/16/2020	PROJECT NO. 16.0062961.10	REVISION NO.	



CROSS SECTION LEGEND

WELL SCREEN

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

BOREHOLE LITHOLOGY

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

OVERVIEW MAP LEGEND

- PROPOSED INVESTIGATION MONITORING WELL
- PROPOSED INVESTIGATION / PERIMETER MONITORING WELL
- PROPOSED GSI PIEZOMETER
- PROPOSED PORE WATER SAMPLING LOCATION
- RESIDENTIAL WATER WELL
- MONITORING WELL
- CROSS SECTION LINE
- HIGHWAY
- PRIMARY COUNTY ROAD
- OTHER ROAD
- RIVER OR STREAM
- SURFACE WATER
- AREA R-1 (19)
- APPROXIMATE HOUSE ST SITE BOUNDARY
- NORTH KENT LANDFILL

NOTES:
1. LOCATIONS AND SITE FEATURES ARE APPROXIMATE.

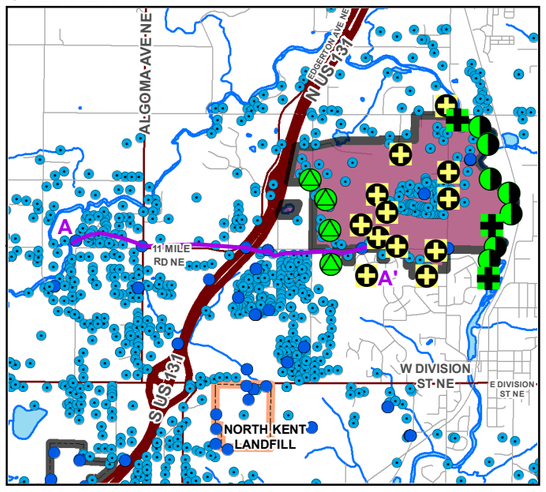
2. GROUND SURFACE ELEVATIONS ARE BASED ON DIGITAL RASTER FILES OF BARE EARTH DIGITAL ELEVATION MODELS (DEMS), GENERATED FROM LIDAR DATA WITH 1-METER HORIZONTAL ACCURACY AND 18.5-CENTIMETER VERTICAL ACCURACY. DIGITAL FILES OF DEMS AND LIDAR DATA WERE PROVIDED BY KENT COUNTY.

3. ESTIMATED GROUNDWATER TABLE 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. CONCENTRATIONS OF TOTAL PFAS AND PFOA+PFOS DEPICTED ARE MAXIMUM CONCENTRATIONS DETECTED AT THE SPECIFIED LOCATION.

OVERVIEW MAP



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

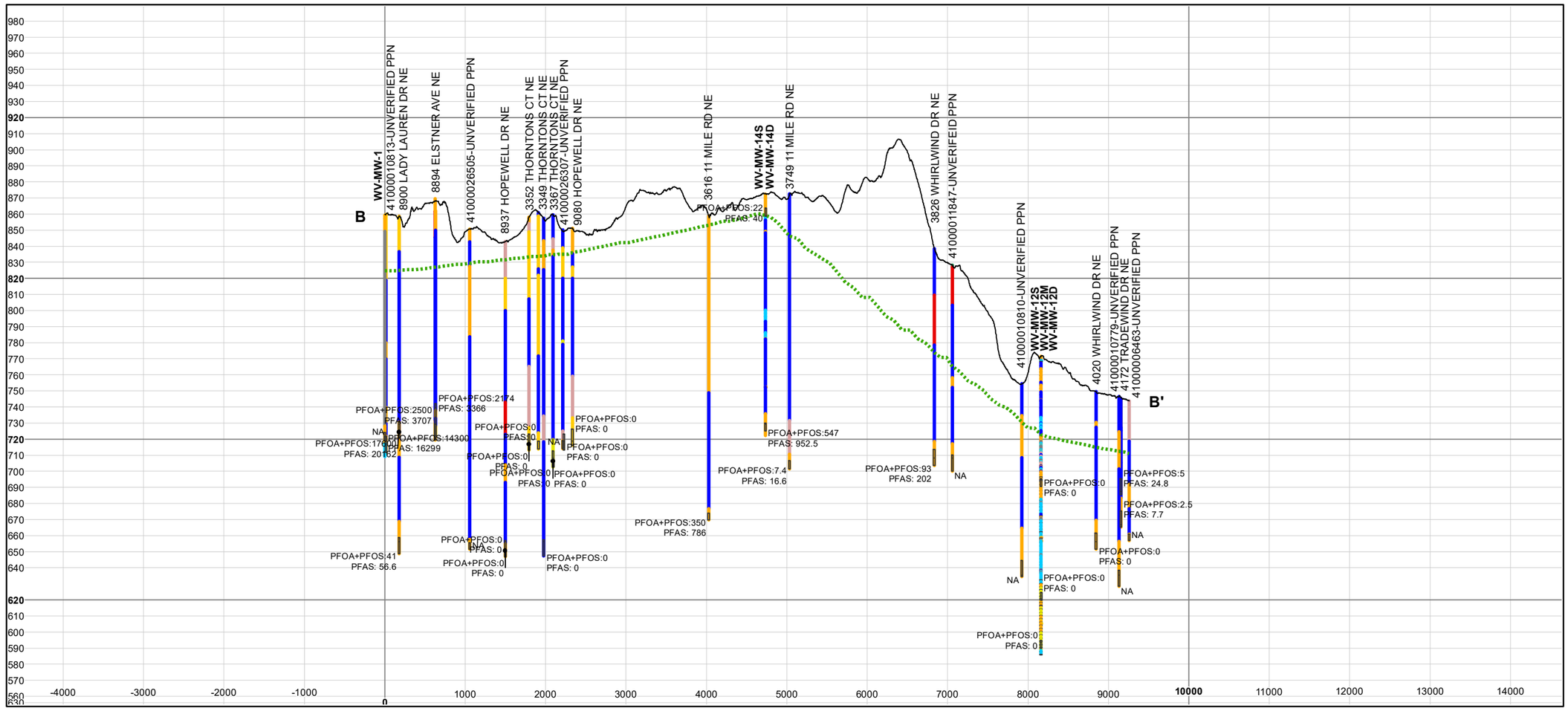
ROSE & WESTRA, A DIVISION OF GZA
601 FIFTH STREET NW, SUITE 102
GRAND RAPIDS, MICHIGAN 49504

NORTH KENT STUDY AREA
GEOLOGICAL CROSS SECTION A-A'
AREA R-1 (19) 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	6
DATE: 06/10/2020	PROJECT NO: 16.0062961.40	REVISION NO:	



SOUTHWEST NORTHEAST

CROSS SECTION LEGEND

WELL SCREEN

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

BOREHOLE LITHOLOGY

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

OVERVIEW MAP LEGEND

- PROPOSED INVESTIGATION MONITORING WELL
- PROPOSED INVESTIGATION / PERIMETER MONITORING WELL
- PROPOSED GSI PIEZOMETER
- PROPOSED PORE WATER SAMPLING LOCATION
- RESIDENTIAL WATER WELL
- MONITORING WELL
- CROSS SECTION LINE
- HIGHWAY
- PRIMARY COUNTY ROAD
- OTHER ROAD
- RIVER OR STREAM
- SURFACE WATER
- AREA R-1 (19)
- APPROXIMATE HOUSE ST SITE BOUNDARY
- NORTH KENT LANDFILL

NOTES:
1. LOCATIONS AND SITE FEATURES ARE APPROXIMATE.

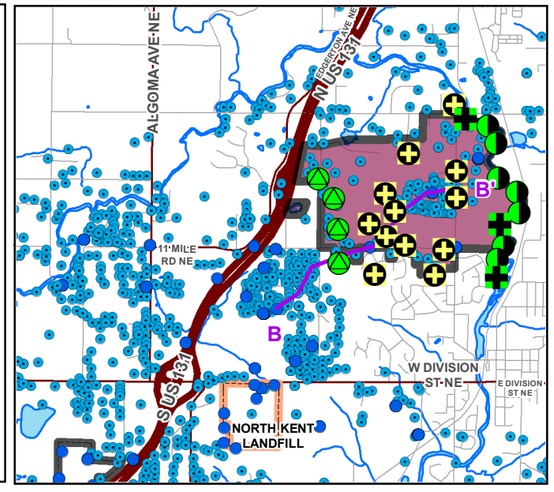
2. GROUND SURFACE ELEVATIONS ARE BASED ON DIGITAL RASTER FILES OF BARE EARTH DIGITAL ELEVATION MODELS (DEMS), GENERATED FROM LIDAR DATA WITH 1-METER HORIZONTAL ACCURACY AND 18.5-CENTIMETER VERTICAL ACCURACY. DIGITAL FILES OF DEMS AND LIDAR DATA WERE PROVIDED BY KENT COUNTY.

3. ESTIMATED GROUNDWATER TABLE 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. CONCENTRATIONS OF TOTAL PFAS AND PFOA+PFOS DEPICTED ARE MAXIMUM CONCENTRATIONS DETECTED AT THE SPECIFIED LOCATION.

OVERVIEW MAP



N

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

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GRAND RAPIDS, MICHIGAN 49504

NORTH KENT STUDY AREA
GEOLOGICAL CROSS SECTION B-B'
AREA R-1 (19) 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 7
DESIGNED BY: JC	DRAWN BY: JC	SCALE: 1:72,000	
DATE: 06/10/2020	PROJECT NO: 16.0062961.40	REVISION NO:	

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 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.

LEGEND

- GZA WOLVEN JEWELL MONITORING WELL LOCATION
- NORTH KENT LANDFILL (NKLF) MONITORING WELL LOCATION
- HIGHWAY
- PRIMARY COUNTY ROAD
- OTHER ROAD
- RIVER OR STREAM
- SURFACE WATER
- AREA 19
- APPROXIMATE HOUSE ST SITE BOUNDARY
- NORTH KENT LANDFILL
- NORTH KENT LANDFILL STUDY AREA
- NORTH KENT STUDY AREA OUTLINE

APPROXIMATE TOTAL PFAS EXTENT (PPT)

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

VALLEY VIEW CT NE
SUNSET RIDGE DR NE
EDGERTON AVE NE
12 MILE RD NE
SUSSEX CT NE
DEER TRL NE
VERSCHEL DR NE
RIVERWATCH RD NE
TRADWIND DR NE
WHIRLWIND DR NE
SUMMIT AVE NE
WHITE PINE
BYRNE INDUS TR DR NE
DIMICK DR NE
11 MILE RD NE
WOLVEN AVE NE
WINZER CT NE
ELSTNER AVE NE
ORCHARD DR
ROCK HOLLOW DR
ROCKVIEW DR NE
WOLVERINE ST NE
OAKWOODS TRL NE
CLEARWATER CT NE
JEWELL DR NE
S US 131
N US 131
LADY LAUREN DR NE
GLENEAGLE DR NE
GLENARBOR DR NE
HIGHLAND DR NE
RIVERCHASE DR NE
GLENCARIN DR NE
N MAIN ST NE
LEWIS ST NE
N MONROE ST NE
PROSPECT ST NE
ASHRIDGE DR
SPRING ST NE
COURTLAND ST NE
W BRIDGE ST NE
E BRIDGE ST NE
DONALD ST NE
WINDMILL DR NE
ERINE BLVD NE
MAPLE ST NE
BENT TREE RDG NE
STONERIDGE DR NE
HIGHLANDER DR NE
GIBRALTAR AVE NE
SHALE CT
10 MILE RD NE
W DIVISION ST NE
E DIVISION ST NE
SQUIRE WOOD DR
HERRINGTON AVE NE
GRAPHIC DR NE
BELMONT AVE NE
NORTH KENT LANDFILL
CHILDSDALE AVE NE
CAHILL DR NE
OAK ST NE
HELEN DR NE
GAYLORD DR NE
LONGVIEW DR NE
S MAIN ST NE
S MONROE ST NE
JAMES ST NE
RICHO AVE NE
BRENT DR
HOUSE ST NE
HOUSE STREET SITE
NORTH KENT LANDFILL STUDY AREA

N

0 750 1,500 3,000
Scale in Feet

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

NORTH KENT STUDY AREA
TOTAL PFAS ISOCONCENTRATION MAP
AREA 19 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 8
DESIGNED BY: KHM	DRAWN BY: ADM	SCALE: 1 inch = 1,500 feet	
DATE: 6/15/2020	PROJECT NO. 16.0062961.10	REVISION NO.	

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NOTES:
1. LOCATIONS AND SITE FEATURES ARE APPROXIMATE.

2. ACRONYMS
- (DWC) = DRINKING WATER CRITERIA FOR MDEQ PART 201 GENERIC CLEANUP CRITERIA FOR RESIDENTIAL USES
- (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.

LEGEND

- GZA WOLVEN JEWELL MONITORING WELL LOCATION
- NORTH KENT LANDFILL (NKLF) MONITORING WELL LOCATION
- HIGHWAY
- PRIMARY COUNTY ROAD
- OTHER ROAD
- RIVER OR STREAM
- SURFACE WATER
- AREA 19
- APPROXIMATE HOUSE ST SITE BOUNDARY
- NORTH KENT LANDFILL
- NORTH KENT LANDFILL STUDY AREA
- NORTH KENT STUDY AREA OUTLINE

APPROXIMATE PFOS + PFOA EXTENT (PPT)

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

FONGER ST NE
GRANGE AV
ALGOMA AVE NE
KIKI RUN NE
ROUGEWOOD AVE NE
GARDEN GATE DR NE
11-MILE-RD-NE
DIMICK DR NE
OAKWOODS TRL NE
CLEARWATER CT NE
JEWELL DR NE
S US 131
N US 131
LAUREN DR NE
ELSTNER AVE NE
WOLVEN AVE NE
BENT TREE RDG NE
STONERIDGE DR NE
12 MILE RD NE
DEER TRL NE
SUSSEX CT NE
VERSCHEL DR NE
RIVERWATCH RD NE
TRADWIND DR NE
WHIRLWIND DR NE
WINZER CT NE
ORCHARD DR
ROCK HOLLOW DR
ROCKVIEW DR NE
WHITE PINE
BYRNE INDUS DR NE
WOLVERINE ST NE
GLENEAGLE DR NE
GLENARBOR DR NE
HIGHLAND DR NE
SUMMIT AVE NE
RIVERCHASE DR NE
N MAIN ST NE
LEWIS ST NE
GLENCARIN DR NE
ASHRIDGE DR
SPRING ST NE
PROSPECT ST NE
N MONROE ST NE
DONALD ST NE
WINDMILL DR NE
COURTLAND ST NE
W BRIDGE ST NE
E BRIDGE ST NE
MAPLE ST NE
HIGHLANDER DR NE
GIBRALTAR AVE NE
SHALE CT NE
W DIVISION ST NE
E DIVISION ST NE
ERINE BLVD NE
10 MILE RD NE
SQUIREWOOD DR
HERRINGTON AVE NE
BRENT DR
HOUSE ST NE
GRAPHIC DR NE
BELMONT AVE NE
CHILDSDALE AVE NE
CAHILL DR NE
OAK ST NE
GAYLORD DR NE
HELEN DR NE
LONGVIEW DR NE
JAMES ST NE
S MAIN ST NE
S MONROE ST NE
RICHO AVE NE

NORTH KENT LANDFILL
NORTH KENT LANDFILL STUDY AREA
HOUSE STREET SITE

N

0 750 1,500 3,000
Scale in Feet

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NORTH KENT STUDY AREA
PFOS + PFOA ISOCONCENTRATION MAP
AREA 19 RAP

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PREPARED FOR: WN&J/WWW

PROJ MGR: LIP	REVIEWED BY: LIP	CHECKED BY: JC	FIGURE 9
DESIGNED BY: KHM	DRAWN BY: ADM	SCALE: 1 inch = 1,500 feet	
DATE: 6/15/2020	PROJECT NO. 16.0062961.10	REVISION NO.	

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

LEGEND

- PROPOSED INVESTIGATION MONITORING WELL
- PROPOSED INVESTIGATION/PERIMETER MONITORING WELL
- GZA WOLVEN JEWELL MONITORING WELL LOCATION
- NORTH KENT LANDFILL (NKLF) MONITORING WELL LOCATION
- HIGHWAY
- PRIMARY COUNTY ROAD
- OTHER ROAD
- RIVER OR STREAM
- SURFACE WATER
- AREA SELECTED FOR MUNICIPAL WATER
- AREA 19
- APPROXIMATE HOUSE ST SITE BOUNDARY
- NORTH KENT LANDFILL
- NORTH KENT LANDFILL STUDY AREA
- NORTH KENT STUDY AREA OUTLINE

APPROXIMATE PFOS + PFOA EXTENT (PPT)

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

AREA19-MW-7
AREA19-MW-6
AREA19-MW-12
AREA19-MW-15
AREA19-MW-9
AREA19-MW-4
WV-MW-12
AREA19-MW-11
AREA19-MW-3
AREA19-MW-10
AREA19-MW-8
AREA19-MW1
AREA19-MW-16
WV-MW-14
AREA19-MW-5
AREA19-MW-14
AREA19-MW-2
AREA19-MW-13
NORTH KENT LANDFILL
NORTH KENT LANDFILL STUDY AREA
HOUSE STREET SITE
12 MILE RD NE
11-MILE-RD-NE
10 MILE RD NE
FONGER ST NE
VERSCHEL DR NE
DEER TRL NE
SUSSEX CT NE
RIVERWATCH RD NE
TRADWIND DR NE
WHIRLWIND DR NE
WINZER CT NE
ORCHARD DR
ROCK HOLLOW DR
ROCKVIEW DR NE
GLENEAGLE DR NE
HIGHLAND DR NE
SUMMIT AVE NE
RIVERCHASE DR NE
GLENCAIRN DR NE
GLENARBOR DR NE
ASHRIDGE DR
SPRING ST NE
PROSPECT ST NE
COURTLAND ST
W BRIDGE ST NE
E BRIDGE ST NE
MAPLE ST NE
W DIVISION ST NE
E DIVISION ST NE
CHILDSDALE AVE NE
CAHILL DR NE
GAYLORD DR NE
HELEN DR NE
LONGVIEW DR NE
JAMES ST NE
OAK ST NE
RICHO AVE NE
SHALE CT NE
GIBRALTAR AVE NE
HIGHLANDER DR NE
N MAIN ST NE
N MONROE ST NE
S MAIN ST NE
S MONROE ST NE
WOLVERINE ST NE
WHITE PINE
LEWIS ST N
KIKI RUN NE
ROUGEWOOD AVE NE
GARDEN GATE DR NE
DIMICK DR NE
ELSTNER AVE NE
WOLVEN AVE NE
LADY LAUREN DR NE
OAKWOODS TRL NE
CLEARWATER CT NE
JEWELL DR NE
BENT TREE RDG NE
STONERIDGE DR NE
SQUIREWOOD DR
HERRINGTON AVE NE
BRENT DR
HOUSE ST NE
GRAPHIC DR NE
BELMONT AVE NE
GRANGE AV
ALGOMA AVE NE
WATTON AVE NE
NUS 131
SUS 131

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NORTH KENT STUDY AREA
PROPOSED MONITORING WELL INSTALLATIONS
AREA 19 RAP

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

PROJ MGR: LIP	REVIEWED BY: LIP	CHECKED BY: JC	FIGURE 10
DESIGNED BY: KHM	DRAWN BY: ADM	SCALE: 1 inch = 1,500 feet	
DATE: 6/15/2020	PROJECT NO. 16.0062961.10	REVISION NO.	

0 750 1,500 3,000
Scale in Feet

N

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APPENDIX A – 2019 GROUNDWATER SAMPLING SUPPLEMENTAL MEMORANDUM

Rose & Westra
A Division of GZA

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ENVIRONMENTAL
ECOLOGICAL
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CONSTRUCTION MANAGEMENT

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APPENDIX A
2019 GROUNDWATER SAMPLING SUPPLEMENTAL MEMORANDUM

June 18, 2020
File No. 16.0062961.10

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 thirty-six (36) groundwater monitoring wells within the Wolven/Jewell Study Area as shown on **Figure 4** of the Draft Area 19 Response Activity Plan, North Kent Study Area, submitted to EGLE on June 18, 2020 (Draft Area 19 RAP [R&W/GZA, 2020]).

2.0 INVESTIGATION METHODOLOGY

The following sections summarize the groundwater monitoring activities conducted in 2019.

2.1 MONITORING WELL INSTALLATION

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. Thirty-six (36) groundwater monitoring wells have been installed in the Wolven/Jewell Area since 2017. Fifteen (15) of the groundwater monitoring wells have been installed since February 2019. At most of the locations, multi-depth cluster wells were installed. The borings were drilled using hollow stem auguring 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 19 RAP. See **Figure 4** of the Draft Area 19 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.

2.2 GROUNDWATER SAMPLING

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, oxidation reduction potential, 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 **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 Dates, 2019

Sampling Round	Start Date	End Date	Number of Wells	Number of New Wells
Quarter 1	2/11/2019	2/21/2019	21	--
Quarter 2	4/30/2019	5/19/2019	29	8
Quarter 3	8/26/2019	9/4/2019	32	3
Quarter 4	11/5/2019	11/13/2019	36	4

Due to the well installation schedule all 36 wells were not sampled in 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 in **Table 3** of the Area 19 RAP.

Table 2: Wolven/Jewell Study Area Well Additions

Quarter	Wells Sampled
Quarter 1	WV-MW-1 , WV-MW-2S , WV-MW-2D , WV-MW-3S , WV-MW-3D , WV-MW-4 , WV-MW-5S , WV-MW-5D , WV-MW-6S , WV-MW-6D , WV-MW-7S , WV-MW-7D , WV-MW-8S , WV-MW-8M , WV-MW-8D , WV-MW-9 , WV-MW-11S , WV-MW-11D , WV-MW-12S , WV-MW-12M , and WV-MW-12D
Quarter 2	Quarter 1 wells except MW-8D plus: WV-MW-7M , WV-MW-10S , WV-MW-10M , WV-MW-10D , WV-MW-13S , WV-MW-13M , WV-MW-13D , WV-MW-16S , and WV-MW-16D
Quarter 3	Quarter 2 wells plus: WV-MW-8D, WV-MW-14S, and WV-MW-14D
Quarter 4	Quarter 3 wells plus: WV-MW-15A, WV-MW-15B, WV-MW-15C, and WV-MW-15D

3.0 SITE SAMPLING RESULTS

Groundwater analytical results for PFAS are provided on **Table 6** of the Draft Area 19 RAP. The analytical reports and associated electronic data deliverables were previously provided to EGLE.

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 19 Response Activity Plan, North Kent Study Area. Submitted to EGLE June 18, 2020.

GZA GeoEnvironmental, Inc.