

Evaluation of Wixom Wastewater  
Treatment Plant (WWTP)  
Biosolids Land Application  
Sites 02N05E01-BC01 & BC02,  
02N05E02-BC01 & AG01  
03N06E04-JW01 & JW05  
Livingston County, Michigan

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## 1. Introduction

This technical memorandum summarizes and reports the findings of site investigations conducted at land application Sites 02N05E01-BC01 (Site E01-BC01), 02N05E01-BC02 (Site E01-BC02), 02N05E02-BC01 (Site E02-BC01), 02N05E02-AG01 (Site AG01), 03N06E04-JW01 (Site JW01), and 03N06E04-JW05 (Site JW05) (**Figure 1**). The purpose of the investigation was to determine the impact, if any, from the land application of Per- and Polyfluoroalkyl Substances (PFAS)-impacted biosolids from the Wixom Wastewater Treatment Plant (WWTP) in the soil, groundwater, and adjacent surface water bodies.

The field investigation activities were designed to characterize soil, groundwater, and surface water conditions and collect data to evaluate the risk to human health and the environment from land applying potential PFAS-impacted biosolids. A review of existing data was used to guide the scope of this investigation. Field investigation activities at the Site included soil, groundwater, perched water, and surface water sampling activities.

## 2. Background

The investigation conducted by AECOM on behalf of the Michigan Department of Environment, Great Lakes, and Energy (EGLE) was performed in accordance with applicable AECOM, EGLE, and US Environmental Protection Agency (USEPA) guidance documents, including the Scope of Work and the Quality Assurance Project Plan (QAPP), previously developed in 2018. The USEPA has classified PFAS as emerging contaminants that EGLE regulates under Part 201, Environmental Remediation, and Part 31, Water Resources Protection, of the Natural Resources and Environmental Protection Act, Act 451 of 1994, as amended and their respective administrative rules, specifically Rule 299.44-299.50 (Generic Cleanup Criteria) and Rule 323.1057 (Rule 57) (Toxic Substances) of the Michigan Administrative Code. PFAS are a complex family of more than 4,750 human-made fluorinated organic chemicals. Due to their unique chemical properties, PFAS has been used in many industries and consumer products since the late 1950s. The Interstate Technology Regulatory Council (ITRC) has identified four primary sources of PFAS: fire training/fire response sites, industrial sites, landfills, and wastewater treatment plants/biosolids.

AECOM initially sampled the Wixom WWTP on November 14, 2018. The Wixom WWTP has an approved Industrial Pretreatment Program (IPP) and authorization to discharge treated municipal wastewater under NPDES permit number MI0024384. In the spring of 2018, EGLE's Water Resources Division (WRD) required all municipal WWTPs with approved IPPs to participate in an IPP PFAS Initiative to evaluate their industrial users for discharges of PFAS. In May 2018, the Wixom WWTP identified an industrial user, a chrome plating facility, as a significant source of perfluorooctanesulfonic acid (PFOS) to their facility and elevated levels of PFOS in the effluent. Based on this information, the Wixom WWTP was included in a statewide WWTP PFAS assessment to provide a range of possible PFAS impacts in WWTPs with industrial discharges. The influent, effluent, and biosolids were sampled for 24 PFAS compounds recommended by EGLE as the PFAS Minimum Laboratory Analyte List.

Further, the Wixom WWTP has frequently sampled their effluent for PFAS since June 2018. EGLE has documented approximately 25 sampling events at the WWTP, which show downward trends in PFOS and perfluorooctanoic acid (PFOA) effluent concentrations with time due to source reduction efforts implemented by the Wixom WWTP. The November 2018 AECOM

sampling event results are consistent with the Wixom WWTP sampling results and trends. The effluent samples from the Wixom WWTP periodically exceeded the Rule 57 Water Quality Standards (WQS) for a surface water body not used as a drinking water source of 12 ng/L for PFOS but did not exceed the WQS of 12,000 ng/L for PFOA. The results from the sampling events are summarized below, listed as the range of values detected by year.

Sample Location	Sample Year	PFOA <sup>1</sup> (detection range)	PFOS <sup>1</sup> (detection range)
Influent	2018	3.07	128
Influent	2019	ND – 2.2	ND – 23
Influent	2020	Not Sampled	Not Sampled
Effluent	2018	6.2 – 9.9	150 – 4,800
Effluent	2019	4.5 – 11	17 – 130
Effluent	2020	4.2 – 9.0	12 – 51
Biosolids	2018	1.7 – 5.2	2,150 – 8,600
Biosolids	2019	Not Sampled	Not Sampled
Biosolids	2020	Not Sampled	Not Sampled

<sup>1</sup>Units for aqueous samples are in nanograms per liter (ng/L) or parts per trillion (ppt), and for the solids are in micrograms per kilogram (µg/Kg) or parts per billion (ppb).

Of the WWTPs included in the statewide WWTP PFAS assessment, the Wixom WWTP had some of the highest PFOS concentrations found in impacted biosolids and is expected to represent a worst-case scenario. EGLE conducted an initial, limited investigation in April 2019 at the Wixom Sites E01-BC01, E01-BC02, JW01, and JW05 that included nine (9) surface soil samples, five (5) surface water samples, seven (7) perched water samples and one (1) tile drain sample. In September 2019, six (6) groundwater samples were collected from six (6) monitoring wells installed at three (3) locations across Sites EB01-BC01, EB01-BC02, and EB02-BC01. In November 2019, six (6) soil samples, two (2) surface water samples, and three (3) perched water samples were collected from Sites EB02-BC01 and AG01 (**Figure 2a - 2c**).

The analytical results from sampling the influent, effluent, and biosolids at the Wixom WWTP represent only the conditions at the time of sampling. There is not enough historic information to accurately estimate the concentrations of PFOA and PFOS within the Wixom WWTP in the past, including the biosolids. It is documented that PFOA and PFOS were much more widely used in the past. As a result, concentrations in all environmental matrices found in agricultural fields where Wixom WWTP biosolids were land applied in the past may not be closely correlated to current concentrations found within the WWTP. However, biosolids associated with IPP WWTPs are expected to have higher PFAS concentrations than those from non-IPP WWTPs. The Wixom WWTP and agricultural fields E01-BC01, E01-BC02, E02-BC01, AG01, JW01, and JW05 were selected to compare WWTPs and agricultural fields that participate in the IPP that had lower PFAS concentrations in their biosolids and non-IPP WWTPs and agricultural fields.

## 2.1 Sites E01-BC01, E01-BC02, E02-BC01

Site E01-BC01 is a 35-acre field located southeast of South Kellogg and Golf Club Road in Howell, Michigan, approximately 18 miles west of the Wixom WWTP. Immediately to the east is Site E01-BC02, a 20-acre field, and immediately to the west of Site E01-BC01, on the other side of South Kellogg Road, is Site E02-BC01, a 30-acre field. All three (3) Sites are owned and farmed by the same landowner/farmer.

Application to apply biosolids from the Wixom WWTP to Sites E01-BC01, E01-BC02, and E02-BC01 was first received by the EGLE WRD in 2010. Records indicate Site E01-BC01 received 521.1 dry tons (dT) of biosolids from five (5) applications by the Wixom WWTP from June 2010 through December 2015. Applications were consistent across the entire acreage of the Site and varied from approximately 62 to 144 dT per application, with an average application rate of 2.99 dT per acre. Records indicate Site E01-BC02 received 184.47 dT of biosolids from five (5) applications by the Wixom WWTP from June 2010 through August 2015. These applications were somewhat consistent in acreage used and moderate in application rate, from 17 to 43 dT per year, with an average application rate of 2.39 dT per acre. Records indicate Site E02-BC01 received 255.64 dT of biosolids from four (4) applications by the Wixom WWTP from June 2010 to December 2013. Applications were somewhat consistent in acreage used and varied from approximately eight (8) to 103 dT per application, with an average application rate of 2.04 dT per acre. The application of biosolids for all three (3) sites is attached in **Table 1a**.

## 2.2 Site AG01

Site AG01 is a 120-acre field located approximately a ½ mile southwest of Golf Club Road and South Kellogg Road in Howell, Michigan, approximately 14 miles west of the Wixom WWTP. Site AG01 is located approximately one (1) mile southwest of Site E01-BC01. The same landowner owns this Site as Sites E01-BC01, E01-BC02, and E02-BC01.

Application to apply biosolids from the Wixom WWTP was first received by the EGLE WRD in 2010. Site AG01 received 487.83 dT of biosolids from five (5) applications by the Wixom WWTP from May 2010 through August 2015. None of the applications covered the entire acreage of the Site. Applications varied from approximately 51 to 171 dry tons per application, with an average application rate of 1.87 dT per acre (**Table 1b**).

## 2.3 Sites JW01, JW05

Site JW01 is a 24-acre field located at 10208 Parshall Road in Fenton, Michigan. Site JW05 is a 13-acre field located directly southeast of Site JW01. Both Sites are approximately 20 miles northwest of the Wixom WWTP and are owned and farmed by the same landowner/farmer.

Application to apply biosolids from the Wixom WWTP was first received by the EGLE WRD in December 1993. Site JW01 received 242.49 dT of biosolids from four (4) applications by the Wixom WWTP from June 1995 through April 2000. All applications covered the entire acreage of the site, varying from 13 to 92 dT per application, with an average application rate of 2.53 dT per acre. Site JW05 received 187.8 dT of biosolids from five (5) applications by the Wixom WWTP from June 1995 to January 2001. All applications covered the entire acreage of the site, varying from 23 to 64 dT per application, with an average application rate of 3.22 dT per acre. The application of biosolids for both sites is attached in **Table 1c**.

## 3. Hydrogeology/Geology

The geology and topography of the Wixom Sites are the results of glacial activity. The glacial aquifers consist of sand and gravel that are part of a thick sequence of Pleistocene glacial deposits (**Figure 9**). The area is composed of ground moraines of medium-textured till and lacustrine outwash deposits that are predominately composed of loamy sand and till. Soil borings installed during the investigation generally encountered surficial silty clay followed by intermixed sand and/or gravel. Soil boring logs are provided in **Appendix A**.

### 3.1 Sites E01-BC01, E01-BC02, E02-BC01

The USDA Natural Resources Conservation Service Web Soil Survey identified two (2) primary types of surface soils in field E01-BC01: the Brookston loam (By) and Wawasee loam (MoA, MoB). Both lithologies were deposited as ground and end moraines consisting of a calcareous loamy till. There are two (2) surface water ponds and standing perched water within the field. Bogue Creek's headwaters, which flows into the Shiawassee River, is a ¼ mile to the north.

The USDA Natural Resources Conservation Service Web Soil Survey identified two (2) primary types of surface soils at Site E01-BC02: the Wawasee loam (MoB, MoC) and Miami loam (MoD, MoE). These soils were deposited as ground moraines and till plains, consisting of a loamy till. No surface water bodies are located on this field, however, standing perched water accumulates in the southwest corner of the Site.

The USDA Natural Resources Conservation Service Web Soil Survey identified three (3) primary types of surface soils at E02-BC01: the Carlisle muck (Cc), Oakville fine sand (OkB), and Wawasee loam (MoA, MoB, MoC). The Wawasee loam was deposited as ground and end moraines and consisted of calcareous loamy till. The Oakville fine sand was deposited as deltas and outwash plains and consists of fine sediment deposits over loamy till. The Carlisle muck was deposited from glacial drainage depressions and consists of woody organic material. There is one (1) centrally located surface water pond within Site E02-BC01. The lithologies at Sites E01-BC01, E01-BC02, and E02-BC01 are described in **Appendix C**.

Regional groundwater flow is expected to generally be towards surface water bodies such as ponds and streams. The general groundwater elevation map based on EGLE-provided shallow groundwater elevation data is provided in **Figure 8a** and shows groundwater generally flows to the northeast region in Sites E01-BC01 and E01-BC02 and to the northwest in E02-BC01. Specific shallow and deep groundwater flow in Sites E01-BC01, E01-BC02 and E02-BC01 is shown in **Figure 6a-1** and **Figure 6a-2**, based on the groundwater elevation data from the locally installed monitoring wells listed in **Table 5**.

### 3.2 Site AG01

In Site AG01, the USDA Natural Resources Conservation Service Web Soil Survey identified three (3) primary types of surface soils from where samples were collected: the Wawasee loam (MoA, MoB, MoC), Fox-Boyer complex (FrB, FrC), and the Brady loamy sand (BuA). The Wawasee loam was deposited as ground and end moraines and consisted of calcareous loamy till. The Fox-Boyer complex was deposited from outwash plains and moraines and consists of loamy sand and gravelly glaciofluvial deposits. The Brady loamy sand was deposited from swales on lake plains and outwash deltas and consists of loam over sandy and gravelly glaciofluvial deposits. Most of Site AG01 is located within a wellhead protection area. The lithologies at Site AG01 are described in **Appendix C**.

Regional groundwater flow is expected to generally be towards surface water bodies such as ponds and streams. The general groundwater elevation map based on EGLE-provided shallow groundwater elevation data is provided in **Figure 8a** and shows groundwater generally flows to the northeast region in Site AG01.

### 3.3 Sites JW01, JW05

The USDA Natural Resources Conservation Service Web Soil Survey identified two (2) primary types of surface soils in Sites JW01 and JW05: the Wawasee loam (MoB, MoC) and Conover loam (Crvaab). The Wawasee loam was deposited as ground and end moraines and consisted of calcareous loamy till. The Conover loam was deposited as ground and end moraines



consisting of a loamy till over a denser loamy till. Site JW01 soil lithologies are split east and west. The Wawasee loam is generally in the west third of the field, and the Conover loam is in the eastern two-thirds of the field. Site JW05 soil lithologies are split north and south. The Wawasee loam is generally in the northern third of the field, while the Conover loam is in the southern two-thirds of the field. The lithologies at Sites JW01 and JW05 are described in **Appendix C**.

Regional groundwater flow is expected to generally be towards surface water bodies such as ponds and streams. The general groundwater elevation map based on EGLE-provided shallow groundwater elevation data is provided in **Figure 8b** and shows groundwater generally flows to the west in Sites JW01 and JW05.

## 4. Scope of Work

Soil, surface water, perched water, and groundwater samples were collected from the agricultural fields to evaluate the potential PFAS impact from Wixom WWTP biosolids. The soil, surface water, perched water, and groundwater samples were submitted to Vista Analytical Laboratory and analyzed for EGLE's recommended minimum analyte list of 24 PFAS compounds provided below, using an isotope dilution method. Soil samples were additionally sent to Test America Laboratory for total organic carbon (TOC) analysis using the Lloyd Kahn Method.

PFAS Name	Carbon Chain length (C#)	Acronym	CAS #
Perfluorobutanoic Acid <sup>1</sup>	C4	PFBA	375-22-4
Perfluoropentanoic Acid <sup>1</sup>	C5	PFPeA	2706-90-3
Perfluorohexanoic Acid <sup>1</sup>	C6	PFHxA	307-24-4
Perfluoroheptanoic Acid <sup>1</sup>	C7	PFHpA	375-85-9
Perfluorooctanoic Acid <sup>1</sup>	C8	PFOA	335-67-1
Perfluorononanoic Acid <sup>1</sup>	C9	PFNA	375-95-1
Perfluorodecanoic Acid <sup>1</sup>	C10	PFDA	335-76-2
Perfluoroundecanoic Acid <sup>1</sup>	C11	PFUnDA	2058-94-8
Perfluorododecanoic Acid <sup>1</sup>	C12	PFDoDA	307-55-1
Perfluorotridecanoic Acid <sup>1</sup>	C13	PFTrDA	72629-94-8
Perfluorotetradecanoic Acid <sup>1</sup>	C14	PFTeDA	376-06-7
Perfluorobutane Sulfonic Acid <sup>2</sup>	C4	PFBS	375-73-5
Perfluoropentane Sulfonic Acid <sup>2</sup>	C5	PFPeS	2706-91-4
Perfluorohexane Sulfonic Acid <sup>2</sup>	C6	PFHxS	355-46-4
Perfluoroheptane Sulfonic Acid <sup>2</sup>	C7	PFHpS	375-92-8
Perfluorooctane Sulfonic Acid <sup>2</sup>	C8	PFOS	1763-23-1
Perfluorononane Sulfonic Acid <sup>2</sup>	C9	PFNS	474511-07-4
Perfluorodecane Sulfonic Acid <sup>2</sup>	C10	PFDS	335-77-3

PFAS Name	Carbon Chain length (C#)	Acronym	CAS #
Perfluorooctane Sulfonamide <sup>3</sup>	C8	FOSA	754-91-6
4:2 Fluorotelomer Sulfonic Acid <sup>4</sup>	C4	4:2 FTSA	757124-72-4
6:2 Fluorotelomer Sulfonic Acid <sup>4</sup>	C6	6:2 FTSA	27619-97-2
8:2 Fluorotelomer Sulfonic Acid <sup>4</sup>	C8	8:2 FTSA	39108-34-4
N-Ethyl Perfluorooctane Sulfonamidoacetic Acid <sup>5</sup>	C8	EtFOSAA	2991-50-6
N-Methyl Perfluorooctane Sulfonamidoacetic Acid <sup>6</sup>	C8	MeFOSAA	2355-31-9

<sup>1</sup>Perfluoroalkyl Carboxylic Acids (PFCAs) Family is composed of the following PFAS: PFBA, PFPeA, PFHxA, PFHpA, PFOA, PFNA, PFDA, PFUnDA, PFDoDA, PFTrDA, PFTeDA

<sup>2</sup>Perfluoroalkane Sulfonic Acids (PFSA) Family is composed of the following PFAS: PFBS, PFPeS, PFHxS, PFHpS, PFOS, PFNS, PFDS

<sup>3</sup>Perfluoroalkane Sulfonamides (FASAs) Family is composed of the following PFAS: FOSA

<sup>4</sup>(n:2) Fluorotelomer Sulfonic Acids (FTSAs) Family is composed of the following PFAS: 4:2 FTSA, 6:2 FTSA, 8:2 FTSA

<sup>5</sup>N-Ethyl Perfluoroalkane Sulfonamidoacetic Acids (EtFASAs) Family is composed of the following PFAS: EtFOSAA

<sup>6</sup>N-Methyl Perfluoroalkane Sulfonamidoacetic Acids (MeFASAs) Family is composed of the following PFAS: MeFOSAA

## 5. Surface Soil

The locations of soil samples were selected based on previous studies, soil types, surface water flow and were generally biased with the intent of obtaining the highest possible concentrations as a worst-case scenario. A total of 12 Decision Units (DUs) as 50 by 50 feet (ft) were identified for soil sampling, with the following number of DUs per Site: Site E01-BC01 (3), Site E01-BC02 (2), Site E02-BC01 (2), Site AG01 (1), Site JW01 (2) and Site JW05 (2). The biosolids were assumed to have been applied consistently at a depth of eight (8) inches across the agricultural fields based on information provided by EGLE. Soil samples were collected for each DU using composite sampling, which is a technique that physically combines several spatially discrete aliquots from a body of material into a single sample for analysis. Each composite sample was composed of nine (9) aliquots, from a depth of six (6) to eight (8) inches or from a depth of zero (0) to 12 inches below ground surface (bgs), depending on the site, using a ¾" diameter soil core sampler. All nine (9) aliquots from each DU were homogenized into one (1) composite sample for each DU. All soil samples were analyzed for PFAS and TOC.

Before sampling the fields associated with the Wixom WWTP, EGLE and AECOM sampled agricultural fields that received land application of biosolids from several other WWTPs, focusing on sample collection at a depth of six (6) to eight (8) inches bgs. However, questions arose regarding whether there would be significant differences in PFAS concentrations between depth intervals (i.e., six (6) to eight (8) inches bgs and zero (0) to 12 inches bgs). The top 12 inches of soil are expected to be generally well homogenized and representative of near-surface soil conditions. To evaluate potential differences in PFAS concentrations with depth, EGLE and AECOM collected two (2) co-located composite samples at Site E02-BC01 from a depth of six (6) to eight (8) inches and from a depth of zero (0) to 12 inches bgs. Also, EGLE and AECOM collected a third co-located composite sample, from a depth of zero (0) to 12 inches bgs, from each DU at Site E02-BC01. The third sample from each DU was processed by the analytical laboratory using Incremental Sampling Methodology (ISM), which includes prescribed procedures on how the sample is homogenized and sub-sampled prior to analysis. This group of samples was used to evaluate the need for ISM processing by the analytical lab.

## 5.1 Sites E01-BC01, E01-BC02

At Site E01-BC01, three (3) Decision Units (E01\_BC01-DU1, E01\_BC01-DU2, and E01\_BC01-DU3) were sampled within the Wawasee loam. Within Site E01-BC02, two (2) additional DUs (E01\_BC02-DU1 and E01\_BC02-DU2) were sampled within the Wawasee loam. The soil samples obtained at Sites E01-BC01 and E01-BC02 were collected from six (6) to eight (8) inches bgs using composite sampling. The soils identified at the Wixom Sites E01-BC01 and E01-BC02 are shown in **Figure 2a** and described in **Appendix C**. The analytical results are summarized in the table below and attached in **Table 2** and **Figure 3a**.

Soil Sample ID	Sample Date	Field Site	Sample Depth	Total PFAS <sup>1</sup>	PFOA <sup>1</sup>	PFOS <sup>1</sup>
SXDU11904111530MK	4/11/2019	E01_BC01-DU1	6-8"	<b>19.9</b>	< 0.839	<b>18.0</b>
SXDU21904111450MK	4/11/2019	E01_BC01-DU2	6-8"	<b>23.5</b>	< 0.844	<b>23.5</b>
SXDU21904111455MK-DUP	4/11/2019	E01_BC01-DU2	6-8"	<b>26.5</b>	< 0.840	<b>26.5</b>
SXDU31904111405MK	4/11/2019	E01_BC01-DU3	6-8"	<b>19.6</b>	< 0.805	<b>19.6</b>
SXDU11904111655MK	4/11/2019	E01_BC02-DU1	6-8"	<b>30.7</b>	< 0.843	<b>28.4</b>
SXDU21904111615MK	4/11/2019	E01_BC02-DU2	6-8"	<b>35.5</b>	< 0.839	<b>33.5</b>

<sup>1</sup>Units are in micrograms per kilogram (µg/Kg) or parts per billion (ppb)

All soil samples collected from the five (5) DUs had some PFAS compounds detected (**Table 2**). Of the 24 PFAS compounds analyzed, only PFDA, PFOS and PFDS were detected in all six (6) samples. PFOS was found in all six (6) samples, ranging from 18.0 to 33.5 µg/Kg. None of the six (6) soil samples detected concentrations of PFOA. All six (6) soil samples collected resulted in moderately low total PFAS concentrations of 19.6 to 35.5 µg/Kg, compared to soil samples collected from other agricultural fields associated with industrially impacted biosolids from other municipal WWTPs with significant industrial sources.

The total organic carbon (TOC) analytical results ranged from 7,800 to 12,000 milligrams per kilogram (mg/Kg). The maximum TOC value is associated with E01\_BC01-DU2 and the Wawasee loam (MoB) lithology, with a TOC value of 11,000 mg/Kg. The remaining four (4) DUs sampled resulted in TOC values ranging from 7,800 to 10,000 mg/Kg. **Table 2** and **Table 6** summarizes the soil PFAS and TOC data by DU, and **Figure 3a** shows the total PFAS concentration and soil classification for each sample.

## 5.2 Site E02-BC01

Within Site E02-BC01, two (2) decision units (E02\_BC01-DU1 and E02\_BC01-DU2) were sampled within the Wawasee loam. At each DU, three (3) samples were collected at a variety of depths, and one (1) of the composite samples was processed using ISM by the lab with the samples noted with "A," "B," and "C" in their sampling nomenclature. At Site E02-BC01, soil samples A and B were collected using composite sampling from six (6) to eight (8) inches and zero (0) to 12 inches bgs, respectively. Soil samples C were collected using composite sampling from zero (0) to 12 inches bgs and processed using ISM by the lab. All three (3) sampling methods were used at Site E02-BC01 to evaluate any associated potential differences in PFAS results. The analytical results are summarized in the table below and attached in **Table 2** and **Figure 3a**.

Soil Sample ID	Sample Date	Field Site	Sample Depth	Total PFAS <sup>1</sup>	PFOA <sup>1</sup>	PFOS <sup>1</sup>
SB1911071345LEM	11/7/2019	E02_BC01-DU1-A	6-8"	101	1.44	96.7
SB1911071350LEM	11/7/2019	E02_BC01-DU1-B	0-12"	99.0	1.19	94.1
SB1911071355LEM	11/7/2019	E02_BC01-DU1-C	0-12" ISM	80.2	1.38	75.7
SB1911071205LEM	11/7/2019	E02_BC01-DU2-A	6-8"	68.3	1.53	63.6
SB1911071210LEM	11/7/2019	E02_BC01-DU2-B	0-12"	74.2	1.05	70.9
SB1911071215LEM	11/7/2019	E02_BC01-DU2-C	0-12" ISM	67.5	1.24	63.7

<sup>1</sup>Units are in micrograms per kilogram (µg/Kg) or parts per billion (ppb).

All soil samples collected from the two (2) DUs had some PFAS compounds detected. Both DUs sampled did not show a strong variance between the three (3) sampling methods (A, B, and C). The results for the A and B samples indicate that biosolids are well mixed in the top 12 inches of soil and that based on this limited dataset, sampling six (6) to eight (8) inches bgs or the top 12 inches of the soil horizon should be comparable. The B and C samples results indicate that the lab's ISM processing may not be necessary to obtain representative PFAS results if the mixing of the soil samples in the field can be done appropriately. The current sampling was not designed to evaluate potential differences in concentrations between the composite sampling and ISM sampling procedures in the field for a specific DU. However, this was evaluated at agricultural field 08N10E33-CL01 associated with the Lapeer WWTP and 07N17E19-CK01 associated with the Port Huron WWTP, where it showed that ISM and composite sampling methods could produce comparable results when used for screening and with properly selected DUs.

Of the 24 PFAS compounds analyzed, only PFPeA, PFHxA, PFOA, PFNA, PFDA, PFBS, PFOS, and MeFOSAA were detected in all six (6) samples. The first DU (E02\_BC01-DU1) detected slightly higher total PFAS soil concentrations than the second DU, with the original sampling collection method (method A) resulting in the highest total PFAS, 101 µg/Kg. The remaining five (5) soil samples collected between the two (2) DUs reported total PFAS values from 67.5 to 99.0 µg/Kg. These six (6) samples were not analyzed for TOC. **Table 2** summarizes the soil PFAS data by DU, and **Figure 3a** shows the total PFAS concentration and soil classification for each sample.

### 5.3 Site AG01

Within Site AG01, two (2) soil samples were collected using composite sampling from a depth of zero (0) to 12 inches from one (1) DU in the Fox-Boyer complex. The analytical results are summarized in the table below and attached in **Table 2** and **Figure 3b**.

Soil Sample ID	Sample Date	Field Site	Sample Depth	Total PFAS <sup>1</sup>	PFOA <sup>1</sup>	PFOS <sup>1</sup>
SB1911071515LEM	11/7/2019	AG01	0-12"	7.59	< 0.424	7.59
SB1911071550LEM	11/7/2019	AG01	0-12"	14.5	0.434	14.1

<sup>1</sup>Units are in micrograms per kilogram (µg/Kg) or parts per billion (ppb)

Both soil samples collected had some PFAS detected. Of the 24 PFAS compounds analyzed, only PFOS and PFOA were detected in the two (2) samples. PFOS was detected in both soil samples, with values of 7.59 and 14.1 µg/Kg, and PFOA was only detected in one (1) of the samples at 0.434 µg/Kg. Both soil samples were not analyzed for TOC. **Table 2** summarizes

the soil PFAS data by DU, and **Figure 3b** shows the total PFAS concentration and soil classification for each sample.

## 5.4 Sites JW01, JW05

Within Site JW01, two (2) DUs were sampled. The first DU (JW01-DU1) was collected within the Wawasee loam (MoB), and the second DU (JW01-DU2) was collected within the Conover loam (CvraaB). Within Site JW05, two (2) DUs were sampled. The first DU (JW05-DU1) was collected within the Wawasee loam (MoB), and the second DU (JW05-DU2) was collected within the Conover loam (CvraaB). The soil samples obtained at both Sites JW01 and JW05 were collected using composite sampling from six (6) to eight (8) inches bgs. The analytical results are summarized in the table below and attached in **Table 2** and **Figure 3c**.

Soil Sample ID	Sample Date	Field Site	Sample Depth	Total PFAS <sup>1</sup>	PFOA <sup>1</sup>	PFOS <sup>1</sup>
SXDU11904111220MK	4/11/2019	JW01-DU1	6-8"	<b>6.37</b>	< 0.825	<b>3.39</b>
SXDU21904111125MK	4/11/2019	JW01-DU2	6-8"	<b>6.18</b>	< 0.828	<b>4.18</b>
SXDU21904111130MK-DUP	4/11/2019	JW01-DU2	6-8"	<b>10.9</b>	< 0.849	<b>5.71</b>
SXDU11904111040MK	4/11/2019	JW05-DU1	6-8"	<b>3.75</b>	< 0.816	<b>2.85</b>
SXDU21904110945MK	4/11/2019	JW05-DU2	6-8"	<b>2.48</b>	< 0.818	<b>2.48</b>

<sup>1</sup>Units are in micrograms per kilogram (µg/Kg) or parts per billion (ppb)

All soil samples collected from the four (4) DUs had some PFAS compounds detected. Of the 24 PFAS compounds analyzed, only PFDA, PFOS, and PFDS were detected in all five (5) samples. None of the five (5) soil samples detected concentrations of PFOA, however, all samples reported values of PFOS from 2.48 to 5.71 µg/Kg. All five (5) soil samples collected resulted in relatively low total PFAS concentrations (**Table 2**) compared to soil samples collected from other agricultural fields associated with industrially impacted biosolids from other municipal WWTPs with significant industrial sources.

The TOC analytical results ranged from 5,000 to 17,000 milligrams per kilogram (mg/Kg). The maximum TOC value is associated with JW05-DU2 and the Conover loam lithology, with a TOC value of 17,000 mg/Kg. The remaining three (3) DUs sampled resulted in TOC values ranging from 5,000 to 11,000 mg/Kg. **Tables 2** and **6** summarize the soil PFAS and TOC data by DU, and **Figure 3c** shows the total PFAS concentration and soil classification for each sample.

## 6. Surface Water

Within Sites E01-BC01, E01-BC02, E02-BC01, AG01, JW01, and JW05, 10 surface water samples, seven (7) perched water samples, and one (1) tile drain water sample were collected. Surface water samples were collected from local ponds onsite or nearby creeks. Due to excessive wet conditions on the fields, standing water was available for sampling and noted as "PEW" for perched water instead of "SW" for surface water. One tile drain sample was collected and noted as "TD" in its sample ID nomenclature. The analytical results and sampling descriptions are detailed below.

### 6.1 Sites E01-BC01, E01-BC02, E02-BC01

Surface water samples were collected from the two (2) centrally located ponds and three (3) standing perched water locations in the northern region of Site E01-BC01. Within Site

E01-BC02, two (2) perched water samples were collected from the southwest corner of the field. No surface water bodies are present for surface water sampling on this field. At Site E02-BC01, one (1) surface water sample was collected from the centrally located pond, and one (1) perched water sample was collected from the southern region of the field. The analytical results are summarized in the table below and attached in **Table 3** and **Figure 4a**.

Surface Water Sample ID	Sample Date	Field Site	Total PFAS <sup>1</sup>	PFOA <sup>1</sup>	PFOS <sup>1</sup>
PEW011904111510RL	4/11/2019	E01-BC01-PEW1	968	37.7	533
PEW021904111515RL	4/11/2019	E01-BC01-PEW2	818	38.6	401
PEW031904111525RL	4/11/2019	E01-BC01-PEW3	952	45.0	246
SW011904111355RL	4/11/2019	E01-BC01-SW1	386	11.7	49.7
SW011904111400RL-DUP	4/11/2019	E01-BC01-SW1	392	12.0	50.7
SW021904111345RL	4/11/2019	E01-BC01-SW2	86.0	5.84	38.4
PEW011904111640RL	4/11/2019	E01-BC02-PEW1	36.8	3.11	16.4
PEW021904111615RL	4/11/2019	E01-BC02-PEW2	86.0	3.97	57.2
SW1911061235LEM	11/6/2019	E02-BC01-SW4	226	13.9	60.4
SW1911061245LEM	11/6/2019	E02-BC01-SW5	297	13.9	191

<sup>1</sup>Units are in nanograms per liter (ng/L) or parts per trillion (ppt)

All 10 surface and perched water samples were above the Rule 57 WQS for PFOS; however, all samples were below the WQS for PFOA (**Section 10**), with PFOS being detected above 12 ng/L and low detections below 12,000 ng/L of PFOA (**Table 3**).

## 6.2 Site AG01

Surface water samples were collected from two (2) perched water bodies and one (1) surface water pond within Site AG01. The two (2) perched water samples were collected within the northwest/central region of the field. The single surface water sample was collected from a neighboring pond south of Site AG01. The analytical results are summarized in the table below and attached in **Table 3** and **Figure 4b**.

Surface Water Sample ID	Sample Date	Field Site	Total PFAS <sup>1</sup>	PFOA <sup>1</sup>	PFOS <sup>1</sup>
SW1911061100LEM	11/6/2019	AG01-PEW1	422	57.3	159
SW1911061135LEM	11/6/2019	AG01-PEW2	551	64.4	120
SW1911061155LEM	11/6/2019	AG01-SW1	12.0	< 1.44	1.56

<sup>1</sup>Units are in nanograms per liter (ng/L) or parts per trillion (ppt)

The three (3) surface and perched water samples reported values above the Rule 57 WQS for PFOS; however, all samples were below the WQS for PFOA (**Section 10**), with PFOS being detected above 12 ng/L and PFOA detections below 12,000 ng/L (**Table 3**). At Site AG01, the

cattle previously used the portion of the Site where perched water sample A01-PEW1 was collected. While the cattle's primary drinking water source is the livestock well (see **Section 7.3**), the cattle had access to and would sometimes consume the perched water. Since sampling was conducted, the farmer fenced the area around the perched water to prevent the cattle from using it as a drinking water source. The farmer continues to use the livestock well as the only drinking water supply for its cattle, which was determined to be non-detect for all PFAS (**Section 7.3**).

### 6.3 Sites JW01, JW05

Surface water samples were collected from two (2) perched water bodies, one (1) surface water creek, and a single tile drain within Site JW01. The first perched water sample was collected along the southern edge of the field, and the second perched water sample was collected along the western edge of field JW01. The single surface water sample was collected along the creek southwest of Site JW01. The tile drain sample was collected on the western edge of Site JW01. Within Site JW05, a single surface water sample was collected from the creek running along the northeast region of the field. The analytical results are summarized in the table below and attached in **Table 3** and **Figure 4c**.

Surface Water Sample ID	Sample Date	Field Site	Total PFAS <sup>1</sup>	PFOA <sup>1</sup>	PFOS <sup>1</sup>
PEW011904111015RL	4/11/2019	JW01-PEW1	59.0	6.14	< 1.47
PEW021904111210RL	4/11/2019	JW01-PEW2	17.5	1.62	1.90
SW011904111220RL	4/11/2019	JW01-SW1	9.43	< 1.49	< 1.49
SW031904110940RL	4/11/2019	JW05-SW3	4.40	< 1.54	< 1.54

<sup>1</sup>Units are in nanograms per liter (ng/L) or parts per trillion (ppt)

Tile Drain Sample ID	Sample Date	Field Site	Total PFAS <sup>1</sup>	PFOA <sup>1</sup>	PFOS <sup>1</sup>
TD011904111225RL	4/11/2019	JW01-TD01	50.0	5.98	17.6

<sup>1</sup>Units are in nanograms per liter (ng/L) or parts per trillion (ppt)

All surface and perched water samples were below the Rule 57 WQS for PFOS; however, the single tile drain sample was above the Rule 57 WQS for PFOS, with PFOS being detected over 12 ng/L (**Section 10**). All samples were below the Rule 57 WQS for PFOA of 12,000 ng/L (**Table 3**).

## 7. Groundwater

Between August 19 to 21, 2019, AECOM and Mateco Drilling Company installed six (6) monitoring wells throughout the Wixom Sites E01-BC01 and E01-BC02. Before any intrusive work was performed, a utility clearance was conducted by MISS DIG, Michigan's one-call utility locating service. Mateco Drilling Company used Ground Penetrating Technology (GPR) to conduct a sub-surface investigation around the boring site locations. All boring site locations marked by AECOM were cleared. No anomalies were encountered that would suggest any of the sampling locations needed to be relocated.

Three (3) drilling locations were selected across Sites E01-BC01 and E01-BC02. A pair of shallow (S) and deep (D) wells were installed at each drilling location. At Site E01-BC01, the monitoring wells BC01-MW1(S, D) were set centrally along the northern boundary of the Site and monitoring wells BC01-MW2(S, D) were set along the southern edge of the Site. On Site E01-BC02, monitoring wells BC02-MW1(S, D) were installed in the northeast corner of the field. The scope of work proposed monitoring well locations to be installed in areas outside of the active farming field and where data was needed within the farm fields.

The up and down gradient locations of the six (6) groundwater wells were selected to provide vertical and horizontal groundwater flow information for PFAS. Regarding shallow groundwater flow, both BC01-MW1(S) and BC01-MW2(S) act as upgradient wells as shallow groundwater flows east/northeast towards BC02-MW1(S). Regarding deep groundwater flow, BC01-MW2(D) acts as the upgradient well, and BC01-MW1(D) and BC02-MW1(D) act as the downgradient wells, as groundwater flows north. Shallow and deep groundwater flow is shown in **Figure 6a-1** and **6a-2**. Monitoring well locations are as shown in **Figure 2a**, and results are discussed in **Figure 5** and **Table 4**.

## 7.1 Permanent Monitoring Wells

Mateco Drilling Company completed the soil borings by hand auguring the first five (5) feet below ground surface (bgs) and then using a Geoprobe 7822DT to drill to depth, typically stopping due to refusal or a very hard till-like lithology. Both hand auguring and 2-inch dual tube systems were continuously used to core soils. Cored soils were logged using the Unified Soil Classification System (USCS) from the surface to total depth. Soil boring logs are provided in **Appendix A** and a photolog of the soil cuttings from the borings is provided in **Appendix D**. The initial borehole drilled per location provided lithology until refusal, allowing this borehole to be completed as the deep well at each Site. Once total depth was reached, hollow stem auger drilling was utilized to over drill the soil boring to the final depth. Additionally, an adjacent second borehole was blind drilled using the hollow stem auger to various shallow depths depending on the screen selection from the deep borehole's geologic soil log. The borings ranged in depth from 24 to 50 feet bgs.

Monitoring wells were installed through the annulus of the hollow stem augers as the augers were extracted from the ground. Monitoring wells were constructed of 2-inch diameter, Schedule 40, polyvinyl chloride (PVC) well casing, and 5-foot long, 10-slot well screens. An appropriately sized filter sand pack was installed around each well screen to approximately 1-foot above the screened interval. The screens were placed in wet sand layers encountered at deep and shallow depths to ensure groundwater sampling success once installed. A 2-foot thick bentonite seal, hydrated in-place, was placed on top of the filter sand pack to isolate the well screen from the remaining borehole. Bentonite chips were then used to seal the remaining annular space within three (3) feet of the ground surface. Each monitoring well was completed at the ground surface with a stickup steel locking protective cover set in concrete surrounded by three (3) safety bollards for protection from any farming equipment. An expandable J-plug was provided for each monitoring well.

## 7.2 Groundwater Sampling

Six (6) groundwater samples were collected within Sites E01-BC01 and E01-BC02 from all of the permanent monitoring wells at the three (3) locations (**Figure 2a**). The monitoring wells were allowed to equilibrate for a total of one (1) month after the installation and development. Before collecting the groundwater samples, static water levels were measured using an electronic water tape from the top of the well casing of each of the wells. Each monitoring well was purged, and groundwater samples were collected for PFAS analysis in laboratory supplied



containers. Water quality parameters (temperature, specific conductance, pH, dissolved solids, oxidation-reduction potential, and turbidity) were recorded following AECOM groundwater Standard Operating Procedures using a YSI Pro DDS water quality meter. Water quality measurements recorded during purging are summarized in **Table 5** and **Appendix B**. The analytical data are summarized in the table below and attached in **Table 4** and **Figure 5**.

Groundwater Sample ID	Sample Date	Field Site	Total PFAS <sup>1</sup>	PFOA <sup>1</sup>	PFOS <sup>1</sup>
GW1909031115SK	9/3/2019	BC01-MW1S	< 1.33	< 1.33	< 1.33
GW1909030955SK	9/3/2019	BC01-MW1D	< 1.36	< 1.36	< 1.36
GW1909041220SK	9/4/2019	BC01-MW2S	<b>188</b>	< 1.35	< 1.35
GW1909041130SK	9/4/2019	BC01-MW2D	< 1.31	< 1.31	< 1.31
GW1909031245SK	9/3/2019	BC02-MW1S	<b>8.75</b>	< 1.45	< 1.45
GW1909040925SK	9/4/2019	BC02-MW1D	< 1.42	< 1.42	< 1.42
FD1909040930SK	9/4/2019	BC02-MW1D	< 1.36	< 1.36	< 1.36

<sup>1</sup>Units are in nanograms per liter (ng/L) or parts per trillion

All samples taken from the six (6) monitoring wells did not exceed Part 201 Residential and Nonresidential Drinking-Water Criteria (DWC) for PFOA, PFOS, PFNA, PFHxS, PFHxA, and PFBS of 8, 16, 6, 51, 400,000, and 420 ng/L, respectively (**Table 4**). All six (6) monitoring wells reported non-detectable values for both PFOA and PFOS.

Only two (2) of the monitoring wells had some PFAS compounds detected. Of the 24 PFAS compounds analyzed, only PFBA, PFPeA, PFHxA, PFBS and PFHxS were detected in the samples. The highest total PFAS concentration of 188 ng/L was detected in the shallow monitoring well BC01-MW2(S) along the southern edge of Site E01-BC01. BC01-MW2(S) was screened from 20 to 25 ft bgs, likely in a perched groundwater zone. On Site E01-BC02, monitoring well BC02-MW1(S) was the only other detection of total PFAS, at 8.75 ng/L. This shallow monitoring well was screened from 18 to 23 ft bgs, a similar depth to BC01-MW2(S).

### 7.3 Residential & Livestock Well Sampling

Four (4) total residential well samples and one (1) livestock well sample were collected adjacent to Sites E01-BC01, E01-BC02 and AG01 (**Figures 2a** and **2b**). The residential well from Resident 2 is along the western edge of Site E01-BC01 and screened from 76 to 86 ft bgs. The residential well from Resident 4 is along the eastern edge of Site E01-BC02 and screened from 57 to 67 ft bgs. The other two (2) residential wells from Resident 3 (screened from 106 to 112 ft bgs) and Resident 1 (screened from 112 to 122 ft bgs) and the single livestock well are located along the southern edge of Site AG01. The analytical data are summarized in the table below and attached in **Table 4** and **Figure 7a** and **7b**.

Groundwater Sample ID	Sample Date	Field Site	Total PFAS <sup>1</sup>	PFOA <sup>1</sup>	PFOS <sup>1</sup>
WR1911060935LEM	11/6/2019	Resident 1	< 4	< 2	< 2
WT1911061255LEM	11/6/2019	Resident 2	< 4	< 2	< 2
WT1911071000LEM	11/7/2019	Resident 3	< 4	< 2	< 2
WT1911071015LEM	11/7/2019	Resident 4	< 4	< 2	< 2
WT1911061000LEM	11/6/2019	Livestock Well	< 4	< 2	< 2

<sup>1</sup>Units are in nanograms per liter (ng/L) or parts per trillion

All samples taken from the residential and livestock wells did not exceed Part 201 Residential and Nonresidential Drinking-Water Criteria (DWC) for PFOA, PFOS, PFNA, PFHxS, PFHxA, and PFBS of 8, 16, 6, 51, 400,000, and 420 ng/L, respectively (**Table 4**). All five (5) samples collected reported under detectable limits for total PFAS.

## 8. QA/QC Results

Laboratory reports 1904043, 1903964, 1900762 and 1900761 (Soil), 1904042, 1900762 and 1900761 (Surface and Perched Water), 1902819, 1903019 and 1903965 (Groundwater), and 1803709 (Wixom WWTP) from Vista Analytical Laboratories and report J17935 (Soil) from Test America Laboratories were subjected to data quality review (**Appendix E**). The reports were evaluated for data completeness, holding times and sample preservation, method and field blanks, ongoing precision and recovery (OPR), field duplicate precision, extracted internal standard recoveries, and reporting issues.

The initial calibration and continuing calibration verifications met the method acceptance criteria. A method blank and ORP sample was extracted and analyzed with each preparation batch. No analytes were detected in the method blank above half (1/2) the Limit of Quantification (LOQ). The OPR recoveries were within the method acceptance criteria. No quality issues were identified for any of the samples, and all of the results were considered usable.

## 9. Investigation-Derived Waste (IDW)

Investigation-derived waste (IDW) generated during the investigation included the following:

- Disposable material such as Geoprobe® liners, personal protective equipment (PPE), plastic sheeting, etc.
- Drill cuttings
- Excess soil leftover from sampling activities
- Well development water
- Perched water
- Decontamination water

Minimally contaminated disposable sampling materials and PPE were containerized and disposed of as ordinary solid waste. Drill cuttings, excess soil from sampling, well development water, perched water, and decontamination water were discharged to the ground surface adjacent to where the material was generated.

## 10. Pathway and Receptors Evaluation

An exposure pathway includes five components: the source of contamination, environmental media and transport mechanism, the point of exposure, route of exposure, and receptor population. A pathway is considered potentially complete if all five (5) components are present, and one or more hazardous substances are detected. The human health risk associated with a potentially complete exposure pathway is acceptable if concentrations do not exceed the

applicable criteria and background concentrations (Rule 299.1013(3)). Ecological risks are acceptable if concentrations do not exceed water quality values or soil screening values. Potentially complete groundwater exposure pathways associated with Sites E01-BC01, E01-BC02, E02-BC01, AG01, JW01, and JW05, and corresponding Part 201 cleanup criteria are:

- Part 201 Residential and Nonresidential Drinking Water Criteria (DWC):
  - PFOA = 8 ng/L
  - PFOS = 16 ng/L
  - Perfluorononanoic acid (PFNA) = 6 ng/L
  - Perfluorohexane sulfonic acid (PFHxS) = 51 ng/L
  - Perfluorohexanoic acid (PFHxA) = 400,000 ng/L
  - Perfluorobutane sulfonic acid (PFBS) = 420 ng/L
  - Hexafluoropropylene oxide dimer acid (HFPO-DA) 370 ng/L
- Groundwater-Surface Water Interface (GSI) Criteria: PFOA = 12,000 ng/L and PFOS = 12 ng/L

Additionally, EGLE only regulates PFOA and PFOS in the surface water. Criteria under the Michigan Rule 57 WQS were developed to protect humans, wildlife, and aquatic life. Potentially complete surface water exposure pathways associated with all Sites and corresponding Rule 57 WQS are:

<b>PFAS</b>	<b>Human Noncancer Value (nondrinking water source)</b>	<b>Human Noncancer Value (drinking water source)</b>	<b>Final Chronic Value</b>	<b>Final Acute Value</b>	<b>Aquatic Maximum Value</b>
PFOS <sup>1</sup>	12	11	140,000	1,600,000	780,000
PFOA <sup>1</sup>	12,000	420	880,000	15,000,000	7,700,000

<sup>1</sup>Units are in nanograms per liter (ng/L) or parts per trillion (ppt).

Potentially complete soil exposure pathways associated with all Sites and corresponding Part 201 cleanup criteria (if available) are:

- Direct Contact Criteria (DCC; criteria not available)
- Human exposure by consuming impacted vegetation (gardening, farming; screening levels not available)

Potential receptors associated with groundwater are:

- People who use impacted groundwater for drinking water

Potential receptors associated with surface water are:

- People using the drains and streams and other impacted surface waters for recreation and fishing.
- Fish and other aquatic life.

Potential receptors associated with soil are:

- Residents living at or near impacted soil areas.
- Non-residential use of impacted soil areas, such as farming and commercial use

## 10.1 Surface Soil Evaluation

On-site farm workers may encounter surficial soils with detectable PFAS concentrations; however, no Part 201 DWC have been established for any PFAS compounds, including PFOS and PFOA. All soil samples collected from the 12 DUs had some PFAS compounds detected. Seven (7) of the 19 soil samples detected PFOA, with low values ranging from 0.434 to 1.53 µg/Kg. All soil samples detected values of PFOS, with a variance of 2.48 to 96.7 µg/Kg. The six (6) soil samples collected from Site E02-BC01 have the highest total PFAS concentrations, ranging from 67.5 to 101 µg/Kg and highest PFOS concentrations, with values ranging from 63.6 to 96/7 µg/Kg.

Studies have shown that PFAS does have the potential for plant uptake. Depending on the plant type and PFAS compound, the accumulation of PFAS is not evenly distributed throughout the major components of the plant. Some of the PFAS will accumulate more in the roots, while others accumulate in the leaves or fruits. However, exposure to PFAS via plant uptake through direct or indirect ingestion of PFAS-impacted plants may also be possible. Crops used for animal feed production (e.g., silage) may potentially allow the PFAS to bioaccumulate in the livestock. Currently, there are no PFAS criteria for plants; however, a consumption advisory could be developed in the future like those for fish. To evaluate the potential uptake of PFAS in crops, a limited number of crop samples were collected for the Michigan PFAS Action Response Team (MPART) from Sites E01-BC02, E02-BC01, and AG01. A total of 10 sorghum plants were collected from Site AG01 with two (2) soil samples co-located with the sorghum plants. One soil sample, AG01-SORG\_SOIL1, was co-located with the first group of 5 sorghum plants (Plant 1 through 5), and the second soil sample, AG01-SORG\_SOIL2, was co-located with the second group of 5 sorghum plants (Plant 6 through 10). The farmer collected two (2) haylage samples from Site E01-BC02 and three (3) corn silage samples from Site E02-BC01. The samples were stored in a Ziploc bag and kept in the refrigerator by the farmer and provided to AECOM. The crop sample results are pending.

## 10.2 Surface and Perched Water Evaluation

PFAS concentrations were detected in all 10 surface water samples, seven (7) perched water samples, and the single sample collected from the on-site tile drain. Seven (7) of the ten (10) surface water samples, all seven (7) perched water samples, and the single tile drain sample collected reported detectable values of PFOA. Rule 57 WQS for PFOA (12,000 ng/L) was not exceeded in any samples. Rule 57 WQS for PFOS (12 ng/L) was exceeded in seven (7) of the ten surface water samples, five (5) of the seven (7) perched water samples and the single tile drain sample.

## 10.3 Groundwater Evaluation

Over 50 private/household wells (residential wells) were identified close to Sites E01-BC01, E01-BC02, E02-BC01, AG01, JW01, and JW05 using the EGLE Wellogic database (**Figure 8a** and **8b**). The EGLE Wellogic database does not include all of the well records; however, a review of additional scanned well logs was also performed. Based on the results of this investigation, there is no unacceptable risk based on Part 201 DWC. Groundwater may also be used for agricultural irrigation. All groundwater samples collected, including the installed

used for agricultural irrigation. All groundwater samples collected, including the installed monitoring wells, residential wells, and livestock well reported values below Part 201 DWC. Therefore, any irrigation well does not suggest risk of Part 201 DWC exceedances. Note, groundwater samples collected as part of EGLE's Statewide Public Water Supply Sampling Program near the biosolids application sites were also non-detect for PFAS.

## 11. Summary and Discussion

AECOM conducted a field investigation to determine the impact, if any, from the land application of biosolids containing low levels of PFAS concentrations from the Wixom WWTP. This investigation expands EGLE's knowledge of PFAS at land application sites that may be associated with industrially impacted biosolids. Further, the investigation allows for comparison of PFAS in the soil, groundwater, and adjacent surface water bodies at Sites E01-BC01, E01-BC02, E02-BC01, AG01, JW01, and JW05 to other agricultural fields associated with land application of biosolids not considered to be industrially impacted from non-IPP and IPP WWTPs. Land application field investigations will also help guide understanding of fate and transport of PFAS in environmental matrices and supplement fate and transport modeling analysis being conducted on this topic.

The soil, surface water, perched water, tile drain, and groundwater sampling results indicate medium to high PFAS concentrations in all matrices, except for groundwater, due to the land applications of biosolids and are summarized in **Table 2**, **Table 3**, and **Table 4**. PFAS was detected in all 19 surface soil samples (**Figure 3a**, **Figure 3b**, **Figure 3c**), all 18 surface/perched water locations (**Figure 4a**, **Figure 4b**, **Figure 4c**), the single tile drain sample (**Figure 4c**), and two (2) of the six (6) groundwater wells (**Figure 5**). PFAS was not detected in the four (4) residential wells and the single livestock well (**Figure 7a** and **7b**). The laboratory reports are included in **Appendix E**.

PFAS such as PFBA, PFPeA, PFHxA, PFHpA, PFBS, and PFPeS have a shorter carbon chain length and are referred to as short-chain PFAS. While PFAS such as PFHxS, PFOA, and PFOS have longer fluorinated carbon chain lengths referred to as long-chain PFAS. The carbon chain length for PFBA and PFBS is four (4), and eight (8) for PFOA and PFOS. The shorter the carbon chain length for PFAS, the more mobile they are in the environment. As a result, long-chain PFAS are expected to concentrate and be present in the biosolids and soils at higher concentrations, while short-chain PFAS to be more frequently detected in the aqueous phases such as surface water, tile drains, and groundwater. The detection limits for the solid phase (i.e., biosolids and soil) are in the low micrograms per kilogram ( $\mu\text{g}/\text{Kg}$ ) or parts per billion (ppb) range. For the aqueous phase (i.e., surface water, tile drains, and groundwater), the detection limits are in the low nanograms per liter (ng/L) or parts per trillion (ppt). As a result, PFAS that are non-detect in the solid phase may still be present at very low concentrations below the detection limit and may be detected in the aqueous phases.

PFAS properties, including fate and transport in the environment, are still being studied and are currently not fully understood. Equations developed to estimate leachability and migration of PFAS have not been empirically verified at this time. EGLE is currently evaluating additional agricultural fields and performing subsurface modeling to better understand the fate and transport of PFOA and PFOS in the environment.

## 11.1 Soil

Based on EGLE's assessment of WWTPs, long-chain PFAS (e.g., PFOS and PFOA) accumulate at higher concentrations in sludge and biosolids; as a result, less short-chain PFAS are expected to be present in the land-applied biosolids when compared to long-chain PFAS. The soil results indicated that PFOS was the PFAS detected at the highest concentrations, varying from 2.48 to 96.7 µg/Kg, supporting the expectation that long-chain PFAS accumulates at higher concentrations in soil. PFAS, especially the long-chain PFAS compounds, are known to adsorb more strongly to fine particles such as silt and clay, which contain more TOC. At Sites E01-BC01 and E01-BC02, the TOC analysis indicates that the maximum TOC values generally are associated with soil samples of the highest PFAS values. Due to lower total PFAS concentrations at Sites JW01 and JW05, the correlation is not strong between TOC and PFAS. This indicates that site-specific environmental conditions could play a very significant role in environmental impacts.

Six (6) soil samples were collected from two (2) DUs using three (3) different methods at Site E02-BC01. Soil samples A and B were collected using composite sampling from six (6) to eight (8) inches and zero (0) to 12 inches bgs, respectively. Soil samples C were collected from zero (0) to 12 inches bgs and were processed using ISM by the analytical lab. The results for the A and B samples indicate that biosolids are well mixed in the top 12 inches of soil, and that based on this limited dataset, sampling six (6) to eight (8) inches bgs or the top 12 inches of the soil horizon should be comparable. The results for the six (6) samples also indicate that if soils can be well mixed in the field, comparable results can be obtained with and without ISM processing by the analytical laboratory. Additional evaluations at agricultural field 08N10E33-CL01 associated with the Lapeer WWTP and 07N17E19-CK01 associated with the Port Huron WWTP also showed that ISM and composite sampling methods could produce comparable results when used for screening with properly selected decision units. Results indicate that both the ISM and composite sampling methods used are appropriate in screening agricultural fields for potential PFAS impacts from the land applications of biosolids. ISM has unique benefits and is recommended when evaluation of a large area is needed, but ISM is not needed for proper screening of PFAS impacts to all soils from land-application of biosolids.

A discussion about the PFAS concentrations in surface water, perched water, tile drains, and groundwater in relation to the soil samples is provided in **Section 11.2** and **11.3** below.

## 11.2 Surface Water

PFAS concentrations detected in surface water are likely related to surface runoff and potential discharge of shallow groundwater into the surface water body. The Rule 57 WQS for PFOS was exceeded for all surface water and perched water samples collected from Sites E01-BC01, E01-BC02, and E02-BC01. Additionally, Rule 57 WQS for PFOS was exceeded in the two (2) perched water samples collected from Site AG01, and the single tile drain sample collected at Site JW01. Rule 57 WQS was not exceeded for PFOA in any of the surface water, perched water or tile drain samples across all Wixom Sites.

The highest total PFAS concentrations were collected from the three (3) perched water samples within Site E01-BC01, located in the northwest region of the field, ranging from 818 to 968 ng/L. This area is partially downgradient of shallow groundwater flow and at a lower elevation resulting in the standing perched water. In general, the perched water samples collected detected higher concentrations of PFAS compared to their neighboring surface water bodies. Upgradient from Site E01-BC01 is Site E02-BC01, which detected high PFAS concentrations in the shallow soil samples, ranging from 68 to 101 µg/Kg. The Wixom Sites tested for surface and perched water resulted in PFAS concentrations from highest to lowest in the following

order: E01-BC01, AG01, E02-BC01, E01-BC02, JW01 and lastly JW05. This order of PFAS detection in the surface and perched water samples is similar to the detection of PFAS in soil samples in the Sites, showing a correlation between surface soil and runoff into surface water bodies and standing perched water.

The environmental impact on the surface waters from all land-application of biosolids, specifically at Sites E01-BC01, E01-BC02, E02-BC01 and AG01, does show a high impact of PFOA and PFOS concentrations with detentions that are above Rule 57 WQS.

### 11.3 Groundwater

A total of six (6) wells were installed as shallow and deep pairs at three (3) locations with four (4) wells BC01-MW1 (S, D) and BC01-MW3 (S, D) at Site E01-BC01, and two (2) wells BC02-MW1 (S, D) at Site E01-BC02. A total of six (6) groundwater samples were collected at Sites E01-BC01 and E01-BC02 from all permanent monitoring wells (**Figure 2a**).

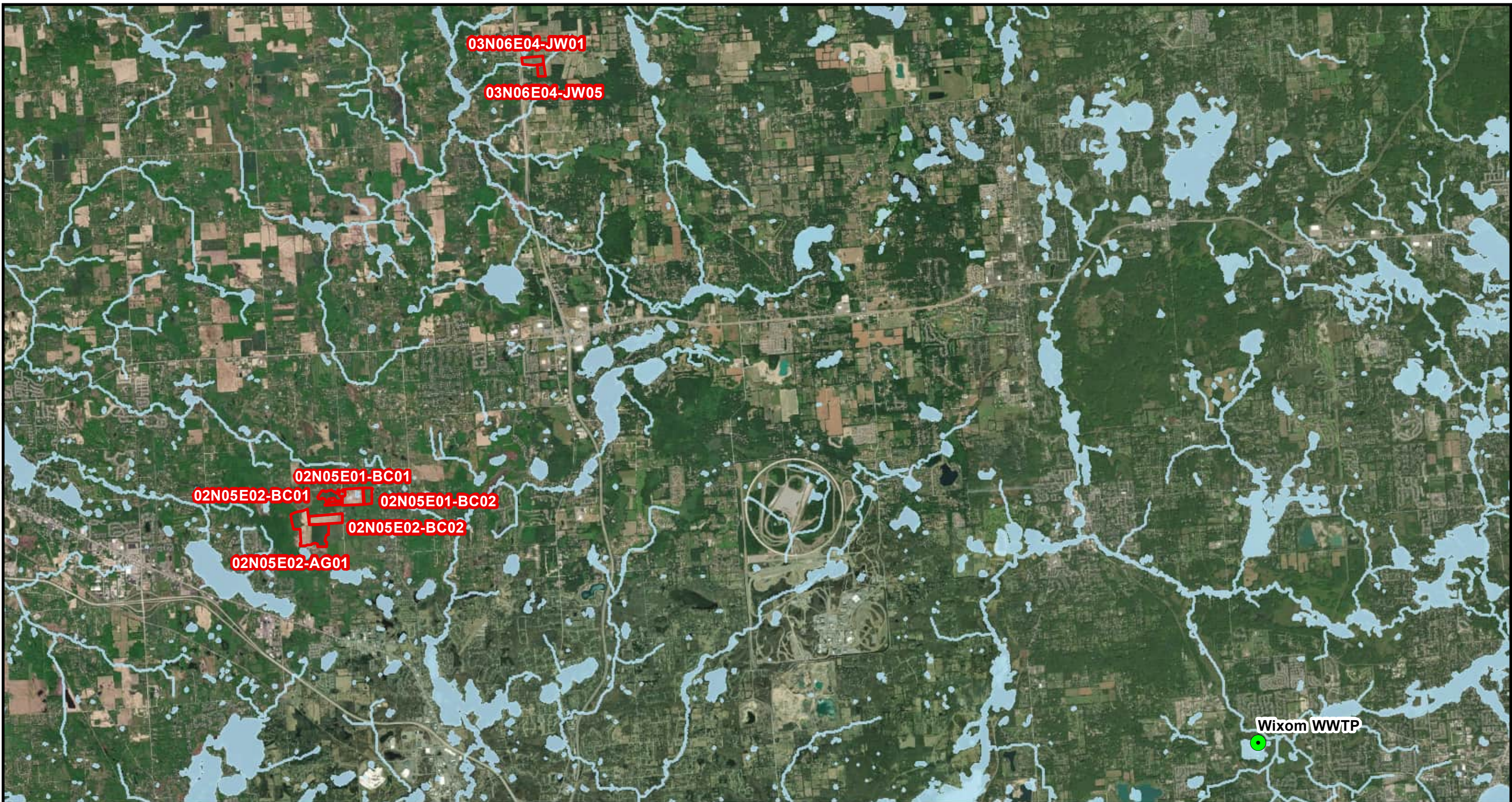
The highest total PFAS concentration of 187 ng/L was identified at Site E01-BC01 in well BC01-MW2S. Well BC01-MW2S is screened from 20 to 25 ft bgs, under a confining layer of clay, with shallow groundwater at approximately 20 ft bgs. Four (4) of the six (6) groundwater wells did not detect PFAS in the groundwater samples. The two (2) monitoring wells with PFAS detections were shallow monitoring wells, BC01-MW2S, and BC02-MW1S. The monitoring well BC02-MW1S detected a low concentration of 8.75 ng/L.

The attached boring logs from **Appendix A** show intervals of shallow clay throughout Sites E01-BC01 and E01-BC02. Short-chain PFAS such as PFBA and PFBS are more mobile in the environment and were detected in the shallow wells, suggesting that shallow silt and clay can prevent the migration of long-chain PFAS such as PFOA and PFOS. All monitoring well and residential well samples collected did not report values of PFOS and PFOA above detection limits. Therefore, there likely is a stronger correlation of increased PFAS concentrations based on lithology on-site, rather than depth. Short-chain PFAS may still be present at very low concentrations below the detection limit in the solid phase (i.e., biosolids and soil) and be detected in the aqueous phase (i.e., surface water and groundwater) even when they are non-detected in the solid phase, due to a much lower detection limit for PFAS in the aqueous phase compared to the solid phase.

The groundwater at Sites E01-BC01, E01-BC02, E02-BC01, AG01, JW01 and JW05 showed a low impact of short and long-chain PFAS, with no exceedance of the Part 201 DWC. Based on the regional groundwater flow, location of residential wells in the area, and minimal PFAS concentrations identified in the deep monitoring wells, there does not appear to be a potential risk to the drinking water wells.

Figures





**AECOM**

Drawn: AA Date: 4/1/2021

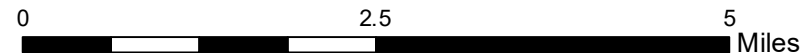
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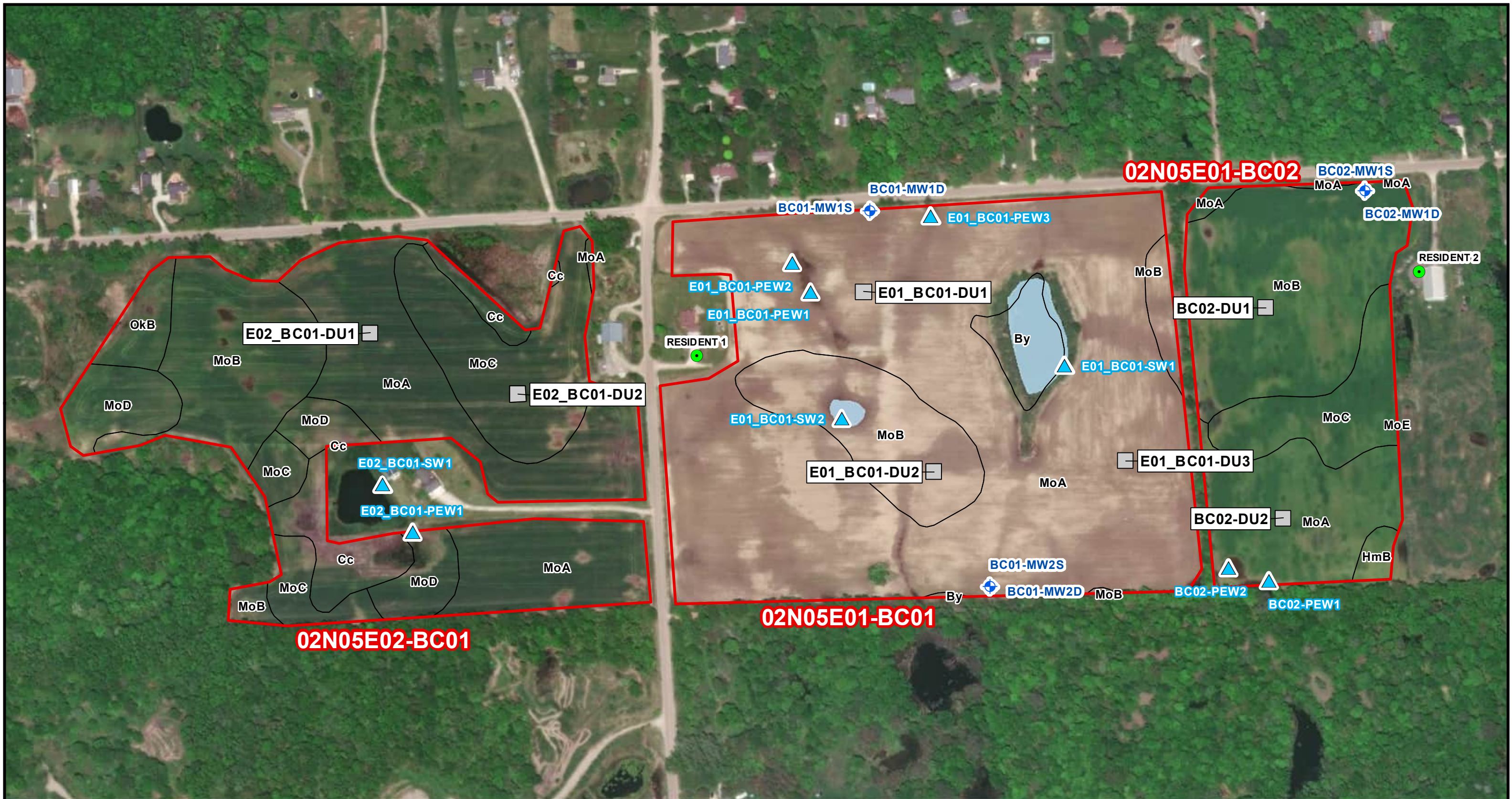
**Legend**

- Waste Water Treatment Plant
- Biosolids Application



**FIGURE 1**  
**WIXOM BIOSOLIDS APPLICATION**  
**FIELDS OVERVIEW**

**LIVINGSTON COUNTY**

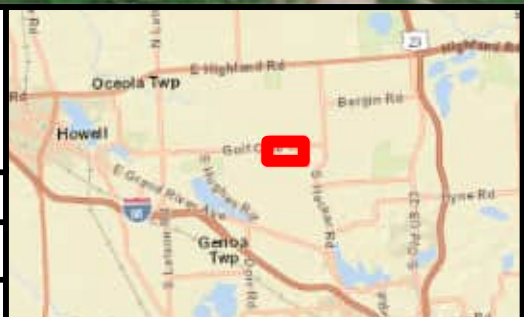


**AECOM**

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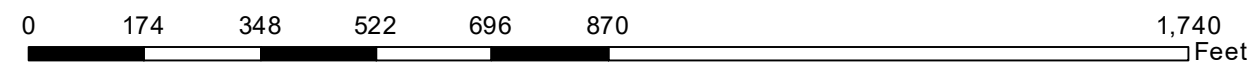
Approved: DB Date: 4/1/2021

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**Legend**

- Biosolids Application Field
- 50' x 50' Sampling Grid
- Soil Type
- + Monitoring Well
- ▲ Surface Water Sample
- Residential Sample



**FIGURE 2a**  
 02n05e02-BC01,  
 02n05e01-BC01 & BC02  
 SAMPLE LOCATIONS  
 LIVINGSTON COUNTY

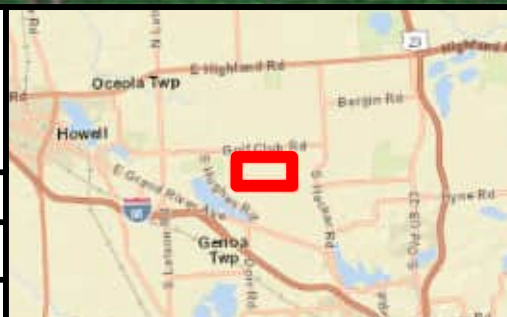


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Drawn: AA Date: 4/1/2021

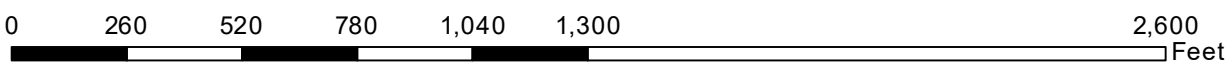
Approved: DB Date: 4/1/2021

Project #: 60588767



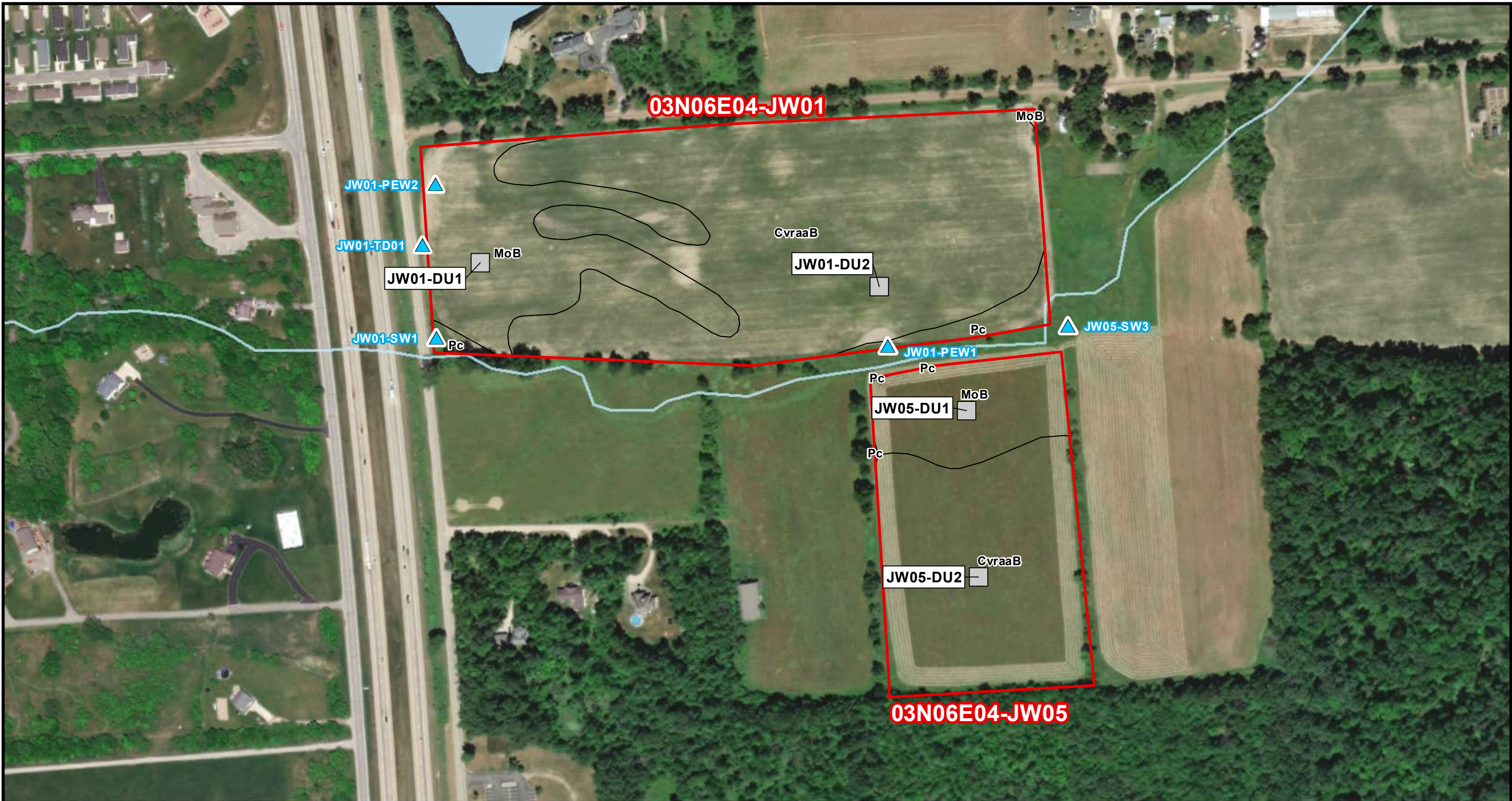
**Legend**

- Biosolids Application Field
- 50' x 50' Sampling Grid
- Soil Type
- ▲ Surface Water Sample
- Residential Sample
- Livestock Well Sample



**FIGURE 2b**  
**02N05E02-AG01**  
**SAMPLE LOCATIONS**

**LIVINGSTON COUNTY**

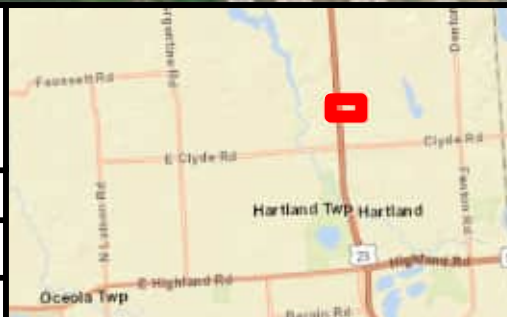


**AECOM**

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Project #: 60588767



**Legend**

- Biosolids Application Field
- 50' x 50' Sampling Grid
- Soil Type
- ▲ Surface Water Sample

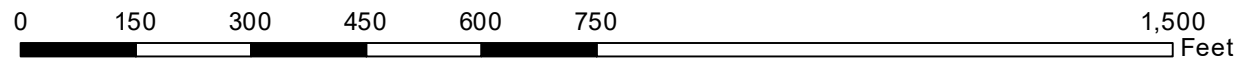
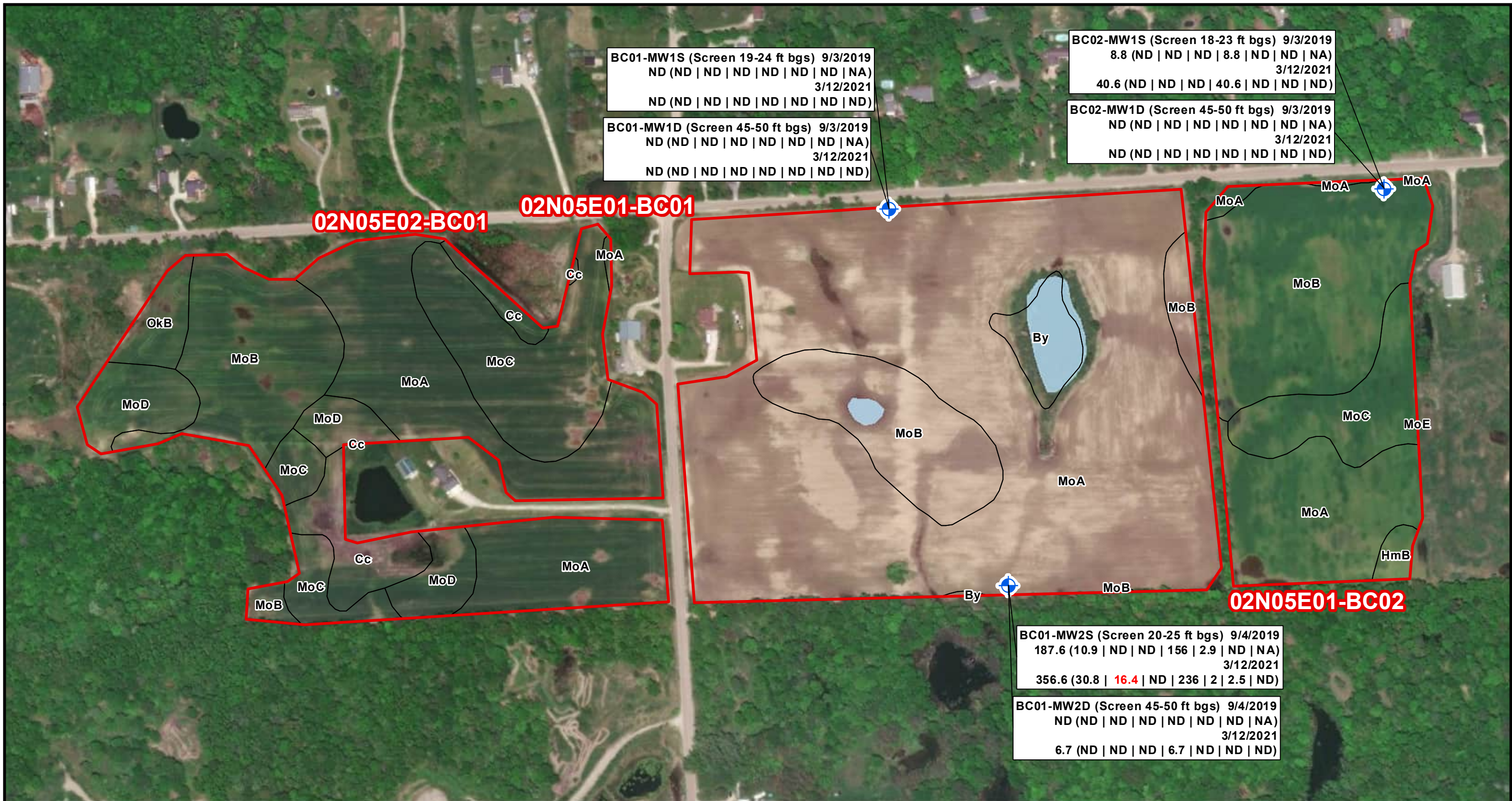


FIGURE 2c  
03n06e04-JW01 & JW05  
SAMPLE LOCATIONS

LIVINGSTON COUNTY



BC01-MW1S (Screen 19-24 ft bgs) 9/3/2019  
 ND (ND | ND | ND | ND | ND | ND | NA)  
 3/12/2021  
 ND (ND | ND | ND | ND | ND | ND | ND)

BC01-MW1D (Screen 45-50 ft bgs) 9/3/2019  
 ND (ND | ND | ND | ND | ND | ND | NA)  
 3/12/2021  
 ND (ND | ND | ND | ND | ND | ND | ND)

BC02-MW1S (Screen 18-23 ft bgs) 9/3/2019  
 8.8 (ND | ND | ND | 8.8 | ND | ND | NA)  
 3/12/2021  
 40.6 (ND | ND | ND | 40.6 | ND | ND | ND)

BC02-MW1D (Screen 45-50 ft bgs) 9/3/2019  
 ND (ND | ND | ND | ND | ND | ND | NA)  
 3/12/2021  
 ND (ND | ND | ND | ND | ND | ND | ND)

BC01-MW2S (Screen 20-25 ft bgs) 9/4/2019  
 187.6 (10.9 | ND | ND | 156 | 2.9 | ND | NA)  
 3/12/2021  
 356.6 (30.8 | **16.4** | ND | 236 | 2 | 2.5 | ND)

BC01-MW2D (Screen 45-50 ft bgs) 9/4/2019  
 ND (ND | ND | ND | ND | ND | ND | NA)  
 3/12/2021  
 6.7 (ND | ND | ND | 6.7 | ND | ND | ND)



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 Project #: 60588767



**Legend**  
 Monitoring Well Sample  
 Biosolids Application  
 Soil Type

**Sample Location (Well Screen)** **Sample Date**  
 Total PFAS (PFHxA | PFOA | PFNA | PFBS | PFHxS | PFOS | HFPO-DA)

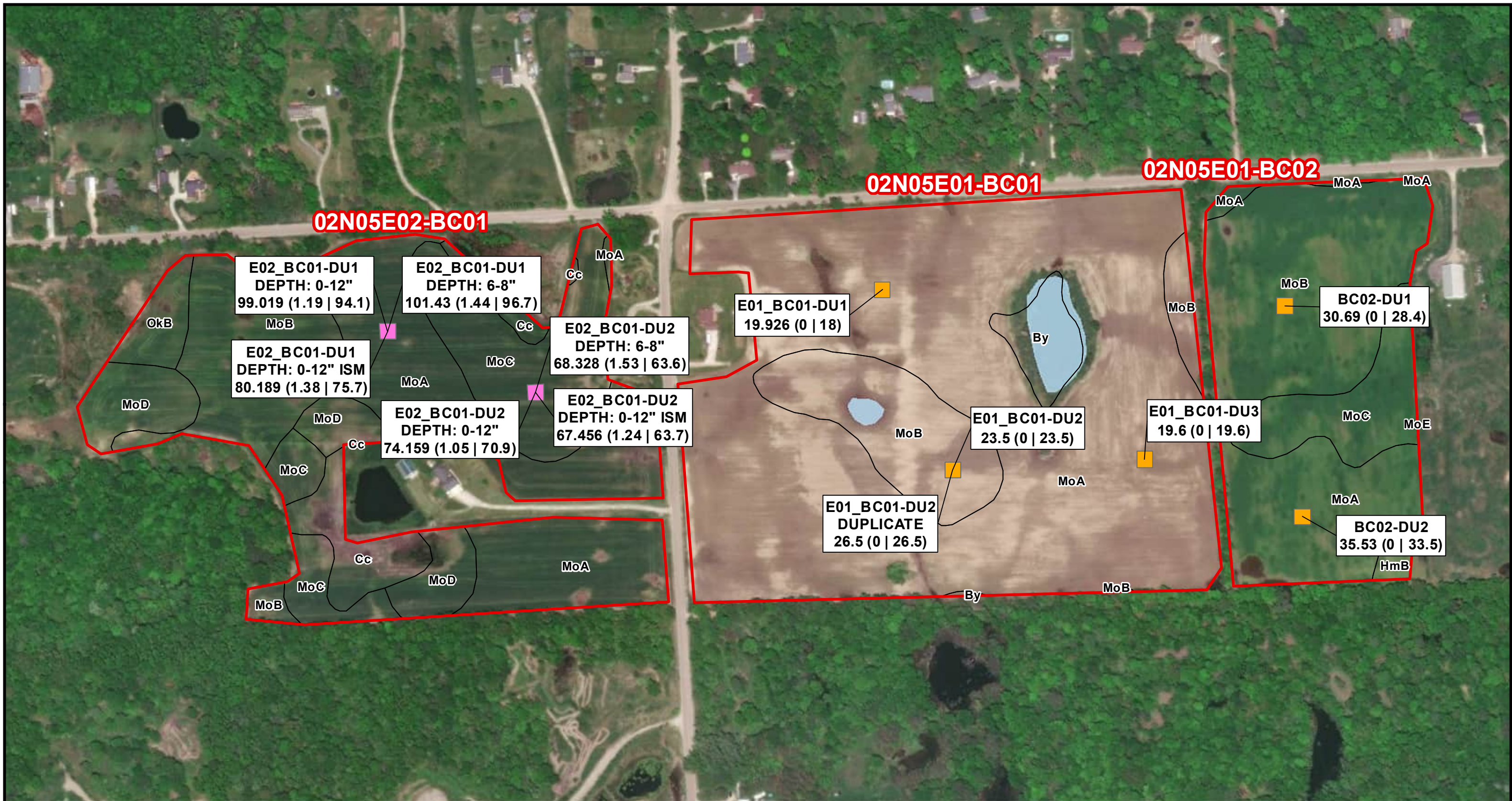
All sample results are in ng/L  
 ND = non-detect, Typical detection limit is <1.92 to <4.04, refer to summary groundwater table for detailed results.  
 NA = Not Analyzed  
 red text indicates exceedance of Part 201 DWC

Michigan Part 201 Residential & Nonresidential Drinking Water Criteria (DWC), ng/L  
 PFHxA = 400,000 PFHxS = 51  
 PFOA = 8 PFOS = 16  
 PFNA = 6 HFPO-DA = 370  
 PFBS = 420

Total PFAS is sum of 24 PFAS compounds for samples collected in 2019 and 28 PFAS compounds for samples collected in 2021.

0 200 400 800 Feet

**FIGURE 3**  
 02N05E02-BC01,  
 02N05E01-BC01 & BC02  
 GROUNDWATER SAMPLING RESULTS  
 LIVINGSTON COUNTY

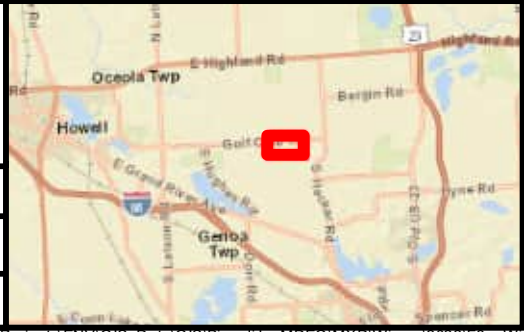


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**Legend**

50' x 50' Soil Sampling Grid

PFOS

- Non-Detect
- >0 - 10
- >10 - 50
- >50 - 100
- >100 - 500
- >500

Biosolids Application Field

Soil Type

**Sample Location**  
Total PFAS (PFOA | PFOS)  
\*results reported in units of ppb

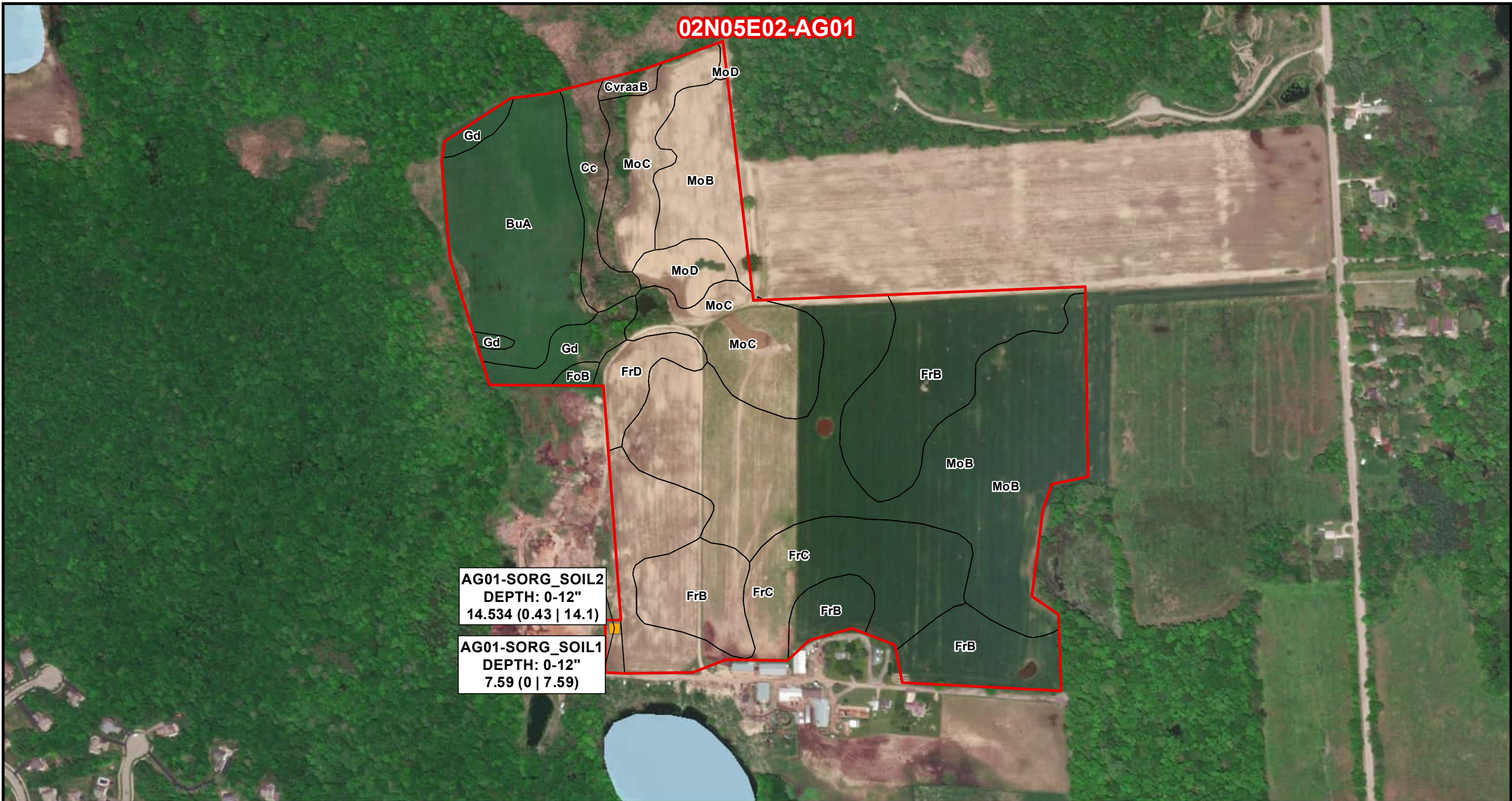
N  
↑

0    124    248    372    496    620    1,240  
Feet

**FIGURE 3a**  
02n05e02-BC01,  
02n05e01-BC01 & BC02  
SOIL SAMPLING RESULTS

**LIVINGSTON COUNTY**

**02N05E02-AG01**



**AG01-SORG\_SOIL2**  
 DEPTH: 0-12"  
 14.534 (0.43 | 14.1)

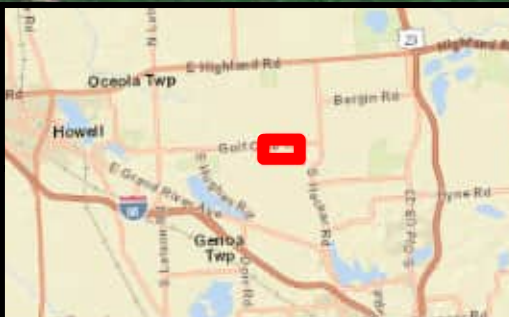
**AG01-SORG\_SOIL1**  
 DEPTH: 0-12"  
 7.59 (0 | 7.59)



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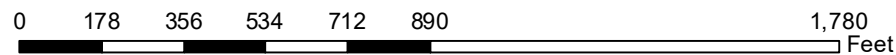
Project #: 60588767



**Legend**

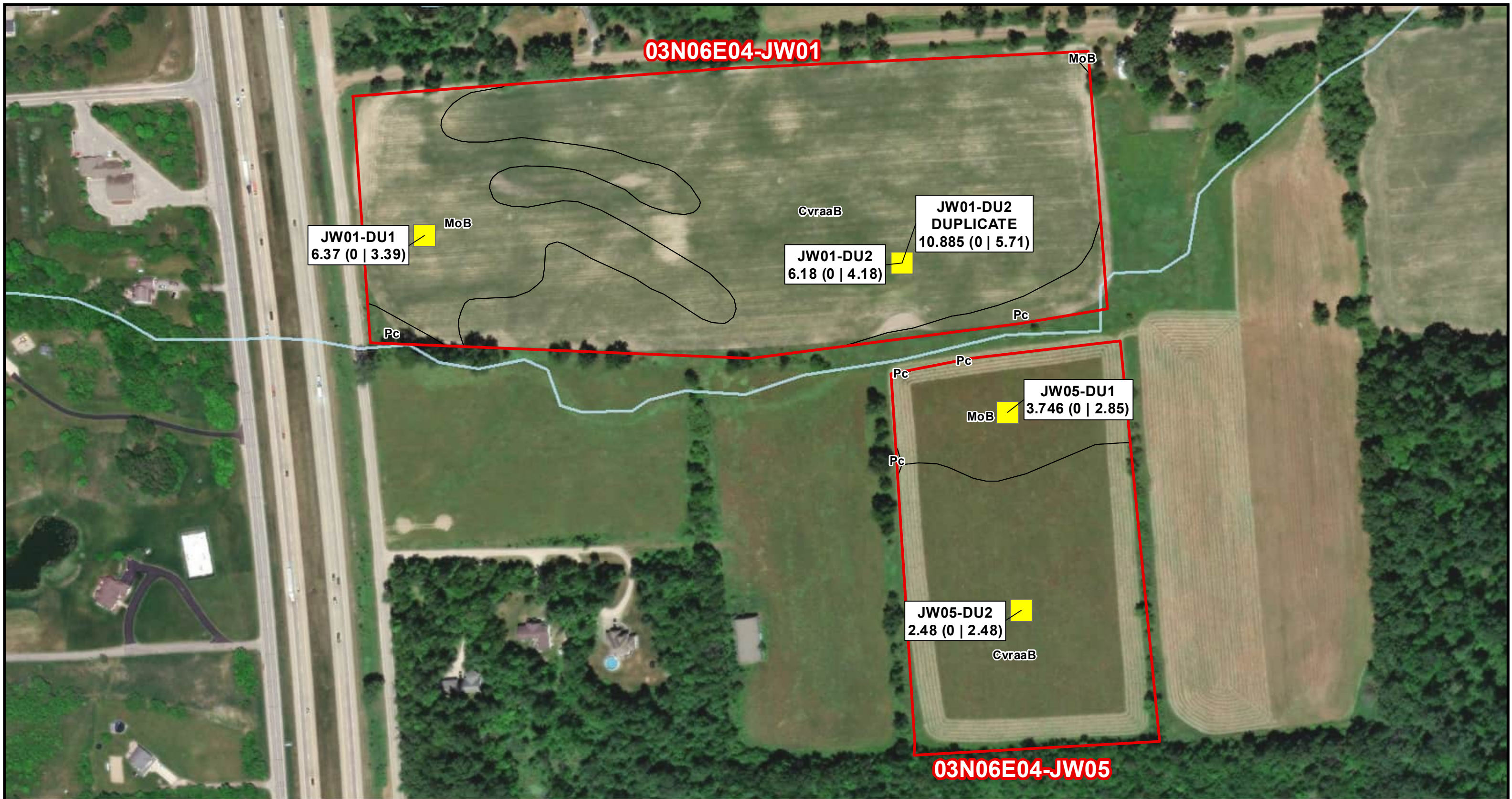
- 50' x 50' Soil Sampling Grid PFOS
- Non-Detect
- >0 - 10
- >10 - 50
- >50 - 100
- >100 - 500
- >500
- Biosolids Application Field
- Soil Type

**Sample Location**  
 Total PFAS (PFOA | PFOS)  
\*results reported in units of ppb



**FIGURE 3b**  
 02N05E02-AG01  
 SOIL SAMPLING RESULTS

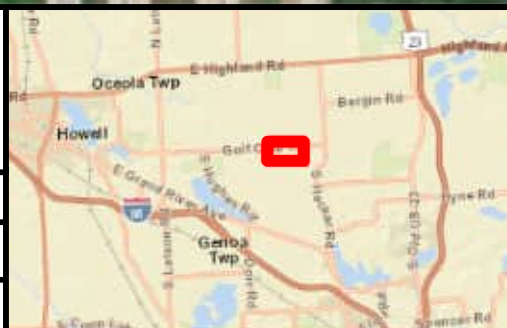
LIVINGSTON COUNTY



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**Legend**

50' x 50' Soil Sampling Grid

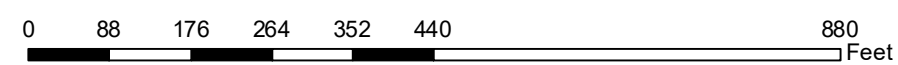
PFOS

- Non-Detect
- >0 - 10
- >10 - 50
- >50 - 100
- >100 - 500
- >500

Biosolids Application Field

Soil Type

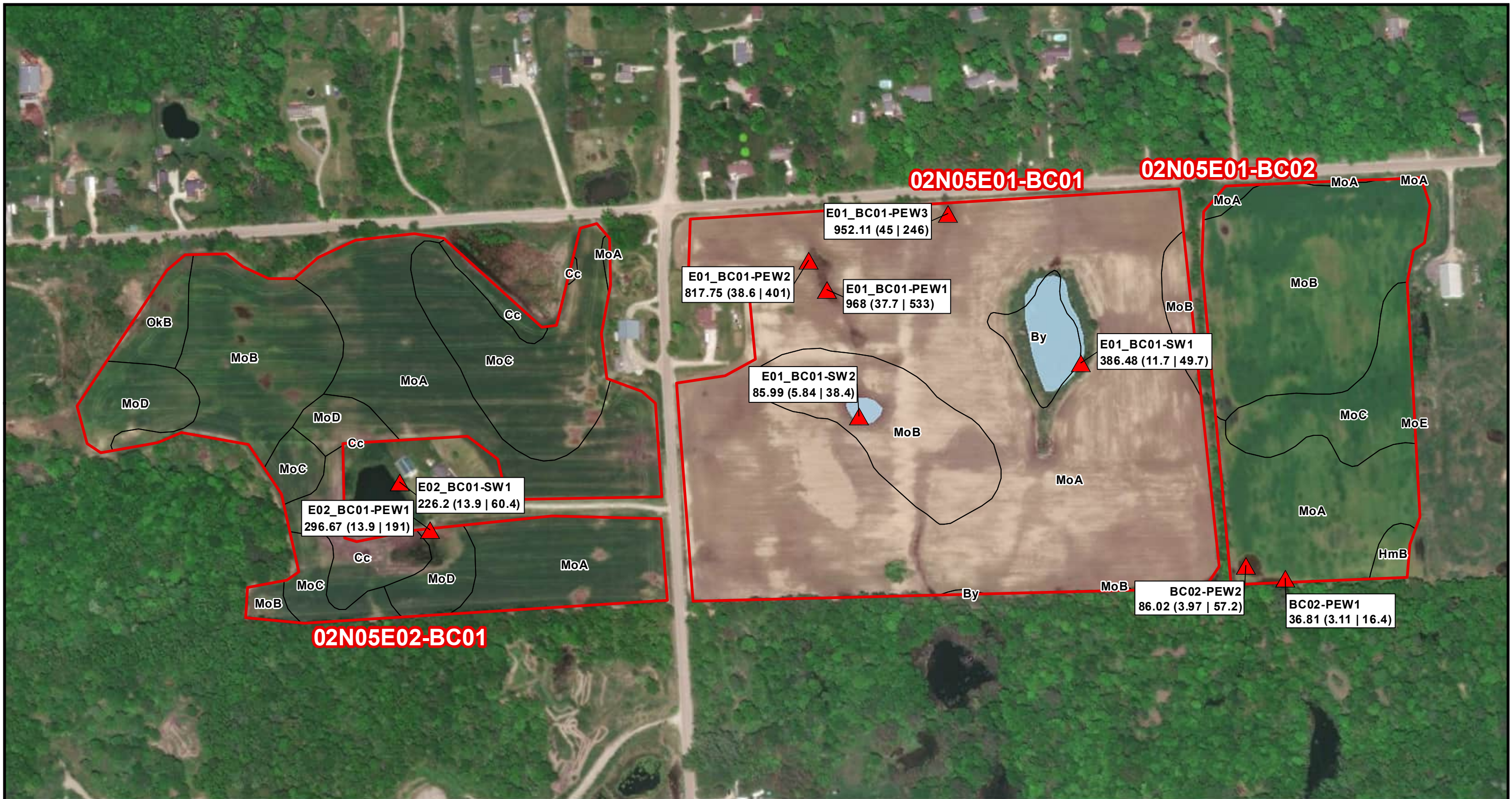
**Sample Location**  
Total PFAS (PFOA | PFOS)  
\*results reported in units of ppb



**FIGURE 3c**  
03n06e04-JW01 & JW05  
SOIL SAMPLING RESULTS

LIVINGSTON COUNTY

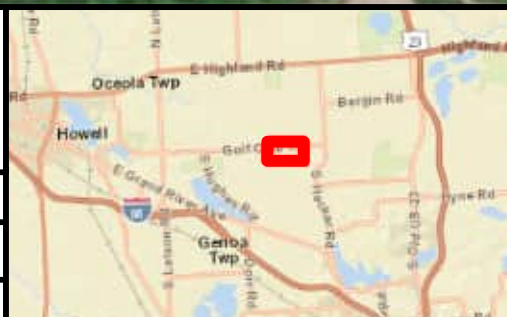




Drawn: AA Date: 4/1/2021

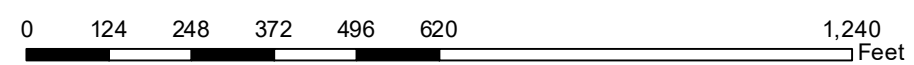
Approved: DB Date: 4/1/2021

Project #: 60588767



- Legend**
- Surface Water Sample PFOS (ppt)
    - Green triangle: Non-Detect
    - Yellow triangle: >0 - 12
    - Red triangle: >12
  - Biosolids Application Field (Red outline)
  - Soil Type (Black outline)

**Sample Location**  
Total PFAS (PFOA | PFOS)  
\*results reported in units of ppt



**FIGURE 4a**  
02n05e02-BC01,  
02n05e01-BC01 & BC02  
SURFACE WATER SAMPLING RESULTS

LIVINGSTON COUNTY

02N05E02-AG01



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**Legend**

- |  |                             |
|--|-----------------------------|
| <b>Surface Water Sample PFOS (ppt)</b> | Biosolids Application Field |
| Non-Detect                             | Soil Type                   |
| >0 - 12                                |                             |
| >12                                    |                             |

**Sample Location**  
Total PFAS (PFOA | PFOS)  
\*results reported in units of ppt

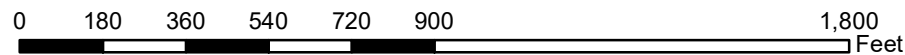


FIGURE 4b  
02N05E02-AG01  
SURFACE WATER SAMPLING RESULTS

LIVINGSTON COUNTY

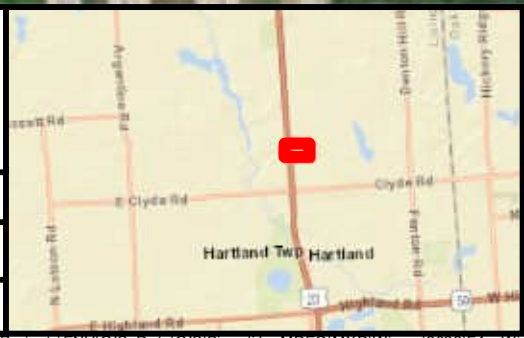


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**Legend**

Surface Water Sample PFOS (ppt)

- ▲ Non-Detect
- ▲ >0 - 12
- ▲ >12

Biosolids Application Field (Red outline)

Soil Type (Black outline)

**Sample Location**

Total PFAS (PFOA | PFOS)

\*results reported in units of ppt

0    88    176    264    352    440    880 Feet

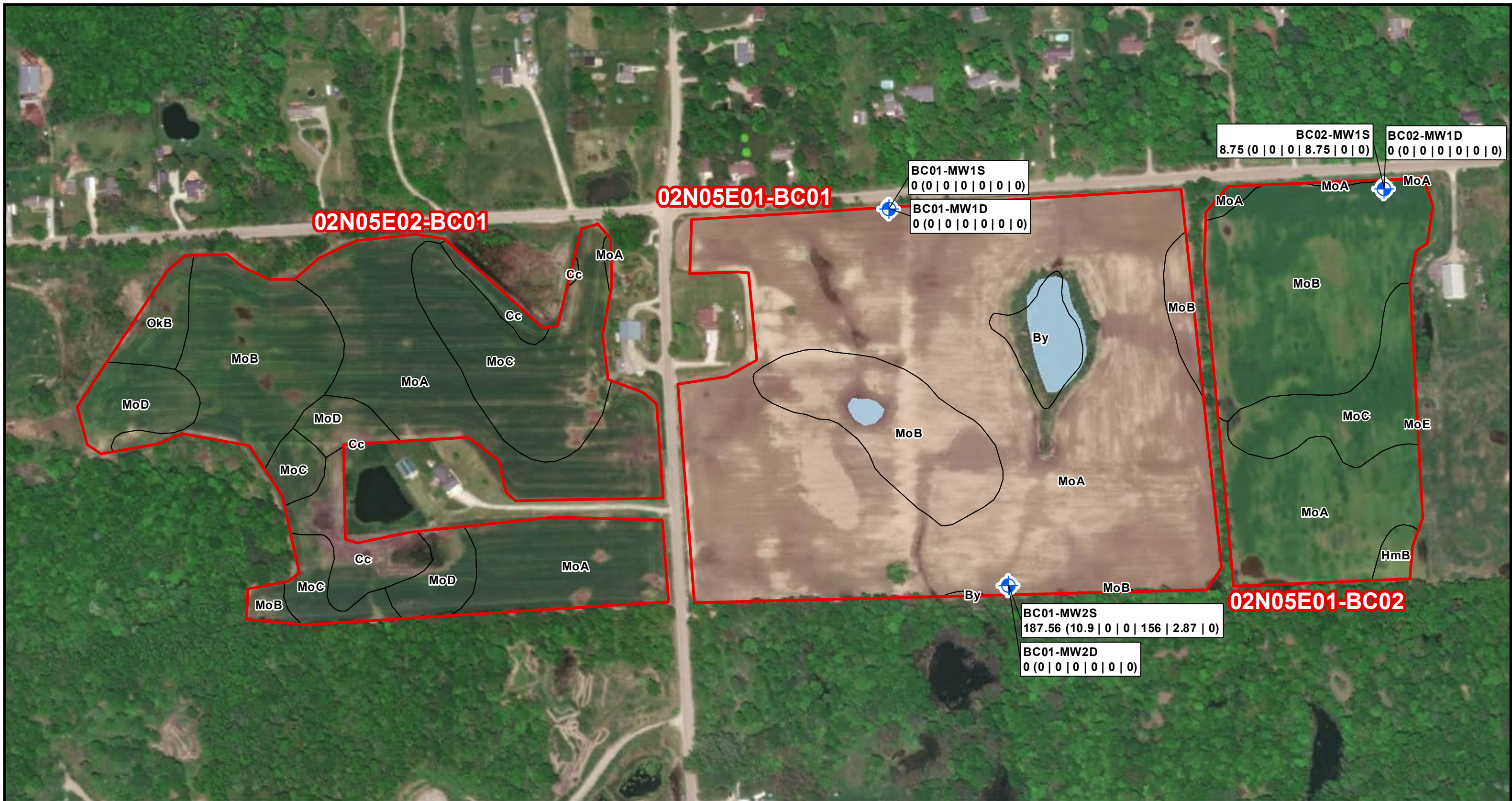
N

**FIGURE 4c**

**03N06E04-JW01 & JW05**

**SURFACE WATER SAMPLING RESULTS**

**LIVINGSTON COUNTY**



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**Legend**

- Monitoring Well Sample
- Biosolids Application Field
- Soil Type

**Sample Location**  
 Total PFAS (PFHxA | PFOA | PFNA | PFBS | PFHxS | PFOS)

red text indicates exceedance of Part 201 DWCC  
 All sample results are in ng/L

Michigan Part 201 Residential & Nonresidential Drinking Water Criteria (DWC), ng/L

PFHxA = 400,000  
 PFOA = 8  
 PFNA = 6  
 PFBS = 420  
 PFHxS = 51  
 PFOS = 16

0 100 200 300 400 500 1,000 Feet

**FIGURE 5**  
 02n05e02-BC01,  
 02n05e01-BC01 & BC02  
 GROUNDWATER SAMPLING RESULTS

LIVINGSTON COUNTY



**AECOM**

Drawn: AA      Date: 4/1/2021

Approved: DB      Date: 4/1/2021

Project #: 60588767



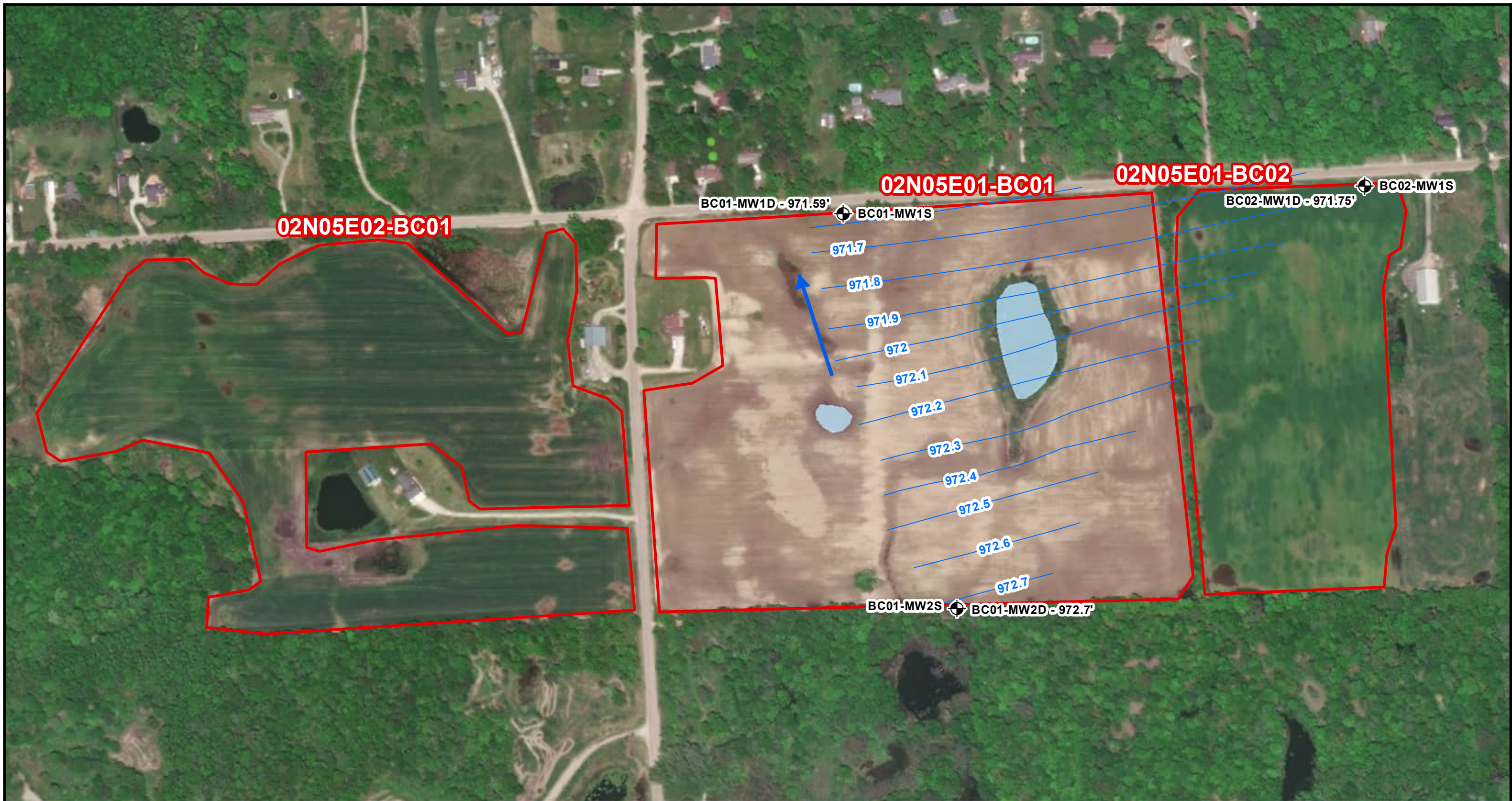
**Legend**

- Monitoring well (GW Elevation - ft amsl)
- Shallow GW Contours (0.1 ft interval)
- Biosolids Application Field
- Approximate GW Flow Direction

0    152    304    456    608    760    1,520 Feet

FIGURE 6a-1  
02n05e01-BC01 & BC02  
SHALLOW GROUNDWATER CONTOURS

LIVINGSTON COUNTY



**AECOM**

Drawn: AA      Date: 4/1/2021

Approved: DB      Date: 4/1/2021

Project #: 60588767



**Legend**

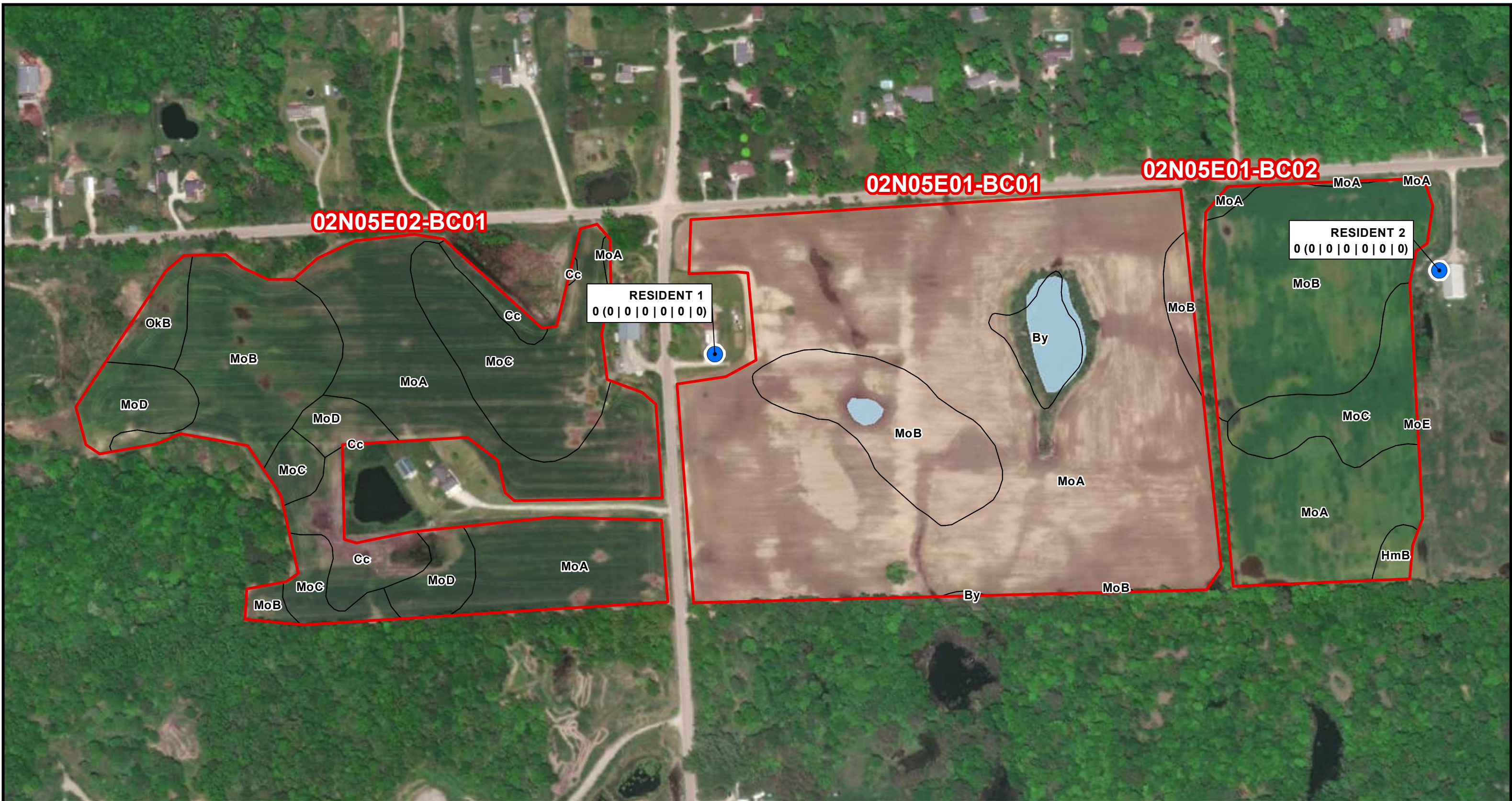
- Monitoring well (GW Elevation - ft amsl)
- Deep GW Contours (0.1 ft interval)
- Biosolids Application Field
- Approximate GW Flow Direction

0    152    304    456    608    760    1,520 Feet

N

FIGURE 6a-2  
02n05e01-BC01 & BC02  
DEEP GROUNDWATER CONTOURS

LIVINGSTON COUNTY



**RESIDENT 1**  
0 (0 | 0 | 0 | 0 | 0 | 0 | 0)

**RESIDENT 2**  
0 (0 | 0 | 0 | 0 | 0 | 0 | 0)

**AECOM**

Drawn: AA Date: 4/1/2021

Approved: DB Date: 4/1/2021

Project #: 60588767



**Legend**

- Residential Sample
- Biosolids Application
- Soil Type

**Sample Location**  
Total PFAS (PFHxA | PFOA | PFNA | PFBS | PFHxS | PFOS)

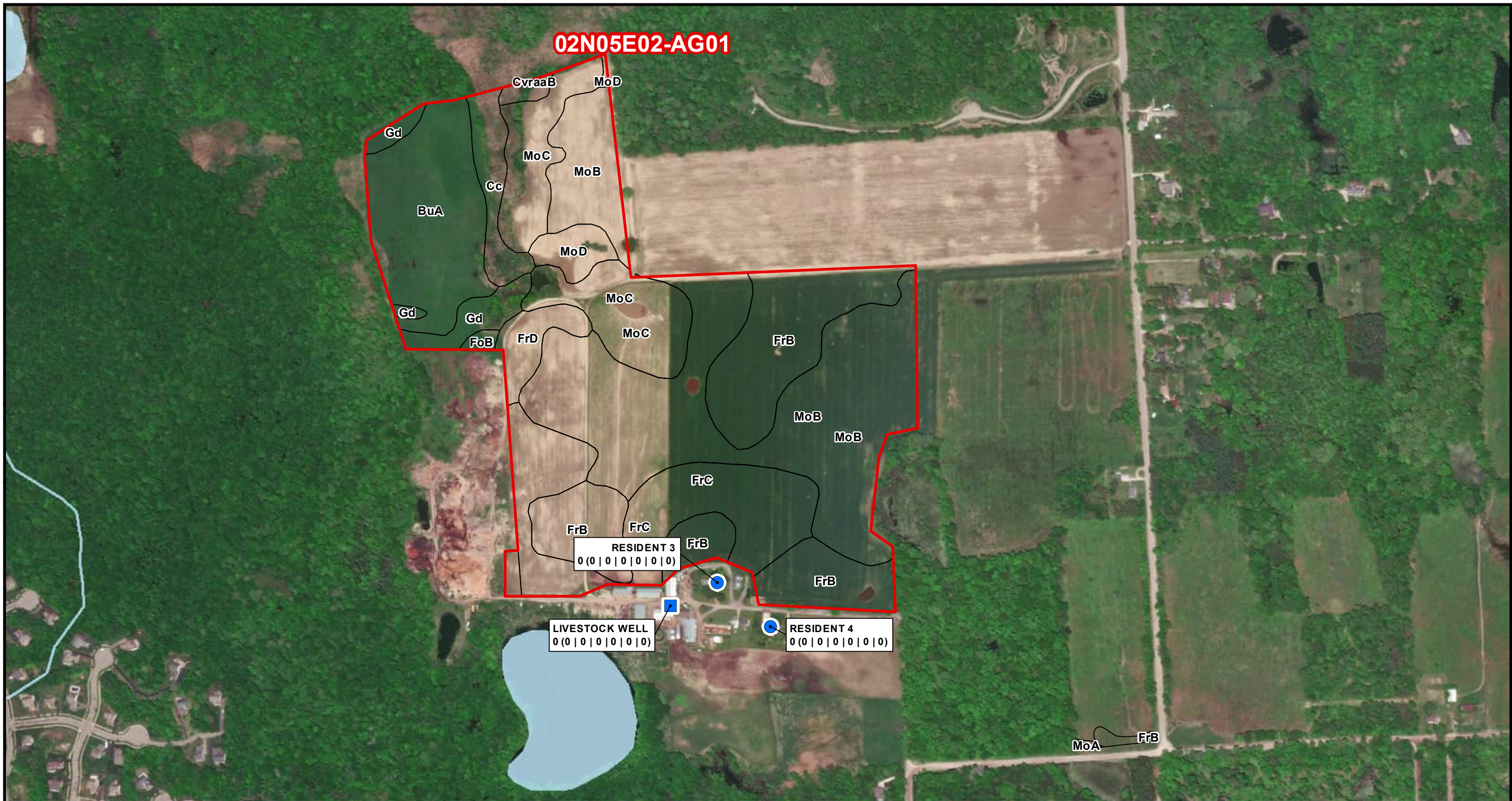
red text indicates exceedance of Part 201 DWCC  
All sample results are in ng/L

Michigan Part 201 Residential & Nonresidential  
Drinking Water Criteria (DWC), ng/L  
PFHxA = 400,000  
PFOA = 8  
PFNA = 6  
PFBS = 420  
PFHxS = 51  
PFOS = 16



**FIGURE 7a**  
02n05e02-BC01,  
02n05e01-BC01 & BC02  
GROUNDWATER SAMPLING RESULTS

LIVINGSTON COUNTY



**02N05E02-AG01**

CvraaB MoD

Gd

MoC

MoB

BuA

Cc

MoD

Gd

Gd

MoC

FoB

FrD

MoC

FrB

MoB

MoB

FrC

FrB

FrC

FrB

FrB

LIVESTOCK WELL  
0(0|0|0|0|0|0|0)

RESIDENT 3  
0(0|0|0|0|0|0|0)

RESIDENT 4  
0(0|0|0|0|0|0|0)

MoA

FrB

**AECOM**

Drawn: AA Date: 4/1/2021

Approved: DB Date: 4/1/2021

Project #: 60588767



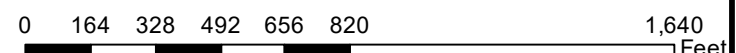
**Legend**

- Residential Sample
- Livestock Well Sample
- Biosolids Application Field
- Soil Type

**Sample Location**  
Total PFAS (PFHxA | PFOA | PFNA | PFBS | PFHxS | PFOS)

red text indicates exceedance of Part 201 DWC  
All sample results are in ng/L

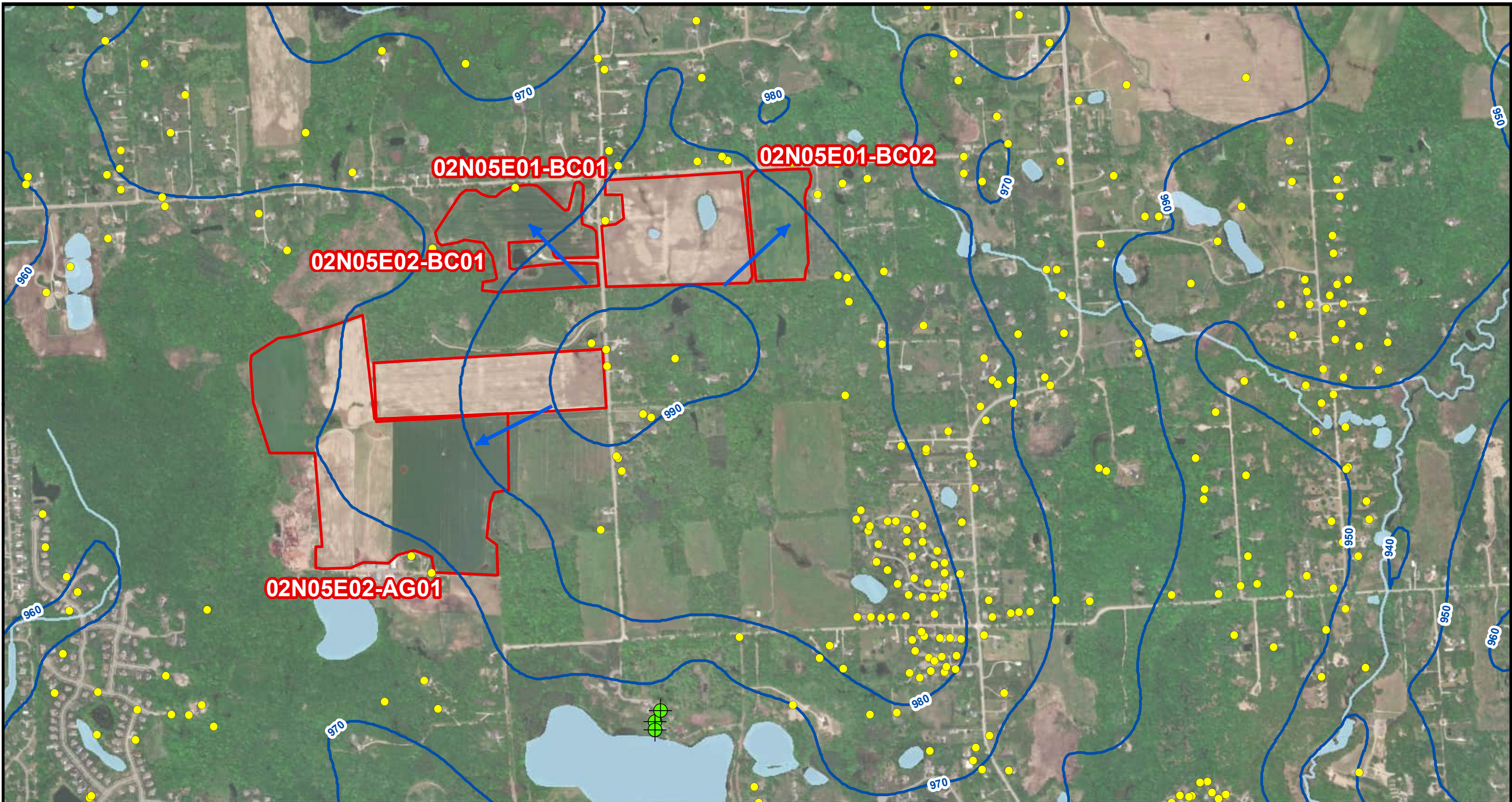
Michigan Part 201 Residential & Nonresidential  
Drinking Water Criteria (DWC), ng/L  
PFHxA = 400,000  
PFOA = 8  
PFNA = 6  
PFBS = 420  
PFHxS = 51  
PFOS = 16



**FIGURE 7b**  
**02N05E02-AG01**  
**GROUNDWATER SAMPLING RESULTS**

**LIVINGSTON COUNTY**





**AECOM**

Drawn: AA Date: 4/1/2021

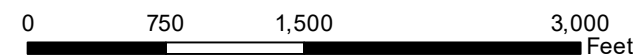
Approved: DB Date: 4/1/2021

Project #: 60588767



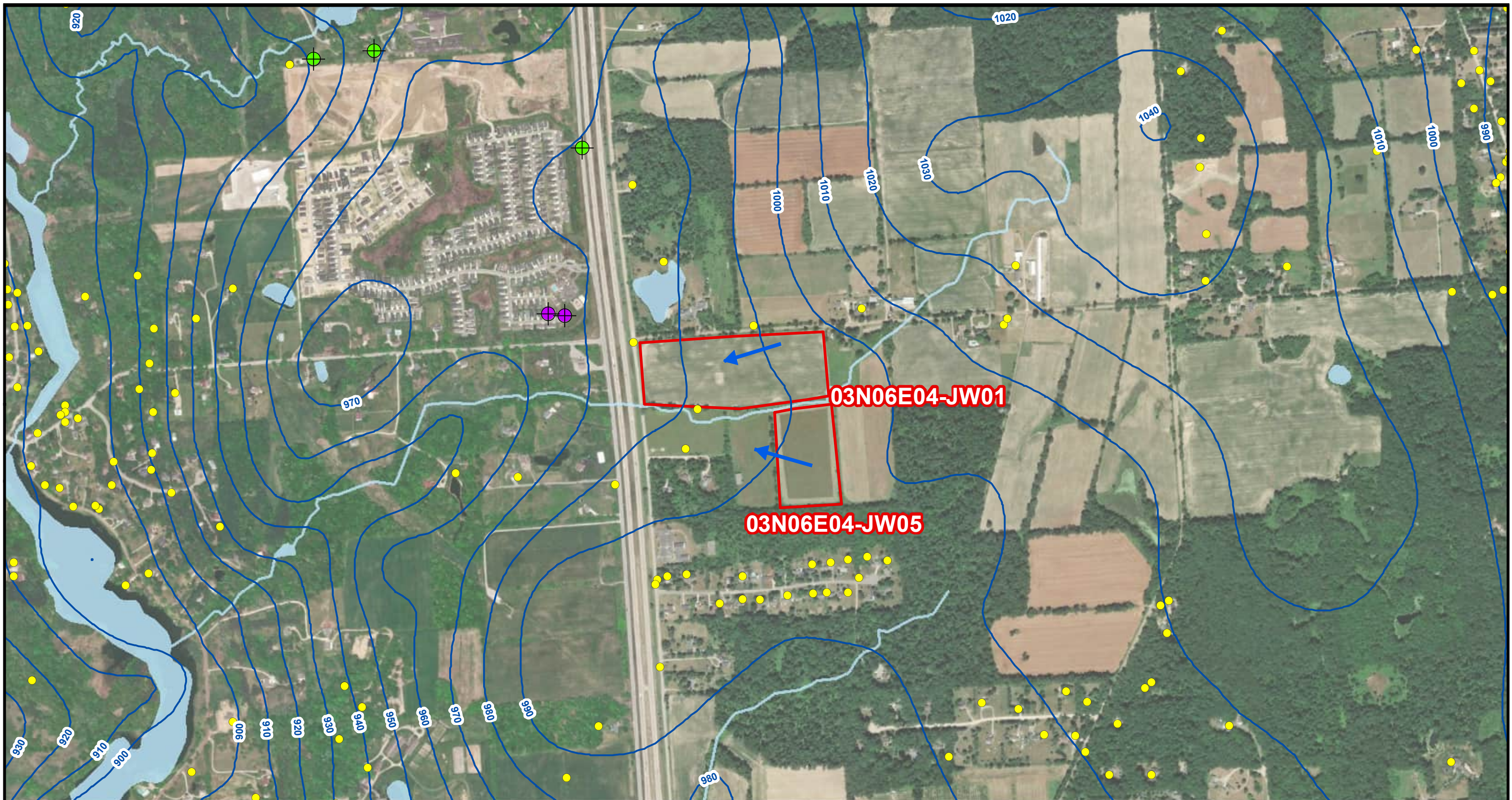
**Legend**

- Wellogic Water Wells
- Wellogic Type I Wells
- Wellogic Type II Wells
- Biosolids Application
- GW Elevation Contours (10' interval)
- ➔ Approximate GW Flow Direction



**FIGURE 8a**  
 02N05E02-AG01 & BC01  
 02N05E01-BC01 & BC02  
 POTENTIAL RECEPTORS

LIVINGSTON COUNTY



**AECOM**

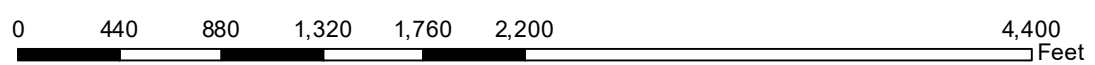
Drawn: AA Date: 4/1/2021

Approved: DB Date: 4/1/2021

Project #: 60588767

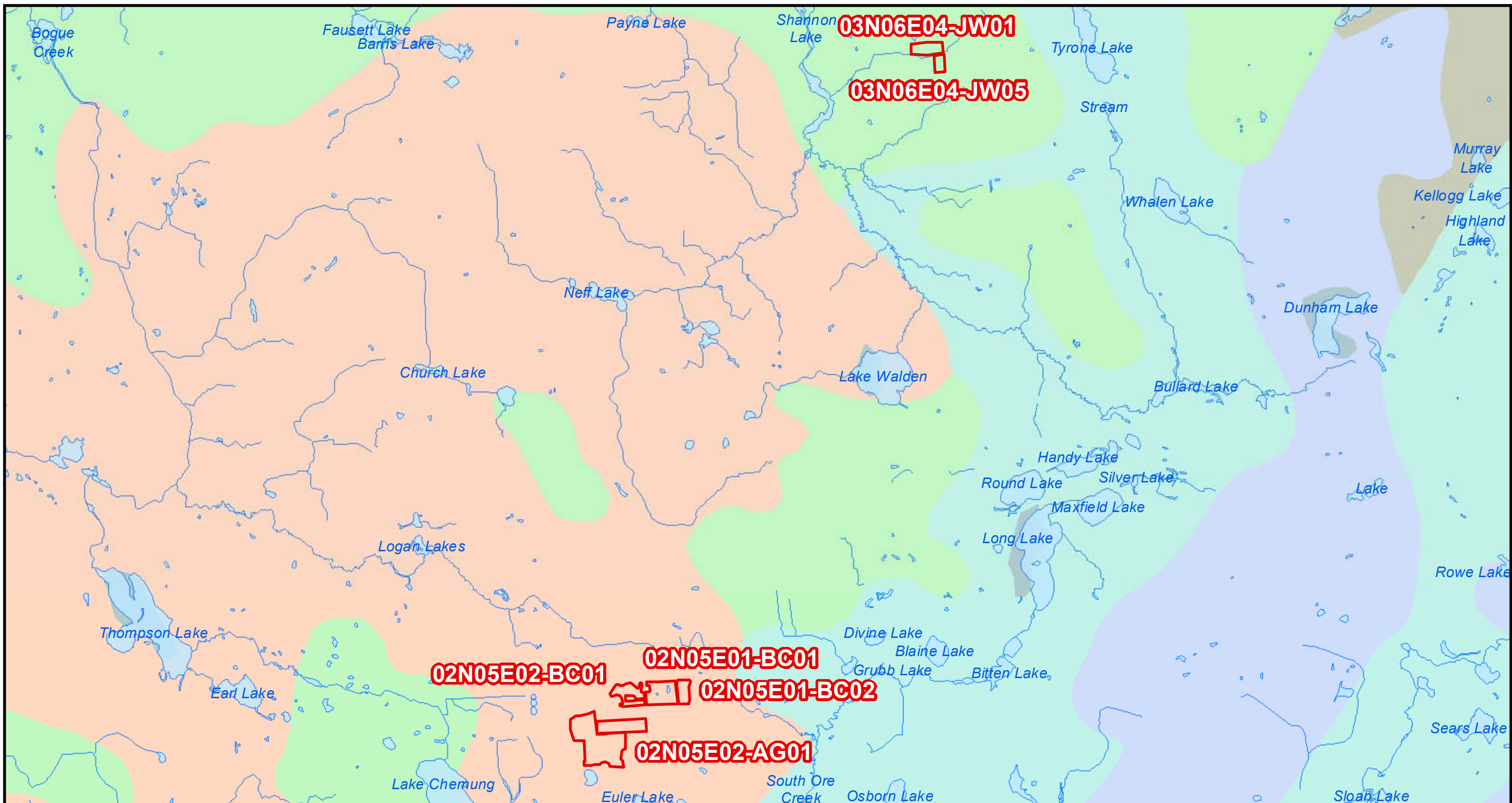


- Legend**
- Wellogic Water Wells
  - ⊗ Wellogic Type I Wells
  - ⊗ Wellogic Type II Wells
  - Biosolids Application Field
  - GW Elevation Contours (10' interval)
  - ➔ Approximate GW Flow Director



**FIGURE 8b**  
**03N06E04-JW01 & JW05**  
**POTENTIAL RECEPTORS**

LIVINGSTON COUNTY



**AECOM**

Drawn: AA Date: 4/1/2021

Approved: DB Date: 4/1/2021

Project #: 60588767

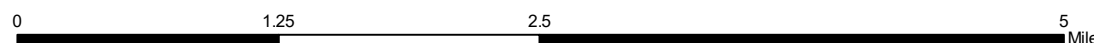


**Legend**

**Glacial Geology**

- |  |                                      |  |  |
|--|--------------------------------------|--|--|
|  | Coarse-textured glacial till         |  | Glacial outwash sand and gravel and postglacial alluvium |
|  | Dune sand                            |  | Lacustrine clay and silt                                 |
|  | End moraines of coarse-textured till |  | Lacustrine sand and gravel                               |
|  | End moraines of fine-textured till   |  | Medium-textured glacial till                             |
|  | End moraines of medium-textured till |  | Water  |
|  | Fine-textured glacial till           |  |  |

Biosolids Application Field



**FIGURE 9**  
 02N05E01-BC01 & BC02  
 02N05E02-AG01 & BC01  
 03N06E04-JW01 & JW05  
**REGIONAL GLACIAL GEOLOGY**  
 LIVINGSTON COUNTY

Tables

# Table 1a

Parcel ID: 02N05E01-BC01, 02N05E01-BC02 and 02N05E02-BC01  
Biosolids Application Data

Year	Site ID	Dry Ton (dT) Land Applied	Acres Used	Acres Approved	Dry Tons (dT) / Acre	Dates
2016	02N05E01-BC01	144.22	35	35	4.12	12/16 - 12/18/15
2013	02N05E01-BC01	88.1	35	35	2.57	7/26 - 7/27/13, 8/12/13, 8/15/13, 8/22 - 8/23/13, 8/26/13
2012	02N05E01-BC01	113.79	35	35	3.25	5/21 - 5/23/12
2011	02N05E01-BC01	112.59	35	35	3.22	11/22/10, 11/29/10, 12/6/10
2010	02N05E01-BC01	62.4	35	35	1.78	6/15 - 6/18
<b>Total dry tons:</b>		<b>521.1</b>	<b>Average application rate (dry tons/acre):</b>		<b>2.99</b>	
2015	02N05E01-BC02	43.12	20	20	2.16	8/12 - 8/13/15
2014	02N05E01-BC02	16.54	7	20	2.36	12/10/2013
2012	02N05E01-BC02	39.75	18	20	2.21	12/30/11, 5/23/12
2011	02N05E01-BC02	57.32	15	20	3.82	12/6 - 12/8/10
2010	02N05E01-BC02	27.74	20	20	1.39	6/17 - 6/18/10
<b>Total dry tons:</b>		<b>184.47</b>	<b>Average application rate (dry tons/acre):</b>		<b>2.39</b>	
2014	02N05E02-BC01	88.2	34	45	2.59	11/27/13, 12/2 - 12/3/13
2013	02N05E02-BC01	7.55	9	9	0.84	10/1/2012
2012	02N05E02-BC01	103.26	32	38	3.23	5/17 - 5/19/12, 5/21/12
2010	02N05E02-BC01	56.63	38	38	1.49	6/18/10, 6/21/10
<b>Total dry tons:</b>		<b>255.6</b>	<b>Average application rate (dry tons/acre):</b>		<b>2.04</b>	

dT = dry tons

**Table 1b**  
Parcel ID: 02N05E02-AG01  
Biosolids Application Data

Year	Site ID	Dry Ton (dT) Land Applied	Acres Used	Acres Approved	Dry Tons (dT) / Acre	Dates
2015	02N05E02-AG01	87.94	50	120	1.76	8/7 - 8/8/15, 8/10 - 8/12/15
2013	02N05E02-AG01	50.68	27	120	1.87	10/1/12, 8/16 - 8/17/13
2012	02N05E02-AG01	171.20	114	120	1.5	12/20 - 12/21/11, 12/28/11, 9/25 - 9/28/12
2011	02N05E02-AG01	75.16	30	120	2.51	5/5 - 5/6/11, 5/10/11
2010	02N05E02-AG01	102.85	60	120	1.71	5/27 - 5/28/10, 6/2/10, 6/14 - 6/15/10
<b>Total dry tons:</b>		<b>487.83</b>	<b>Average application rate (dry tons/acre):</b>		<b>1.87</b>	

dT = dry tons

## Table 1c

### Parcel ID: 03N06E04-JW01 and 03N06E04-JW05 Biosolids Application Data

Year	Site ID	Dry Ton (dT) Land Applied	Acres Used	Acres Approved	Dry Tons (dT) / Acre	Dates
2000	03N06E04-JW01	13.05	24	24	0.54	4/7/00, 4/17 - 4/18/00, 2/4/00, 2/7/00
1998	03N06E04-JW01	46.56	24	24	1.94	5/19 - 5/20/98
1997	03N06E04-JW01	92.40	24	24	3.85	10/2 - 10/3/96, 10/7 - 10/9/96
1995	03N06E04-JW01	90.48	24	24	3.77	6/14 - 6/16/95, 6/19 - 6/21/95
<b>Total dry tons:</b>		<b>242.49</b>	<b>Average application rate (dry tons/acre):</b>		<b>2.53</b>	
2001	03N06E04-JW05, reported as 04N06E33- JW05	23.4	13	13	1.8	1/8 - 1/10/01
2000	03N06E04-JW05, reported as 04N06E33- JW05	22.91		13		1/27 - 1/31/00
2000	03N06E04-JW05	25.38	13	13	2.15	2/1 - 2/3/00
1997	03N06E04-JW05	52.26	13	13	4.02	10/14 - 10/16/96
1995	03N06E04-JW05	63.83	13	13	4.91	6/7 - 6/10/95, 6/12 - 6/13/95
<b>Total dry tons:</b>		<b>187.8</b>	<b>Average application rate (dry tons/acre):</b>		<b>3.22</b>	

dT = dry tons

**Table 2**

Parcel ID: 02N05E01-BC01, 02N05E01-BC02, 02N05E02-BC01, 02N05E02-AG01, 03N06E04-JW01 and 03N06E04-JW05  
Soil PFAS Analytical Results Summary

Soil Sample	Sample Date	Site Code	Sampling Depth	Total PFAS	PFBA	PFPeA	PFHxA	PFHpA	PFOA	PFNA	PFDA	PFUnDA	PFDoDA	PFTrDA	PFTeDA	PFBS	PFPeS	PFHxS	PFHpS	PFOS	PFNS	PFDS	FOSA	4:2 FTSA	6:2 FTSA	8:2 FTSA	EtFOSAA	MeFOSAA	TOC	
SXDU11904111530MK	4/11/2019	E01_BC01-DU1	6-8"	19.9	< 0.839	<b>0.943</b>	< 0.839	< 0.839	< 0.839	< 0.839	<b>0.983</b>	< 0.839	< 0.839	< 0.839	< 0.839	< 0.839	< 0.839	< 0.839	< 0.839	<b>18.0</b>	< 0.839	< 0.839	< 0.839	< 0.839	< 0.839	< 0.839	< 0.839	< 0.839	< 0.839	7800
SXDU21904111450MK	4/11/2019	E01_BC01-DU2	6-8"	23.5	< 0.844	< 0.844	< 0.844	< 0.844	< 0.844	< 0.844	< 0.844	< 0.844	< 0.844	< 0.844	< 0.844	< 0.844	< 0.844	< 0.844	< 0.844	<b>23.5</b>	< 0.844	< 0.844	< 0.844	< 0.844	< 0.844	< 0.844	< 0.844	< 0.844	< 0.844	11000
SXDU21904111455MK-DUP	4/11/2019	E01_BC01-DU2	6-8"	26.5	< 0.840	< 0.840	< 0.840	< 0.840	< 0.840	< 0.840	< 0.840	< 0.840	< 0.840	< 0.840	< 0.840	< 0.840	< 0.840	< 0.840	< 0.840	<b>26.5</b>	< 0.840	< 0.840	< 0.840	< 0.840	< 0.840	< 0.840	< 0.840	< 0.840	< 0.840	12000
SXDU31904111405MK	4/11/2019	E01_BC01-DU3	6-8"	19.6	< 0.805	< 0.805	< 0.805	< 0.805	< 0.805	< 0.805	< 0.805	< 0.805	< 0.805	< 0.805	< 0.805	< 0.805	< 0.805	< 0.805	< 0.805	<b>19.6</b>	< 0.805	< 0.805	< 0.805	< 0.805	< 0.805	< 0.805	< 0.805	< 0.805	< 0.805	10000
SXDU11904111655MK	4/11/2019	E01_BC02-DU1	6-8"	30.7	< 0.843	< 0.843	< 0.843	< 0.843	< 0.843	< 0.843	< 0.843	< 0.843	< 0.843	< 0.843	< 0.843	< 0.843	< 0.843	< 0.843	< 0.843	<b>28.4</b>	< 0.843	<b>2.29</b>	< 0.843	< 0.843	< 0.843	< 0.843	< 0.843	< 0.843	< 0.843	7800
SXDU21904111615MK	4/11/2019	E01_BC02-DU2	6-8"	35.5	< 0.839	< 0.839	< 0.839	< 0.839	< 0.839	< 0.839	< 0.839	< 0.839	< 0.839	< 0.839	< 0.839	< 0.839	< 0.839	< 0.839	< 0.839	<b>33.5</b>	< 0.839	<b>2.03</b>	< 0.839	< 0.839	< 0.839	< 0.839	< 0.839	< 0.839	< 0.839	10000
SB1911071345LEM	11/7/2019	E02_BC01-DU1-A	6-8"	101	< 0.421	<b>0.822</b>	<b>0.430</b>	< 0.421	<b>1.44</b>	<b>0.510</b>	<b>1.03</b>	< 0.421	< 0.421	< 0.421	< 0.421	<b>0.498</b>	< 0.421	< 0.421	< 0.421	<b>96.7</b>	< 0.421	< 0.421	< 0.421	< 0.421	< 0.421	< 0.421	< 0.421	< 0.421	< 0.421	--
SB1911071350LEM	11/7/2019	E02_BC01-DU1-B	0-12"	99.0	< 0.422	<b>0.771</b>	<b>0.465</b>	< 0.422	<b>1.19</b>	< 0.422	<b>1.30</b>	< 0.422	< 0.422	< 0.422	< 0.422	<b>0.526</b>	< 0.422	< 0.422	< 0.422	<b>94.1</b>	< 0.422	< 0.422	< 0.422	< 0.422	< 0.422	< 0.422	< 0.422	< 0.422	<b>0.667</b>	--
SB1911071355LEM	11/7/2019	E02_BC01-DU1-C	0-12" ISM	80.2	< 0.424	<b>0.830</b>	<b>0.448</b>	< 0.424	<b>1.38</b>	< 0.424	<b>1.30</b>	< 0.424	< 0.424	< 0.424	< 0.424	<b>0.531</b>	< 0.424	< 0.424	< 0.424	<b>75.7</b>	< 0.424	< 0.424	< 0.424	< 0.424	< 0.424	< 0.424	< 0.424	< 0.424	< 0.424	--
SB1911071205LEM	11/7/2019	E02_BC01-DU2-A	6-8"	68.3	< 0.423	<b>0.787</b>	<b>0.567</b>	< 0.423	<b>1.53</b>	< 0.423	<b>1.19</b>	< 0.423	< 0.423	< 0.423	< 0.423	<b>0.654</b>	< 0.423	< 0.423	< 0.423	<b>63.6</b>	< 0.423	< 0.423	< 0.423	< 0.423	< 0.423	< 0.423	< 0.423	< 0.423	< 0.423	--
SB1911071210LEM	11/7/2019	E02_BC01-DU2-B	0-12"	74.2	< 0.422	<b>0.609</b>	< 0.422	< 0.422	<b>1.05</b>	< 0.422	<b>1.02</b>	< 0.422	< 0.422	< 0.422	< 0.422	<b>0.580</b>	< 0.422	< 0.422	< 0.422	<b>70.9</b>	< 0.422	< 0.422	< 0.422	< 0.422	< 0.422	< 0.422	< 0.422	< 0.422	< 0.422	--
SB1911071215LEM	11/7/2019	E02_BC01-DU2-C	0-12" ISM	67.5	< 0.424	<b>0.624</b>	<b>0.503</b>	< 0.424	<b>1.24</b>	< 0.424	<b>0.908</b>	< 0.424	< 0.424	< 0.424	< 0.424	<b>0.481</b>	< 0.424	< 0.424	< 0.424	<b>63.7</b>	< 0.424	< 0.424	< 0.424	< 0.424	< 0.424	< 0.424	< 0.424	< 0.424	< 0.424	--
SB1911071515LEM	11/7/2019	AG01	0-12"	7.59	< 0.424	< 0.424	< 0.424	< 0.424	< 0.424	< 0.424	< 0.424	< 0.424	< 0.424	< 0.424	< 0.424	< 0.424	< 0.424	< 0.424	< 0.424	<b>7.59</b>	< 0.424	< 0.424	< 0.424	< 0.424	< 0.424	< 0.424	< 0.424	< 0.424	< 0.424	--
SB1911071550LEM	11/7/2019	AG01	0-12"	14.5	< 0.426	< 0.426	< 0.426	< 0.426	<b>0.434</b>	< 0.426	< 0.426	< 0.426	< 0.426	< 0.426	< 0.426	< 0.426	< 0.426	< 0.426	< 0.426	<b>14.1</b>	< 0.426	< 0.426	< 0.426	< 0.426	< 0.426	< 0.426	< 0.426	< 0.426	< 0.426	--
SXDU11904111220MK	4/11/2019	JW01-DU1	6-8"	6.37	< 0.825	< 0.825	< 0.825	< 0.825	< 0.825	< 0.825	< 0.825	< 0.825	< 0.825	< 0.825	< 0.825	< 0.825	< 0.825	< 0.825	< 0.825	<b>3.39</b>	< 0.825	<b>2.98</b>	< 0.825	< 0.825	< 0.825	< 0.825	< 0.825	< 0.825	< 0.825	5000
SXDU21904111125MK	4/11/2019	JW01-DU2	6-8"	6.18	< 0.828	< 0.828	< 0.828	< 0.828	< 0.828	< 0.828	< 0.828	< 0.828	< 0.828	< 0.828	< 0.828	< 0.828	< 0.828	< 0.828	< 0.828	<b>4.18</b>	< 0.828	<b>2.00</b>	< 0.828	< 0.828	< 0.828	< 0.828	< 0.828	< 0.828	< 0.828	11000
SXDU21904111130MK-DUP	4/11/2019	JW01-DU2	6-8"	10.9	< 0.849	< 0.849	< 0.849	< 0.849	< 0.849	< 0.849	<b>0.895</b>	< 0.849	< 0.849	< 0.849	< 0.849	< 0.849	< 0.849	< 0.849	< 0.849	<b>5.71</b>	< 0.849	<b>4.28</b>	< 0.849	< 0.849	< 0.849	< 0.849	< 0.849	< 0.849	< 0.849	11000
SXDU11904111040MK	4/11/2019	JW05-DU1	6-8"	3.75	< 0.816	< 0.816	< 0.816	< 0.816	< 0.816	< 0.816	< 0.816	< 0.816	< 0.816	< 0.816	< 0.816	< 0.816	< 0.816	< 0.816	< 0.816	<b>2.85</b>	< 0.816	<b>0.896</b>	ND	< 0.816	< 0.816	< 0.816	< 0.816	< 0.816	< 0.816	11000
SXDU21904110945MK	4/11/2019	JW05-DU2	6-8"	2.48	< 0.818	< 0.818	< 0.818	< 0.818	< 0.818	< 0.818	< 0.818	< 0.818	< 0.818	< 0.818	< 0.818	< 0.818	< 0.818	< 0.818	< 0.818	<b>2.48</b>	< 0.818	< 0.818	< 0.818	< 0.818	< 0.818	< 0.818	< 0.818	< 0.818	< 0.818	17000

TOC = Total Organic Carbon

Soil concentrations are reported as ug/Kg or parts per billion (ppb)

TOC concentrations are reported as mg/Kg or parts per million (ppm)

"<" = Values Below Detection Limit (DL)

"-" = Not analyzed

**Bolded values indicate detection**

	Perfluoroalkyl Carboxylic Acids (PFCAs)
	Perfluoroalkane Sulfonic Acids (PFSAAs)
	Perfluoroalkane Sulfonamides (FASAs)
	Fluorotelomer Sulfonic Acids (FTSAs)
	N-Ethyl Perfluoroalkane Sulfonamidoacetic Acids (EtFASAAs)
	N-Methyl Perfluoroalkane Sulfonamidoacetic Acids (MeFASAAs)

PFBA = Perfluorobutanoic acid

PFPeA = Perfluoropentanoic acid

PFHxA = Perfluorohexanoic acid

PFHpA = Perfluoroheptanoic acid

PFOA = Perfluorooctanoic acid

PFNA = Perfluorononanoic acid

PFDA = Perfluorodecanoic acid

PFUnDA = Perfluoroundecanoic acid

PFDoDA = Perfluorododecanoic acid

PFTTrDA = Perfluorotridecanoic acid

PFTeDA = Perfluorotetradecanoic acid

PFHxDA = Perfluorohexadecanoic acid

PFODA = Perfluoro-n-octadecanoic acid

PFBS = Perfluorobutane sulfonic acid

PFHxS = Perfluorohexane sulfonic acid

PFHpS = Perfluoroheptane sulfonic acid

PFOS = Perfluorooctane sulfonic acid

PFDS = Perfluorodecane sulfonic acid

FOSA = Perfluorooctane sulfonamide

4:2 FTSA = 4:2 Fluorotelomer sulfonic acid

6:2 FTSA = 4:2 Fluorotelomer sulfonic acid

8:2 FTSA = 4:2 Fluorotelomer sulfonic acid

EtFOSAA = N-Ethyl perfluorooctane sulfonamidoacetic acid

MeFOSAA = N-Methyl perfluorooctane sulfonamidoacetic acid



**Table 3**

Parcel ID: 02N05E01-BC01, 02N05E01-BC02, 02N05E02-BC01, 02N05E02-AG01, 03N06E04-JW01 and 03N06E04-JW05  
Surface Water PFAS Analytical Results Summary

Surface Water Sample	Sample Date	Site Code	Total PFAS	PFBA	PFPeA	PFHxA	PFHpA	PFOA	PFNA	PFDA	PFUnDA	PFDoDA	PFTTrDA	PFTeDA	PFBS	PFPeS	PFHxS	PFHpS	PFOS	PFNS	PFDS	FOSA	4:2 FTSA	6:2 FTSA	8:2 FTSA	EtFOSAA	MeFOSAA
PEW011904111510RL	4/11/2019	E01-BC01-PEW1	<b>968</b>	<b>53.1</b>	<b>91.2</b>	<b>90.5</b>	<b>40.1</b>	<b>37.7</b>	<b>6.31</b>	< 1.56	< 1.56	< 1.56	< 1.56	< 1.56	<b>108</b>	< 1.56	<b>5.81</b>	<b>2.28</b>	<b>533</b>	< 1.56	< 1.56	< 1.56	< 1.56	< 1.56	< 1.56	< 1.56	< 1.56
PEW021904111515RL	4/11/2019	E01-BC01-PEW2	<b>818</b>	<b>49.9</b>	<b>89.8</b>	<b>82.2</b>	<b>36.2</b>	<b>38.6</b>	<b>4.73</b>	< 1.54	< 1.54	< 1.54	< 1.54	< 1.54	<b>109</b>	< 1.54	<b>4.62</b>	<b>1.70</b>	<b>401</b>	< 1.54	< 1.54	< 1.54	< 1.54	< 1.54	< 1.54	< 1.54	< 1.54
PEW031904111525RL	4/11/2019	E01-BC01-PEW3	<b>952</b>	<b>95.6</b>	<b>171</b>	<b>153</b>	<b>57.6</b>	<b>45.0</b>	<b>3.64</b>	< 1.61	< 1.61	< 1.61	< 1.61	< 1.61	<b>173</b>	< 1.61	<b>7.27</b>	< 1.61	<b>246</b>	< 1.61	< 1.61	< 1.61	< 1.61	< 1.61	< 1.61	< 1.61	< 1.61
SW011904111355RL	4/11/2019	E01-BC01-SW1	<b>386</b>	<b>55.8</b>	<b>84.1</b>	<b>78.3</b>	<b>29.6</b>	<b>11.7</b>	< 1.64	< 1.64	< 1.64	< 1.64	< 1.64	< 1.64	<b>73.7</b>	< 1.64	<b>3.58</b>	< 1.64	<b>49.7</b>	< 1.64	< 1.64	< 1.64	< 1.64	< 1.64	< 1.64	< 1.64	< 1.64
SW011904111400RL-DUP	4/11/2019	E01-BC01-SW1	<b>392</b>	<b>57.0</b>	<b>86.9</b>	<b>78.0</b>	<b>29.3</b>	<b>12.0</b>	< 1.61	< 1.61	< 1.61	< 1.61	< 1.61	< 1.61	<b>75.4</b>	< 1.61	<b>3.04</b>	< 1.61	<b>50.7</b>	< 1.61	< 1.61	< 1.61	< 1.61	< 1.61	< 1.61	< 1.61	< 1.61
SW021904111345RL	4/11/2019	E01-BC01-SW2	<b>86.0</b>	<b>9.90</b>	<b>9.36</b>	<b>9.18</b>	<b>4.94</b>	<b>5.84</b>	< 1.50	< 1.50	< 1.50	< 1.50	< 1.50	< 1.50	<b>8.37</b>	< 1.50	< 1.50	< 1.50	<b>38.4</b>	< 1.50	< 1.50	< 1.50	< 1.50	< 1.50	< 1.50	< 1.50	< 1.50
PEW011904111640RL	4/11/2019	E01-BC02-PEW1	<b>36.8</b>	<b>7.27</b>	< 1.49	<b>2.95</b>	<b>2.52</b>	<b>3.11</b>	< 1.49	< 1.49	< 1.49	< 1.49	< 1.49	< 1.49	<b>4.56</b>	< 1.49	< 1.49	< 1.49	<b>16.4</b>	< 1.49	< 1.49	< 1.49	< 1.49	< 1.49	< 1.49	< 1.49	< 1.49
PEW021904111615RL	4/11/2019	E01-BC02-PEW2	<b>86.0</b>	<b>6.73</b>	<b>4.72</b>	<b>4.42</b>	<b>2.74</b>	<b>3.97</b>	< 1.53	< 1.53	< 1.53	< 1.53	< 1.53	< 1.53	<b>6.24</b>	< 1.53	< 1.53	< 1.53	<b>57.2</b>	< 1.53	< 1.53	< 1.53	< 1.53	< 1.53	< 1.53	< 1.53	< 1.53
SW1911061235LEM	11/6/2019	E02-BC01-SW1	<b>226</b>	<b>13.0</b>	<b>18.2</b>	<b>13.8</b>	<b>6.1</b>	<b>13.9</b>	< 1.47	< 1.47	< 1.47	< 1.47	< 1.47	< 1.47	<b>99.1</b>	< 1.47	<b>1.70</b>	< 1.47	<b>60.4</b>	< 1.47	< 1.47	< 1.47	< 1.47	< 1.47	< 1.47	< 1.47	< 1.47
SW1911061245LEM	11/6/2019	E02-BC01-PEW1	<b>297</b>	<b>8.62</b>	<b>11.7</b>	<b>10.6</b>	<b>4.56</b>	<b>13.9</b>	<b>2.03</b>	<b>2.25</b>	< 1.48	< 1.48	< 1.48	< 1.48	<b>50.1</b>	< 1.48	<b>1.91</b>	< 1.48	<b>191</b>	< 1.48	< 1.48	< 1.48	< 1.48	< 1.48	< 1.48	< 1.48	< 1.48
SW1911061100LEM	11/6/2019	AG01-PEW1	<b>422</b>	<b>14.5</b>	<b>39.7</b>	<b>38.9</b>	<b>17.7</b>	<b>57.3</b>	<b>6.43</b>	<b>5.95</b>	< 1.44	< 1.44	< 1.44	< 1.44	<b>73.3</b>	< 1.44	<b>7.73</b>	<b>1.49</b>	<b>159</b>	< 1.44	< 1.44	< 1.44	< 1.44	< 1.44	< 1.44	< 1.44	< 1.44
SW1911061135LEM	11/6/2019	AG01-PEW2	<b>551</b>	<b>27.3</b>	<b>76.4</b>	<b>68.3</b>	<b>21.9</b>	<b>64.4</b>	<b>7.17</b>	<b>3.75</b>	< 1.47	< 1.47	< 1.47	< 1.47	<b>154</b>	< 1.47	<b>7.76</b>	< 1.47	<b>120</b>	< 1.47	< 1.47	< 1.47	< 1.47	< 1.47	< 1.47	< 1.47	< 1.47
SW1911061155LEM	11/6/2019	AG01-SW1	<b>12.0</b>	<b>5.40</b>	<b>1.62</b>	<b>1.45</b>	< 1.44	< 1.44	< 1.44	< 1.44	< 1.44	< 1.44	< 1.44	< 1.44	<b>2.00</b>	< 1.44	< 1.44	< 1.44	<b>1.56</b>	< 1.44	< 1.44	< 1.44	< 1.44	< 1.44	< 1.44	< 1.44	< 1.44
PEW011904111015RL	4/11/2019	JW01-PEW1	<b>59.0</b>	<b>16.1</b>	<b>12.3</b>	<b>11.9</b>	<b>7.06</b>	<b>6.14</b>	< 1.47	< 1.47	< 1.47	< 1.47	< 1.47	< 1.47	<b>2.75</b>	< 1.47	<b>2.75</b>	< 1.47	< 1.47	< 1.47	< 1.47	< 1.47	< 1.47	< 1.47	< 1.47	< 1.47	< 1.47
PEW021904111210RL	4/11/2019	JW01-PEW2	<b>17.5</b>	<b>5.35</b>	<b>1.72</b>	<b>1.94</b>	< 1.42	<b>1.62</b>	< 1.42	< 1.42	< 1.42	< 1.42	< 1.42	< 1.42	<b>4.92</b>	< 1.42	< 1.42	< 1.42	<b>1.90</b>	< 1.42	< 1.42	< 1.42	< 1.42	< 1.42	< 1.42	< 1.42	< 1.42
SW011904111220RL	4/11/2019	JW01-SW1	<b>9.43</b>	<b>5.29</b>	<b>2.20</b>	<b>1.94</b>	< 1.49	< 1.49	< 1.49	< 1.49	< 1.49	< 1.49	< 1.49	< 1.49	< 1.49	< 1.49	< 1.49	< 1.49	< 1.49	< 1.49	< 1.49	< 1.49	< 1.49	< 1.49	< 1.49	< 1.49	< 1.49
SW031904110940RL	4/11/2019	JW05-SW3	<b>4.40</b>	<b>2.73</b>	< 1.54	< 1.54	< 1.54	< 1.54	< 1.54	< 1.54	< 1.54	< 1.54	< 1.54	< 1.54	<b>1.67</b>	< 1.54	< 1.54	< 1.54	< 1.54	< 1.54	< 1.54	< 1.54	< 1.54	< 1.54	< 1.54	< 1.54	< 1.54
TD011904111225RL	4/11/2019	JW01-TD01	<b>50.0</b>	<b>4.55</b>	<b>4.24</b>	<b>4.46</b>	<b>2.13</b>	<b>5.98</b>	< 1.49	< 1.49	< 1.49	< 1.49	< 1.49	< 1.49	<b>2.62</b>	< 1.49	<b>8.42</b>	< 1.49	<b>17.6</b>	< 1.49	< 1.49	< 1.49	< 1.49	< 1.49	< 1.49	< 1.49	< 1.49

All values are in nanograms per liter (ng/L) or parts per trillion (ppt)  
" < " = Values Below Detection Limit (DL)  
**Bolded values indicate detection**

	Perfluoroalkyl Carboxylic Acids (PFCA)s	PFBA = Perfluorobutanoic acid	PFDA = Perfluorodecanoic acid	PFPeS = Perfluoropentane sulfonic acid	FOSA = Perfluorooctane sulfonamide
	Perfluoroalkane Sulfonic Acids (PFSA)s	PFPeA = Perfluoropentanoic acid	PFUnDA = Perfluoroundecanoic acid	PFHxS = Perfluorohexane sulfonic acid	4:2 FTSA = 4:2 Fluorotelomer sulfonic acid
	Perfluoroalkane Sulfonamides (FASA)s	PFHxA = Perfluorohexanoic acid	PFDoDA = Perfluorododecanoic acid	PFHpS = Perfluoroheptane sulfonic acid	6:2 FTSA = 4:2 Fluorotelomer sulfonic acid
	Fluorotelomer Sulfonic Acids (FTSA)s	PFHpA = Perfluoroheptanoic acid	PFTTrDA = Perfluorotridecanoic acid	PFOS = Perfluorooctane sulfonic acid	8:2 FTSA = 4:2 Fluorotelomer sulfonic acid
	N-Ethyl Perfluoroalkane Sulfonamidoacetic Acids (EtFASAAs)	PFOA = Perfluorooctanoic acid	PFTeDA = Perfluorotetradecanoic acid	PFNS = Perfluorononane sulfonic acid	EtFOSAA = N-Ethyl perfluorooctane sulfonamidoacetic acid
	N-Methyl Perfluoroalkane Sulfonamidoacetic Acids (MeFASAAs)	PFNA = Perfluorononanoic acid	PFBS = Perfluorobutane sulfonic acid	PFDS = Perfluorodecane sulfonic acid	MeFOSAA = N-Methyl perfluorooctane sulfonamidoacetic acid

**Rule 57 Water Quality Standards (WQS) (ng/L)**

	PFOA	PFOS	
Human Noncancer Value (HNV) (non-drinking water source)	12,000	12	# Concentration exceeds Rule 57 WQS: HNV
Final Chronic Value (FCV)	880,000	140,000	# Concentration exceeds Rule 57 WQS: FCV and HNV
Final Acute Value (FAV)	15,000,000	1,600,000	# Concentration exceeds Rule 57 WQS: FAV, FCV and HNV
Aquatic Maximum Value (AMV)	7,700,000	780,000	# Concentration exceeds Rule 57 WQS: AMV, FAV, FCV and HNV

**Table 4**  
Parcel ID: 02N05E01-BC01 and 02N05E01-BC02  
Groundwater, Residential, and Livestock Well PFAS Analytical Results Summary

Groundwater Sample	Sample Date	Site Code	Total PFAS	PFBA	PFPeA	PFHxA	PFHpA	PFOA	PFNA	PFDA	PFUnDA	PFDoDA	PFTeDA	PFBS	PFPeS	PFHxS	PFHpS	PFOS	PFNS	PFDS	FOSA	4:2 FTSA	6:2 FTSA	8:2 FTSA	EtFOSAA	MeFOSAA
GW1909031115SK	9/3/2019	BC01-MW1S	< 1.33	< 1.33	< 1.33	< 1.33	< 1.33	< 1.33	< 1.33	< 1.33	< 1.33	< 1.33	< 1.33	< 1.33	< 1.33	< 1.33	< 1.33	< 1.33	< 1.33	< 1.33	< 1.33	< 1.33	< 1.33	< 1.33	< 1.33	< 1.33
GW1909030955SK	9/3/2019	BC01-MW1D	< 1.36	< 1.36	< 1.36	< 1.36	< 1.36	< 1.36	< 1.36	< 1.36	< 1.36	< 1.36	< 1.36	< 1.36	< 1.36	< 1.36	< 1.36	< 1.36	< 1.36	< 1.36	< 1.36	< 1.36	< 1.36	< 1.36	< 1.36	< 1.36
GW1909041220SK	9/4/2019	BC01-MW2S	<b>188</b>	<b>14.4</b>	<b>3.39</b>	<b>10.9</b>	< 1.35	< 1.35	< 1.35	< 1.35	< 1.35	< 1.35	< 1.35	<b>156</b>	< 1.35	<b>2.87</b>	< 1.35	< 1.35	< 1.35	< 1.35	< 1.35	< 1.35	< 1.35	< 1.35	< 1.35	< 1.35
GW1909041130SK	9/4/2019	BC01-MW2D	< 1.31	< 1.31	< 1.31	< 1.31	< 1.31	< 1.31	< 1.31	< 1.31	< 1.31	< 1.31	< 1.31	< 1.31	< 1.31	< 1.31	< 1.31	< 1.31	< 1.31	< 1.31	< 1.31	< 1.31	< 1.31	< 1.31	< 1.31	< 1.31
GW1909031245SK	9/3/2019	BC02-MW1S	<b>8.75</b>	< 1.45	< 1.45	< 1.45	< 1.45	< 1.45	< 1.45	< 1.45	< 1.45	< 1.45	< 1.45	<b>8.75</b>	< 1.45	< 1.45	< 1.45	< 1.45	< 1.45	< 1.45	< 1.45	< 1.45	< 1.45	< 1.45	< 1.45	< 1.45
GW1909040925SK	9/4/2019	BC02-MW1D	< 1.42	< 1.42	< 1.42	< 1.42	< 1.42	< 1.42	< 1.42	< 1.42	< 1.42	< 1.42	< 1.42	< 1.42	< 1.42	< 1.42	< 1.42	< 1.42	< 1.42	< 1.42	< 1.42	< 1.42	< 1.42	< 1.42	< 1.42	< 1.42
FD1909040930SK	9/4/2019	BC02-MW1D	< 1.36	< 1.36	< 1.36	< 1.36	< 1.36	< 1.36	< 1.36	< 1.36	< 1.36	< 1.36	< 1.36	< 1.36	< 1.36	< 1.36	< 1.36	< 1.36	< 1.36	< 1.36	< 1.36	< 1.36	< 1.36	< 1.36	< 1.36	< 1.36
WR1911060935LEM	11/6/2019	Resident 1	< 4	--	--	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	--	< 2	--	< 2	--	--	--	--	--	< 4	< 4
WT1911061255LEM	11/6/2019	Resident 2	< 4	--	--	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	--	< 2	--	< 2	--	--	--	--	--	< 4	< 4
WT1911071000LEM	11/7/2019	Resident 3	< 4	--	--	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	--	< 2	--	< 2	--	--	--	--	--	< 4	< 4
WT1911071015LEM	11/7/2019	Resident 4	< 4	--	--	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	--	< 2	--	< 2	--	--	--	--	--	< 4	< 4
WT1911061000LEM	11/6/2019	Livestock Well	< 4	--	--	< 2	< 2	< 2	< 2	< 2	< 4	< 4	< 4	< 4	< 2	--	< 2	--	< 2	--	--	--	--	--	< 4	< 4

All values are in nanograms per liter (ng/L) or parts per trillion (ppt)  
"<" = Values Below Detection Limit (DL)  
"--" = Not analyzed

**Bolded values indicate detection**

**EGLE Part 201 Drinking Water Criteria (DWC) (ng/L)**

PFOA = 8; PFOS = 16; PFNA =6; PFHxS=51  
PFHxA = 400,000; PFBS = 420

**EGLE Part 201 Groundwater Surfacewater Interface (GSI) Criteria (ng/L)**

**(Surface water not used for drinking water - Non-drink)**

PFOA = 12,000  
PFOS = 12

	Perfluoroalkyl Carboxylic Acids (PFCAs)
	Perfluoroalkane Sulfonic Acids (PFSAAs)
	Perfluoroalkane Sulfonamides (FASAAs)
	Fluorotelomer Sulfonic Acids (FTSAs)
	N-Ethyl Perfluoroalkane Sulfonamidoacetic Acids (EtFASAAs)
	N-Methyl Perfluoroalkane Sulfonamidoacetic Acids (MeFASAAs)

PFBA = Perfluorobutanoic acid  
PFPeA = Perfluoropentanoic acid  
PFHxA = Perfluorohexanoic acid  
PFHpA = Perfluoroheptanoic acid  
PFOA = Perfluorooctanoic acid  
PFNA = Perfluorononanoic acid

PFDA = Perfluorodecanoic acid  
PFUnDA = Perfluoroundecanoic acid  
PFDoDA = Perfluorododecanoic acid  
PFTeDA = Perfluorotetradecanoic acid  
PFBS = Perfluorobutane sulfonic acid

PFPeS = Perfluoropentane sulfonic acid  
PFHxS = Perfluorohexane sulfonic acid  
PFHpS = Perfluoroheptane sulfonic acid  
PFOS = Perfluorooctane sulfonic acid  
PFNS = Perfluorononane sulfonic acid  
PFDS = Perfluorodecane sulfonic acid

FOSA = Perfluorooctane sulfonamide  
4:2 FTSA = 4:2 Fluorotelomer sulfonic acid  
6:2 FTSA = 4:2 Fluorotelomer sulfonic acid  
8:2 FTSA = 4:2 Fluorotelomer sulfonic acid  
EtFOSAA = N-Ethyl perfluorooctane sulfonamidoacetic acid  
MeFOSAA = N-Methyl perfluorooctane sulfonamidoacetic acid

#	Concentration exceeds DWC criteria
#	Concentration exceeds GSI criteria
#	Concentration exceeds both DWC and GSI criteria

**Table 5**

Parcel ID: 02N05E01-BC01 and 02N05E01-BC02  
Stabilized Water Quality Parameters

Groundwater Monitoring Well ID	Field Site	DTW	GW Elevation*	Total PFAS	Lithology Top Screen	Lithology Middle Screen	Lithology Bottom Screen	Sample Screen Interval	pH	Conductivity	Turbidity	D.O	Temperature	ORP
		(ft)	(ft)	(ng/L)				(ft bgs)	SU	uS/cm	NTU	mg/L	°C	mV
BC01-MW1S	E01-BC01	18.43	972.58	< 1.33	Poorly sorted coarse sand with gravel	Well sorted medium sand	Silt with fine sand	19-24	7.00	2090	0	0.13	14.1	-11.5
BC01-MW1D	E01-BC01	19.53	971.59	< 1.36	Well sorted fine to medium sand	Well sorted fine to medium sand, few gravel lenses	Well sorted fine to medium sand	45-50	7.28	461	0	2.04	14.1	38.2
BC01-MW2S	E01-BC01	21.91	972.71	<b>188</b>	Poorly sorted coarse sand with gravel	Poorly sorted medium to coarse sand	No Recovery	20-25	7.12	495	4	1.49	12.0	7.2
BC01-MW2D	E01-BC01	22.05	972.70	< 1.31	Well sorted fine sand	Well sorted medium to coarse sand	Well sorted fine sand	45-50	7.17	496	4	0.12	11.8	-41.8
BC02-MW1S	E01-BC02	14.05	971.81	<b>8.75</b>	No Recovery	Well sorted medium sand	Poorly sorted coarse sand with gravel	18-23	7.08	840	0	0.09	14.4	-7.3
BC02-MW1D	E01-BC02	14.13	971.75	< 1.42	Well sorted medium sand	Well sorted fine sand	Well sorted medium sand	45-50	7.11	770	0	0.09	12.3	-88.0

ft = Feet  
bgs = Below ground surface  
SU = Standard Unit  
uS/cm = Microseimens/centimeter  
NTU = Nephelometric Turbidity Units  
mg/L = Milligrams/Liter  
°C = Degree Celcius  
mV = Millivolt

DTW = Depth to water (from top of well casing)  
GW = Groundwater  
D.O. = Dissolved Oxygen  
ORP = Oxidation-Reduction Potential  
\*GW Elevation based on estimated values using USGS 1-m Digital Elevation Model

## Table 6

Parcel ID: 02N05E01-BC01, 02N05E01-BC02, 02N05E02-BC01, 02N05E02-AG01, 03N06E04-JW01 and 03N06E04-JW05  
 PFAS and TOC Soil Analytical Results Summary

Soil Sample ID	Sample Date	Field Site	Depth (in bgs)	Total PFAS	Total TOC	Soil Survey	Soil Survey Description
E01-BC01-DU1	4/11/2019	02N05E01-BC01	6-8"	19.9	7,800	MoA	Wawasee loam (0-2% slopes), <i>landform</i> : Ground moraines, end moraines, Parent material: Calcareous loamy till
E01-BC01-DU2	4/11/2019	02N05E01-BC01	6-8"	23.5	11,000 (12,000 Duplicate)	MoB	Wawasee loam (2-6% slopes), <i>landform</i> : Ground moraines, end moraines, Parent material: Calcareous loamy till
E01-BC01-DU3	4/11/2019	02N05E01-BC01	6-8"	19.6	10,000	MoA	Wawasee loam (0-2% slopes), <i>landform</i> : Ground moraines, end moraines, Parent material: Calcareous loamy till
E01-BC02-DU1	4/11/2019	02N05E01-BC02	6-8"	30.7	7,800	MoB	Wawasee loam (2-6% slopes), <i>landform</i> : Ground moraines, end moraines, Parent material: Calcareous loamy till
E01-BC02-DU2	4/11/2019	02N05E01-BC02	6-8"	35.5	10,000	MoA	Wawasee loam (0-2% slopes), <i>landform</i> : Ground moraines, end moraines, Parent material: Calcareous loamy till
E02-BC01-DU1-A	11/7/2019	02N05E02-BC01	6-8"	101	N/A	MoA	Wawasee loam (0-2% slopes), <i>landform</i> : Ground moraines, end moraines, Parent material: Calcareous loamy till
E02-BC01-DU1-B	11/7/2019	02N05E02-BC01	0-12"	99.0	N/A	MoA	Wawasee loam (0-2% slopes), <i>landform</i> : Ground moraines, end moraines, Parent material: Calcareous loamy till
E02-BC01-DU1-C	11/7/2019	02N05E02-BC01	0-12" ISM	80.2	N/A	MoA	Wawasee loam (0-2% slopes), <i>landform</i> : Ground moraines, end moraines, Parent material: Calcareous loamy till
E02-BC01-DU2-A	11/7/2019	02N05E02-BC01	6-8"	68.3	N/A	MoC	Wawasee loam (6-12% slopes), <i>landform</i> : Ground moraines, end moraines, Parent material: calcareous loamy till
E02-BC01-DU2-B	11/7/2019	02N05E02-BC01	0-12"	74.2	N/A	MoC	Wawasee loam (6-12% slopes), <i>landform</i> : Ground moraines, end moraines, Parent material: calcareous loamy till
E02-BC01-DU2-C	11/7/2019	02N05E02-BC01	0-12" ISM	67.5	N/A	MoC	Wawasee loam (6-12% slopes), <i>landform</i> : Ground moraines, end moraines, Parent material: calcareous loamy till
AG01	11/7/2019	02N05E02-AG01	0-12"	7.59	N/A	FrC	Fox-Boyer complex (6-12% slopes), <i>landform</i> : moraines, outwash plains, valley trains, Parent material: loamy over stratified sandy and gravelly glaciofluvial deposits
AG01	11/7/2019	02N05E02-AG01	0-12"	14.5	N/A	FrC	Fox-Boyer complex (6-12% slopes), <i>landform</i> : moraines, outwash plains, valley trains, Parent material: loamy over stratified sandy and gravelly glaciofluvial deposits
JW01-DU1	4/11/2019	03N06E04-JW01	6-8"	6.37	5,000	MoB	Wawasee loam (2-6% slopes), <i>landform</i> : Ground moraines, end moraines, Parent material: Calcareous loamy till
JW01-DU2	4/11/2019	03N06E04-JW01	6-8"	6.18	11,000 (11,000 Duplicate)	CvraaB	Conover loam, <i>Landform</i> : Ground moraines, end moraines, Parent material: Loamy till over dense loamy till
JW05-DU1	4/11/2019	03N06E04-JW05	6-8"	3.75	11,000	MoB	Wawasee loam (2-6% slopes), <i>landform</i> : Ground moraines, end moraines, Parent material: Calcareous loamy till
JW05-DU2	4/11/2019	03N06E04-JW05	6-8"	2.48	17,000	CvraaB	Conover loam, <i>Landform</i> : Ground moraines, end moraines, Parent material: Loamy till over dense loamy till

in bgs = Inches below ground surface

ND = Non Detect

TOC = Total Organic Carbon

PFAS soil concentrations are reported as ug/Kg or ppb

TOC concentrations reported as ug/Kg or ppb

N/A = Not Applicable/Not Analyzed

MoA = Wawasee loam (0-2% slopes)

MoB = Wawasee loam (2-6% slopes)

MoC = Wawasee loam (6-12% slopes)

CvraaB = Conover loam

FrC = Fox-Boyer complex

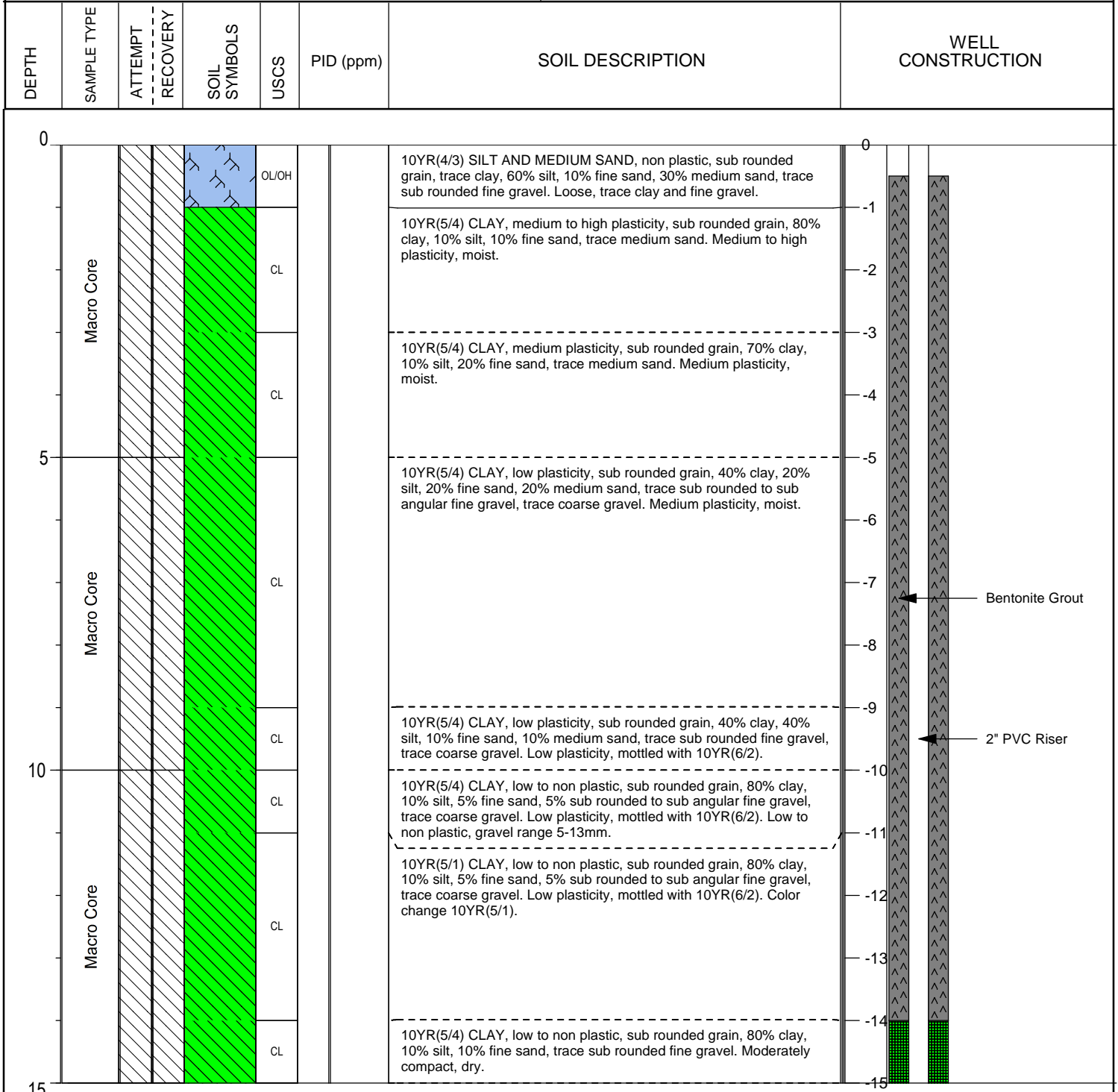
# Appendix A

### PROJECT INFORMATION

PROJECT: **Biosolid PFAS Study**  
 SITE LOCATION: **Howell, MI**  
 PROJECT NO.: **60588767**  
 PROJECT MANAGER: **John Cuthbertson**  
 LOGGED BY: **Stanley Krenz**  
 CREATED BY: **Stanley Krenz**

### DRILLING INFORMATION

CONTRACTOR: **Mateco**  
 CREW CHIEF: **Mitch Slachter**  
 DRILL RIG TYPE: **Geoprobe 7822DT**  
 DRILLING METHOD: **Direct Push/ 4.25" Hollow Stem Auger**  
 HOLE DIAMETER: **6"**  
 DATE START: **8/19/19**  
 DATE END: **8/20/19**



NOTES:

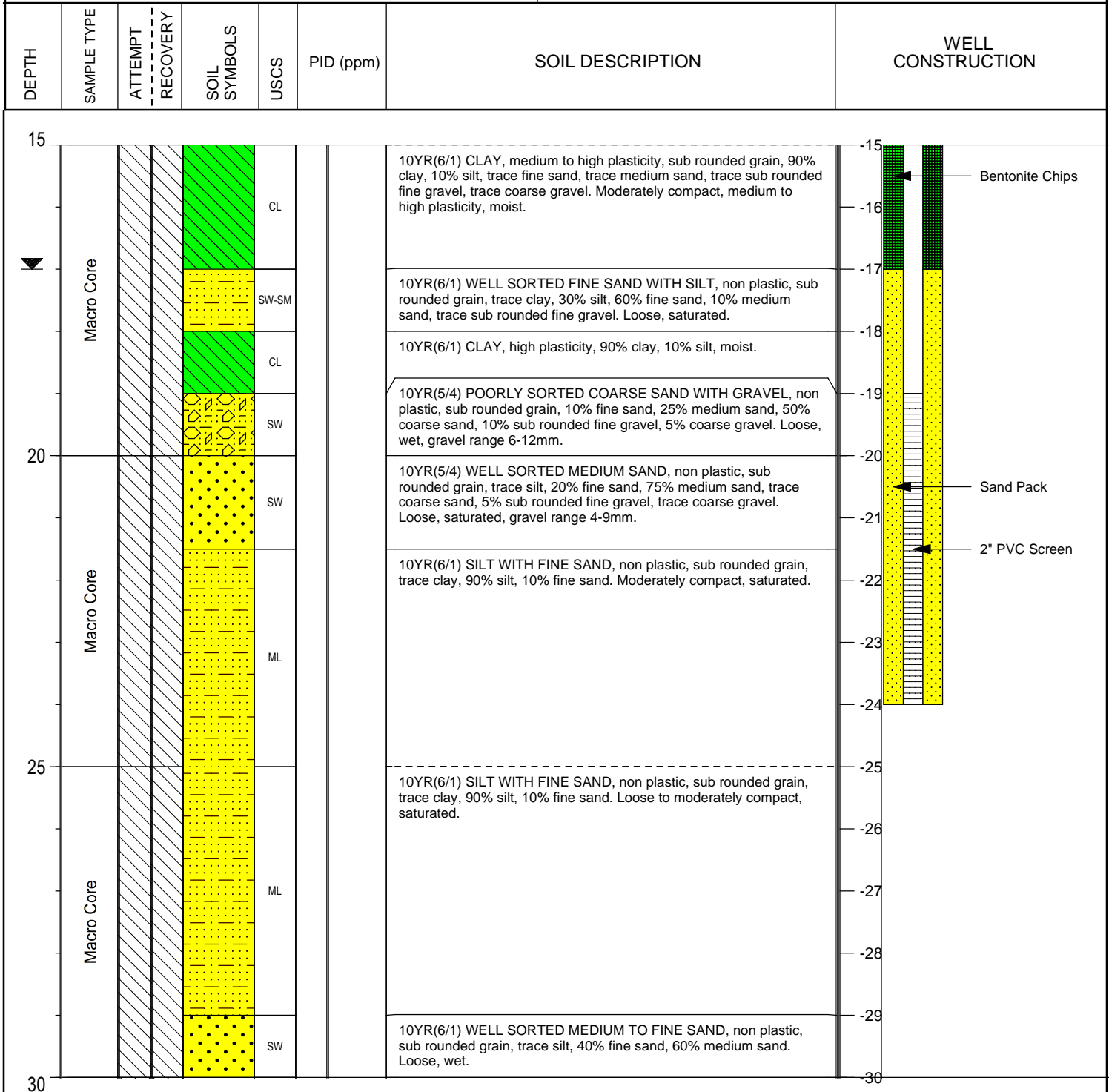
☼ Water level during drilling    ▼ Water level in completed well

### PROJECT INFORMATION

PROJECT: **Biosolid PFAS Study**  
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NOTES:

☒ Water level during drilling    ▼ Water level in completed well



# FIELD BOREHOLE LOG

BOREHOLE NO: **BC01-MW1S**  
TOTAL DEPTH: **50'**

## PROJECT INFORMATION

PROJECT: **Biosolid PFAS Study**  
SITE LOCATION: **Howell, MI**  
PROJECT NO.: **60588767**  
PROJECT MANAGER: **John Cuthbertson**  
LOGGED BY: **Stanley Krenz**  
CREATED BY: **Stanley Krenz**

## DRILLING INFORMATION

CONTRACTOR: **Mateco**  
CREW CHIEF: **Mitch Slachter**  
DRILL RIG TYPE: **Geoprobe 7822DT**  
DRILLING METHOD: **Direct Push/ 4.25" Hollow Stem Auger**  
HOLE DIAMETER: **6"**  
DATE START: **8/19/19**  
DATE END: **8/20/19**

DEPTH	SAMPLE TYPE	ATTEMPT RECOVERY	SOIL SYMBOLS	USCS	PID (ppm)	SOIL DESCRIPTION	WELL CONSTRUCTION
30	Macro Core		[Yellow dotted pattern]	SM		10YR(6/1) WELL SORTED FINE SAND WITH SILT, non plastic, sub rounded grain, trace clay, 20% silt, 60% fine sand, 20% medium sand. Loose, wet.	
				SM		10YR(6/1) WELL SORTED SILT WITH FINE SAND, non plastic, sub rounded grain, 80% silt, 20% fine sand. Moderately compact, saturated.	
				SM		10YR(6/1) WELL SORTED FINE SAND WITH SILT, non plastic, sub rounded grain, 30% silt, 60% fine sand, 10% medium sand. Loose, wet to saturated.	
				SM		10YR(6/1) WELL SORTED SILT WITH FINE SAND, non plastic, sub rounded grain, 80% silt, 20% fine sand. Moderately compact, saturated.	
35	Macro Core		[Yellow dotted pattern]	ML		10YR(6/1) WELL SORTED SILT WITH FINE SAND, non plastic, sub rounded grain, trace clay, 90% silt, 10% fine sand. Moderately compact, saturated.	
				SM		10YR(6/1) WELL SORTED FINE SAND WITH SILT, non plastic, sub rounded grain, 20% silt, 80% fine sand, trace fine gravel, trace coarse gravel. Moderately compact, saturated, gravel range 6-9mm.	
				SW		10YR(6/2) WELL SORTED MEDIUM TO FINE SAND, non plastic, sub rounded grain, trace silt, 10% fine sand, 70% medium sand, 10% coarse sand, 5% fine gravel, 5% coarse gravel. Loose, saturated, gravel range 9-17mm.	
				SW		10YR(6/2) WELL SORTED FINE SAND WITH SILT, non plastic, sub rounded grain, 10% silt, 80% fine sand, 10% medium sand, trace fine gravel, trace coarse gravel. Loose, saturated.	
40	Macro Core		[Yellow dotted pattern]			No Recovery.	
						10YR(6/1) WELL SORTED FINE TO MEDIUM SAND, non plastic, sub rounded grain, 15% silt, 40% fine sand, 45% medium sand, trace sub rounded to sub angular fine gravel, trace coarse gravel. Moderately compact, wet, gravel range 4-19mm.	
45							

### NOTES:

☒ Water level during drilling    ☒ Water level in completed well





# FIELD BOREHOLE LOG

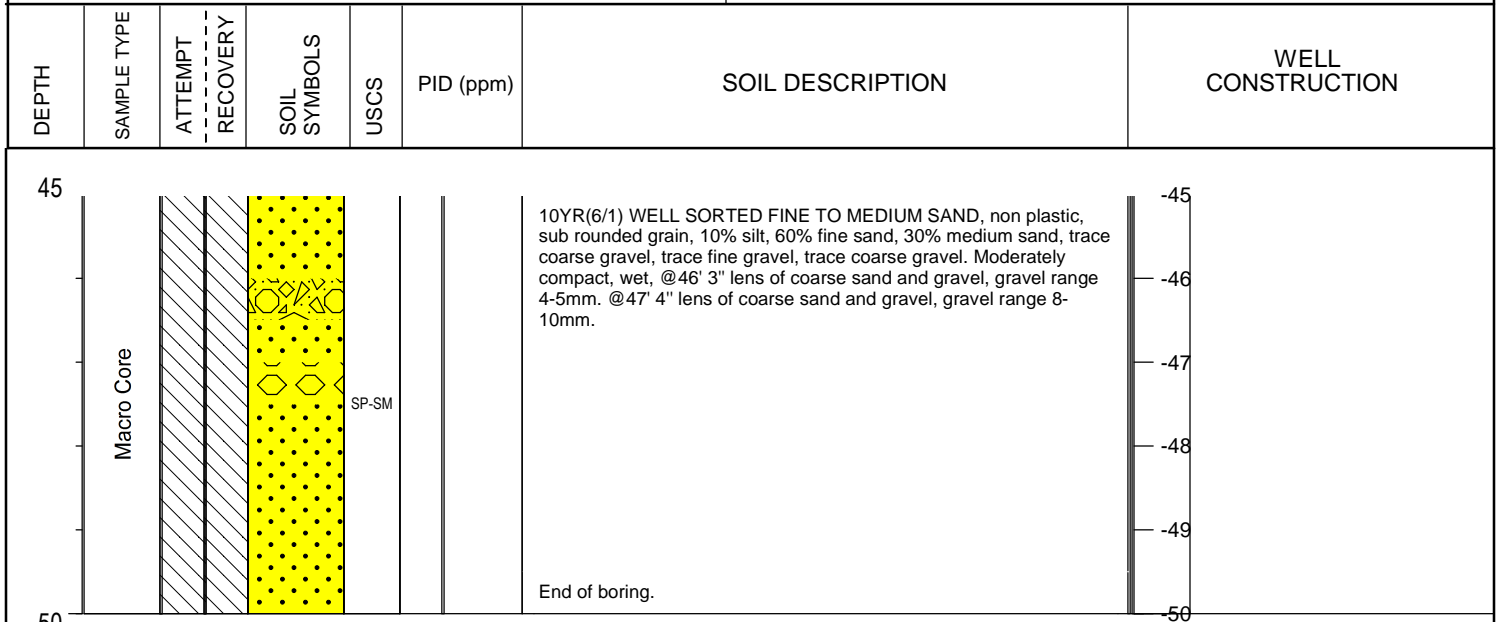
BOREHOLE NO: **BC01-MW1S**  
TOTAL DEPTH: **50'**

## PROJECT INFORMATION

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SITE LOCATION: **Howell, MI**  
PROJECT NO.: **60588767**  
PROJECT MANAGER: **John Cuthbertson**  
LOGGED BY: **Stanley Krenz**  
CREATED BY: **Stanley Krenz**

## DRILLING INFORMATION

CONTRACTOR: **Mateco**  
CREW CHIEF: **Mitch Slachter**  
DRILL RIG TYPE: **Geoprobe 7822DT**  
DRILLING METHOD: **Direct Push/ 4.25" Hollow Stem Auger**  
HOLE DIAMETER: **6"**  
DATE START: **8/19/19**  
DATE END: **8/20/19**



### NOTES:

☒ Water level during drilling    ☒ Water level in completed well



# FIELD BOREHOLE LOG

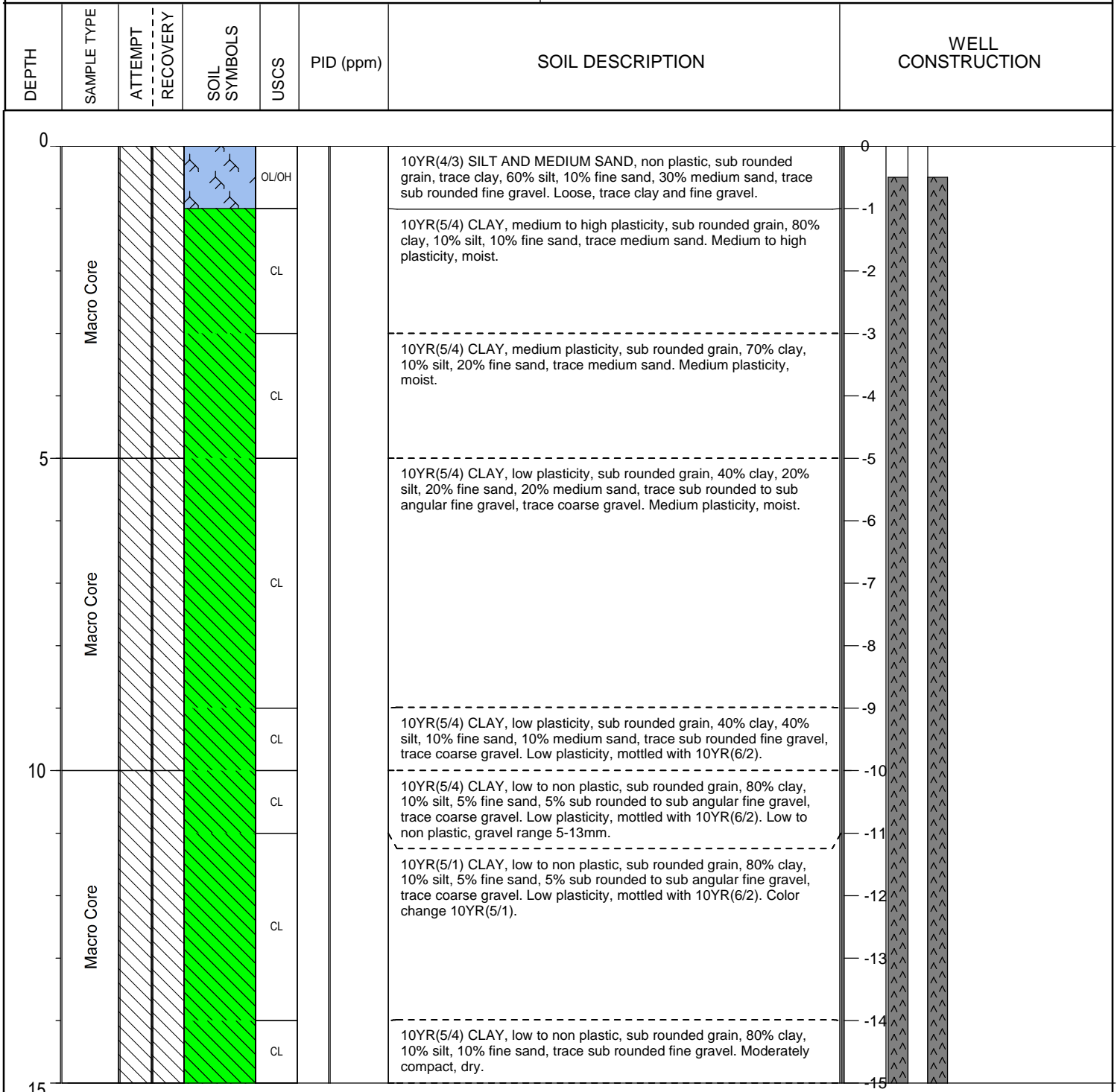
BOREHOLE NO: **BC01-MW1D**  
 TOTAL DEPTH: **50'**

## PROJECT INFORMATION

PROJECT: **Biosolid PFAS Study**  
 SITE LOCATION: **Howell, MI**  
 PROJECT NO.: **60588767**  
 PROJECT MANAGER: **John Cuthbertson**  
 LOGGED BY: **Stanley Krenz**  
 CREATED BY: **Stanley Krenz**

## DRILLING INFORMATION

CONTRACTOR: **Mateco**  
 CREW CHIEF: **Mitch Slachter**  
 DRILL RIG TYPE: **Geoprobe 7822DT**  
 DRILLING METHOD: **Direct Push/ 4.25" Hollow Stem Auger**  
 HOLE DIAMETER: **6"**  
 DATE START: **8/19/19**  
 DATE END: **8/20/19**



### NOTES:

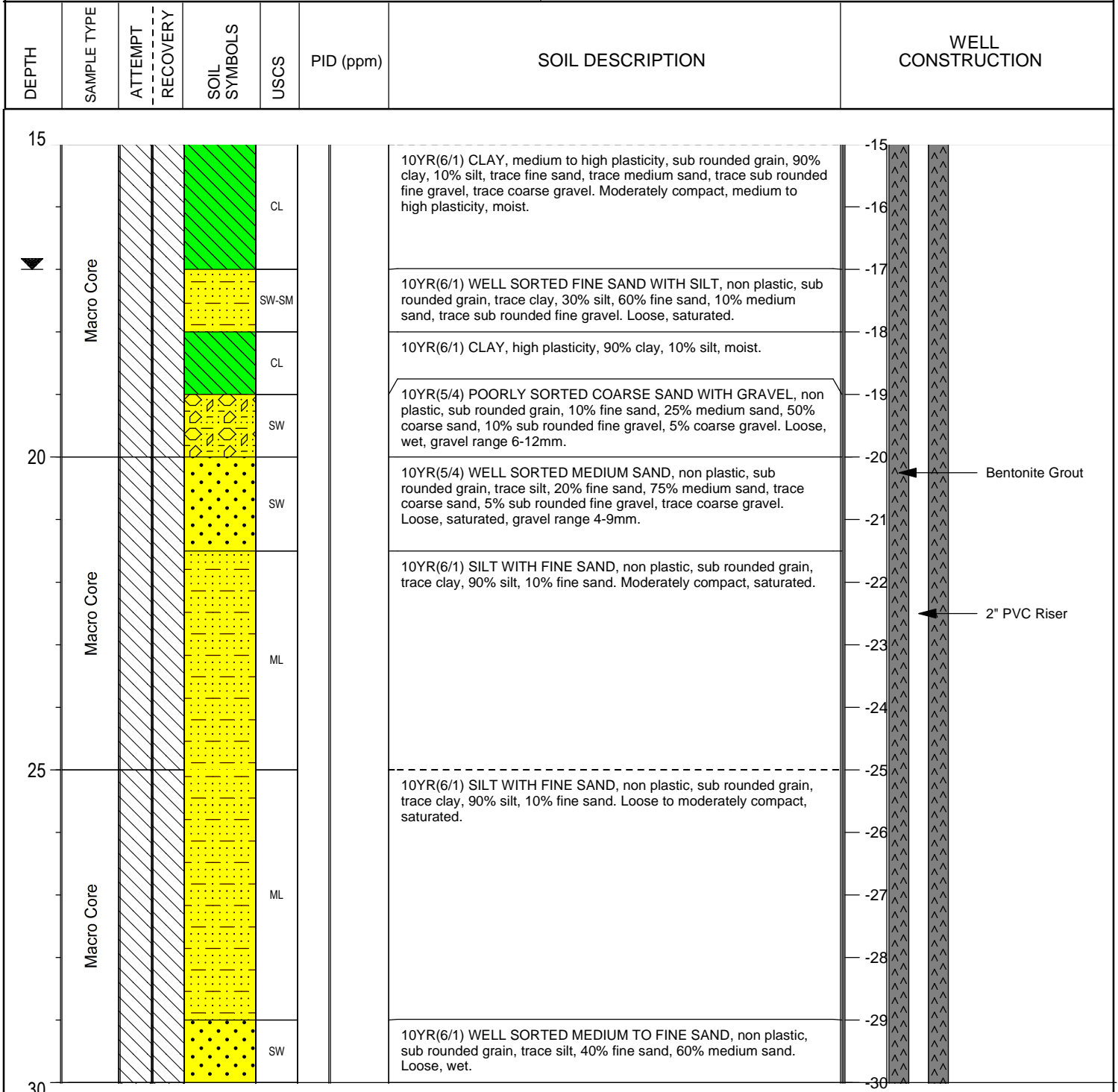
☒ Water level during drilling    ☒ Water level in completed well

### PROJECT INFORMATION

PROJECT: **Biosolid PFAS Study**  
 SITE LOCATION: **Howell, MI**  
 PROJECT NO.: **60588767**  
 PROJECT MANAGER: **John Cuthbertson**  
 LOGGED BY: **Stanley Krenz**  
 CREATED BY: **Stanley Krenz**

### DRILLING INFORMATION

CONTRACTOR: **Mateco**  
 CREW CHIEF: **Mitch Slachter**  
 DRILL RIG TYPE: **Geoprobe 7822DT**  
 DRILLING METHOD: **Direct Push/ 4.25" Hollow Stem Auger**  
 HOLE DIAMETER: **6"**  
 DATE START: **8/19/19**  
 DATE END: **8/20/19**



NOTES:

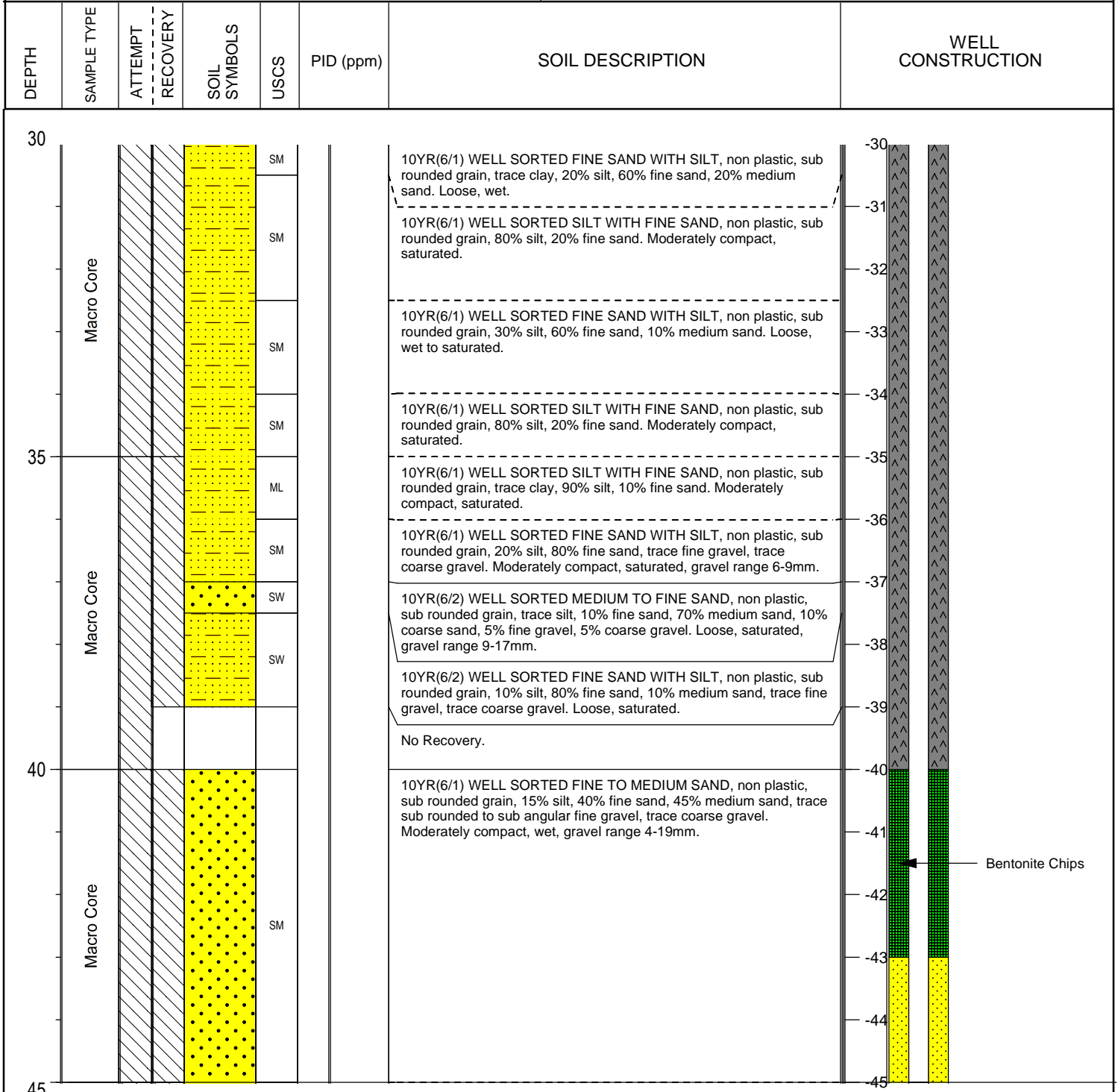
☒ Water level during drilling    ▼ Water level in completed well

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 HOLE DIAMETER: **6"**  
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 DATE END: **8/20/19**



NOTES:

☰ Water level during drilling    ▼ Water level in completed well



# FIELD BOREHOLE LOG

BOREHOLE NO: **BC01-MW1D**  
TOTAL DEPTH: **50'**

## PROJECT INFORMATION

PROJECT: **Biosolid PFAS Study**  
SITE LOCATION: **Howell, MI**  
PROJECT NO.: **60588767**  
PROJECT MANAGER: **John Cuthbertson**  
LOGGED BY: **Stanley Krenz**  
CREATED BY: **Stanley Krenz**

## DRILLING INFORMATION

CONTRACTOR: **Mateco**  
CREW CHIEF: **Mitch Slachter**  
DRILL RIG TYPE: **Geoprobe 7822DT**  
DRILLING METHOD: **Direct Push/ 4.25" Hollow Stem Auger**  
HOLE DIAMETER: **6"**  
DATE START: **8/19/19**  
DATE END: **8/20/19**

DEPTH	SAMPLE TYPE	ATTEMPT RECOVERY	SOIL SYMBOLS	USCS	PID (ppm)	SOIL DESCRIPTION	WELL CONSTRUCTION
45	Macro Core			SP-SM		10YR(6/1) WELL SORTED FINE TO MEDIUM SAND, non plastic, sub rounded grain, 10% silt, 60% fine sand, 30% medium sand, trace coarse gravel, trace fine gravel, trace coarse gravel. Moderately compact, wet, @46' 3" lens of coarse sand and gravel, gravel range 4-5mm. @47' 4" lens of coarse sand and gravel, gravel range 8-10mm.	
50						End of boring.	

### NOTES:

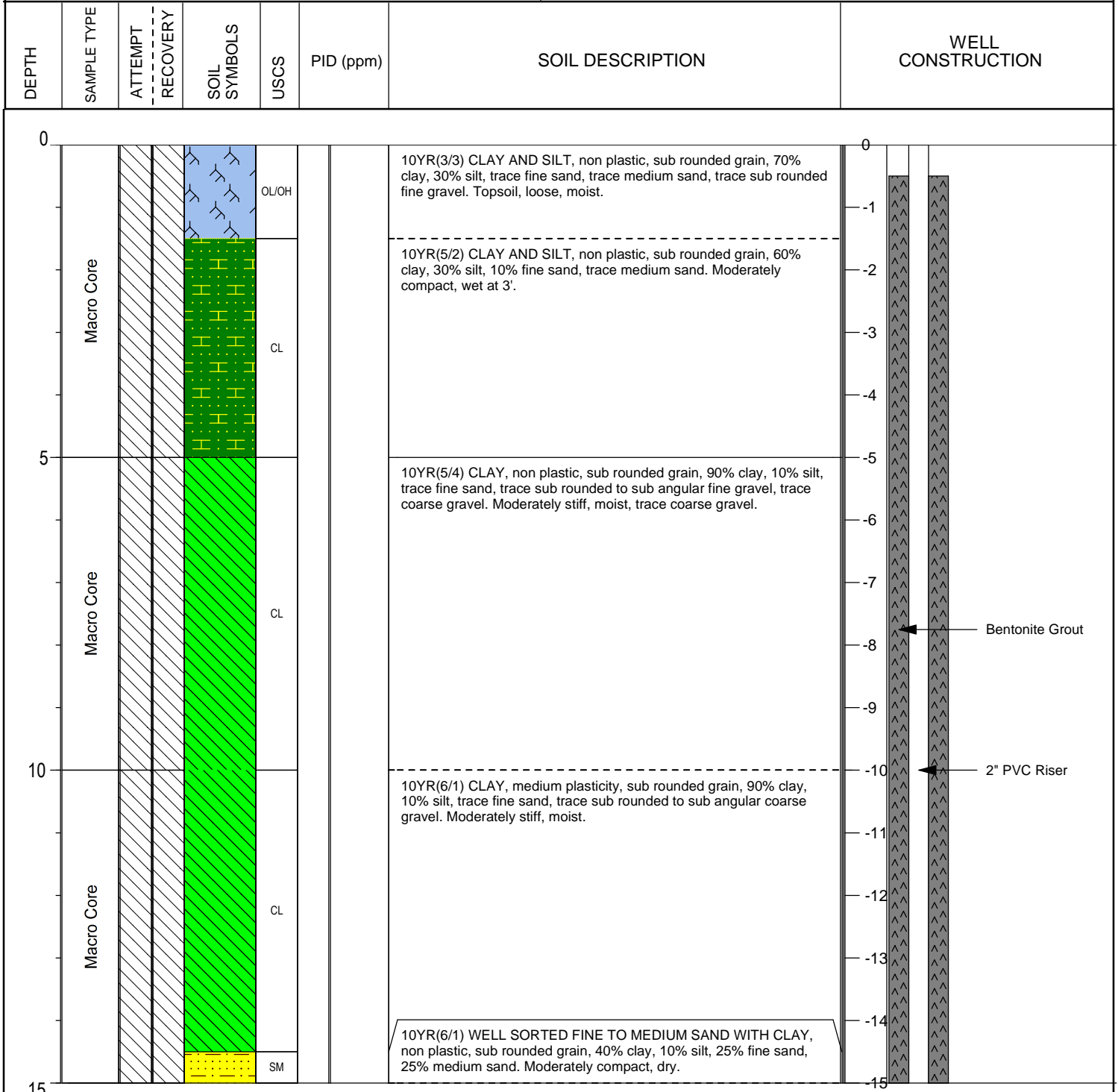
☒ Water level during drilling    ☒ Water level in completed well

### PROJECT INFORMATION

PROJECT: **Biosolid PFAS Study**  
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### DRILLING INFORMATION

CONTRACTOR: **Mateco**  
 CREW CHIEF: **Mitch Slachter**  
 DRILL RIG TYPE: **Geoprobe 7822DT**  
 DRILLING METHOD: **Direct Push/ 4.25" Hollow Stem Auger**  
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 DATE START: **8/22/19**  
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NOTES:

☼ Water level during drilling    ▼ Water level in completed well

### PROJECT INFORMATION

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 DRILL RIG TYPE: **Geoprobe 7822DT**  
 DRILLING METHOD: **Direct Push/ 4.25" Hollow Stem Auger**  
 HOLE DIAMETER: **6"**  
 DATE START: **8/22/19**  
 DATE END: **8/22/19**

DEPTH	SAMPLE TYPE	ATTEMPT RECOVERY	SOIL SYMBOLS	USCS	PID (ppm)	SOIL DESCRIPTION	WELL CONSTRUCTION	
15	Macro Core	No Recovery	[Yellow dotted pattern]	SP		10YR(5/4) WELL SORTED MEDIUM TO COARSE SAND, non plastic, sub rounded grain, 5% silt, 20% fine sand, 30% medium sand, 35% coarse sand, 5% sub rounded fine gravel, 5% coarse gravel. Loose, moist, gravel range 4-9mm.	-15 -16 -17 -18 -19	Bentonite Chips
						No Recovery.		
20	Macro Core	No Recovery	[Yellow dotted pattern]	SW		10YR(5/4) POORLY SORTED COARSE SAND WITH GRAVEL, non plastic, sub rounded grain, trace silt, trace fine sand, 30% medium sand, 50% coarse sand, 15% sub rounded fine gravel, 5% coarse gravel. Loose, saturated, gravel range 8-15mm.	-20 -21 -22 -23	Sand Pack
						No Recovery.		
25	Macro Core	No Recovery	[Yellow dotted pattern]	SW		10YR(5/4) POORLY SORTED MEDIUM TO COARSE SAND, non plastic, sub rounded grain, trace silt, 10% fine sand, 50% medium sand, 40% coarse sand, trace sub rounded fine gravel. Loose, saturated.	-24 -25	2" PVC Screen
						No Recovery.		
30	Macro Core	No Recovery	[Yellow dotted pattern]	SW		10YR(5/4) POORLY SORTED MEDIUM TO COARSE SAND, non plastic, sub rounded grain, trace silt, 10% fine sand, 60% medium sand, 30% coarse sand. Loose, saturated.	-26 -27 -28 -29 -30	

NOTES:

☒ Water level during drilling    ☒ Water level in completed well



# FIELD BOREHOLE LOG

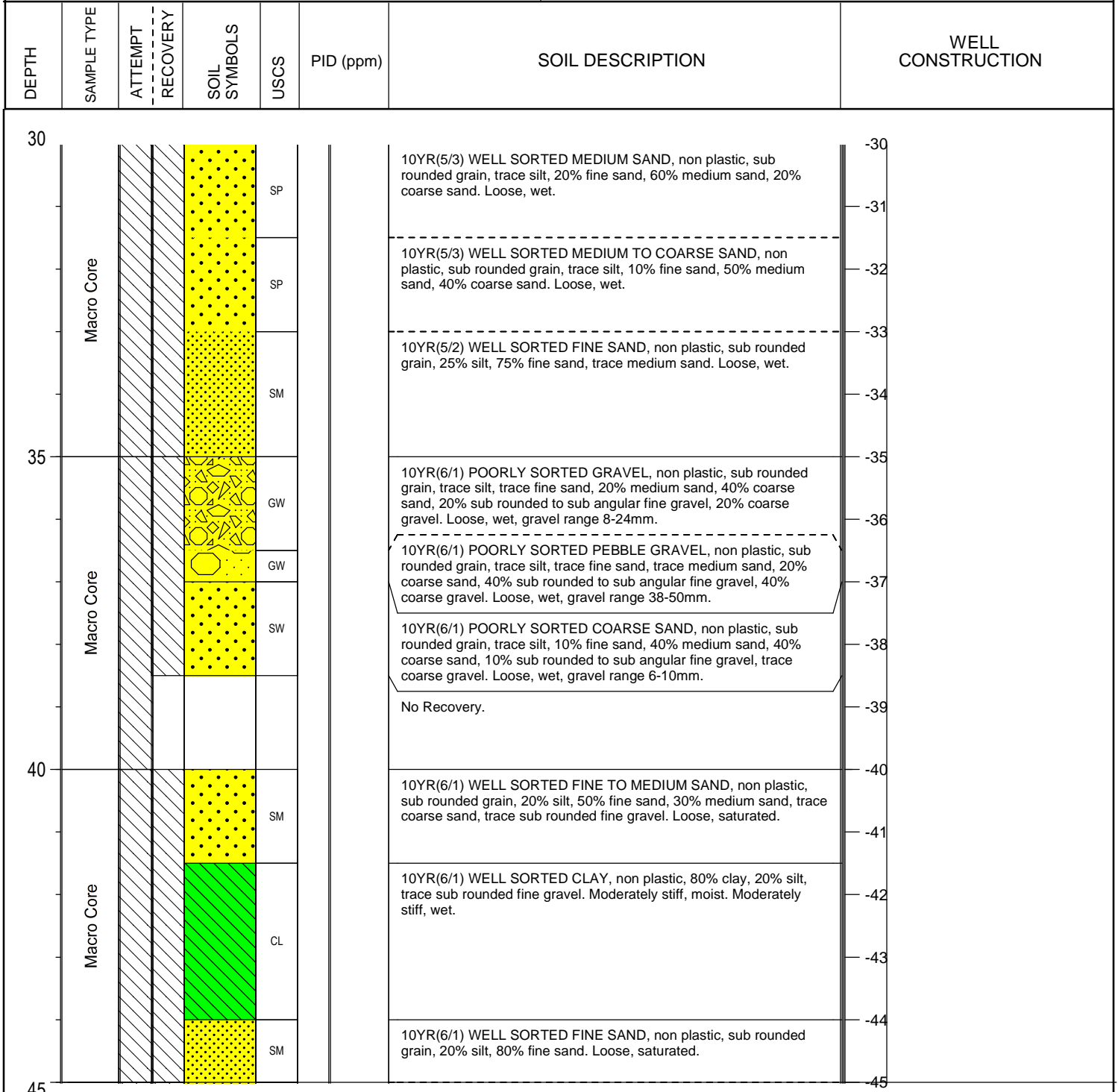
BOREHOLE NO: **BC01-MW2S**  
 TOTAL DEPTH: **50'**

## PROJECT INFORMATION

PROJECT: **Biosolid PFAS Study**  
 SITE LOCATION: **Howell, MI**  
 PROJECT NO.: **60588767**  
 PROJECT MANAGER: **John Cuthbertson**  
 LOGGED BY: **Stanley Krenz**  
 CREATED BY: **Stanley Krenz**

## DRILLING INFORMATION

CONTRACTOR: **Mateco**  
 CREW CHIEF: **Mitch Slachter**  
 DRILL RIG TYPE: **Geoprobe 7822DT**  
 DRILLING METHOD: **Direct Push/ 4.25" Hollow Stem Auger**  
 HOLE DIAMETER: **6"**  
 DATE START: **8/22/19**  
 DATE END: **8/22/19**



NOTES:

☼ Water level during drilling    ▼ Water level in completed well





# FIELD BOREHOLE LOG

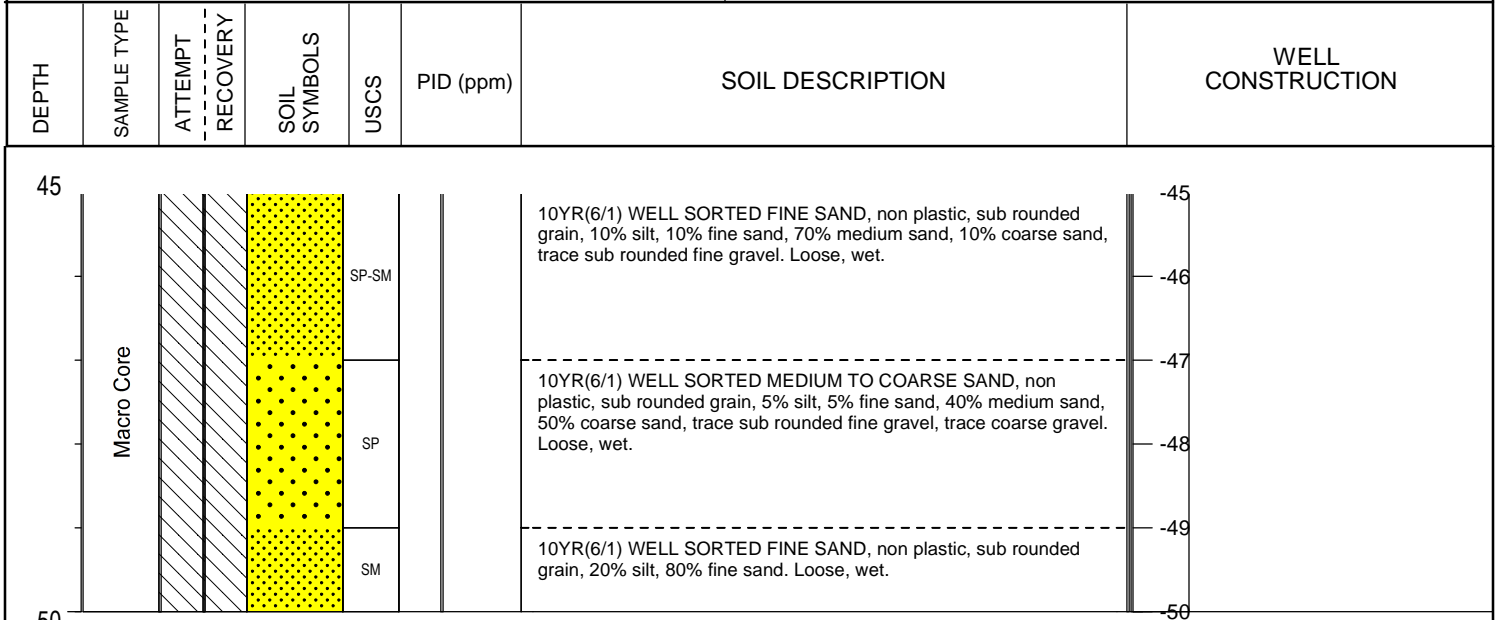
BOREHOLE NO: **BC01-MW2S**  
 TOTAL DEPTH: **50'**

## PROJECT INFORMATION

PROJECT: **Biosolid PFAS Study**  
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 PROJECT NO.: **60588767**  
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 CREATED BY: **Stanley Krenz**

## DRILLING INFORMATION

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 CREW CHIEF: **Mitch Slachter**  
 DRILL RIG TYPE: **Geoprobe 7822DT**  
 DRILLING METHOD: **Direct Push/ 4.25" Hollow Stem Auger**  
 HOLE DIAMETER: **6"**  
 DATE START: **8/22/19**  
 DATE END: **8/22/19**



### NOTES:

☒ Water level during drilling    ☒ Water level in completed well



# FIELD BOREHOLE LOG

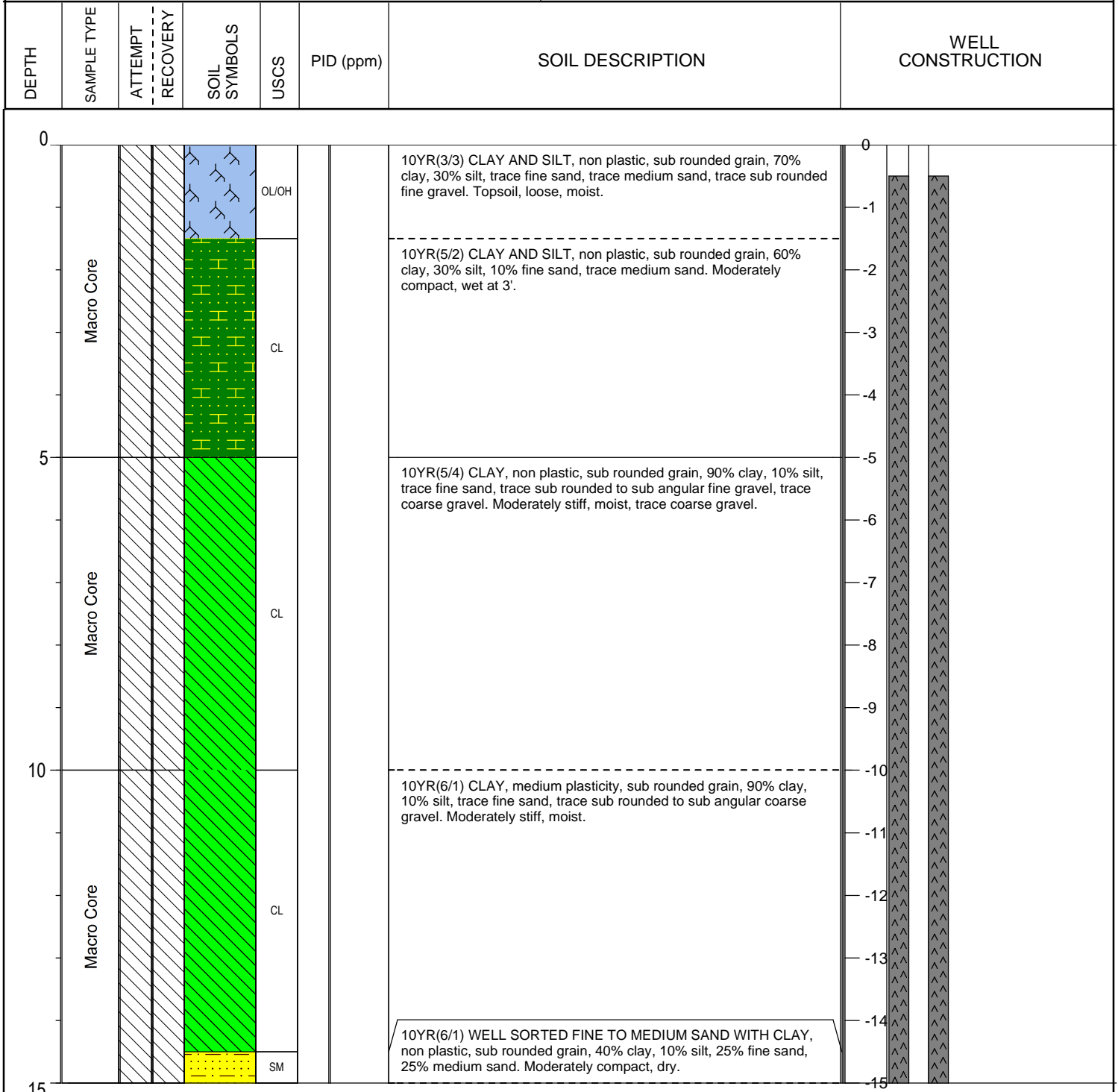
BOREHOLE NO: **BC01-MW2D**  
 TOTAL DEPTH: **50'**

## PROJECT INFORMATION

PROJECT: **Biosolid PFAS Study**  
 SITE LOCATION: **Howell, MI**  
 PROJECT NO.: **60588767**  
 PROJECT MANAGER: **John Cuthbertson**  
 LOGGED BY: **Stanley Krenz**  
 CREATED BY: **Stanley Krenz**

## DRILLING INFORMATION

CONTRACTOR: **Mateco**  
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 DRILL RIG TYPE: **Geoprobe 7822DT**  
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NOTES:

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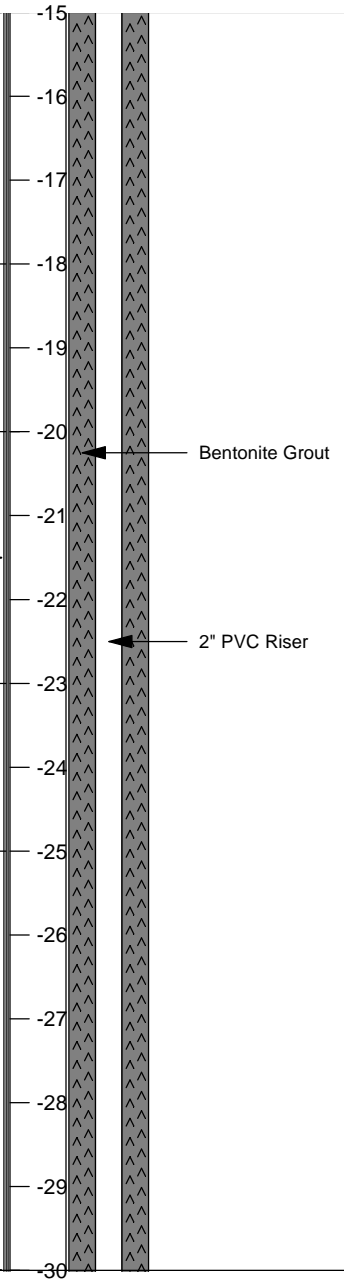
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 DATE END: **8/22/19**

DEPTH	SAMPLE TYPE	ATTEMPT RECOVERY	SOIL SYMBOLS	USCS	PID (ppm)	SOIL DESCRIPTION	WELL CONSTRUCTION
15	Macro Core	[Hatched]	[Yellow dots]	SP		10YR(5/4) WELL SORTED MEDIUM TO COARSE SAND, non plastic, sub rounded grain, 5% silt, 20% fine sand, 30% medium sand, 35% coarse sand, 5% sub rounded fine gravel, 5% coarse gravel. Loose, moist, gravel range 4-9mm.	[Well Construction Diagram]
						No Recovery.	
20	Macro Core	[Hatched]	[Yellow dots]	SW		10YR(5/4) POORLY SORTED COARSE SAND WITH GRAVEL, non plastic, sub rounded grain, trace silt, trace fine sand, 30% medium sand, 50% coarse sand, 15% sub rounded fine gravel, 5% coarse gravel. Loose, saturated, gravel range 8-15mm.	[Well Construction Diagram]
						10YR(5/4) POORLY SORTED MEDIUM TO COARSE SAND, non plastic, sub rounded grain, trace silt, 10% fine sand, 50% medium sand, 40% coarse sand, trace sub rounded fine gravel. Loose, saturated.	
						No Recovery.	
25	Macro Core	[Hatched]	[Yellow dots]	SW		10YR(5/4) POORLY SORTED MEDIUM TO COARSE SAND, non plastic, sub rounded grain, trace silt, 10% fine sand, 60% medium sand, 30% coarse sand. Loose, saturated.	
30							



**NOTES:**

☒ Water level during drilling    ☒ Water level in completed well

### PROJECT INFORMATION

PROJECT: **Biosolid PFAS Study**  
 SITE LOCATION: **Howell, MI**  
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 DATE END: **8/22/19**

DEPTH	SAMPLE TYPE	ATTEMPT RECOVERY	SOIL SYMBOLS	USCS	PID (ppm)	SOIL DESCRIPTION	WELL CONSTRUCTION
30	Macro Core	-	[Yellow dotted pattern]	SP		10YR(5/3) WELL SORTED MEDIUM SAND, non plastic, sub rounded grain, trace silt, 20% fine sand, 60% medium sand, 20% coarse sand. Loose, wet.	[Well construction diagram showing casing and bentonite chips]
				SP		10YR(5/3) WELL SORTED MEDIUM TO COARSE SAND, non plastic, sub rounded grain, trace silt, 10% fine sand, 50% medium sand, 40% coarse sand. Loose, wet.	
				SM		10YR(5/2) WELL SORTED FINE SAND, non plastic, sub rounded grain, 25% silt, 75% fine sand, trace medium sand. Loose, wet.	
35	Macro Core	-	[Yellow dotted pattern]	GW		10YR(6/1) POORLY SORTED GRAVEL, non plastic, sub rounded grain, trace silt, trace fine sand, 20% medium sand, 40% coarse sand, 20% sub rounded to sub angular fine gravel, 20% coarse gravel. Loose, wet, gravel range 8-24mm.	
				GW		10YR(6/1) POORLY SORTED PEBBLE GRAVEL, non plastic, sub rounded grain, trace silt, trace fine sand, trace medium sand, 20% coarse sand, 40% sub rounded to sub angular fine gravel, 40% coarse gravel. Loose, wet, gravel range 38-50mm.	
				SW		10YR(6/1) POORLY SORTED COARSE SAND, non plastic, sub rounded grain, trace silt, 10% fine sand, 40% medium sand, 40% coarse sand, 10% sub rounded to sub angular fine gravel, trace coarse gravel. Loose, wet, gravel range 6-10mm.	
40	Macro Core	-	[Yellow dotted pattern]			No Recovery.	
				SM		10YR(6/1) WELL SORTED FINE TO MEDIUM SAND, non plastic, sub rounded grain, 20% silt, 50% fine sand, 30% medium sand, trace coarse sand, trace sub rounded fine gravel. Loose, saturated.	
				CL		10YR(6/1) WELL SORTED CLAY, non plastic, 80% clay, 20% silt, trace sub rounded fine gravel. Moderately stiff, moist. Moderately stiff, wet.	
45			[Yellow dotted pattern]	SM		10YR(6/1) WELL SORTED FINE SAND, non plastic, sub rounded grain, 20% silt, 80% fine sand. Loose, saturated.	

NOTES:

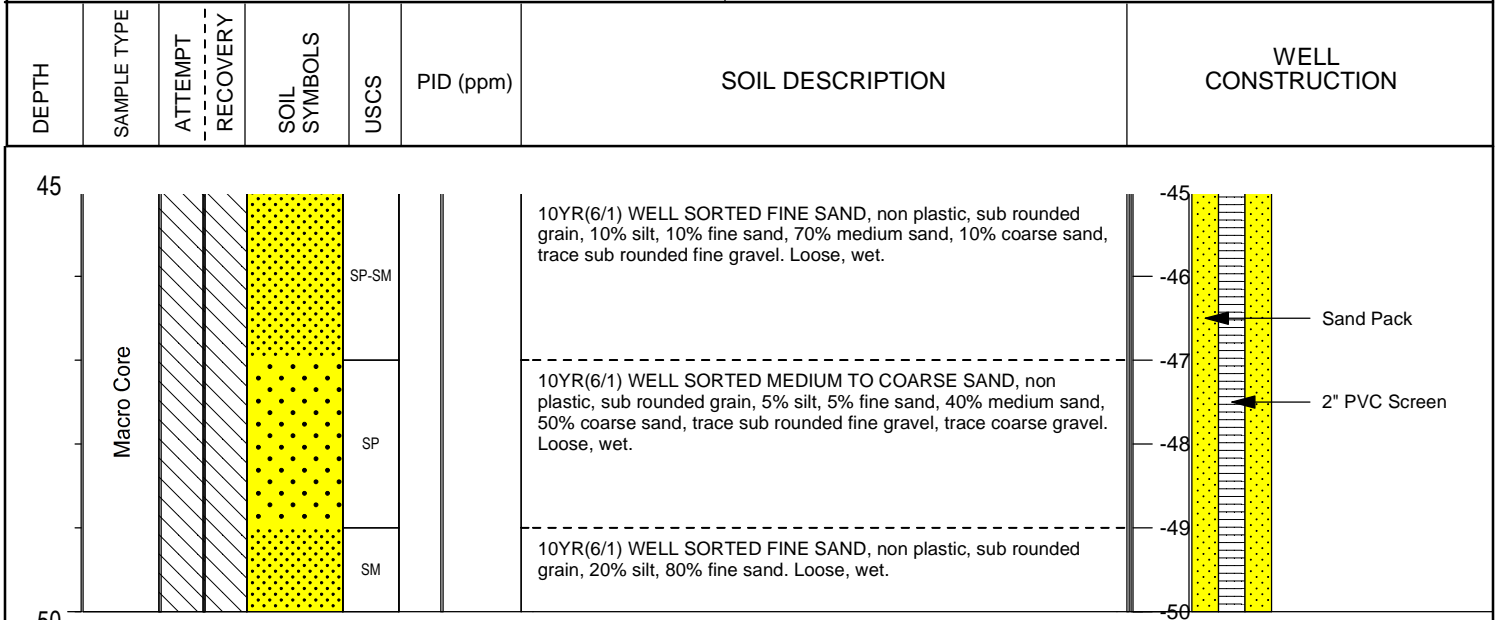
☰ Water level during drilling    ▼ Water level in completed well

### PROJECT INFORMATION

PROJECT: **Biosolid PFAS Study**  
 SITE LOCATION: **Howell, MI**  
 PROJECT NO.: **60588767**  
 PROJECT MANAGER: **John Cuthbertson**  
 LOGGED BY: **Stanley Krenz**  
 CREATED BY: **Stanley Krenz**

### DRILLING INFORMATION

CONTRACTOR: **Mateco**  
 CREW CHIEF: **Mitch Slachter**  
 DRILL RIG TYPE: **Geoprobe 7822DT**  
 DRILLING METHOD: **Direct Push/ 4.25" Hollow Stem Auger**  
 HOLE DIAMETER: **6"**  
 DATE START: **8/22/19**  
 DATE END: **8/22/19**



**NOTES:**

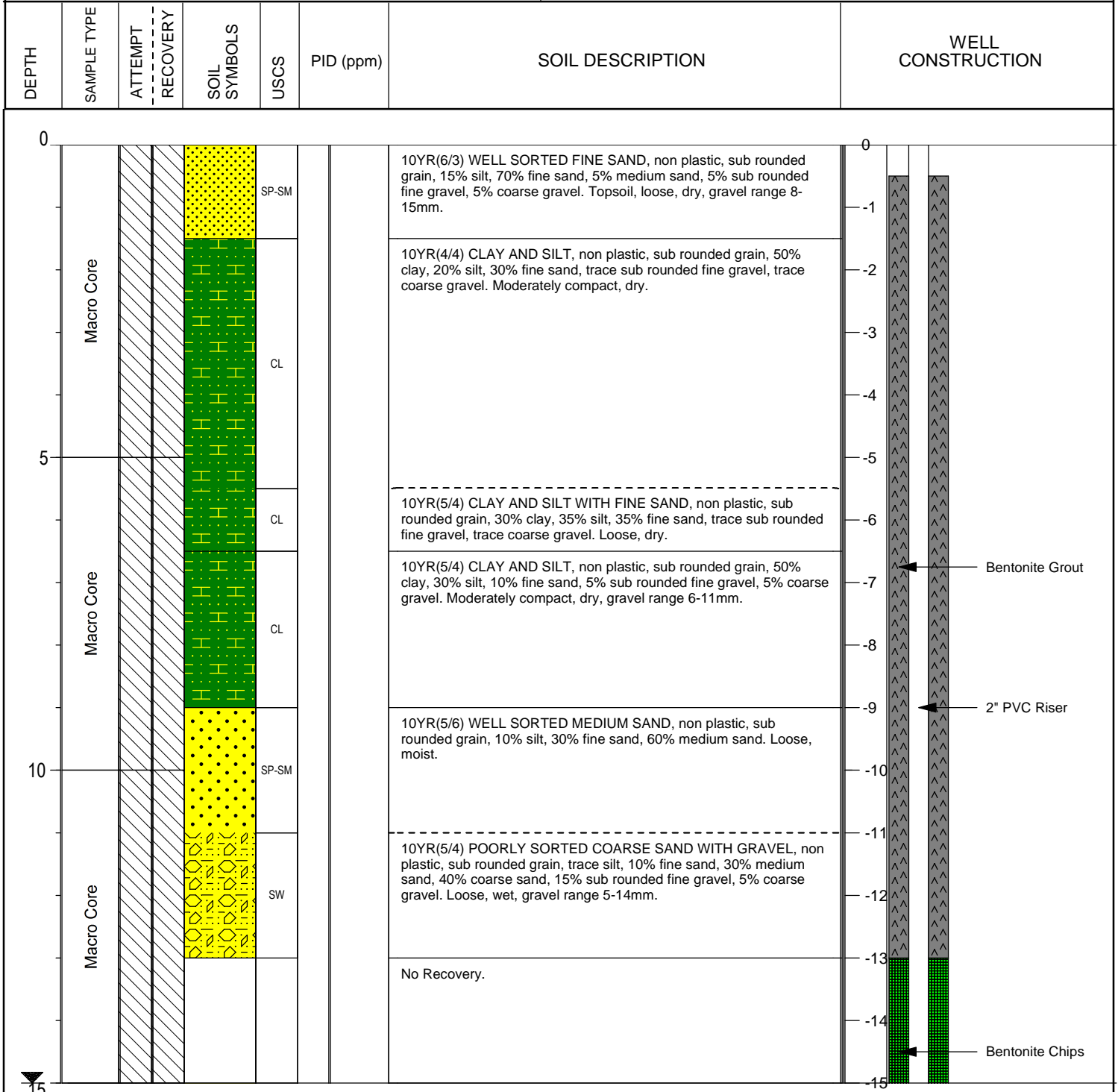
☒ Water level during drilling    ☒ Water level in completed well

### PROJECT INFORMATION

PROJECT: **Biosolid PFAS Study**  
 SITE LOCATION: **Howell, MI**  
 PROJECT NO.: **60588767**  
 PROJECT MANAGER: **John Cuthbertson**  
 LOGGED BY: **Stanley Krenz**  
 CREATED BY: **Stanley Krenz**

### DRILLING INFORMATION

CONTRACTOR: **Mateco**  
 CREW CHIEF: **Mitch Slachter**  
 DRILL RIG TYPE: **Geoprobe 7822DT**  
 DRILLING METHOD: **Direct Push/ 4.25" Hollow Stem Auger**  
 HOLE DIAMETER: **6"**  
 DATE START: **10/21/16**  
 DATE END: **10/21/16**



**NOTES:**

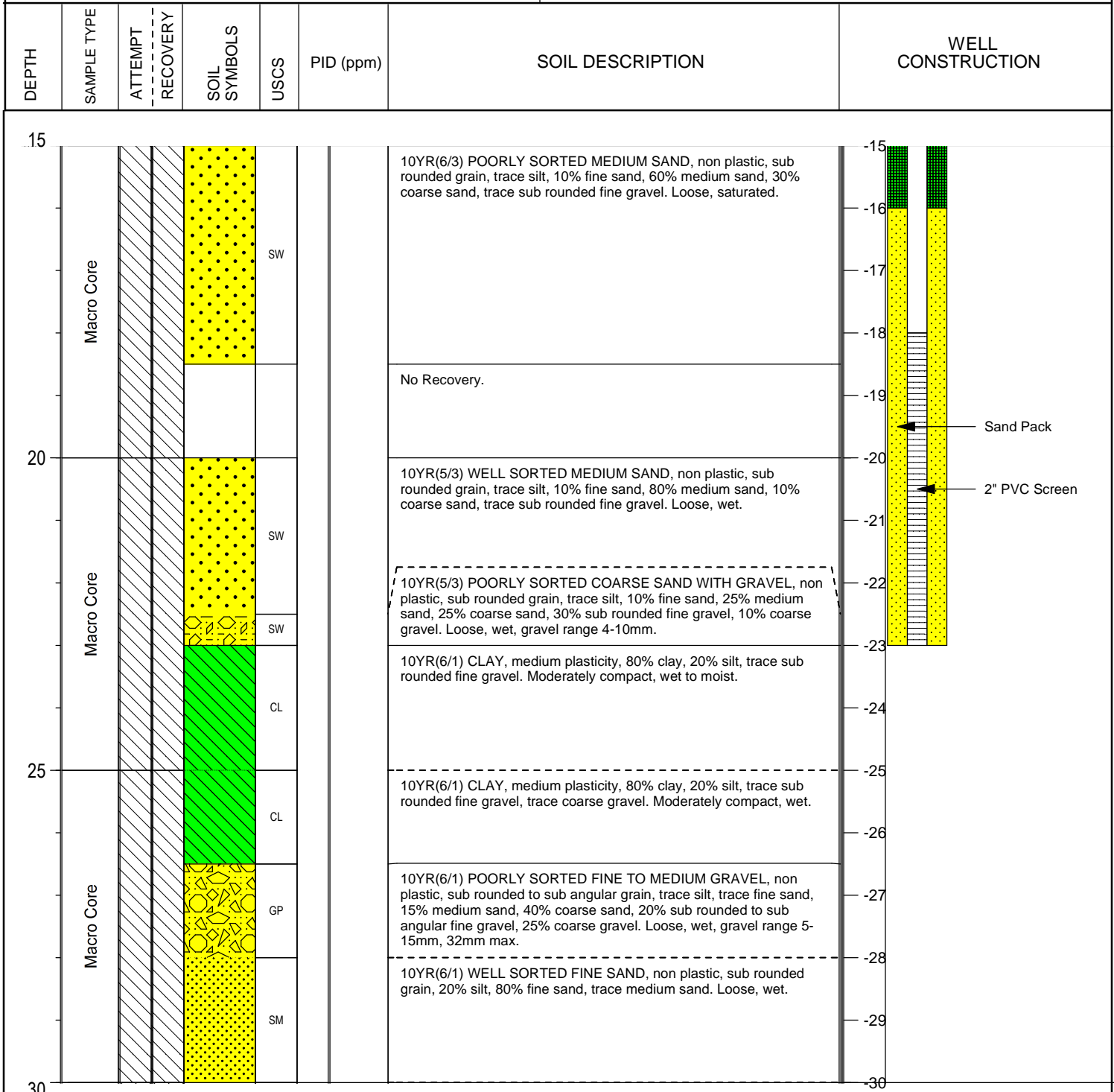
☰ Water level during drilling    ▼ Water level in completed well

### PROJECT INFORMATION

PROJECT: **Biosolid PFAS Study**  
 SITE LOCATION: **Howell, MI**  
 PROJECT NO.: **60588767**  
 PROJECT MANAGER: **John Cuthbertson**  
 LOGGED BY: **Stanley Krenz**  
 CREATED BY: **Stanley Krenz**

### DRILLING INFORMATION

CONTRACTOR: **Mateco**  
 CREW CHIEF: **Mitch Slachter**  
 DRILL RIG TYPE: **Geoprobe 7822DT**  
 DRILLING METHOD: **Direct Push/ 4.25" Hollow Stem Auger**  
 HOLE DIAMETER: **6"**  
 DATE START: **10/21/16**  
 DATE END: **10/21/16**



NOTES:

☼ Water level during drilling    ▼ Water level in completed well



# FIELD BOREHOLE LOG

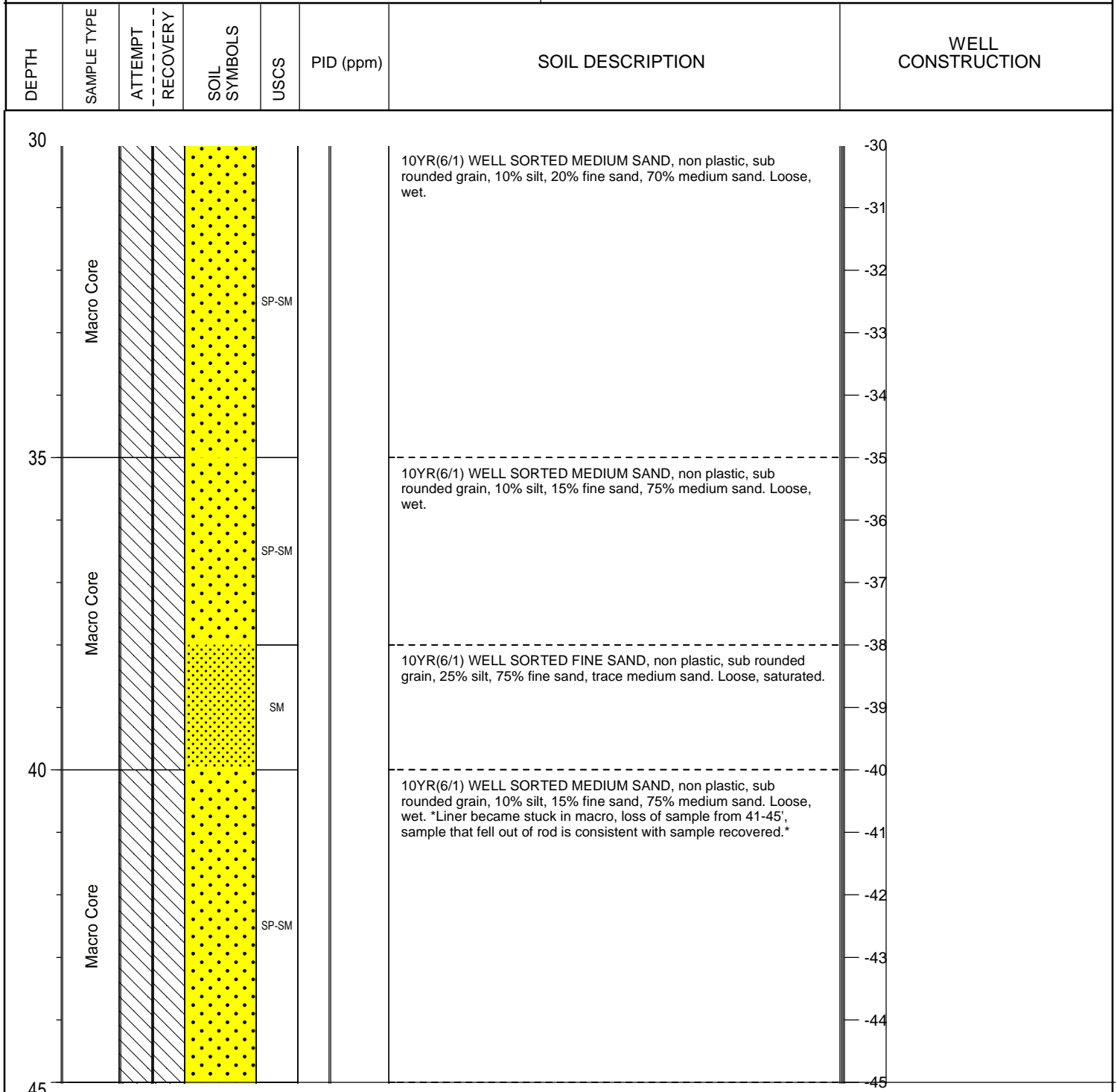
BOREHOLE NO: **BC02-MW1S**  
TOTAL DEPTH: **50'**

## PROJECT INFORMATION

PROJECT: **Biosolid PFAS Study**  
SITE LOCATION: **Howell, MI**  
PROJECT NO.: **60588767**  
PROJECT MANAGER: **John Cuthbertson**  
LOGGED BY: **Stanley Krenz**  
CREATED BY: **Stanley Krenz**

## DRILLING INFORMATION

CONTRACTOR: **Mateco**  
CREW CHIEF: **Mitch Slachter**  
DRILL RIG TYPE: **Geoprobe 7822DT**  
DRILLING METHOD: **Direct Push/ 4.25" Hollow Stem Auger**  
HOLE DIAMETER: **6"**  
DATE START: **10/21/16**  
DATE END: **10/21/16**



### NOTES:

☒ Water level during drilling    ☒ Water level in completed well





# FIELD BOREHOLE LOG

BOREHOLE NO: **BC02-MW1S**  
TOTAL DEPTH: **50'**

## PROJECT INFORMATION

PROJECT: **Biosolid PFAS Study**  
SITE LOCATION: **Howell, MI**  
PROJECT NO.: **60588767**  
PROJECT MANAGER: **John Cuthbertson**  
LOGGED BY: **Stanley Krenz**  
CREATED BY: **Stanley Krenz**

## DRILLING INFORMATION

CONTRACTOR: **Mateco**  
CREW CHIEF: **Mitch Slachter**  
DRILL RIG TYPE: **Geoprobe 7822DT**  
DRILLING METHOD: **Direct Push/ 4.25" Hollow Stem Auger**  
HOLE DIAMETER: **6"**  
DATE START: **10/21/16**  
DATE END: **10/21/16**

DEPTH	SAMPLE TYPE	ATTEMPT RECOVERY	SOIL SYMBOLS	USCS	PID (ppm)	SOIL DESCRIPTION	WELL CONSTRUCTION
45	Macro Core			SP-SM		10YR(6/1) WELL SORTED MEDIUM SAND, non plastic, sub rounded grain, 10% silt, 20% fine sand, 70% medium sand. Loose, wet.	
				SM		10YR(6/1) WELL SORTED FINE SAND, non plastic, sub rounded grain, 20% silt, 80% fine sand, trace medium sand. Loose, wet.	
				SP-SM		10YR(6/1) WELL SORTED MEDIUM SAND, non plastic, sub rounded grain, 10% silt, 20% fine sand, 70% medium sand. Loose, wet.	
50							

### NOTES:

☒ Water level during drilling    ☒ Water level in completed well



# FIELD BOREHOLE LOG

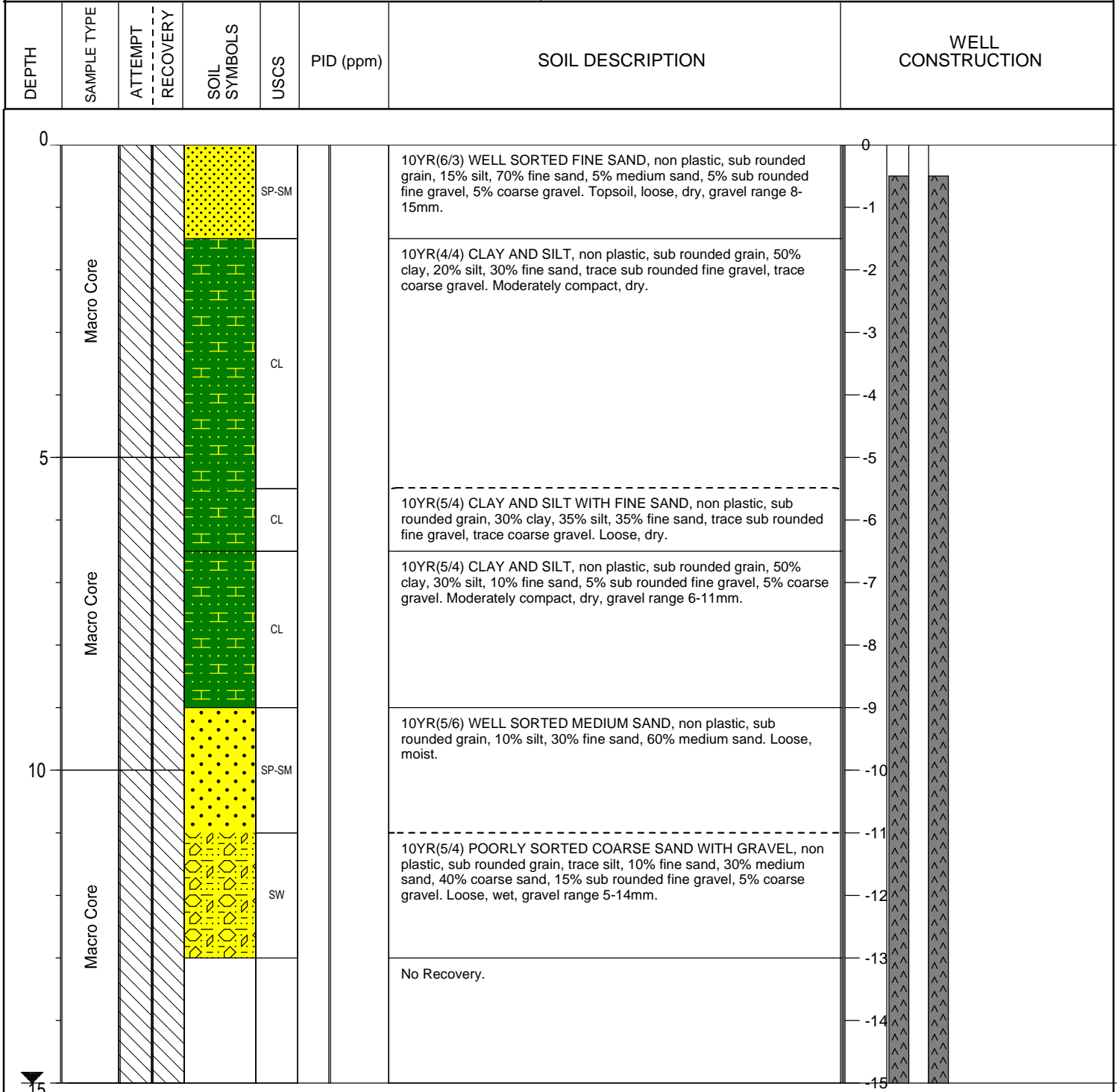
BOREHOLE NO: **BC02-MW1D**  
 TOTAL DEPTH: **50'**

## PROJECT INFORMATION

PROJECT: **Biosolid PFAS Study**  
 SITE LOCATION: **Howell, MI**  
 PROJECT NO.: **60588767**  
 PROJECT MANAGER: **John Cuthbertson**  
 LOGGED BY: **Stanley Krenz**  
 CREATED BY: **Stanley Krenz**

## DRILLING INFORMATION

CONTRACTOR: **Mateco**  
 CREW CHIEF: **Mitch Slachter**  
 DRILL RIG TYPE: **Geoprobe 7822DT**  
 DRILLING METHOD: **Direct Push/ 4.25" Hollow Stem Auger**  
 HOLE DIAMETER: **6"**  
 DATE START: **10/21/16**  
 DATE END: **10/21/16**



### NOTES:

☒ Water level during drilling    ☒ Water level in completed well

### PROJECT INFORMATION

PROJECT: **Biosolid PFAS Study**  
 SITE LOCATION: **Howell, MI**  
 PROJECT NO.: **60588767**  
 PROJECT MANAGER: **John Cuthbertson**  
 LOGGED BY: **Stanley Krenz**  
 CREATED BY: **Stanley Krenz**

### DRILLING INFORMATION

CONTRACTOR: **Mateco**  
 CREW CHIEF: **Mitch Slachter**  
 DRILL RIG TYPE: **Geoprobe 7822DT**  
 DRILLING METHOD: **Direct Push/ 4.25" Hollow Stem Auger**  
 HOLE DIAMETER: **6"**  
 DATE START: **10/21/16**  
 DATE END: **10/21/16**

DEPTH	SAMPLE TYPE	ATTEMPT RECOVERY	SOIL SYMBOLS	USCS	PID (ppm)	SOIL DESCRIPTION	WELL CONSTRUCTION
15	Macro Core	-		SW		10YR(6/3) POORLY SORTED MEDIUM SAND, non plastic, sub rounded grain, trace silt, 10% fine sand, 60% medium sand, 30% coarse sand, trace sub rounded fine gravel. Loose, saturated.	
						No Recovery.	
20	Macro Core	-		SW		10YR(5/3) WELL SORTED MEDIUM SAND, non plastic, sub rounded grain, trace silt, 10% fine sand, 80% medium sand, 10% coarse sand, trace sub rounded fine gravel. Loose, wet.	Bentonite Grout 2" PVC Riser
						10YR(5/3) POORLY SORTED COARSE SAND WITH GRAVEL, non plastic, sub rounded grain, trace silt, 10% fine sand, 25% medium sand, 25% coarse sand, 30% sub rounded fine gravel, 10% coarse gravel. Loose, wet, gravel range 4-10mm.	
						10YR(6/1) CLAY, medium plasticity, 80% clay, 20% silt, trace sub rounded fine gravel. Moderately compact, wet to moist.	
25	Macro Core	-		CL		10YR(6/1) CLAY, medium plasticity, 80% clay, 20% silt, trace sub rounded fine gravel, trace coarse gravel. Moderately compact, wet.	
						10YR(6/1) POORLY SORTED FINE TO MEDIUM GRAVEL, non plastic, sub rounded to sub angular grain, trace silt, trace fine sand, 15% medium sand, 40% coarse sand, 20% sub rounded to sub angular fine gravel, 25% coarse gravel. Loose, wet, gravel range 5-15mm, 32mm max.	
						10YR(6/1) WELL SORTED FINE SAND, non plastic, sub rounded grain, 20% silt, 80% fine sand, trace medium sand. Loose, wet.	
30				SM			

NOTES:

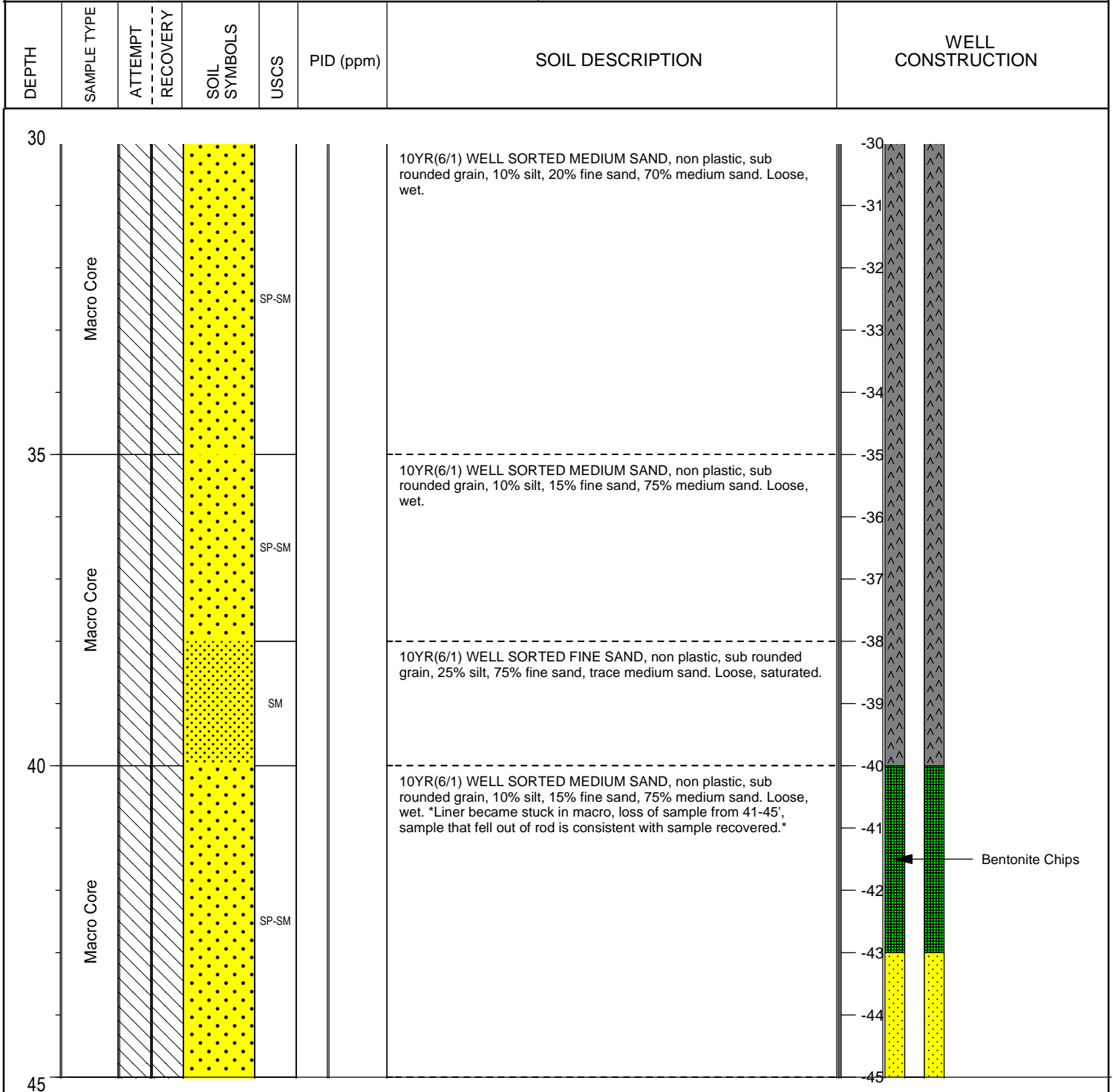
☞ Water level during drilling    ▼ Water level in completed well

### PROJECT INFORMATION

PROJECT: **Biosolid PFAS Study**  
 SITE LOCATION: **Howell, MI**  
 PROJECT NO.: **60588767**  
 PROJECT MANAGER: **John Cuthbertson**  
 LOGGED BY: **Stanley Krenz**  
 CREATED BY: **Stanley Krenz**

### DRILLING INFORMATION

CONTRACTOR: **Mateco**  
 CREW CHIEF: **Mitch Slachter**  
 DRILL RIG TYPE: **Geoprobe 7822DT**  
 DRILLING METHOD: **Direct Push/ 4.25" Hollow Stem Auger**  
 HOLE DIAMETER: **6"**  
 DATE START: **10/21/16**  
 DATE END: **10/21/16**



**NOTES:**

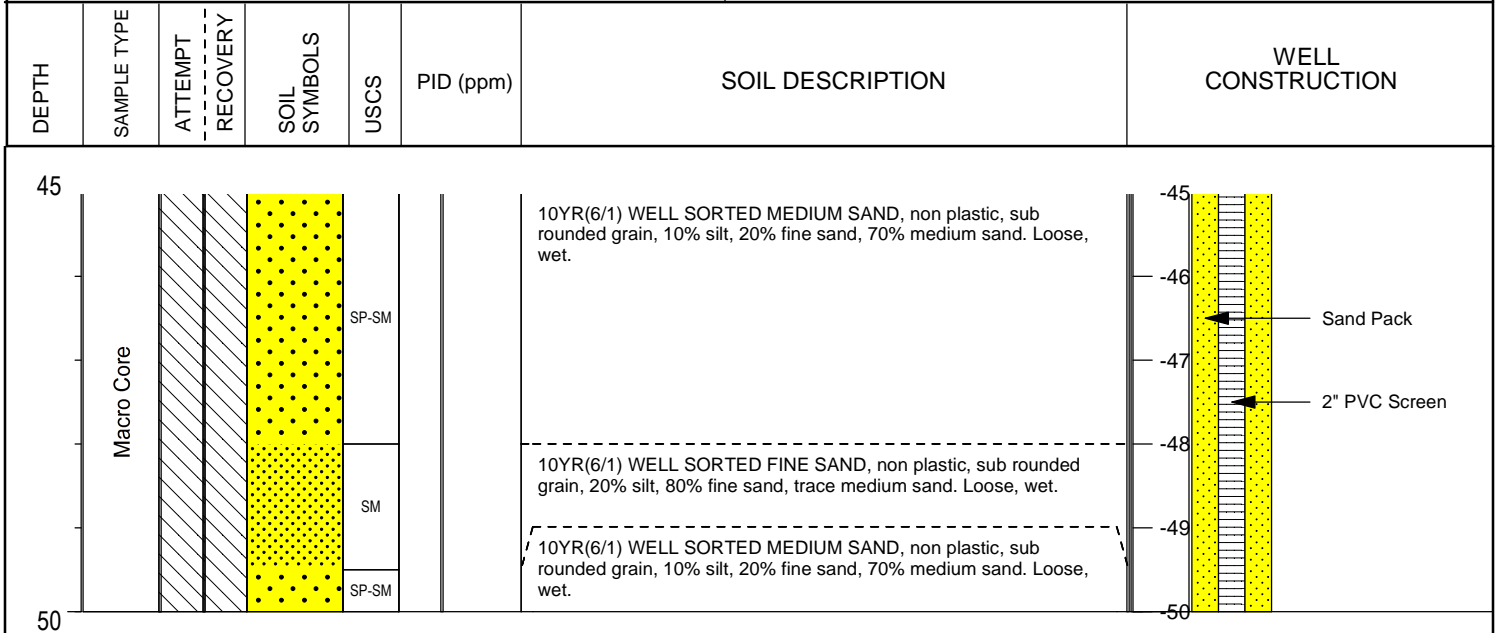
☒ Water level during drilling    ▼ Water level in completed well

### PROJECT INFORMATION

PROJECT: **Biosolid PFAS Study**  
 SITE LOCATION: **Howell, MI**  
 PROJECT NO.: **60588767**  
 PROJECT MANAGER: **John Cuthbertson**  
 LOGGED BY: **Stanley Krenz**  
 CREATED BY: **Stanley Krenz**

### DRILLING INFORMATION

CONTRACTOR: **Mateco**  
 CREW CHIEF: **Mitch Slachter**  
 DRILL RIG TYPE: **Geoprobe 7822DT**  
 DRILLING METHOD: **Direct Push/ 4.25" Hollow Stem Auger**  
 HOLE DIAMETER: **6"**  
 DATE START: **10/21/16**  
 DATE END: **10/21/16**



NOTES:

☒ Water level during drilling    ☒ Water level in completed well

# Appendix B

CLIENT: EGLE  
 LOCATION: Howell, MI  
 PROJECT #: 60588707 (Wixom Biosolid)

WELL ID: BCOT MW1S

**INSPECTION**

Label on well?  YES NO  
 Is reference mark visible?  YES NO  
 Condition of well: Good  
 Well size and material: 2" PVC  
 Weather: Partly Sunny Air Temperature: 66° F  
 Notes:

**STATIC WATER LEVEL JUST PRIOR TO PURGING**

Date: 9-3-19 Time: 1015

Depth to Water: 18.43' Measured with: WATER TAPE INTERFACE PROBE  
 Length of Well: 26.83' Decontaminated:  Y / N

**WELL PURGING**

Date: 9-3-19 Begin Time: 1020 End Time: 1110

PURGING EQUIPMENT: Decontaminated: Y / N /  NA

PUMP TYPE: Geo Pump

Tubing Type: 1/4" Poly

Meter Type: YSI Pro Plus

Actual volume purged: 20 liters

Meter Type: Portable Turbidity meter

Actual purge flow rate: 400 mL/min

Notes:

Time	Volume (liters)	Drawdown (feet)	pH (SU)	Specific Conductivity ( $\mu S/cm$ ) ms/cm +/- 3%	Turbidity (NTU)	D.O. (mg/L)	Temp (°C)	ORP (mV)	Color and/or Odor
		<0.33	+/- 0.1		+/- 10%	+/- 10%	+/- 0.5	+/- 10	
Start: 1035	6	-	6.93	2.50	0	0.15	14.5	11.1	X
1040	8	-	6.94	2.41	0	0.12	14.4	6.4	
1045	10	-	6.95	2.36	0	0.09	14.3	2.9	
1050	12	-	6.96	2.29	0	0.12	14.2	-1.1	
1055	14	-	6.97	2.25	0	0.09	14.2	-3.5	
1100	16	-	6.98	2.19	0	0.13	14.3	-6.9	
1105	18	-	6.99	2.13	0	0.13	14.1	-9.4	
1110	20	-	7.00	2.09	0	0.13	14.1	-11.5	

**SAMPLE COLLECTION**

Date: 9-3-19 Time: 1115 Actual sample flow rate: 400 mL/min

Appearance of Sample: clear Sample ID: 6W19090311155K

Sample Analyte(s) Collected: see col Additional Sample ID: -

**SAMPLING PERSONNEL**

Name: Stan Krenz Company: AECOM

CLIENT: EGLE  
 LOCATION: Howell, MI  
 PROJECT #: 60588707 (W. Tom Biosolid)

WELL ID: BC01-MW1A

INSPECTION

Label on well?  YES NO Is cap locked? YES  NO  
 Is reference mark visible?  YES NO Standing water present? YES  NO  
 Condition of well: Good Any indication of surface runoff in well? YES  NO  
 Well size and material: 2" PVC  
 Weather: \_\_\_\_\_ Air Temperature: 64°F  
 Notes: \_\_\_\_\_

STATIC WATER LEVEL JUST PRIOR TO PURGING

Date: 9-3-19 Time: 0910

Depth to Water: 19.53' Measured with: WATER TAPE INTERFACE PROBE  
 Length of Well: 54.71' Decontaminated:  Y  N

WELL PURGING

Date: 9-3-19 Begin Time: 0915 End Time: 0955

PURGING EQUIPMENT: Decontaminated: Y / N /  NA  
 PUMP TYPE: GeoPump Tubing Type: 1/4" Poly  
 Meter Type: YSI Pro Plus Actual volume purged: 10 liters  
 Meter Type: portable Turbidity meter Actual purge flow rate: 400-200 mL/min

Notes: initial drawdown 2.21' due to purge rate. flow rate changed to 200 mL/min

Time	Volume (liters)	Drawdown (feet)	pH (SU)	Specific Conductivity ( $\mu S/cm$ ) MS/cm +/- 3%	Turbidity (NTU) +/- 10%	D.O. (mg/L) +/- 10%	Temp (°C) +/- 0.5	ORP (mV) +/- 10	Color and/or Odor
Start: 0930	6	*2.21	7.20	0.447	2	3.05	13.0	65.9	X
0935	8	-	7.25	0.464	0	2.72	14.1	56.3	
0940	10	-	7.27	0.463	0	2.35	14.1	48.8	
0945	9	-	7.27	0.460	0	2.20	14.0	45.0	
0950	10	-	7.28	0.461	0	2.04	14.1	38.2	

SAMPLE COLLECTION

Date: 9-3-19 Time: 0955 Actual sample flow rate: 200 mL/min

Appearance of Sample: clear Sample ID: GW1909030955SK

Sample Analyte(s) Collected: See COC Additional Sample ID: -

SAMPLING PERSONNEL

Name: Stan Krenz Company: AECOM



CLIENT: EGLE  
 LOCATION: Howell, MI  
 PROJECT #: 60588767.01 (Wixom Biosolid)

WELL ID: BC01-MW2S

**INSPECTION**

Label on well? YES NO      Is cap locked? YES NO

Is reference mark visible? YES NO      Standing water present? YES NO

Condition of well: Good      Any indication of surface runoff in well? YES NO

Well size and material: 2" PVC

Weather: Cloudy      Air Temperature: 60's °F

Notes:

**STATIC WATER LEVEL JUST PRIOR TO PURGING**

Date: 9-4-19      Time: 1135

Depth to Water: 21.91'      Measured with: WATER TAPE      INTERFACE PROBE

Length of Well: 28.46'      Decontaminated: Y/N

**WELL PURGING**

Date: 9-4-19      Begin Time: 1140      End Time: 1215

PURGING EQUIPMENT:      Decontaminated: Y/N/NA

PUMP TYPE: geofump      Tubing Type: 1/4" Poly

Meter Type: YSI Pro Plus      Actual volume purged: 14 liters

Meter Type: Portable Turbidity Meter      Actual purge flow rate: 400 mL/min

Notes:

Time	Volume (liters)	Drawdown (feet)	pH (SU)	Specific Conductivity (µS/cm) (mS/cm) +/- 3%	Turbidity (NTU) +/- 10%	D.O. (mg/L) +/- 10%	Temp (°C) +/- 0.5	ORP (mV) +/- 10	Color and/or Odor
Start: 1155	6	0.0	7.12	0.492	12	1.01	12.0	0.2	<del>Color and/or Odor</del>
1200	8	0.0	7.12	0.495	6	1.20	12.1	1.8	
1205	10	0.0	7.12	0.495	3	1.41	12.1	3.7	
1210	12	0.0	7.12	0.496	4	1.44	12.2	5.7	
1215	14	0.0	7.12	0.495	4	1.49	12.0	7.2	

**SAMPLE COLLECTION**

Date: 9-4-19      Time: 1220      Actual sample flow rate: 400 mL/min

Appearance of Sample: Clear      Sample ID: GW1409041220SK

Sample Analyte(s) Collected: See COC      Additional Sample ID: —

**SAMPLING PERSONNEL**

Name: Stan Kranz      Company: AECOM

CLIENT: EGLE  
 LOCATION: Howell, MI  
 PROJECT #: 00545767.01 (Wixom, fissiled)

WELL ID: BCO1-MW2D

INSPECTION

Label on well?  YES NO  
 Is reference mark visible?  YES NO  
 Condition of well: Good  
 Well size and material: 2" PVC  
 Weather: Cloudy  
 Notes:  
 Is cap locked? YES NO  
 Standing water present? YES NO  
 Any indication of surface runoff in well? YES NO  
 Air Temperature: 60's °F

STATIC WATER LEVEL JUST PRIOR TO PURGING

Date: 9-4-19 Time: 1035

Depth to Water: 22.05' Measured with: WATER TAPE INTERFACE PROBE  
 Length of Well: 53.15' Decontaminated: 0 / N

WELL PURGING

Date: 9-4-19 Begin Time: 1040 End Time: 1125

PURGING EQUIPMENT: Decontaminated: Y / N / NA  
 PUMP TYPE: Geopump Tubing Type: 1/2" Poly  
 Meter Type: YSI Pro Plus Actual volume purged: 18 liters  
 Meter Type: portable Turbidity meter Actual purge flow rate: 400 mL/min

Notes:

Time	Volume (liters)	Drawdown (feet)	pH (SU)	Specific Conductivity (µS/cm) MS/cm +/- 3%	Turbidity (NTU) +/- 10%	D.O. (mg/L) +/- 10%	Temp (°C) +/- 0.5	ORP (mV) +/- 10	Color and/or Odor
Start: 1055	6	0.04	7.12	0.493	26	0.18	11.8	-21.9	<del>Color and/or Odor</del>
1100	8	0.04	7.14	0.496	39	0.17	11.8	-27.4	
1105	10	0.04	7.15	0.499	9	0.16	11.8	-29.5	
1110	12	0.04	7.15	0.500	12	0.16	11.9	-32.6	
1115	14	0.04	7.16	0.498	2	0.12	11.8	-36.4	
1120	16	0.04	7.17	0.499	6	0.12	11.8	-38.3	
1125	18	0.04	7.17	0.496	4	0.12	11.8	-41.8	

SAMPLE COLLECTION

Date: 9-4-19 Time: 1130 Actual sample flow rate: 400 mL/min

Appearance of Sample: clear Sample ID: GW190904113051K

Sample Analyte(s) Collected: See coc Additional Sample ID: —

SAMPLING PERSONNEL

Name: Stan Krenz Company: AECOM

CLIENT: EGLE  
 LOCATION: Howell, MI  
 PROJECT #: 60588767 (Nixon Biosolids)

WELL ID: BC02-MW15

**INSPECTION**

Label on well? YES NO Is cap locked? YES NO  
 Is reference mark visible? YES NO Standing water present? YES NO  
 Condition of well: Good Any indication of surface runoff in well? YES NO  
 Well size and material: 2" PVC Air Temperature: 66°F  
 Weather: Cloudy  
 Notes:

**STATIC WATER LEVEL JUST PRIOR TO PURGING**

Date: 9-3-19 Time: 1140

Depth to Water: 14.05' Measured with: WATER TAPE INTERFACE PROBE  
 Length of Well: 25.86' Decontaminated: Y/N

**WELL PURGING**

Date: 9-3-19 Begin Time: 1145 End Time: 1240

PURGING EQUIPMENT: Decontaminated: Y/N/NA  
 PUMP TYPE: Geopump Tubing Type: 1/4" Poly  
 Meter Type: YSI Pro Plus Actual volume purged: 22 liters  
 Meter Type: Portable Turbidity meter Actual purge flow rate: 400 mL/min

Notes:

Time	Volume (liters)	Drawdown (feet)	pH (SU)	Specific Conductivity ( $\mu S/cm$ ) MS/cm +/- 3%	Turbidity (NTU) +/- 10%	D.O. (mg/L) +/- 10%	Temp (°C) +/- 0.5	ORP (mV) +/- 10	Color and/or Odor
Start: 1200	6	-	7.07	0.82	2	0.69	14.3	9.3	X
1205	8	-	7.07	0.83	2	0.15	14.3	4.2	
1210	10	-	7.07	0.83	1	0.08	14.3	2.0	
1215	12	-	7.07	0.83	0	0.12	14.3	0.6	
1220	14	-	7.08	0.83	0	0.09	14.4	-1.6	
1225	16	-	7.08	0.83	0	0.13	14.3	-2.8	
1230	18	-	7.08	0.84	1	0.09	14.4	-4.8	
1235	20	-	7.09	0.84	0	0.09	14.5	-6.2	
1240	22	-	7.08	0.84	0	0.09	14.4	-7.3	

**SAMPLE COLLECTION**

Date: 9-3-19 Time: 1245 Actual sample flow rate: 400 mL/min

Appearance of Sample: Clear Sample ID: GW1909031245SK

Sample Analyte(s) Collected: See Coe Additional Sample ID: -

**SAMPLING PERSONNEL**

Name: Stan Krenz Company: AECOM

CLIENT: EGLE  
 LOCATION: Howell, MI  
 PROJECT #: 60588767.01 (WIKOM Biosolid)

WELL ID: BC02-MW1D

INSPECTION

Label on well? YES NO Is cap locked? YES NO  
 Is reference mark visible? YES NO Standing water present? YES NO  
 Condition of well: Good Any indication of surface runoff in well? YES NO  
 Well size and material: 2" PVC  
 Weather: Sunny Air Temperature: 60°F  
 Notes:

STATIC WATER LEVEL JUST PRIOR TO PURGING

Date: 9-4-19 Time: 0830

Depth to Water: 14.13' Measured with: WATER TAP INTERFACE PROBE  
 Length of Well: 52.41' Decontaminated: Y/N

WELL PURGING

Date: 9-4-19 Begin Time: 0835 End Time: 0920

PURGING EQUIPMENT: Decontaminated: Y/N/NA  
 PUMP TYPE: geopump Tubing Type: 1/4" Poly  
 Meter Type: YSI Pro Plus Actual volume purged: 18 liters  
 Meter Type: portable Turbidity meter Actual purge flow rate: 400 mL/min

Notes:

Time	Volume (liters)	Drawdown (feet)	pH (SU)	Specific Conductivity ( $\mu S/cm$ ) ( $ms/cm$ ) +/- 3%	Turbidity (NTU)	D.O. (mg/L)	Temp (°C)	ORP (mV)	Color and/or Odor
		<0.33	+/- 0.1		+/- 10%	+/- 10%	+/- 0.5	+/- 10	
Start: 0850	6	0.05	7.05	0.78	35	0.16	12.6	-55.3	<del>X</del>
0855	8	0.05	7.07	0.78	10	0.13	12.5	-69.1	
0900	10	0.05	7.08	0.78	4	0.11	12.4	-74.1	
0905	12	0.05	7.09	0.78	3	0.12	12.6	-78.8	
0910	14	0.05	7.10	0.77	1	0.09	12.4	-80.8	
0915	16	0.05	7.10	0.78	1	0.09	12.4	-83.4	
0920	18	0.05	7.11	0.77	0	0.09	12.3	-88.0	

SAMPLE COLLECTION

Date: 9-4-19 Time: 0925 Actual sample flow rate: 400 mL/min

Appearance of Sample: clear Sample ID: GW1909040925SK

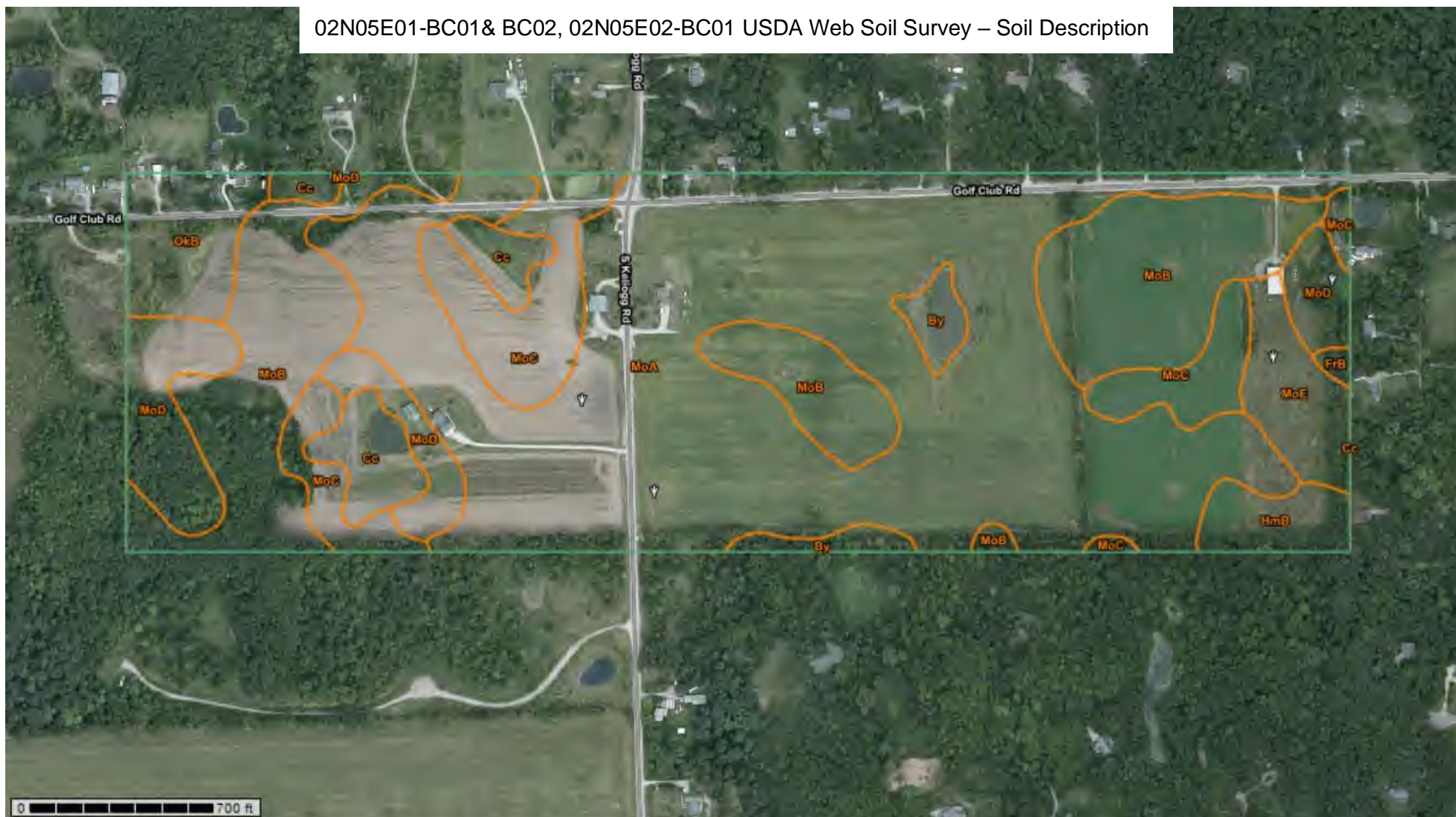
Sample Analyte(s) Collected: See COC Additional Sample ID: FD1909040930SK

SAMPLING PERSONNEL

Name: Stan Krenz Company: AECOM

# Appendix C

02N05E01-BC01& BC02, 02N05E02-BC01 USDA Web Soil Survey – Soil Description



OkB – Oakville fine sand, loamy substratum, *Landform*: Deltas on till plains, outwash plains, knolls on till plains, *Parent material*: eolian deposits and/or outwash over loamy till

Cc – Carlisle muck, *Landform*: Depressions on glacial drainage channels, depressions on outwash plains, depressions on till plains, depressions on moraines, *Parent material*: woody organic material

MoA – Wawasee loam (0-2% slopes), *Landform*: Ground moraines, end moraines, *Parent material*: Calcareous loamy till

MoB – Wawasee loam (2-6% slopes), *Landform*: Ground moraines, end moraines, *Parent material*: Calcareous loamy till

MoC – Wawasee loam (6-12% slopes), *Landform*: Ground moraines, end moraines, *Parent material*: calcareous loamy till

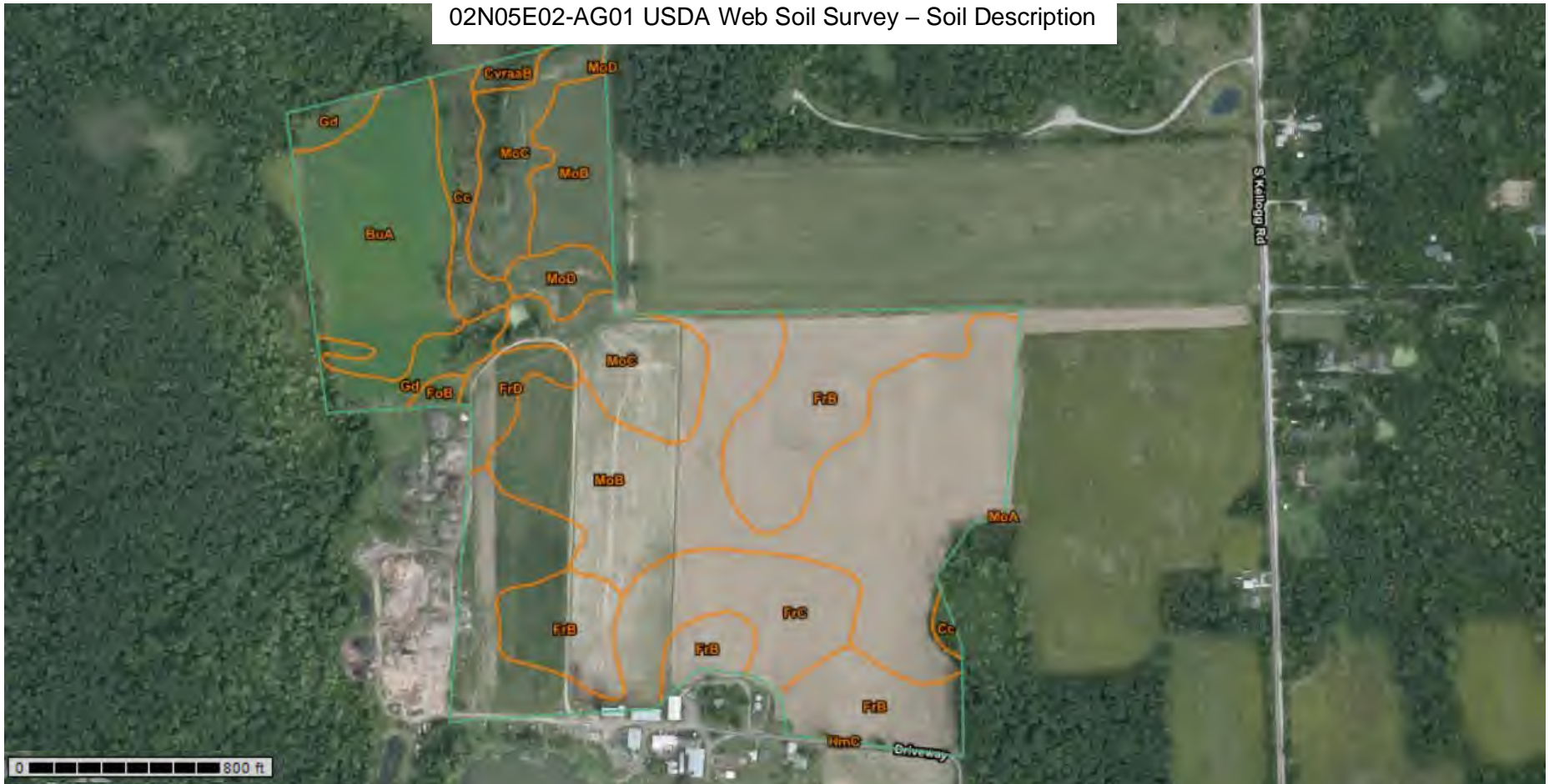
MoD – Miami loam (12-18% slopes), *Landform*: Till plains, moraines, *Parent material*: loamy till

MoE – Miami loam (18-25% slopes), *Landform*: Till plains, moraines, *Parent material*: loamy till

By – Brookston loam, *Landform*: Depressions on till plains, drainageways on till plains, depression on moraines, drainageways on moraines, *Parent material*: loamy till

FrB – Fox-Boyer complex (2-6% slopes), *Landform*: Outwash plains, valley trains, moraines, *Parent material*: loamy over stratified sandy and gravelly glaciofluvial deposits

02N05E02-AG01 USDA Web Soil Survey – Soil Description



Gd – Gilford sandy loam, *Landform*: Glacial drainage channels, *Parent material*: coarse-loamy drift over sandy and gravelly outwash

CrvaaB – Conover loam, *Landform*: Ground moraines, end moraines, *Parent material*: Loamy till over dense loamy till

BuA – Brady loamy sand, *Landform*: Swales on valley trains, swales on lake plains, swales on outwash deltas, *Parent material*: loamy over sandy and gravelly glaciofluvial deposits

Cc – Carlisle much, *Landform*: Depressions on glacial drainage channels, depressions on outwash plains, depressions on till plains, depressions on moraines, *Parent material*: woody organic material

FoB – Fox sandy loam, *Landform*: Outwash plains, valley trains, moraines, *Parent material*: loamy over stratified sandy and gravelly glaciofluvial deposits

MoA – Wawasee loam (0-2% slopes), *Landform*: Ground moraines, end moraines, *Parent material*: Calcareous loamy till

MoB – Wawasee loam (2-6% slopes), *Landform*: Ground moraines, end moraines, *Parent material*: Calcareous loamy till

MoC – Wawasee loam (6-12% slopes), *Landform*: Ground moraines, end moraines, *Parent material*: calcareous loamy till

MoD – Miami loam (12-18% slopes), *Landform*: Till plains, moraines, *Parent material*: loamy till

FrB – Fox-Boyer complex (2-6% slopes), *Landform*: Outwash plains, valley trains, moraines, *Parent material*: loamy over stratified sandy and gravelly glaciofluvial deposits

FrC – Fox-Boyer complex (6-12% slopes), *Landform*: moraines, outwash plains, valley trains, *Parent material*: loamy over stratified sandy and gravelly glaciofluvial deposits

HmC – Hillsdale-Miami loams, *Landform*: moraines, *Parent material*: loamy till

03N06E04-JW01 & JW05 USDA Web Soil Survey – Soil Description



Pc – Pewamo clay loam, *Landform*: Depression on till plains, drainageways on till plains, *Parent material*: till

MoB – Wawasee loam (2-6% slopes), *Landform*: Ground moraines, end moraines, *Parent material*: Calcareous loamy till

MoC – Wawasee loam (6-12% slopes), *Landform*: Ground moraines, end moraines, *Parent material*: calcareous loamy till

CrvaaB – Conover loam, *Landform*: Ground moraines, end moraines, *Parent material*: Loamy till over dense loamy till



# Appendix D

<b>Project Name:</b> Statewide WWTP PFAS Evaluation	<b>Site Location:</b> Howell, MI	<b>Boring ID:</b> BC01-MW1	<b>Project No.:</b> 60588767
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<b>Photo No.</b> <b>1</b>	<b>Date:</b> <b>08/19/19</b>	<p>Aug 19, 2019 9:58:42 AM 65 North Kellogg Road Howell Livingston County Michigan</p> 
<b>Direction Photo Taken:</b> N/A		
<b>Description:</b> BC01-MW1: 0-5ft (1)		

<b>Photo No.</b> <b>2</b>	<b>Date:</b> <b>08/19/19</b>	<p>Aug 19, 2019 9:58:46 AM 65 North Kellogg Road Howell Livingston County Michigan</p> 
<b>Direction Photo Taken:</b> N/A		
<b>Description:</b> BC01-MW1: 0-5ft (2)		

<b>Project Name:</b> Statewide WWTP PFAS Evaluation	<b>Site Location:</b> Howell, MI	<b>Boring ID:</b> BC01-MW1	<b>Project No.</b> 60588767
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<b>Photo No.</b> <b>3</b>	<b>Date:</b> 08/19/19
<b>Direction Photo Taken:</b>  N/A	
<b>Description:</b> BC01-MW1: 0-5ft (3)	



<b>Photo No.</b> <b>4</b>	<b>Date:</b> 08/19/19
<b>Direction Photo Taken:</b>  N/A	
<b>Description:</b> BC01-MW1: 5-10ft (1)	



<b>Project Name:</b> Statewide WWTP PFAS Evaluation	<b>Site Location:</b> Howell, MI	<b>Boring ID:</b> BC01-MW1	<b>Project No.</b> 60588767
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<b>Photo No.</b> <b>5</b>	<b>Date:</b> <b>08/19/19</b>
<b>Direction Photo Taken:</b>  N/A	
<b>Description:</b>  BC01-MW1: 5-10ft (2)	



<b>Photo No.</b> <b>6</b>	<b>Date:</b> <b>08/19/19</b>
<b>Direction Photo Taken:</b>  N/A	
<b>Description:</b>  BC01-MW1: 5-10ft (3)	



<b>Project Name:</b> Statewide WWTP PFAS Evaluation	<b>Site Location:</b> Howell, MI	<b>Boring ID:</b> BC01-MW1	<b>Project No.</b> 60588767
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<b>Photo No.</b> 7	<b>Date:</b> 08/19/19
<b>Direction Photo Taken:</b> N/A	
<b>Description:</b> BC01-MW1: 10-14ft (1)	



<b>Photo No.</b> 8	<b>Date:</b> 08/19/19
<b>Direction Photo Taken:</b> N/A	
<b>Description:</b> BC01-MW1: 10-14ft (2)	



<b>Project Name:</b> Statewide WWTP PFAS Evaluation	<b>Site Location:</b> Howell, MI	<b>Boring ID:</b> BC01-MW1	<b>Project No.</b> 60588767
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<b>Photo No.</b> <b>9</b>	<b>Date:</b> 08/19/19
<b>Direction Photo Taken:</b>  N/A	
<b>Description:</b> BC01-MW1: 10-14ft (3)	



<b>Photo No.</b> <b>10</b>	<b>Date:</b> 08/19/19
<b>Direction Photo Taken:</b>  N/A	
<b>Description:</b> BC01-MW1: 14-17ft (1)	



<b>Project Name:</b> Statewide WWTP PFAS Evaluation	<b>Site Location:</b> Howell, MI	<b>Boring ID:</b> BC01-MW1	<b>Project No.</b> 60588767
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<b>Photo No.</b> <b>11</b>	<b>Date:</b> <b>08/19/19</b>	
<b>Direction Photo Taken:</b> N/A		
<b>Description:</b> BC01-MW1: 14-17ft (2)		

Aug 19, 2019 10:41:28 AM  
65 North Kellogg Road  
Howell  
Livingston County  
Michigan

<b>Photo No.</b> <b>12</b>	<b>Date:</b> <b>08/19/19</b>	
<b>Direction Photo Taken:</b> N/A		
<b>Description:</b> BC01-MW1: 17-20ft (1)		

Aug 19, 2019 10:47:54 AM  
65 North Kellogg Road  
Howell  
Livingston County  
Michigan

<b>Project Name:</b> Statewide WWTP PFAS Evaluation	<b>Site Location:</b> Howell, MI	<b>Boring ID:</b> BC01-MW1	<b>Project No.</b> 60588767
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<b>Photo No.</b> <b>13</b>	<b>Date:</b> 08/19/19
<b>Direction Photo Taken:</b>  N/A	
<b>Description:</b>  BC01-MW1: 17-20ft (2)	



<b>Photo No.</b> <b>14</b>	<b>Date:</b> 08/19/19
<b>Direction Photo Taken:</b>  N/A	
<b>Description:</b>  BC01-MW1: 20-25ft (1)	





<b>Project Name:</b> Statewide WWTP PFAS Evaluation	<b>Site Location:</b> Howell, MI	<b>Boring ID:</b> BC01-MW1	<b>Project No.</b> 60588767
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<b>Photo No.</b> <b>15</b>	<b>Date:</b> 08/19/19		Aug 19, 2019 10:54:38 AM 65 North Kellogg Road Howell Livingston County Michigan
<b>Direction Photo Taken:</b>			
N/A			
<b>Description:</b>			
BC01-MW1: 20-25ft (2)			

<b>Photo No.</b> <b>16</b>	<b>Date:</b> 08/19/19		Aug 19, 2019 10:54:45 AM 65 North Kellogg Road Howell Livingston County Michigan
<b>Direction Photo Taken:</b>			
N/A			
<b>Description:</b>			
BC01-MW1: 20-25ft (3)			

<b>Project Name:</b> Statewide WWTP PFAS Evaluation	<b>Site Location:</b> Howell, MI	<b>Boring ID:</b> BC01-MW1	<b>Project No.</b> 60588767
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<b>Photo No.</b> <b>17</b>	<b>Date:</b> 08/19/19
<b>Direction Photo Taken:</b>  N/A	
<b>Description:</b>  BC01-MW1: 20-25ft (4)	



<b>Photo No.</b> <b>18</b>	<b>Date:</b> 08/19/19
<b>Direction Photo Taken:</b>  N/A	
<b>Description:</b>  BC01-MW1: 25-30ft (1)	



<b>Project Name:</b> Statewide WWTP PFAS Evaluation	<b>Site Location:</b> Howell, MI	<b>Boring ID:</b> BC01-MW1	<b>Project No.</b> 60588767
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<b>Photo No.</b> <b>19</b>	<b>Date:</b> 08/19/19
<b>Direction Photo Taken:</b>  N/A	
<b>Description:</b>  BC01-MW1: 25-30ft (2)	



<b>Photo No.</b> <b>20</b>	<b>Date:</b> 08/19/19
<b>Direction Photo Taken:</b>  N/A	
<b>Description:</b>  BC01-MW1: 25-30ft (3)	



<b>Project Name:</b> Statewide WWTP PFAS Evaluation	<b>Site Location:</b> Howell, MI	<b>Boring ID:</b> BC01-MW1	<b>Project No.</b> 60588767
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<b>Photo No.</b> <b>21</b>	<b>Date:</b> 08/19/19
<b>Direction Photo Taken:</b>  N/A	
<b>Description:</b> BC01-MW1: 30-35ft (1)	



<b>Photo No.</b> <b>22</b>	<b>Date:</b> 08/19/19
<b>Direction Photo Taken:</b>  N/A	
<b>Description:</b> BC01-MW1: 30-35ft (2)	



<b>Project Name:</b> Statewide WWTP PFAS Evaluation	<b>Site Location:</b> Howell, MI	<b>Boring ID:</b> BC01-MW1	<b>Project No.</b> 60588767
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<b>Photo No.</b> <b>23</b>	<b>Date:</b> 08/19/19	Aug 19, 2019 12:39:04 PM 65 North Kellogg Road Howell Livingston County Michigan
<b>Direction Photo Taken:</b>  N/A		
<b>Description:</b> BC01-MW1: 30-35ft (3)		

<b>Photo No.</b> <b>24</b>	<b>Date:</b> 08/19/19	Aug 19, 2019 12:55:03 PM 65 North Kellogg Road Howell Livingston County Michigan
<b>Direction Photo Taken:</b>  N/A		
<b>Description:</b> BC01-MW1: 35-39ft (1)		

<b>Project Name:</b> Statewide WWTP PFAS Evaluation	<b>Site Location:</b> Howell, MI	<b>Boring ID:</b> BC01-MW1	<b>Project No.</b> 60588767
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<b>Photo No.</b> <b>25</b>	<b>Date:</b> 08/19/19	
<b>Direction Photo Taken:</b> N/A		
<b>Description:</b> BC01-MW1: 35-39ft (2)		

Aug 19, 2019 12:55:08 PM  
65 North Kellogg Road  
Howell  
Livingston County  
Michigan

BC01-MW1  
0-5' 14-17' 25-30'  
5-10' 17-20' 30-35'  
10-14' 20-25' 35-39'

<b>Photo No.</b> <b>26</b>	<b>Date:</b> 08/19/19	
<b>Direction Photo Taken:</b> N/A		
<b>Description:</b> BC01-MW1: 35-39ft (3)		

Aug 19, 2019 12:55:12 PM  
65 North Kellogg Road  
Howell  
Livingston County  
Michigan

BC01-MW1  
0-5' 14-17' 25-30'  
5-10' 17-20' 30-35'  
10-14' 20-25' 35-39'

<b>Project Name:</b> Statewide WWTP PFAS Evaluation	<b>Site Location:</b> Howell, MI	<b>Boring ID:</b> BC01-MW1	<b>Project No.</b> 60588767
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<b>Photo No.</b> <b>27</b>	<b>Date:</b> <b>08/19/19</b>
<b>Direction Photo Taken:</b>  N/A	
<b>Description:</b>  BC01-MW1: 40-45ft (1)	



<b>Photo No.</b> <b>28</b>	<b>Date:</b> <b>08/19/19</b>
<b>Direction Photo Taken:</b>  N/A	
<b>Description:</b>  BC01-MW1: 40-45ft (2)	



<b>Project Name:</b> Statewide WWTP PFAS Evaluation	<b>Site Location:</b> Howell, MI	<b>Boring ID:</b> BC01-MW1	<b>Project No.</b> 60588767
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<b>Photo No.</b> <b>29</b>	<b>Date:</b> <b>08/19/19</b>	<p style="writing-mode: vertical-rl; transform: rotate(180deg);">             Aug 19, 2019 1:10:56 PM              65 North Kellogg Road              Howell              Livingston County              Michigan           </p> 
<b>Direction Photo Taken:</b>  N/A		
<b>Description:</b> BC01-MW1: 40-45ft (3)		

<b>Photo No.</b> <b>30</b>	<b>Date:</b> <b>08/19/19</b>	<p style="writing-mode: vertical-rl; transform: rotate(180deg);">             Aug 19, 2019 1:31:48 PM              65 North Kellogg Road              Howell              Livingston County              Michigan           </p> 
<b>Direction Photo Taken:</b>  N/A		
<b>Description:</b> BC01-MW1: 45-50ft (4)		



<b>Project Name:</b> Statewide WWTP PFAS Evaluation	<b>Site Location:</b> Howell, MI	<b>Boring ID:</b> BC01-MW1	<b>Project No.:</b> 60588767
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<b>Photo No.:</b> <b>31</b>	<b>Date:</b> 08/19/19	<p style="writing-mode: vertical-rl; transform: rotate(180deg);">             Aug 19, 2019 1:31:52 PM              65 North Kellogg Road              Howell              Livingston County              Michigan           </p>
<b>Direction Photo Taken:</b> N/A		
<b>Description:</b> BC01-MW1: 45-50ft (5)		

<b>Photo No.:</b> <b>32</b>	<b>Date:</b> 08/19/19	<p style="writing-mode: vertical-rl; transform: rotate(180deg);">             Aug 19, 2019 1:31:58 PM              65 North Kellogg Road              Howell              Livingston County              Michigan           </p>
<b>Direction Photo Taken:</b> N/A		
<b>Description:</b> BC01-MW1: 45-50ft (6)		

<b>Project Name:</b> Statewide WWTP PFAS Evaluation	<b>Site Location:</b> Howell, MI	<b>Boring ID:</b> BC01-MW1	<b>Project No.</b> 60588767
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<b>Photo No.</b> <b>33</b>	<b>Date:</b> 8/20/19
<b>Direction Photo Taken:</b>  N/A	
<b>Description:</b>  BC01-MW1: Pro Covers	



<b>Project Name:</b> Statewide WWTP PFAS Evaluation	<b>Site Location:</b> Howell, MI	<b>Boring ID:</b> BC01-MW2	<b>Project No.</b> 60588767
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<b>Photo No.</b> <b>34</b>	<b>Date:</b> 08/21/19
<b>Direction Photo Taken:</b>  N/A	
<b>Description:</b> BC01-MW2: 0-5ft (1)	



<b>Photo No.</b> <b>35</b>	<b>Date:</b> 08/21/19
<b>Direction Photo Taken:</b>  N/A	
<b>Description:</b> BC01-MW2: 0-5ft (2)	



<b>Project Name:</b> Statewide WWTP PFAS Evaluation	<b>Site Location:</b> Howell, MI	<b>Boring ID:</b> BC01-MW2	<b>Project No.</b> 60588767
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<b>Photo No.</b> <b>36</b>	<b>Date:</b> 08/21/19
<b>Direction Photo Taken:</b>  N/A	
<b>Description:</b> BC01-MW2: 5-10ft (1)	



<b>Photo No.</b> <b>37</b>	<b>Date:</b> 08/21/19
<b>Direction Photo Taken:</b>  N/A	
<b>Description:</b> BC01-MW2: 5-10ft (2)	



<b>Project Name:</b> Statewide WWTP PFAS Evaluation	<b>Site Location:</b> Howell, MI	<b>Boring ID:</b> BC01-MW2	<b>Project No.</b> 60588767
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<b>Photo No.</b> <b>38</b>	<b>Date:</b> 08/21/19	
<b>Direction Photo Taken:</b> N/A		
<b>Description:</b> BC01-MW2: 5-10ft (3)		

<b>Photo No.</b> <b>39</b>	<b>Date:</b> 08/21/19	
<b>Direction Photo Taken:</b> N/A		
<b>Description:</b> BC01-MW2: 10-15ft (1)		

<b>Project Name:</b> Statewide WWTP PFAS Evaluation	<b>Site Location:</b> Howell, MI	<b>Boring ID:</b> BC01-MW2	<b>Project No.</b> 60588767
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<b>Photo No.</b> <b>40</b>	<b>Date:</b> 08/21/19	Aug 21, 2019 2:00:35 PM	
<b>Direction Photo Taken:</b>  N/A			
<b>Description:</b> MW-18-21: 10-15ft (2)			

<b>Photo No.</b> <b>41</b>	<b>Date:</b> 08/21/19	Aug 21, 2019 2:00:40 PM	
<b>Direction Photo Taken:</b>  N/A			
<b>Description:</b> BC01-MW2: 10-15ft (3)			

<b>Project Name:</b> Statewide WWTP PFAS Evaluation	<b>Site Location:</b> Howell, MI	<b>Boring ID:</b> BC01-MW2	<b>Project No.</b> 60588767
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<b>Photo No.</b> <b>42</b>	<b>Date:</b> 08/21/19	
<b>Direction Photo Taken:</b> N/A		
<b>Description:</b> BC01-MW2: 10-15ft (4)		

Aug 21, 2019 2:00:44 PM

<b>Photo No.</b> <b>43</b>	<b>Date:</b> 08/21/19	
<b>Direction Photo Taken:</b> N/A		
<b>Description:</b> BC01-MW2: 15-18ft (1)		

Aug 21, 2019 2:14:05 PM

<b>Project Name:</b> Statewide WWTP PFAS Evaluation	<b>Site Location:</b> Howell, MI	<b>Boring ID:</b> BC01-MW2	<b>Project No.</b> 60588767
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<b>Photo No.</b> <b>44</b>	<b>Date:</b> 08/21/19	
<b>Direction Photo Taken:</b> N/A		
<b>Description:</b> BC01-MW2: 15-18ft (2)		

<b>Photo No.</b> <b>45</b>	<b>Date:</b> 08/21/19	
<b>Direction Photo Taken:</b> N/A		
<b>Description:</b> BC01-MW2: 15-18ft (3)		



<b>Project Name:</b> Statewide WWTP PFAS Evaluation	<b>Site Location:</b> Howell, MI	<b>Boring ID:</b> BC01-MW2	<b>Project No.</b> 60588767
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<b>Photo No.</b> <b>46</b>	<b>Date:</b> 08/21/19	
<b>Direction Photo Taken:</b>  N/A		
<b>Description:</b> BC01-MW2: 20-23ft (1)		

<b>Photo No.</b> <b>47</b>	<b>Date:</b> 08/21/19	
<b>Direction Photo Taken:</b>  N/A		
<b>Description:</b> BC01-MW2: 20-23ft (2)		

<b>Project Name:</b> Statewide WWTP PFAS Evaluation	<b>Site Location:</b> Howell, MI	<b>Boring ID:</b> BC01-MW2	<b>Project No.</b> 60588767
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<b>Photo No.</b> <b>48</b>	<b>Date:</b> 08/21/19
<b>Direction Photo Taken:</b>  N/A	
<b>Description:</b> BC01-MW2: 20-23ft (3)	



<b>Photo No.</b> <b>49</b>	<b>Date:</b> 08/21/19
<b>Direction Photo Taken:</b>  N/A	
<b>Description:</b> BC01-MW2: 25-30ft (1)	



**Project Name:**  
Statewide WWTP PFAS  
Evaluation

**Site Location:**  
Howell, MI

**Boring ID:**  
BC01-MW2

**Project No.**  
60588767

<b>Photo No.</b> <b>50</b>	<b>Date:</b> 08/21/19
<b>Direction Photo Taken:</b>  N/A	
<b>Description:</b> BC01-MW2: 25-30ft (2)	



<b>Photo No.</b> <b>51</b>	<b>Date:</b> 08/21/19
<b>Direction Photo Taken:</b>  N/A	
<b>Description:</b> BC01-MW2: 25-30ft (3)	



<b>Project Name:</b> Statewide WWTP PFAS Evaluation	<b>Site Location:</b> Howell, MI	<b>Boring ID:</b> BC01-MW2	<b>Project No.</b> 60588767
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<b>Photo No.</b> <b>52</b>	<b>Date:</b> 08/21/19
<b>Direction Photo Taken:</b>  N/A	
<b>Description:</b> BC01-MW2: 30-35ft (1)	



<b>Photo No.</b> <b>53</b>	<b>Date:</b> 08/21/19
<b>Direction Photo Taken:</b>  N/A	
<b>Description:</b> BC01-MW2: 30-35ft (2)	



<b>Project Name:</b> Statewide WWTP PFAS Evaluation	<b>Site Location:</b> Howell, MI	<b>Boring ID:</b> BC01-MW2	<b>Project No.</b> 60588767
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<b>Photo No.</b> <b>54</b>	<b>Date:</b> 08/21/19	
<b>Direction Photo Taken:</b>  N/A		
<b>Description:</b> BC01-MW2: 30-35ft (3)		

<b>Photo No.</b> <b>55</b>	<b>Date:</b> 08/21/19	
<b>Direction Photo Taken:</b>  N/A		
<b>Description:</b> BC01-MW2: 30-35ft (4)		

<b>Project Name:</b> Statewide WWTP PFAS Evaluation	<b>Site Location:</b> Howell, MI	<b>Boring ID:</b> BC01-MW2	<b>Project No.</b> 60588767
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<b>Photo No.</b> <b>56</b>	<b>Date:</b> 08/21/19
<b>Direction Photo Taken:</b>  N/A	
<b>Description:</b> BC01-MW2: 30-35ft (5)	



<b>Photo No.</b> <b>57</b>	<b>Date:</b> 08/21/19
<b>Direction Photo Taken:</b>  N/A	
<b>Description:</b> MW-18-21: 30-35ft (1)	



<b>Project Name:</b> Statewide WWTP PFAS Evaluation	<b>Site Location:</b> Howell, MI	<b>Boring ID:</b> BC01-MW2	<b>Project No.</b> 60588767
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<b>Photo No.</b> <b>58</b>	<b>Date:</b> 08/21/19
<b>Direction Photo Taken:</b>  N/A	
<b>Description:</b> BC01-MW2: 35-38.5ft (1)	



<b>Photo No.</b> <b>59</b>	<b>Date:</b> 08/21/19
<b>Direction Photo Taken:</b>  N/A	
<b>Description:</b> BC01-MW2: 35-38.5ft (2)	



<b>Project Name:</b> Statewide WWTP PFAS Evaluation	<b>Site Location:</b> Howell, MI	<b>Boring ID:</b> BC01-MW2	<b>Project No.</b> 60588767
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<b>Photo No.</b> <b>60</b>	<b>Date:</b> 08/21/19
<b>Direction Photo Taken:</b>  N/A	
<b>Description:</b>  BC01-MW2: 35-38.5ft (3)	



<b>Photo No.</b> <b>61</b>	<b>Date:</b> 08/21/19
<b>Direction Photo Taken:</b>  N/A	
<b>Description:</b>  BC01-MW2: 40-45ft (1)	





<b>Project Name:</b> Statewide WWTP PFAS Evaluation	<b>Site Location:</b> Howell, MI	<b>Boring ID:</b> BC01-MW2	<b>Project No.</b> 60588767
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<b>Photo No.</b> <b>62</b>	<b>Date:</b> 08/21/19
<b>Direction Photo Taken:</b>  N/A	
<b>Description:</b> BC01-MW2: 40-45ft (2)	



<b>Photo No.</b> <b>63</b>	<b>Date:</b> 08/21/19
<b>Direction Photo Taken:</b>  N/A	
<b>Description:</b> BC01-MW2: 40-45ft (3)	



<b>Project Name:</b> Statewide WWTP PFAS Evaluation	<b>Site Location:</b> Howell, MI	<b>Boring ID:</b> BC01-MW2	<b>Project No.</b> 60588767
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<b>Photo No.</b> <b>64</b>	<b>Date:</b> 08/21/19
<b>Direction Photo Taken:</b>  N/A	
<b>Description:</b> BC01-MW2: 45-50ft (1)	



<b>Photo No.</b> <b>65</b>	<b>Date:</b> 08/21/19
<b>Direction Photo Taken:</b>  N/A	
<b>Description:</b> BC01-MW2: 45-50ft (2)	



<b>Project Name:</b> Statewide WWTP PFAS Evaluation	<b>Site Location:</b> Howell, MI	<b>Boring ID:</b> BC01-MW2	<b>Project No.</b> 60588767
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<b>Photo No.</b> <b>66</b>	<b>Date:</b> 08/21/19
<b>Direction Photo Taken:</b>  N/A	
<b>Description:</b> BC01-MW2: 45-50ft (3)	



<b>Photo No.</b> <b>67</b>	<b>Date:</b> 08/23/19
<b>Direction Photo Taken:</b>  N/A	
<b>Description:</b> BC01-MW2: Pro Covers	



<b>Project Name:</b> Statewide WWTP PFAS Evaluation	<b>Site Location:</b> Howell, MI	<b>Boring ID:</b> BC02-MW1	<b>Project No.</b> 60588767
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<b>Photo No.</b> <b>68</b>	<b>Date:</b> <b>08/20/19</b>	<p>Aug 20, 2019 2:14:08 PM 1998 Gray Road Howell Livingston County Michigan</p>
<b>Direction Photo Taken:</b> N/A		
<b>Description:</b> BC02-MW1: 0-5ft (1)		

<b>Photo No.</b> <b>69</b>	<b>Date:</b> <b>08/20/19</b>	<p>Aug 20, 2019 2:14:11 PM 1998 Gray Road Howell Livingston County Michigan</p>
<b>Direction Photo Taken:</b> N/A		
<b>Description:</b> BC02-MW1: 0-5ft (2)		

<b>Project Name:</b> Statewide WWTP PFAS Evaluation	<b>Site Location:</b> Howell, MI	<b>Boring ID:</b> BC02-MW1	<b>Project No.</b> 60588767
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<b>Photo No.</b> <b>70</b>	<b>Date:</b> 08/20/19
<b>Direction Photo Taken:</b>  N/A	
<b>Description:</b> BC02-MW1: 0-5ft (3)	



<b>Photo No.</b> <b>71</b>	<b>Date:</b> 08/20/19
<b>Direction Photo Taken:</b>  N/A	
<b>Description:</b> BC02-MW1: 5-10ft (1)	



<b>Project Name:</b> Statewide WWTP PFAS Evaluation	<b>Site Location:</b> Howell, MI	<b>Boring ID:</b> BC02-MW1	<b>Project No.</b> 60588767
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<b>Photo No.</b> <b>72</b>	<b>Date:</b> <b>08/20/19</b>
<b>Direction Photo Taken:</b>  N/A	
<b>Description:</b>  BC02-MW1: 5-10ft (2)	



<b>Photo No.</b> <b>73</b>	<b>Date:</b> <b>08/20/19</b>
<b>Direction Photo Taken:</b>  N/A	
<b>Description:</b>  BC02-MW1: 5-10ft (3)	



<b>Project Name:</b> Statewide WWTP PFAS Evaluation	<b>Site Location:</b> Howell, MI	<b>Boring ID:</b> BC02-MW1	<b>Project No.</b> 60588767
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<b>Photo No.</b> <b>74</b>	<b>Date:</b> <b>08/20/19</b>	
<b>Direction Photo Taken:</b> N/A		
<b>Description:</b> BC02-MW1: 10-13ft (1)		

Aug 20, 2019 2:30:35 PM  
 1862 Odyssey Drive  
 Brighton  
 Livingston County  
 Michigan

<b>Photo No.</b> <b>75</b>	<b>Date:</b> <b>08/20/19</b>	
<b>Direction Photo Taken:</b> N/A		
<b>Description:</b> BC02-MW1: 10-13ft (2)		

Aug 20, 2019 2:30:41 PM  
 1862 Odyssey Drive  
 Brighton  
 Livingston County  
 Michigan

<b>Project Name:</b> Statewide WWTP PFAS Evaluation	<b>Site Location:</b> Howell, MI	<b>Boring ID:</b> BC02-MW1	<b>Project No.</b> 60588767
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<b>Photo No.</b> <b>76</b>	<b>Date:</b> 08/20/19	Aug 20, 2019 2:34:17 PM 1862 Odyssey Drive Brighton Livingston County Michigan
<b>Direction Photo Taken:</b>  N/A		
<b>Description:</b> BC02-MW1: 15-18.5ft (1)		

<b>Photo No.</b> <b>77</b>	<b>Date:</b> 08/20/19	Aug 20, 2019 2:34:24 PM 1862 Odyssey Drive Brighton Livingston County Michigan
<b>Direction Photo Taken:</b>  N/A		
<b>Description:</b> BC02-MW1: 15-18.5ft (2)		



<b>Project Name:</b> Statewide WWTP PFAS Evaluation	<b>Site Location:</b> Howell, MI	<b>Boring ID:</b> BC02-MW1	<b>Project No.</b> 60588767
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<b>Photo No.</b> <b>78</b>	<b>Date:</b> 08/20/19	Aug 20, 2019 2:43:02 PM 1862 Odyssey Drive Brighton Livingston County Michigan
<b>Direction Photo Taken:</b>  N/A		
<b>Description:</b> BC02-MW1: 20-25ft (1)		

BC02-MW1  
 0-5' 15-18.5'  
 5-10' 20-25'  
 10-13'

<b>Photo No.</b> <b>79</b>	<b>Date:</b> 08/20/19	Aug 20, 2019 2:43:08 PM 1862 Odyssey Drive Brighton Livingston County Michigan
<b>Direction Photo Taken:</b>  N/A		
<b>Description:</b> BC02-MW1: 20-25ft (2)		

BC02-MW1  
 0-5' 15-18.5'  
 5-10' 20-25'  
 10-13'

<b>Project Name:</b> Statewide WWTP PFAS Evaluation	<b>Site Location:</b> Howell, MI	<b>Boring ID:</b> BC02-MW1	<b>Project No.</b> 60588767
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<b>Photo No.</b> <b>80</b>	<b>Date:</b> 08/20/19	
<b>Direction Photo Taken:</b>  N/A		
<b>Description:</b> BC02-MW1: 25-30ft (1)		

Aug 20, 2019 2:55:45 PM  
 1862 Odyssey Drive  
 Brighton  
 Livingston County  
 Michigan

BC02-MW1  
 0-5' 15-18.5'  
 5-10' 20-25'  
 10-13' 25-30'

<b>Photo No.</b> <b>81</b>	<b>Date:</b> 08/20/19	
<b>Direction Photo Taken:</b>  N/A		
<b>Description:</b> BC02-MW1: 25-30ft (2)		

Aug 20, 2019 2:55:53 PM  
 1862 Odyssey Drive  
 Brighton  
 Livingston County  
 Michigan

BC02-MW1  
 0-5' 15-18.5'  
 5-10' 20-25'  
 10-13' 25-30'

<b>Project Name:</b> Statewide WWTP PFAS Evaluation	<b>Site Location:</b> Howell, MI	<b>Boring ID:</b> BC02-MW1	<b>Project No.</b> 60588767
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<b>Photo No.</b> <b>82</b>	<b>Date:</b> 08/20/19	Aug 20, 2019 2:55:59 PM 1862 Odyssey Drive Brighton Livingston County Michigan
<b>Direction Photo Taken:</b>  N/A		
<b>Description:</b> BC02-MW1: 25-30ft (3)		

<b>Photo No.</b> <b>83</b>	<b>Date:</b> 08/20/19	Aug 20, 2019 2:56:02 PM 1862 Odyssey Drive Brighton Livingston County Michigan
<b>Direction Photo Taken:</b>  N/A		
<b>Description:</b> BC02-MW1: 25-30ft (4)		

<b>Project Name:</b> Statewide WWTP PFAS Evaluation	<b>Site Location:</b> Howell, MI	<b>Boring ID:</b> BC02-MW1	<b>Project No.</b> 60588767
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<b>Photo No.</b> <b>84</b>	<b>Date:</b> 08/20/19	
<b>Direction Photo Taken:</b>  N/A		
<b>Description:</b> BC02-MW1: 30-35ft (1)		

<b>Photo No.</b> <b>85</b>	<b>Date:</b> 08/20/19	
<b>Direction Photo Taken:</b>  N/A		
<b>Description:</b> BC02-MW1: 30-35ft (2)		

<b>Project Name:</b> Statewide WWTP PFAS Evaluation	<b>Site Location:</b> Howell, MI	<b>Boring ID:</b> BC02-MW1	<b>Project No.</b> 60588767
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<b>Photo No.</b> <b>86</b>	<b>Date:</b> 08/20/19	Aug 20, 2019 3:08:45 PM 1998 Gray Road Howell Livingston County Michigan
<b>Direction Photo Taken:</b>  N/A		
<b>Description:</b> BC02-MW1: 30-35ft (3)		

<b>Photo No.</b> <b>87</b>	<b>Date:</b> 08/20/19	Aug 20, 2019 3:08:49 PM 1998 Gray Road Howell Livingston County Michigan
<b>Direction Photo Taken:</b>  N/A		
<b>Description:</b> BC02-MW1: 30-35ft (4)		

<b>Project Name:</b> Statewide WWTP PFAS Evaluation	<b>Site Location:</b> Howell, MI	<b>Boring ID:</b> BC02-MW1	<b>Project No.</b> 60588767
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<b>Photo No.</b> <b>88</b>	<b>Date:</b> 08/20/19
<b>Direction Photo Taken:</b>  N/A	
<b>Description:</b>  BC02-MW1: 35-40ft (1)	



<b>Photo No.</b> <b>89</b>	<b>Date:</b> 08/20/19
<b>Direction Photo Taken:</b>  N/A	
<b>Description:</b>  BC02-MW1: 35-40ft (2)	



<b>Project Name:</b> Statewide WWTP PFAS Evaluation	<b>Site Location:</b> Howell, MI	<b>Boring ID:</b> BC02-MW1	<b>Project No.</b> 60588767
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<b>Photo No.</b> <b>90</b>	<b>Date:</b> 08/20/19	
<b>Direction Photo Taken:</b> N/A		
<b>Description:</b> BC02-MW1: 35-40ft (3)		

<b>Photo No.</b> <b>91</b>	<b>Date:</b> 08/20/19	
<b>Direction Photo Taken:</b> N/A		
<b>Description:</b> BC02-MW1: 35-40ft (4)		

<b>Project Name:</b> Statewide WWTP PFAS Evaluation	<b>Site Location:</b> Howell, MI	<b>Boring ID:</b> BC02-MW1	<b>Project No.</b> 60588767
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<b>Photo No.</b> <b>92</b>	<b>Date:</b> 08/20/19	
<b>Direction Photo Taken:</b> N/A		
<b>Description:</b> BC02-MW1: 40-45ft (1)		

<b>Photo No.</b> <b>93</b>	<b>Date:</b> 08/20/19	
<b>Direction Photo Taken:</b> N/A		
<b>Description:</b> BC02-MW1: 45-50ft (1)		



<b>Project Name:</b> Statewide WWTP PFAS Evaluation	<b>Site Location:</b> Howell, MI	<b>Boring ID:</b> BC02-MW1	<b>Project No.</b> 60588767
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<b>Photo No.</b> <b>94</b>	<b>Date:</b> 08/20/19
<b>Direction Photo Taken:</b>  N/A	
<b>Description:</b>  BC02-MW1: 45-50ft (2)	



<b>Photo No.</b> <b>95</b>	<b>Date:</b> 08/20/19
<b>Direction Photo Taken:</b>  N/A	
<b>Description:</b>  BC02-MW1: 45-50ft (3)	



<b>Project Name:</b> Statewide WWTP PFAS Evaluation	<b>Site Location:</b> Howell, MI	<b>Boring ID:</b> BC02-MW1	<b>Project No.</b> 60588767
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<b>Photo No.</b> <b>96</b>	<b>Date:</b> 08/23/19
<b>Direction Photo Taken:</b>  N/A	
<b>Description:</b>  BC02-MW1: Pro Covers	



# Appendix E



December 03, 2019

**Vista Work Order No. 1904043**

Ms. Maya Murshak  
Merit Laboratories, Inc.  
2680 East Lansing Drive  
East Lansing, MI 48823

Dear Ms. Murshak,

Enclosed are the results for the sample set received at Vista Analytical Laboratory on November 08, 2019 under your Project Name 'Statewide Biosolids'.

Vista Analytical Laboratory is committed to serving you effectively. If you require additional information, please contact me at 916-673-1520 or by email at [mmaier@vista-analytical.com](mailto:mmaier@vista-analytical.com).

Thank you for choosing Vista as part of your analytical support team.

Sincerely,

Martha Maier  
Laboratory Director



*Vista Analytical Laboratory certifies that the report herein meets all the requirements set forth by NELAP for those applicable test methods. Results relate only to the samples as received by the laboratory. This report should not be reproduced except in full without the written approval of Vista.*

Vista Analytical Laboratory 1104 Windfield Way El Dorado Hills, CA 95762 ph: 916-673-1520 fx: 916-673-0106 [www.vista-analytical.com](http://www.vista-analytical.com)

## Vista Work Order No. 1904043

### Case Narrative

#### Sample Condition on Receipt:

Six soil samples were received in good condition and within the method temperature requirements. The samples were received and stored securely in accordance with Vista standard operating procedures and EPA methodology. A revised CoC was received by email on November 15, 2019.

#### Analytical Notes:

##### PFAS Isotope Dilution Method

As directed, samples "SB1911071215LEM" and "SB19110713558LEM" were dried and homogenized following the Incremental Sampling Procedure prior to extraction.

The samples were extracted and analyzed for a selected list of PFAS using VAL Method PFAS. The results for PFHxS, PFOA, PFOS, MeFOSAA and EtFOSAA include both linear and branched isomers. Results for all other analytes include the linear isomers only.

##### Holding Times

The samples were extracted and analyzed within the hold times.

##### Quality Control

The Initial Calibration and Continuing Calibration Verifications met the method acceptance criteria.

A Method Blank and Ongoing Precision and Recovery (OPR) sample were extracted and analyzed with the preparation batch. No analytes were detected in the Method Blank above 1/2 the LOQ. The OPR recoveries were within the method acceptance criteria.

The labeled standard recoveries outside the acceptance criteria are listed in the table below.

#### QC Anomalies

LabNumber	SampleName	Analysis	Analyte	Flag	%Rec
1904043-01	SB1911071210LEM	PFAS Isotope Dilution Method	13C2-PFTeDA	H	18.3

H = Recovery was outside laboratory acceptance criteria.

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# Sample Inventory Report

<b>Vista Sample ID</b>	<b>Client Sample ID</b>	<b>Sampled</b>	<b>Received</b>	<b>Components/Containers</b>
1904043-01	SB1911071210LEM	07-Nov-19 12:10	08-Nov-19 08:53	HDPE Jar, 6 oz
1904043-02	SB1911071215LEM	07-Nov-19 12:15	08-Nov-19 08:53	HDPE Jar, 6 oz
1904043-03	SB1911071205LEM	07-Nov-19 12:05	08-Nov-19 08:53	HDPE Jar, 6 oz
1904043-04	SB1911071355LEM	07-Nov-19 13:55	08-Nov-19 08:53	HDPE Jar, 6 oz
1904043-05	SB1911071350LEM	07-Nov-19 13:50	08-Nov-19 08:53	HDPE Jar, 6 oz
1904043-06	SB1911071345LEM	07-Nov-19 13:45	08-Nov-19 08:53	HDPE Jar, 6 oz

## **ANALYTICAL RESULTS**



**Sample ID: Method Blank**
**PFAS Isotope Dilution Method**

Client Data				Laboratory Data							
Name:	Merit Laboratories, Inc.	Matrix:	Solid	Lab Sample:	B9K0189-BLK1	Column:	BEH C18				
Project:	Statewide Biosolids										

Analyte	CAS Number	Conc. (ng/g)	DL	LOD	LOQ	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
PFBA	375-22-4	ND	0.423	0.500	1.00		B9K0189	20-Nov-19	2.00 g	26-Nov-19 03:24	1
PFPeA	2706-90-3	ND	0.423	0.500	1.00		B9K0189	20-Nov-19	2.00 g	26-Nov-19 03:24	1
PFBS	375-73-5	ND	0.423	0.500	1.00		B9K0189	20-Nov-19	2.00 g	26-Nov-19 03:24	1
4:2 FTS	757124-72-4	ND	0.423	0.500	1.00		B9K0189	20-Nov-19	2.00 g	26-Nov-19 03:24	1
PFHxA	307-24-4	ND	0.423	0.500	1.00		B9K0189	20-Nov-19	2.00 g	26-Nov-19 03:24	1
PFPeS	2706-91-4	ND	0.423	0.500	1.00		B9K0189	20-Nov-19	2.00 g	26-Nov-19 03:24	1
PFHpA	375-85-9	ND	0.423	0.500	1.00		B9K0189	20-Nov-19	2.00 g	26-Nov-19 03:24	1
PFHxS	355-46-4	ND	0.423	0.500	1.00		B9K0189	20-Nov-19	2.00 g	26-Nov-19 03:24	1
6:2 FTS	27619-97-2	ND	0.423	0.500	1.00		B9K0189	20-Nov-19	2.00 g	26-Nov-19 03:24	1
PFOA	335-67-1	ND	0.423	0.500	1.00		B9K0189	20-Nov-19	2.00 g	26-Nov-19 03:24	1
PFHpS	375-92-8	ND	0.423	0.500	1.00		B9K0189	20-Nov-19	2.00 g	26-Nov-19 03:24	1
PFNA	375-95-1	ND	0.423	0.500	1.00		B9K0189	20-Nov-19	2.00 g	26-Nov-19 03:24	1
PFOSA	754-91-6	ND	0.423	0.500	1.00		B9K0189	20-Nov-19	2.00 g	26-Nov-19 03:24	1
PFOS	1763-23-1	ND	0.423	0.500	1.00		B9K0189	20-Nov-19	2.00 g	26-Nov-19 03:24	1
PFDA	335-76-2	ND	0.423	0.500	1.00		B9K0189	20-Nov-19	2.00 g	26-Nov-19 03:24	1
8:2 FTS	39108-34-4	ND	0.423	0.500	1.00		B9K0189	20-Nov-19	2.00 g	26-Nov-19 03:24	1
PFNS	68259-12-1	ND	0.715	0.750	1.00		B9K0189	20-Nov-19	2.00 g	26-Nov-19 03:24	1
MeFOSAA	2355-31-9	ND	0.423	0.500	1.00		B9K0189	20-Nov-19	2.00 g	26-Nov-19 03:24	1
EtFOSAA	2991-50-6	ND	0.423	0.500	1.00		B9K0189	20-Nov-19	2.00 g	26-Nov-19 03:24	1
PFOA	2058-94-8	ND	0.423	0.500	1.00		B9K0189	20-Nov-19	2.00 g	26-Nov-19 03:24	1
PFDS	335-77-3	ND	0.423	0.500	1.00		B9K0189	20-Nov-19	2.00 g	26-Nov-19 03:24	1
PFDoA	307-55-1	ND	0.423	0.500	1.00		B9K0189	20-Nov-19	2.00 g	26-Nov-19 03:24	1
PFTTrDA	72629-94-8	ND	0.423	0.500	1.00		B9K0189	20-Nov-19	2.00 g	26-Nov-19 03:24	1
PFTeDA	376-06-7	ND	0.423	0.500	1.00		B9K0189	20-Nov-19	2.00 g	26-Nov-19 03:24	1

Labeled Standards	Type	% Recovery	Limits	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
13C3-PFBA	IS	95.5	60 - 130		B9K0189	20-Nov-19	2.00 g	26-Nov-19 03:24	1
13C3-PFPeA	IS	96.8	60 - 150		B9K0189	20-Nov-19	2.00 g	26-Nov-19 03:24	1
13C3-PFBS	IS	90.6	60 - 150		B9K0189	20-Nov-19	2.00 g	26-Nov-19 03:24	1
13C2-4:2 FTS	IS	98.2	40 - 150		B9K0189	20-Nov-19	2.00 g	26-Nov-19 03:24	1
13C2-PFHxA	IS	92.5	70 - 130		B9K0189	20-Nov-19	2.00 g	26-Nov-19 03:24	1
13C4-PFHpA	IS	90.2	60 - 150		B9K0189	20-Nov-19	2.00 g	26-Nov-19 03:24	1
13C3-PFHxS	IS	89.5	60 - 130		B9K0189	20-Nov-19	2.00 g	26-Nov-19 03:24	1
13C2-6:2 FTS	IS	90.3	40 - 150		B9K0189	20-Nov-19	2.00 g	26-Nov-19 03:24	1
13C5-PFNA	IS	80.1	50 - 130		B9K0189	20-Nov-19	2.00 g	26-Nov-19 03:24	1
13C8-PFOSA	IS	49.9	20 - 150		B9K0189	20-Nov-19	2.00 g	26-Nov-19 03:24	1
13C2-PFOA	IS	87.3	60 - 130		B9K0189	20-Nov-19	2.00 g	26-Nov-19 03:24	1
13C8-PFOS	IS	86.7	60 - 130		B9K0189	20-Nov-19	2.00 g	26-Nov-19 03:24	1
13C2-PFDA	IS	75.0	60 - 130		B9K0189	20-Nov-19	2.00 g	26-Nov-19 03:24	1

**Sample ID: Method Blank** **PFAS Isotope Dilution Method**

<b>Client Data</b>				<b>Laboratory Data</b>			
Name:	Merit Laboratories, Inc.	Matrix:	Solid	Lab Sample:	B9K0189-BLK1	Column:	BEH C18
Project:	Statewide Biosolids						

Labeled Standards	Type	% Recovery	Limits	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
13C2-8:2 FTS	IS	97.1	40 - 150		B9K0189	20-Nov-19	2.00 g	26-Nov-19 03:24	1
d3-MeFOSAA	IS	59.9	50 - 150		B9K0189	20-Nov-19	2.00 g	26-Nov-19 03:24	1
13C2-PFUnA	IS	67.7	60 - 130		B9K0189	20-Nov-19	2.00 g	26-Nov-19 03:24	1
d5-EtFOSAA	IS	66.1	50 - 150		B9K0189	20-Nov-19	2.00 g	26-Nov-19 03:24	1
13C2-PFDoA	IS	77.4	30 - 130		B9K0189	20-Nov-19	2.00 g	26-Nov-19 03:24	1
13C2-PFTeDA	IS	68.5	20 - 150		B9K0189	20-Nov-19	2.00 g	26-Nov-19 03:24	1

DL - Detection Limit

LOD - Limit of Detection  
LOQ - Limit of quantitation

The results are reported in dry weight.  
The sample size is reported in wet weight.  
Results reported to the DL.

When reported, PFHxS, PFOA, PFOS, MeFOSAA and EtFOSAA include both linear and branched isomers. Only the linear isomer is reported for all other analytes.

**Sample ID: OPR**

**PFAS Isotope Dilution Method**

Client Data					Laboratory Data						
Name:	Merit Laboratories, Inc.		Matrix:	Solid	Lab Sample:	B9K0189-BS1	Column:	BEH C18			
Project:	Statewide Biosolids										

Analyte	CAS Number	Amt Found (ng/g)	Spike Amt	% Rec	Limits	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
PFBA	375-22-4	4.93	5.00	98.6	70 - 130		B9K0189	20-Nov-19	2.00 g	26-Nov-19 03:34	1
PFPeA	2706-90-3	5.68	5.00	114	70 - 130		B9K0189	20-Nov-19	2.00 g	26-Nov-19 03:34	1
PFBS	375-73-5	5.36	5.00	107	70 - 130		B9K0189	20-Nov-19	2.00 g	26-Nov-19 03:34	1
4:2 FTS	757124-72-4	5.61	5.00	112	70 - 130		B9K0189	20-Nov-19	2.00 g	26-Nov-19 03:34	1
PFHxA	307-24-4	4.52	5.00	90.4	70 - 130		B9K0189	20-Nov-19	2.00 g	26-Nov-19 03:34	1
PFPeS	2706-91-4	6.01	5.00	120	70 - 130		B9K0189	20-Nov-19	2.00 g	26-Nov-19 03:34	1
PFHpA	375-85-9	4.76	5.00	95.2	70 - 130		B9K0189	20-Nov-19	2.00 g	26-Nov-19 03:34	1
PFHxS	355-46-4	5.70	5.00	114	70 - 130		B9K0189	20-Nov-19	2.00 g	26-Nov-19 03:34	1
6:2 FTS	27619-97-2	6.06	5.00	121	60 - 130		B9K0189	20-Nov-19	2.00 g	26-Nov-19 03:34	1
PFOA	335-67-1	5.20	5.00	104	70 - 130		B9K0189	20-Nov-19	2.00 g	26-Nov-19 03:34	1
PFHpS	375-92-8	5.38	5.00	108	60 - 130		B9K0189	20-Nov-19	2.00 g	26-Nov-19 03:34	1
PFNA	375-95-1	5.44	5.00	109	70 - 130		B9K0189	20-Nov-19	2.00 g	26-Nov-19 03:34	1
PFOSA	754-91-6	6.04	5.00	121	70 - 130		B9K0189	20-Nov-19	2.00 g	26-Nov-19 03:34	1
PFOS	1763-23-1	6.08	5.01	121	70 - 130		B9K0189	20-Nov-19	2.00 g	26-Nov-19 03:34	1
PFDA	335-76-2	5.88	5.00	118	70 - 130		B9K0189	20-Nov-19	2.00 g	26-Nov-19 03:34	1
8:2 FTS	39108-34-4	5.11	5.00	102	60 - 130		B9K0189	20-Nov-19	2.00 g	26-Nov-19 03:34	1
PFNS	68259-12-1	5.56	5.00	111	70 - 130		B9K0189	20-Nov-19	2.00 g	26-Nov-19 03:34	1
MeFOSAA	2355-31-9	5.85	5.00	117	70 - 130		B9K0189	20-Nov-19	2.00 g	26-Nov-19 03:34	1
EtFOSAA	2991-50-6	5.02	5.00	100	70 - 130		B9K0189	20-Nov-19	2.00 g	26-Nov-19 03:34	1
PFUnA	2058-94-8	5.33	5.00	107	70 - 130		B9K0189	20-Nov-19	2.00 g	26-Nov-19 03:34	1
PFDS	335-77-3	4.28	5.01	85.5	60 - 130		B9K0189	20-Nov-19	2.00 g	26-Nov-19 03:34	1
PFDaA	307-55-1	4.97	5.00	99.5	70 - 130		B9K0189	20-Nov-19	2.00 g	26-Nov-19 03:34	1
PFTTrDA	72629-94-8	5.61	5.00	112	60 - 130		B9K0189	20-Nov-19	2.00 g	26-Nov-19 03:34	1
PFTeDA	376-06-7	5.38	5.00	108	70 - 130		B9K0189	20-Nov-19	2.00 g	26-Nov-19 03:34	1

Labeled Standards	Type	% Rec	Limits	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
13C3-PFBA	IS	94.9	60- 130		B9K0189	20-Nov-19	2.00 g	26-Nov-19 03:34	1
13C3-PFPeA	IS	97.0	60- 150		B9K0189	20-Nov-19	2.00 g	26-Nov-19 03:34	1
13C3-PFBS	IS	86.7	60- 150		B9K0189	20-Nov-19	2.00 g	26-Nov-19 03:34	1
13C2-4:2 FTS	IS	84.2	40- 150		B9K0189	20-Nov-19	2.00 g	26-Nov-19 03:34	1
13C2-PFHxA	IS	95.3	70- 130		B9K0189	20-Nov-19	2.00 g	26-Nov-19 03:34	1
13C4-PFHpA	IS	98.1	60- 150		B9K0189	20-Nov-19	2.00 g	26-Nov-19 03:34	1
13C3-PFHxS	IS	85.3	60- 130		B9K0189	20-Nov-19	2.00 g	26-Nov-19 03:34	1
13C2-6:2 FTS	IS	81.9	40- 150		B9K0189	20-Nov-19	2.00 g	26-Nov-19 03:34	1
13C5-PFNA	IS	82.3	50- 130		B9K0189	20-Nov-19	2.00 g	26-Nov-19 03:34	1
13C8-PFOSA	IS	54.0	20- 150		B9K0189	20-Nov-19	2.00 g	26-Nov-19 03:34	1

**Sample ID: OPR**

**PFAS Isotope Dilution Method**

Client Data				Laboratory Data			
Name:	Merit Laboratories, Inc.	Matrix:	Solid	Lab Sample:	B9K0189-BS1	Column:	BEH C18
Project:	Statewide Biosolids						

Labeled Standards	Type	% Rec	Limits	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
13C2-PFOA	IS	88.8	60- 130		B9K0189	20-Nov-19	2.00 g	26-Nov-19 03:34	1
13C8-PFOS	IS	85.9	60- 130		B9K0189	20-Nov-19	2.00 g	26-Nov-19 03:34	1
13C2-PFDA	IS	64.4	60- 130		B9K0189	20-Nov-19	2.00 g	26-Nov-19 03:34	1
13C2-8:2 FTS	IS	78.4	40- 150		B9K0189	20-Nov-19	2.00 g	26-Nov-19 03:34	1
d3-MeFOSAA	IS	66.6	50- 150		B9K0189	20-Nov-19	2.00 g	26-Nov-19 03:34	1
13C2-PFUnA	IS	69.5	60- 130		B9K0189	20-Nov-19	2.00 g	26-Nov-19 03:34	1
d5-EtFOSAA	IS	73.2	50- 150		B9K0189	20-Nov-19	2.00 g	26-Nov-19 03:34	1
13C2-PFDoA	IS	68.8	30- 130		B9K0189	20-Nov-19	2.00 g	26-Nov-19 03:34	1
13C2-PFTeDA	IS	69.1	20- 150		B9K0189	20-Nov-19	2.00 g	26-Nov-19 03:34	1

**Sample ID: SB1911071210LEM**
**PFAS Isotope Dilution Method**

Client Data				Laboratory Data			
Name:	Merit Laboratories, Inc.	Matrix:	Soil	Lab Sample:	1904043-01	Column:	BEH C18
Project:	Statewide Biosolids	Date Collected:	07-Nov-19 12:10	Date Received:	08-Nov-19 08:53		
Location:	WIXO-02n05e02-BC01			% Solids:	84.1		

Analyte	CAS Number	Conc. (ng/g)	DL	LOD	LOQ	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
PFBA	375-22-4	ND	0.422	0.500	0.999		B9K0189	20-Nov-19	2.38 g	26-Nov-19 03:45	1
PFPeA	2706-90-3	0.609	0.422	0.500	0.999	J	B9K0189	20-Nov-19	2.38 g	26-Nov-19 03:45	1
PFBS	375-73-5	0.580	0.422	0.500	0.999	J	B9K0189	20-Nov-19	2.38 g	26-Nov-19 03:45	1
4:2 FTS	757124-72-4	ND	0.422	0.500	0.999		B9K0189	20-Nov-19	2.38 g	26-Nov-19 03:45	1
PFHxA	307-24-4	ND	0.422	0.500	0.999		B9K0189	20-Nov-19	2.38 g	26-Nov-19 03:45	1
PFPeS	2706-91-4	ND	0.422	0.500	0.999		B9K0189	20-Nov-19	2.38 g	26-Nov-19 03:45	1
PFHpA	375-85-9	ND	0.422	0.500	0.999		B9K0189	20-Nov-19	2.38 g	26-Nov-19 03:45	1
PFHxS	355-46-4	ND	0.422	0.500	0.999		B9K0189	20-Nov-19	2.38 g	26-Nov-19 03:45	1
6:2 FTS	27619-97-2	ND	0.422	0.500	0.999		B9K0189	20-Nov-19	2.38 g	26-Nov-19 03:45	1
PFOA	335-67-1	1.05	0.422	0.500	0.999		B9K0189	20-Nov-19	2.38 g	26-Nov-19 03:45	1
PFHpS	375-92-8	ND	0.422	0.500	0.999		B9K0189	20-Nov-19	2.38 g	26-Nov-19 03:45	1
PFNA	375-95-1	ND	0.422	0.500	0.999		B9K0189	20-Nov-19	2.38 g	26-Nov-19 03:45	1
PFOSA	754-91-6	ND	0.422	0.500	0.999		B9K0189	20-Nov-19	2.38 g	26-Nov-19 03:45	1
PFOS	1763-23-1	70.9	0.422	0.500	0.999		B9K0189	20-Nov-19	2.38 g	26-Nov-19 03:45	1
PFDA	335-76-2	1.02	0.422	0.500	0.999		B9K0189	20-Nov-19	2.38 g	26-Nov-19 03:45	1
8:2 FTS	39108-34-4	ND	0.422	0.500	0.999		B9K0189	20-Nov-19	2.38 g	26-Nov-19 03:45	1
PFNS	68259-12-1	ND	0.714	0.749	0.999		B9K0189	20-Nov-19	2.38 g	26-Nov-19 03:45	1
MeFOSAA	2355-31-9	ND	0.422	0.500	0.999		B9K0189	20-Nov-19	2.38 g	26-Nov-19 03:45	1
EtFOSAA	2991-50-6	ND	0.422	0.500	0.999		B9K0189	20-Nov-19	2.38 g	26-Nov-19 03:45	1
PFUnA	2058-94-8	ND	0.422	0.500	0.999		B9K0189	20-Nov-19	2.38 g	26-Nov-19 03:45	1
PFDS	335-77-3	ND	0.422	0.500	0.999		B9K0189	20-Nov-19	2.38 g	26-Nov-19 03:45	1
PFDoA	307-55-1	ND	0.422	0.500	0.999		B9K0189	20-Nov-19	2.38 g	26-Nov-19 03:45	1
PFTTrDA	72629-94-8	ND	0.422	0.500	0.999		B9K0189	20-Nov-19	2.38 g	26-Nov-19 03:45	1
PFTeDA	376-06-7	ND	0.422	0.500	0.999		B9K0189	20-Nov-19	2.38 g	26-Nov-19 03:45	1

Labeled Standards	Type	% Recovery	Limits	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
13C3-PFBA	IS	94.0	60 - 130		B9K0189	20-Nov-19	2.38 g	26-Nov-19 03:45	1
13C3-PFPeA	IS	92.2	60 - 150		B9K0189	20-Nov-19	2.38 g	26-Nov-19 03:45	1
13C3-PFBS	IS	90.8	60 - 150		B9K0189	20-Nov-19	2.38 g	26-Nov-19 03:45	1
13C2-4:2 FTS	IS	74.6	40 - 150		B9K0189	20-Nov-19	2.38 g	26-Nov-19 03:45	1
13C2-PFHxA	IS	85.7	70 - 130		B9K0189	20-Nov-19	2.38 g	26-Nov-19 03:45	1
13C4-PFHpA	IS	88.7	60 - 150		B9K0189	20-Nov-19	2.38 g	26-Nov-19 03:45	1
13C3-PFHxS	IS	95.5	60 - 130		B9K0189	20-Nov-19	2.38 g	26-Nov-19 03:45	1
13C2-6:2 FTS	IS	97.1	40 - 150		B9K0189	20-Nov-19	2.38 g	26-Nov-19 03:45	1
13C5-PFNA	IS	84.1	50 - 130		B9K0189	20-Nov-19	2.38 g	26-Nov-19 03:45	1
13C8-PFOSA	IS	52.1	20 - 150		B9K0189	20-Nov-19	2.38 g	26-Nov-19 03:45	1
13C2-PFOA	IS	82.5	60 - 130		B9K0189	20-Nov-19	2.38 g	26-Nov-19 03:45	1
13C8-PFOS	IS	88.4	60 - 130		B9K0189	20-Nov-19	2.38 g	26-Nov-19 03:45	1
13C2-PFDA	IS	68.9	60 - 130		B9K0189	20-Nov-19	2.38 g	26-Nov-19 03:45	1

**Sample ID: SB1911071210LEM** **PFAS Isotope Dilution Method**

Client Data				Laboratory Data			
Name:	Merit Laboratories, Inc.	Matrix:	Soil	Lab Sample:	1904043-01	Column:	BEH C18
Project:	Statewide Biosolids	Date Collected:	07-Nov-19 12:10	Date Received:	08-Nov-19 08:53		
Location:	WIXO-02n05e02-BC01			% Solids:	84.1		

Labeled Standards	Type	% Recovery	Limits	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
13C2-8:2 FTS	IS	91.1	40 - 150		B9K0189	20-Nov-19	2.38 g	26-Nov-19 03:45	1
d3-MeFOSAA	IS	59.0	50 - 150		B9K0189	20-Nov-19	2.38 g	26-Nov-19 03:45	1
13C2-PFUnA	IS	72.5	60 - 130		B9K0189	20-Nov-19	2.38 g	26-Nov-19 03:45	1
d5-EtFOSAA	IS	59.4	50 - 150		B9K0189	20-Nov-19	2.38 g	26-Nov-19 03:45	1
13C2-PFDoA	IS	63.0	30 - 130		B9K0189	20-Nov-19	2.38 g	26-Nov-19 03:45	1
13C2-PFTeDA	IS	18.3	20 - 150	H	B9K0189	20-Nov-19	2.38 g	26-Nov-19 03:45	1

DL - Detection Limit

LOD - Limit of Detection  
LOQ - Limit of quantitation

The results are reported in dry weight.  
The sample size is reported in wet weight.  
Results reported to the DL.

When reported, PFHxS, PFOA, PFOS, MeFOSAA and EtFOSAA include both linear and branched isomers. Only the linear isomer is reported for all other analytes.

**Sample ID: SB1911071215LEM**
**PFAS Isotope Dilution Method**

Client Data				Laboratory Data			
Name:	Merit Laboratories, Inc.	Matrix:	Soil	Lab Sample:	1904043-02	Column:	BEH C18
Project:	Statewide Biosolids	Date Collected:	07-Nov-19 12:15	Date Received:	08-Nov-19 08:53		
Location:	WIXO-02n05e02-BC01			% Solids:	98.6		

Analyte	CAS Number	Conc. (ng/g)	DL	LOD	LOQ	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
PFBA	375-22-4	ND	0.424	0.502	1.00		B9K0189	20-Nov-19	2.02 g	26-Nov-19 03:55	1
PFPeA	2706-90-3	0.624	0.424	0.502	1.00	J	B9K0189	20-Nov-19	2.02 g	26-Nov-19 03:55	1
PFBS	375-73-5	0.481	0.424	0.502	1.00	J	B9K0189	20-Nov-19	2.02 g	26-Nov-19 03:55	1
4:2 FTS	757124-72-4	ND	0.424	0.502	1.00		B9K0189	20-Nov-19	2.02 g	26-Nov-19 03:55	1
PFHxA	307-24-4	0.503	0.424	0.502	1.00	J, Q	B9K0189	20-Nov-19	2.02 g	26-Nov-19 03:55	1
PFPeS	2706-91-4	ND	0.424	0.502	1.00		B9K0189	20-Nov-19	2.02 g	26-Nov-19 03:55	1
PFHpA	375-85-9	ND	0.424	0.502	1.00		B9K0189	20-Nov-19	2.02 g	26-Nov-19 03:55	1
PFHxS	355-46-4	ND	0.424	0.502	1.00		B9K0189	20-Nov-19	2.02 g	26-Nov-19 03:55	1
6:2 FTS	27619-97-2	ND	0.424	0.502	1.00		B9K0189	20-Nov-19	2.02 g	26-Nov-19 03:55	1
PFOA	335-67-1	1.24	0.424	0.502	1.00		B9K0189	20-Nov-19	2.02 g	26-Nov-19 03:55	1
PFHpS	375-92-8	ND	0.424	0.502	1.00		B9K0189	20-Nov-19	2.02 g	26-Nov-19 03:55	1
PFNA	375-95-1	ND	0.424	0.502	1.00		B9K0189	20-Nov-19	2.02 g	26-Nov-19 03:55	1
PFOSA	754-91-6	ND	0.424	0.502	1.00		B9K0189	20-Nov-19	2.02 g	26-Nov-19 03:55	1
PFOS	1763-23-1	63.7	0.424	0.502	1.00		B9K0189	20-Nov-19	2.02 g	26-Nov-19 03:55	1
PFDA	335-76-2	0.908	0.424	0.502	1.00	J	B9K0189	20-Nov-19	2.02 g	26-Nov-19 03:55	1
8:2 FTS	39108-34-4	ND	0.424	0.502	1.00		B9K0189	20-Nov-19	2.02 g	26-Nov-19 03:55	1
PFNS	68259-12-1	ND	0.718	0.753	1.00		B9K0189	20-Nov-19	2.02 g	26-Nov-19 03:55	1
MeFOSAA	2355-31-9	ND	0.424	0.502	1.00		B9K0189	20-Nov-19	2.02 g	26-Nov-19 03:55	1
EtFOSAA	2991-50-6	ND	0.424	0.502	1.00		B9K0189	20-Nov-19	2.02 g	26-Nov-19 03:55	1
PFOA	2058-94-8	ND	0.424	0.502	1.00		B9K0189	20-Nov-19	2.02 g	26-Nov-19 03:55	1
PFDS	335-77-3	ND	0.424	0.502	1.00		B9K0189	20-Nov-19	2.02 g	26-Nov-19 03:55	1
PFDoA	307-55-1	ND	0.424	0.502	1.00		B9K0189	20-Nov-19	2.02 g	26-Nov-19 03:55	1
PFTTrDA	72629-94-8	ND	0.424	0.502	1.00		B9K0189	20-Nov-19	2.02 g	26-Nov-19 03:55	1
PFTeDA	376-06-7	ND	0.424	0.502	1.00		B9K0189	20-Nov-19	2.02 g	26-Nov-19 03:55	1

Labeled Standards	Type	% Recovery	Limits	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
13C3-PFBA	IS	92.5	60 - 130		B9K0189	20-Nov-19	2.02 g	26-Nov-19 03:55	1
13C3-PFPeA	IS	92.3	60 - 150		B9K0189	20-Nov-19	2.02 g	26-Nov-19 03:55	1
13C3-PFBS	IS	84.3	60 - 150		B9K0189	20-Nov-19	2.02 g	26-Nov-19 03:55	1
13C2-4:2 FTS	IS	69.6	40 - 150		B9K0189	20-Nov-19	2.02 g	26-Nov-19 03:55	1
13C2-PFHxA	IS	86.0	70 - 130		B9K0189	20-Nov-19	2.02 g	26-Nov-19 03:55	1
13C4-PFHpA	IS	93.1	60 - 150		B9K0189	20-Nov-19	2.02 g	26-Nov-19 03:55	1
13C3-PFHxS	IS	87.4	60 - 130		B9K0189	20-Nov-19	2.02 g	26-Nov-19 03:55	1
13C2-6:2 FTS	IS	98.8	40 - 150		B9K0189	20-Nov-19	2.02 g	26-Nov-19 03:55	1
13C5-PFNA	IS	74.2	50 - 130		B9K0189	20-Nov-19	2.02 g	26-Nov-19 03:55	1
13C8-PFOSA	IS	53.3	20 - 150		B9K0189	20-Nov-19	2.02 g	26-Nov-19 03:55	1
13C2-PFOA	IS	82.3	60 - 130		B9K0189	20-Nov-19	2.02 g	26-Nov-19 03:55	1
13C8-PFOS	IS	81.6	60 - 130		B9K0189	20-Nov-19	2.02 g	26-Nov-19 03:55	1
13C2-PFDA	IS	71.4	60 - 130		B9K0189	20-Nov-19	2.02 g	26-Nov-19 03:55	1

**Sample ID: SB1911071215LEM** **PFAS Isotope Dilution Method**

Client Data				Laboratory Data			
Name:	Merit Laboratories, Inc.	Matrix:	Soil	Lab Sample:	1904043-02	Column:	BEH C18
Project:	Statewide Biosolids	Date Collected:	07-Nov-19 12:15	Date Received:	08-Nov-19 08:53		
Location:	WIXO-02n05e02-BC01			% Solids:	98.6		

Labeled Standards	Type	% Recovery	Limits	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
13C2-8:2 FTS	IS	99.9	40 - 150		B9K0189	20-Nov-19	2.02 g	26-Nov-19 03:55	1
d3-MeFOSAA	IS	66.1	50 - 150		B9K0189	20-Nov-19	2.02 g	26-Nov-19 03:55	1
13C2-PFUnA	IS	74.3	60 - 130		B9K0189	20-Nov-19	2.02 g	26-Nov-19 03:55	1
d5-EtFOSAA	IS	74.2	50 - 150		B9K0189	20-Nov-19	2.02 g	26-Nov-19 03:55	1
13C2-PFDoA	IS	84.9	30 - 130		B9K0189	20-Nov-19	2.02 g	26-Nov-19 03:55	1
13C2-PFTeDA	IS	56.2	20 - 150		B9K0189	20-Nov-19	2.02 g	26-Nov-19 03:55	1

DL - Detection Limit

LOD - Limit of Detection  
LOQ - Limit of quantitation

The results are reported in dry weight.  
The sample size is reported in wet weight.  
Results reported to the DL.

When reported, PFHxS, PFOA, PFOS, MeFOSAA and EtFOSAA include both linear and branched isomers. Only the linear isomer is reported for all other analytes.



**Sample ID: SB1911071205LEM**
**PFAS Isotope Dilution Method**

Client Data				Laboratory Data			
Name:	Merit Laboratories, Inc.	Matrix:	Soil	Lab Sample:	1904043-03	Column:	BEH C18
Project:	Statewide Biosolids	Date Collected:	07-Nov-19 12:05	Date Received:	08-Nov-19 08:53		
Location:	WIXO-02n05e02-BC01			% Solids:	85.1		

Analyte	CAS Number	Conc. (ng/g)	DL	LOD	LOQ	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
PFBA	375-22-4	ND	0.423	0.500	1.00		B9K0189	20-Nov-19	2.35 g	26-Nov-19 04:06	1
PFPeA	2706-90-3	0.787	0.423	0.500	1.00	J	B9K0189	20-Nov-19	2.35 g	26-Nov-19 04:06	1
PFBS	375-73-5	0.654	0.423	0.500	1.00	J	B9K0189	20-Nov-19	2.35 g	26-Nov-19 04:06	1
4:2 FTS	757124-72-4	ND	0.423	0.500	1.00		B9K0189	20-Nov-19	2.35 g	26-Nov-19 04:06	1
PFHxA	307-24-4	0.567	0.423	0.500	1.00	J	B9K0189	20-Nov-19	2.35 g	26-Nov-19 04:06	1
PFPeS	2706-91-4	ND	0.423	0.500	1.00		B9K0189	20-Nov-19	2.35 g	26-Nov-19 04:06	1
PFHpA	375-85-9	ND	0.423	0.500	1.00		B9K0189	20-Nov-19	2.35 g	26-Nov-19 04:06	1
PFHxS	355-46-4	ND	0.423	0.500	1.00		B9K0189	20-Nov-19	2.35 g	26-Nov-19 04:06	1
6:2 FTS	27619-97-2	ND	0.423	0.500	1.00		B9K0189	20-Nov-19	2.35 g	26-Nov-19 04:06	1
PFOA	335-67-1	1.53	0.423	0.500	1.00		B9K0189	20-Nov-19	2.35 g	26-Nov-19 04:06	1
PFHpS	375-92-8	ND	0.423	0.500	1.00		B9K0189	20-Nov-19	2.35 g	26-Nov-19 04:06	1
PFNA	375-95-1	ND	0.423	0.500	1.00		B9K0189	20-Nov-19	2.35 g	26-Nov-19 04:06	1
PFOSA	754-91-6	ND	0.423	0.500	1.00		B9K0189	20-Nov-19	2.35 g	26-Nov-19 04:06	1
PFOS	1763-23-1	63.6	0.423	0.500	1.00		B9K0189	20-Nov-19	2.35 g	26-Nov-19 04:06	1
PFDA	335-76-2	1.19	0.423	0.500	1.00		B9K0189	20-Nov-19	2.35 g	26-Nov-19 04:06	1
8:2 FTS	39108-34-4	ND	0.423	0.500	1.00		B9K0189	20-Nov-19	2.35 g	26-Nov-19 04:06	1
PFNS	68259-12-1	ND	0.715	0.750	1.00		B9K0189	20-Nov-19	2.35 g	26-Nov-19 04:06	1
MeFOSAA	2355-31-9	ND	0.423	0.500	1.00		B9K0189	20-Nov-19	2.35 g	26-Nov-19 04:06	1
EtFOSAA	2991-50-6	ND	0.423	0.500	1.00		B9K0189	20-Nov-19	2.35 g	26-Nov-19 04:06	1
PFUnA	2058-94-8	ND	0.423	0.500	1.00		B9K0189	20-Nov-19	2.35 g	26-Nov-19 04:06	1
PFDS	335-77-3	ND	0.423	0.500	1.00		B9K0189	20-Nov-19	2.35 g	26-Nov-19 04:06	1
PFDoA	307-55-1	ND	0.423	0.500	1.00		B9K0189	20-Nov-19	2.35 g	26-Nov-19 04:06	1
PFTrDA	72629-94-8	ND	0.423	0.500	1.00		B9K0189	20-Nov-19	2.35 g	26-Nov-19 04:06	1
PFTeDA	376-06-7	ND	0.423	0.500	1.00		B9K0189	20-Nov-19	2.35 g	26-Nov-19 04:06	1

Labeled Standards	Type	% Recovery	Limits	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
13C3-PFBA	IS	92.6	60 - 130		B9K0189	20-Nov-19	2.35 g	26-Nov-19 04:06	1
13C3-PFPeA	IS	91.3	60 - 150		B9K0189	20-Nov-19	2.35 g	26-Nov-19 04:06	1
13C3-PFBS	IS	85.3	60 - 150		B9K0189	20-Nov-19	2.35 g	26-Nov-19 04:06	1
13C2-4:2 FTS	IS	66.9	40 - 150		B9K0189	20-Nov-19	2.35 g	26-Nov-19 04:06	1
13C2-PFHxA	IS	93.3	70 - 130		B9K0189	20-Nov-19	2.35 g	26-Nov-19 04:06	1
13C4-PFHpA	IS	94.4	60 - 150		B9K0189	20-Nov-19	2.35 g	26-Nov-19 04:06	1
13C3-PFHxS	IS	81.4	60 - 130		B9K0189	20-Nov-19	2.35 g	26-Nov-19 04:06	1
13C2-6:2 FTS	IS	104	40 - 150		B9K0189	20-Nov-19	2.35 g	26-Nov-19 04:06	1
13C5-PFNA	IS	83.2	50 - 130		B9K0189	20-Nov-19	2.35 g	26-Nov-19 04:06	1
13C8-PFOSA	IS	46.1	20 - 150		B9K0189	20-Nov-19	2.35 g	26-Nov-19 04:06	1
13C2-PFOA	IS	81.7	60 - 130		B9K0189	20-Nov-19	2.35 g	26-Nov-19 04:06	1
13C8-PFOS	IS	95.3	60 - 130		B9K0189	20-Nov-19	2.35 g	26-Nov-19 04:06	1
13C2-PFDA	IS	70.3	60 - 130		B9K0189	20-Nov-19	2.35 g	26-Nov-19 04:06	1

**Sample ID: SB1911071205LEM** **PFAS Isotope Dilution Method**

Client Data				Laboratory Data			
Name:	Merit Laboratories, Inc.	Matrix:	Soil	Lab Sample:	1904043-03	Column:	BEH C18
Project:	Statewide Biosolids	Date Collected:	07-Nov-19 12:05	Date Received:	08-Nov-19 08:53		
Location:	WIXO-02n05e02-BC01			% Solids:	85.1		

Labeled Standards	Type	% Recovery	Limits	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
13C2-8:2 FTS	IS	98.0	40 - 150		B9K0189	20-Nov-19	2.35 g	26-Nov-19 04:06	1
d3-MeFOSAA	IS	58.4	50 - 150		B9K0189	20-Nov-19	2.35 g	26-Nov-19 04:06	1
13C2-PFUnA	IS	72.1	60 - 130		B9K0189	20-Nov-19	2.35 g	26-Nov-19 04:06	1
d5-EtFOSAA	IS	67.1	50 - 150		B9K0189	20-Nov-19	2.35 g	26-Nov-19 04:06	1
13C2-PFDoA	IS	79.7	30 - 130		B9K0189	20-Nov-19	2.35 g	26-Nov-19 04:06	1
13C2-PFTeDA	IS	57.7	20 - 150		B9K0189	20-Nov-19	2.35 g	26-Nov-19 04:06	1

DL - Detection Limit

LOD - Limit of Detection  
LOQ - Limit of quantitation

The results are reported in dry weight.  
The sample size is reported in wet weight.  
Results reported to the DL.

When reported, PFHxS, PFOA, PFOS, MeFOSAA and EtFOSAA include both linear and branched isomers. Only the linear isomer is reported for all other analytes.

**Sample ID: SB1911071355LEM**
**PFAS Isotope Dilution Method**

Client Data				Laboratory Data			
Name:	Merit Laboratories, Inc.	Matrix:	Soil	Lab Sample:	1904043-04	Column:	BEH C18
Project:	Statewide Biosolids	Date Collected:	07-Nov-19 13:55	Date Received:	08-Nov-19 08:53		
Location:	WIXO-02n05e02-BC01			% Solids:	98.7		

Analyte	CAS Number	Conc. (ng/g)	DL	LOD	LOQ	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
PFBA	375-22-4	ND	0.424	0.502	1.00		B9K0189	20-Nov-19	2.02 g	26-Nov-19 04:16	1
PFPeA	2706-90-3	0.830	0.424	0.502	1.00	J	B9K0189	20-Nov-19	2.02 g	26-Nov-19 04:16	1
PFBS	375-73-5	0.531	0.424	0.502	1.00	J	B9K0189	20-Nov-19	2.02 g	26-Nov-19 04:16	1
4:2 FTS	757124-72-4	ND	0.424	0.502	1.00		B9K0189	20-Nov-19	2.02 g	26-Nov-19 04:16	1
PFHxA	307-24-4	0.448	0.424	0.502	1.00	J	B9K0189	20-Nov-19	2.02 g	26-Nov-19 04:16	1
PFPeS	2706-91-4	ND	0.424	0.502	1.00		B9K0189	20-Nov-19	2.02 g	26-Nov-19 04:16	1
PFHpA	375-85-9	ND	0.424	0.502	1.00		B9K0189	20-Nov-19	2.02 g	26-Nov-19 04:16	1
PFHxS	355-46-4	ND	0.424	0.502	1.00		B9K0189	20-Nov-19	2.02 g	26-Nov-19 04:16	1
6:2 FTS	27619-97-2	ND	0.424	0.502	1.00		B9K0189	20-Nov-19	2.02 g	26-Nov-19 04:16	1
PFOA	335-67-1	1.38	0.424	0.502	1.00		B9K0189	20-Nov-19	2.02 g	26-Nov-19 04:16	1
PFHpS	375-92-8	ND	0.424	0.502	1.00		B9K0189	20-Nov-19	2.02 g	26-Nov-19 04:16	1
PFNA	375-95-1	ND	0.424	0.502	1.00		B9K0189	20-Nov-19	2.02 g	26-Nov-19 04:16	1
PFOSA	754-91-6	ND	0.424	0.502	1.00		B9K0189	20-Nov-19	2.02 g	26-Nov-19 04:16	1
PFOS	1763-23-1	75.7	0.424	0.502	1.00		B9K0189	20-Nov-19	2.02 g	26-Nov-19 04:16	1
PFDA	335-76-2	1.30	0.424	0.502	1.00		B9K0189	20-Nov-19	2.02 g	26-Nov-19 04:16	1
8:2 FTS	39108-34-4	ND	0.424	0.502	1.00		B9K0189	20-Nov-19	2.02 g	26-Nov-19 04:16	1
PFNS	68259-12-1	ND	0.717	0.752	1.00		B9K0189	20-Nov-19	2.02 g	26-Nov-19 04:16	1
MeFOSAA	2355-31-9	ND	0.424	0.502	1.00		B9K0189	20-Nov-19	2.02 g	26-Nov-19 04:16	1
EtFOSAA	2991-50-6	ND	0.424	0.502	1.00		B9K0189	20-Nov-19	2.02 g	26-Nov-19 04:16	1
PFUnA	2058-94-8	ND	0.424	0.502	1.00		B9K0189	20-Nov-19	2.02 g	26-Nov-19 04:16	1
PFDS	335-77-3	ND	0.424	0.502	1.00		B9K0189	20-Nov-19	2.02 g	26-Nov-19 04:16	1
PFDoA	307-55-1	ND	0.424	0.502	1.00		B9K0189	20-Nov-19	2.02 g	26-Nov-19 04:16	1
PFTTrDA	72629-94-8	ND	0.424	0.502	1.00		B9K0189	20-Nov-19	2.02 g	26-Nov-19 04:16	1
PFTeDA	376-06-7	ND	0.424	0.502	1.00		B9K0189	20-Nov-19	2.02 g	26-Nov-19 04:16	1

Labeled Standards	Type	% Recovery	Limits	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
13C3-PFBA	IS	96.2	60 - 130		B9K0189	20-Nov-19	2.02 g	26-Nov-19 04:16	1
13C3-PFPeA	IS	93.0	60 - 150		B9K0189	20-Nov-19	2.02 g	26-Nov-19 04:16	1
13C3-PFBS	IS	98.0	60 - 150		B9K0189	20-Nov-19	2.02 g	26-Nov-19 04:16	1
13C2-4:2 FTS	IS	85.0	40 - 150		B9K0189	20-Nov-19	2.02 g	26-Nov-19 04:16	1
13C2-PFHxA	IS	82.6	70 - 130		B9K0189	20-Nov-19	2.02 g	26-Nov-19 04:16	1
13C4-PFHpA	IS	88.0	60 - 150		B9K0189	20-Nov-19	2.02 g	26-Nov-19 04:16	1
13C3-PFHxS	IS	97.7	60 - 130		B9K0189	20-Nov-19	2.02 g	26-Nov-19 04:16	1
13C2-6:2 FTS	IS	99.7	40 - 150		B9K0189	20-Nov-19	2.02 g	26-Nov-19 04:16	1
13C5-PFNA	IS	81.2	50 - 130		B9K0189	20-Nov-19	2.02 g	26-Nov-19 04:16	1
13C8-PFOSA	IS	62.2	20 - 150		B9K0189	20-Nov-19	2.02 g	26-Nov-19 04:16	1
13C2-PFOA	IS	88.9	60 - 130		B9K0189	20-Nov-19	2.02 g	26-Nov-19 04:16	1
13C8-PFOS	IS	104	60 - 130		B9K0189	20-Nov-19	2.02 g	26-Nov-19 04:16	1
13C2-PFDA	IS	72.1	60 - 130		B9K0189	20-Nov-19	2.02 g	26-Nov-19 04:16	1

**Sample ID: SB1911071355LEM** **PFAS Isotope Dilution Method**

Client Data				Laboratory Data			
Name:	Merit Laboratories, Inc.	Matrix:	Soil	Lab Sample:	1904043-04	Column:	BEH C18
Project:	Statewide Biosolids	Date Collected:	07-Nov-19 13:55	Date Received:	08-Nov-19 08:53		
Location:	WIXO-02n05e02-BC01			% Solids:	98.7		

Labeled Standards	Type	% Recovery	Limits	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
13C2-8:2 FTS	IS	112	40 - 150		B9K0189	20-Nov-19	2.02 g	26-Nov-19 04:16	1
d3-MeFOSAA	IS	66.1	50 - 150		B9K0189	20-Nov-19	2.02 g	26-Nov-19 04:16	1
13C2-PFUnA	IS	74.6	60 - 130		B9K0189	20-Nov-19	2.02 g	26-Nov-19 04:16	1
d5-EtFOSAA	IS	72.4	50 - 150		B9K0189	20-Nov-19	2.02 g	26-Nov-19 04:16	1
13C2-PFDoA	IS	77.9	30 - 130		B9K0189	20-Nov-19	2.02 g	26-Nov-19 04:16	1
13C2-PFTeDA	IS	45.7	20 - 150		B9K0189	20-Nov-19	2.02 g	26-Nov-19 04:16	1

DL - Detection Limit

LOD - Limit of Detection  
LOQ - Limit of quantitation

The results are reported in dry weight.  
The sample size is reported in wet weight.  
Results reported to the DL.

When reported, PFHxS, PFOA, PFOS, MeFOSAA and EtFOSAA include both linear and branched isomers. Only the linear isomer is reported for all other analytes.

**Sample ID: SB1911071350LEM**
**PFAS Isotope Dilution Method**

Client Data				Laboratory Data			
Name:	Merit Laboratories, Inc.	Matrix:	Soil	Lab Sample:	1904043-05	Column:	BEH C18
Project:	Statewide Biosolids	Date Collected:	07-Nov-19 13:50	Date Received:	08-Nov-19 08:53		
Location:	WIXO-02n05e02-BC01			% Solids:	83.1		

Analyte	CAS Number	Conc. (ng/g)	DL	LOD	LOQ	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
PFBA	375-22-4	ND	0.422	0.499	0.999		B9K0189	20-Nov-19	2.41 g	26-Nov-19 04:27	1
PFPeA	2706-90-3	0.771	0.422	0.499	0.999	J	B9K0189	20-Nov-19	2.41 g	26-Nov-19 04:27	1
PFBS	375-73-5	0.526	0.422	0.499	0.999	J	B9K0189	20-Nov-19	2.41 g	26-Nov-19 04:27	1
4:2 FTS	757124-72-4	ND	0.422	0.499	0.999		B9K0189	20-Nov-19	2.41 g	26-Nov-19 04:27	1
PFHxA	307-24-4	0.465	0.422	0.499	0.999	J, Q	B9K0189	20-Nov-19	2.41 g	26-Nov-19 04:27	1
PFPeS	2706-91-4	ND	0.422	0.499	0.999		B9K0189	20-Nov-19	2.41 g	26-Nov-19 04:27	1
PFHpA	375-85-9	ND	0.422	0.499	0.999		B9K0189	20-Nov-19	2.41 g	26-Nov-19 04:27	1
PFHxS	355-46-4	ND	0.422	0.499	0.999		B9K0189	20-Nov-19	2.41 g	26-Nov-19 04:27	1
6:2 FTS	27619-97-2	ND	0.422	0.499	0.999		B9K0189	20-Nov-19	2.41 g	26-Nov-19 04:27	1
PFOA	335-67-1	1.19	0.422	0.499	0.999		B9K0189	20-Nov-19	2.41 g	26-Nov-19 04:27	1
PFHpS	375-92-8	ND	0.422	0.499	0.999		B9K0189	20-Nov-19	2.41 g	26-Nov-19 04:27	1
PFNA	375-95-1	ND	0.422	0.499	0.999		B9K0189	20-Nov-19	2.41 g	26-Nov-19 04:27	1
PFOSA	754-91-6	ND	0.422	0.499	0.999		B9K0189	20-Nov-19	2.41 g	26-Nov-19 04:27	1
PFOS	1763-23-1	94.1	0.422	0.499	0.999		B9K0189	20-Nov-19	2.41 g	26-Nov-19 04:27	1
PFDA	335-76-2	1.30	0.422	0.499	0.999		B9K0189	20-Nov-19	2.41 g	26-Nov-19 04:27	1
8:2 FTS	39108-34-4	ND	0.422	0.499	0.999		B9K0189	20-Nov-19	2.41 g	26-Nov-19 04:27	1
PFNS	68259-12-1	ND	0.714	0.749	0.999		B9K0189	20-Nov-19	2.41 g	26-Nov-19 04:27	1
MeFOSAA	2355-31-9	0.667	0.422	0.499	0.999	J	B9K0189	20-Nov-19	2.41 g	26-Nov-19 04:27	1
EtFOSAA	2991-50-6	ND	0.422	0.499	0.999		B9K0189	20-Nov-19	2.41 g	26-Nov-19 04:27	1
PFUnA	2058-94-8	ND	0.422	0.499	0.999		B9K0189	20-Nov-19	2.41 g	26-Nov-19 04:27	1
PFDS	335-77-3	ND	0.422	0.499	0.999		B9K0189	20-Nov-19	2.41 g	26-Nov-19 04:27	1
PFDoA	307-55-1	ND	0.422	0.499	0.999		B9K0189	20-Nov-19	2.41 g	26-Nov-19 04:27	1
PFTTrDA	72629-94-8	ND	0.422	0.499	0.999		B9K0189	20-Nov-19	2.41 g	26-Nov-19 04:27	1
PFTeDA	376-06-7	ND	0.422	0.499	0.999		B9K0189	20-Nov-19	2.41 g	26-Nov-19 04:27	1

Labeled Standards	Type	% Recovery	Limits	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
13C3-PFBA	IS	93.8	60 - 130		B9K0189	20-Nov-19	2.41 g	26-Nov-19 04:27	1
13C3-PFPeA	IS	92.0	60 - 150		B9K0189	20-Nov-19	2.41 g	26-Nov-19 04:27	1
13C3-PFBS	IS	88.4	60 - 150		B9K0189	20-Nov-19	2.41 g	26-Nov-19 04:27	1
13C2-4:2 FTS	IS	74.0	40 - 150		B9K0189	20-Nov-19	2.41 g	26-Nov-19 04:27	1
13C2-PFHxA	IS	91.0	70 - 130		B9K0189	20-Nov-19	2.41 g	26-Nov-19 04:27	1
13C4-PFHpA	IS	92.3	60 - 150		B9K0189	20-Nov-19	2.41 g	26-Nov-19 04:27	1
13C3-PFHxS	IS	93.0	60 - 130		B9K0189	20-Nov-19	2.41 g	26-Nov-19 04:27	1
13C2-6:2 FTS	IS	92.4	40 - 150		B9K0189	20-Nov-19	2.41 g	26-Nov-19 04:27	1
13C5-PFNA	IS	74.2	50 - 130		B9K0189	20-Nov-19	2.41 g	26-Nov-19 04:27	1
13C8-PFOSA	IS	59.5	20 - 150		B9K0189	20-Nov-19	2.41 g	26-Nov-19 04:27	1
13C2-PFOA	IS	85.6	60 - 130		B9K0189	20-Nov-19	2.41 g	26-Nov-19 04:27	1
13C8-PFOS	IS	86.0	60 - 130		B9K0189	20-Nov-19	2.41 g	26-Nov-19 04:27	1
13C2-PFDA	IS	75.2	60 - 130		B9K0189	20-Nov-19	2.41 g	26-Nov-19 04:27	1

**Sample ID: SB1911071350LEM** **PFAS Isotope Dilution Method**

Client Data				Laboratory Data			
Name:	Merit Laboratories, Inc.	Matrix:	Soil	Lab Sample:	1904043-05	Column:	BEH C18
Project:	Statewide Biosolids	Date Collected:	07-Nov-19 13:50	Date Received:	08-Nov-19 08:53		
Location:	WIXO-02n05e02-BC01			% Solids:	83.1		

Labeled Standards	Type	% Recovery	Limits	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
13C2-8:2 FTS	IS	102	40 - 150		B9K0189	20-Nov-19	2.41 g	26-Nov-19 04:27	1
d3-MeFOSAA	IS	62.1	50 - 150		B9K0189	20-Nov-19	2.41 g	26-Nov-19 04:27	1
13C2-PFUnA	IS	82.6	60 - 130		B9K0189	20-Nov-19	2.41 g	26-Nov-19 04:27	1
d5-EtFOSAA	IS	69.6	50 - 150		B9K0189	20-Nov-19	2.41 g	26-Nov-19 04:27	1
13C2-PFDoA	IS	74.1	30 - 130		B9K0189	20-Nov-19	2.41 g	26-Nov-19 04:27	1
13C2-PFTeDA	IS	44.6	20 - 150		B9K0189	20-Nov-19	2.41 g	26-Nov-19 04:27	1

DL - Detection Limit

LOD - Limit of Detection  
LOQ - Limit of quantitation

The results are reported in dry weight.  
The sample size is reported in wet weight.  
Results reported to the DL.

When reported, PFHxS, PFOA, PFOS, MeFOSAA and EtFOSAA include both linear and branched isomers. Only the linear isomer is reported for all other analytes.

**Sample ID: SB1911071345LEM**
**PFAS Isotope Dilution Method**

Client Data				Laboratory Data			
Name:	Merit Laboratories, Inc.	Matrix:	Soil	Lab Sample:	1904043-06	Column:	BEH C18
Project:	Statewide Biosolids	Date Collected:	07-Nov-19 13:45	Date Received:	08-Nov-19 08:53		
Location:	WIXO-02n05e02-BC01			% Solids:	85.7		

Analyte	CAS Number	Conc. (ng/g)	DL	LOD	LOQ	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
PFBA	375-22-4	ND	0.421	0.499	0.997		B9K0189	20-Nov-19	2.34 g	26-Nov-19 04:37	1
PFPeA	2706-90-3	0.822	0.421	0.499	0.997	J	B9K0189	20-Nov-19	2.34 g	26-Nov-19 04:37	1
PFBS	375-73-5	0.498	0.421	0.499	0.997	J	B9K0189	20-Nov-19	2.34 g	26-Nov-19 04:37	1
4:2 FTS	757124-72-4	ND	0.421	0.499	0.997		B9K0189	20-Nov-19	2.34 g	26-Nov-19 04:37	1
PFHxA	307-24-4	0.430	0.421	0.499	0.997	J, Q	B9K0189	20-Nov-19	2.34 g	26-Nov-19 04:37	1
PFPeS	2706-91-4	ND	0.421	0.499	0.997		B9K0189	20-Nov-19	2.34 g	26-Nov-19 04:37	1
PFHpA	375-85-9	ND	0.421	0.499	0.997		B9K0189	20-Nov-19	2.34 g	26-Nov-19 04:37	1
PFHxS	355-46-4	ND	0.421	0.499	0.997		B9K0189	20-Nov-19	2.34 g	26-Nov-19 04:37	1
6:2 FTS	27619-97-2	ND	0.421	0.499	0.997		B9K0189	20-Nov-19	2.34 g	26-Nov-19 04:37	1
PFOA	335-67-1	1.44	0.421	0.499	0.997		B9K0189	20-Nov-19	2.34 g	26-Nov-19 04:37	1
PFHpS	375-92-8	ND	0.421	0.499	0.997		B9K0189	20-Nov-19	2.34 g	26-Nov-19 04:37	1
PFNA	375-95-1	0.510	0.421	0.499	0.997	J, Q	B9K0189	20-Nov-19	2.34 g	26-Nov-19 04:37	1
PFOSA	754-91-6	ND	0.421	0.499	0.997		B9K0189	20-Nov-19	2.34 g	26-Nov-19 04:37	1
PFOS	1763-23-1	96.7	0.421	0.499	0.997		B9K0189	20-Nov-19	2.34 g	26-Nov-19 04:37	1
PFDA	335-76-2	1.03	0.421	0.499	0.997		B9K0189	20-Nov-19	2.34 g	26-Nov-19 04:37	1
8:2 FTS	39108-34-4	ND	0.421	0.499	0.997		B9K0189	20-Nov-19	2.34 g	26-Nov-19 04:37	1
PFNS	68259-12-1	ND	0.713	0.748	0.997		B9K0189	20-Nov-19	2.34 g	26-Nov-19 04:37	1
MeFOSAA	2355-31-9	ND	0.421	0.499	0.997		B9K0189	20-Nov-19	2.34 g	26-Nov-19 04:37	1
EtFOSAA	2991-50-6	ND	0.421	0.499	0.997		B9K0189	20-Nov-19	2.34 g	26-Nov-19 04:37	1
PFUnA	2058-94-8	ND	0.421	0.499	0.997		B9K0189	20-Nov-19	2.34 g	26-Nov-19 04:37	1
PFDS	335-77-3	ND	0.421	0.499	0.997		B9K0189	20-Nov-19	2.34 g	26-Nov-19 04:37	1
PFDoA	307-55-1	ND	0.421	0.499	0.997		B9K0189	20-Nov-19	2.34 g	26-Nov-19 04:37	1
PFTTrDA	72629-94-8	ND	0.421	0.499	0.997		B9K0189	20-Nov-19	2.34 g	26-Nov-19 04:37	1
PFTeDA	376-06-7	ND	0.421	0.499	0.997		B9K0189	20-Nov-19	2.34 g	26-Nov-19 04:37	1

Labeled Standards	Type	% Recovery	Limits	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
13C3-PFBA	IS	91.0	60 - 130		B9K0189	20-Nov-19	2.34 g	26-Nov-19 04:37	1
13C3-PFPeA	IS	92.6	60 - 150		B9K0189	20-Nov-19	2.34 g	26-Nov-19 04:37	1
13C3-PFBS	IS	99.3	60 - 150		B9K0189	20-Nov-19	2.34 g	26-Nov-19 04:37	1
13C2-4:2 FTS	IS	87.5	40 - 150		B9K0189	20-Nov-19	2.34 g	26-Nov-19 04:37	1
13C2-PFHxA	IS	90.6	70 - 130		B9K0189	20-Nov-19	2.34 g	26-Nov-19 04:37	1
13C4-PFHpA	IS	85.8	60 - 150		B9K0189	20-Nov-19	2.34 g	26-Nov-19 04:37	1
13C3-PFHxS	IS	97.7	60 - 130		B9K0189	20-Nov-19	2.34 g	26-Nov-19 04:37	1
13C2-6:2 FTS	IS	93.7	40 - 150		B9K0189	20-Nov-19	2.34 g	26-Nov-19 04:37	1
13C5-PFNA	IS	80.5	50 - 130		B9K0189	20-Nov-19	2.34 g	26-Nov-19 04:37	1
13C8-PFOSA	IS	65.0	20 - 150		B9K0189	20-Nov-19	2.34 g	26-Nov-19 04:37	1
13C2-PFOA	IS	92.4	60 - 130		B9K0189	20-Nov-19	2.34 g	26-Nov-19 04:37	1
13C8-PFOS	IS	92.1	60 - 130		B9K0189	20-Nov-19	2.34 g	26-Nov-19 04:37	1
13C2-PFDA	IS	69.8	60 - 130		B9K0189	20-Nov-19	2.34 g	26-Nov-19 04:37	1

**Sample ID: SB1911071345LEM** **PFAS Isotope Dilution Method**

Client Data				Laboratory Data			
Name:	Merit Laboratories, Inc.	Matrix:	Soil	Lab Sample:	1904043-06	Column:	BEH C18
Project:	Statewide Biosolids	Date Collected:	07-Nov-19 13:45	Date Received:	08-Nov-19 08:53		
Location:	WIXO-02n05e02-BC01			% Solids:	85.7		

Labeled Standards	Type	% Recovery	Limits	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
13C2-8:2 FTS	IS	109	40 - 150		B9K0189	20-Nov-19	2.34 g	26-Nov-19 04:37	1
d3-MeFOSAA	IS	72.0	50 - 150		B9K0189	20-Nov-19	2.34 g	26-Nov-19 04:37	1
13C2-PFUnA	IS	74.8	60 - 130		B9K0189	20-Nov-19	2.34 g	26-Nov-19 04:37	1
d5-EtFOSAA	IS	64.9	50 - 150		B9K0189	20-Nov-19	2.34 g	26-Nov-19 04:37	1
13C2-PFDoA	IS	75.7	30 - 130		B9K0189	20-Nov-19	2.34 g	26-Nov-19 04:37	1
13C2-PFTeDA	IS	52.1	20 - 150		B9K0189	20-Nov-19	2.34 g	26-Nov-19 04:37	1

DL - Detection Limit

LOD - Limit of Detection  
LOQ - Limit of quantitation

The results are reported in dry weight.  
The sample size is reported in wet weight.  
Results reported to the DL.

When reported, PFHxS, PFOA, PFOS, MeFOSAA and EtFOSAA include both linear and branched isomers. Only the linear isomer is reported for all other analytes.



## DATA QUALIFIERS & ABBREVIATIONS

B	This compound was also detected in the method blank
Conc.	Concentration
CRS	Cleanup Recovery Standard
D	Dilution
DL	Detection limit
E	The associated compound concentration exceeded the calibration range of the instrument
H	Recovery and/or RPD was outside laboratory acceptance limits
I	Chemical Interference
IS	Internal Standard
J	The amount detected is below the Reporting Limit/LOQ
LOD	Limit of Detection
LOQ	Limit of Quantitation
M	Estimated Maximum Possible Concentration (CA Region 2 projects only)
NA	Not applicable
ND	Not Detected
OPR	Ongoing Precision and Recovery sample
P	The reported concentration may include contribution from chlorinated diphenyl ether(s).
Q	The ion transition ratio is outside of the acceptance criteria.
RL	Reporting Limit
TEQ	Toxic Equivalency
U	Not Detected (specific projects only)
*	See Cover Letter

Unless otherwise noted, solid sample results are reported in dry weight. Tissue samples are reported in wet weight.

### Vista Analytical Laboratory Certifications

Accrediting Authority	Certificate Number
Alaska Department of Environmental Conservation	17-013
Arkansas Department of Environmental Quality	19-013-0
California Department of Health – ELAP	2892
DoD ELAP - A2LA Accredited - ISO/IEC 17025:2005	3091.01
Florida Department of Health	E87777-23
Hawaii Department of Health	N/A
Louisiana Department of Environmental Quality	01977
Maine Department of Health	2018017
Massachusetts Department of Environmental Protection	N/A
Michigan Department of Environmental Quality	9932
Minnesota Department of Health	1521520
New Hampshire Environmental Accreditation Program	207718-B
New Jersey Department of Environmental Protection	190001
New York Department of Health	11411
Oregon Laboratory Accreditation Program	4042-010
Pennsylvania Department of Environmental Protection	016
Texas Commission on Environmental Quality	T104704189-19-10
Vermont Department of Health	VT-4042
Virginia Department of General Services	10272
Washington Department of Ecology	C584-19
Wisconsin Department of Natural Resources	998036160

*Current certificates and lists of licensed parameters are located in the Quality Assurance office and are available upon request.*

## NELAP Accredited Test Methods

MATRIX: Air	
Description of Test	Method
Determination of Polychlorinated p-Dioxins & Polychlorinated Dibenzofurans	EPA 23
Determination of Polychlorinated p-Dioxins & Polychlorinated Dibenzofurans	EPA TO-9A

MATRIX: Biological Tissue	
Description of Test	Method
Tetra- through Octa-Chlorinated Dioxins and Furans by Isotope Dilution GC/HRMS	EPA 1613B
Brominated Diphenyl Ethers by HRGC/HRMS	EPA 1614A
Chlorinated Biphenyl Congeners in Water, Soil, Sediment, and Tissue by GC/HRMS	EPA 1668A/C
Pesticides in Water, Soil, Sediment, Biosolids, and Tissue by HRGC/HRMS	EPA 1699
Perfluorinated Alkyl Acids in Drinking Water by SPE and LC/MS/MS	EPA 537
Polychlorinated Dibenzo-p-Dioxins and Polychlorinated Dibenzofurans by GC/HRMS	EPA 8280A/B
Polychlorinated Dibenzodioxins (PCDDs) and Polychlorinated Dibenzofurans (PCDFs) by GC/HRMS	EPA 8290/8290A

MATRIX: Drinking Water	
Description of Test	Method
2,3,7,8-Tetrachlorodibenzo- p-dioxin (2,3,7,8-TCDD) GC/HRMS	EPA 1613/1613B
1,4-Dioxane (1,4-Diethyleneoxide) analysis by GC/HRMS	EPA 522
Perfluorinated Alkyl Acids in Drinking Water by SPE and LC/MS/MS	EPA 537
Perfluorinated Alkyl Acids in Drinking Water by SPE and LC/MS/MS	ISO 25101 2009

MATRIX: Non-Potable Water	
Description of Test	Method
Tetra- through Octa-Chlorinated Dioxins and Furans by Isotope Dilution GC/HRMS	EPA 1613B
Brominated Diphenyl Ethers by HRGC/HRMS	EPA 1614A
Chlorinated Biphenyl Congeners in Water, Soil, Sediment, and Tissue by GC/HRMS	EPA 1668A/C
Pesticides in Water, Soil, Sediment, Biosolids, and Tissue by HRGC/HRMS	EPA 1699
Perfluorinated Alkyl Acids in Drinking Water by SPE and LC/MS/MS	EPA 537
Dioxin by GC/HRMS	EPA 613
Polychlorinated Dibenzo-p-Dioxins and Polychlorinated Dibenzofurans by GC/HRMS	EPA 8280A/B
Polychlorinated Dibenzodioxins (PCDDs) and Polychlorinated Dibenzofurans (PCDFs) by GC/HRMS	EPA 8290/8290A

MATRIX: Solids	
Description of Test	Method
Tetra-Octa Chlorinated Dioxins and Furans by Isotope Dilution GC/HRMS	EPA 1613
Tetra- through Octa-Chlorinated Dioxins and Furans by Isotope Dilution GC/HRMS	EPA 1613B
Brominated Diphenyl Ethers by HRGC/HRMS	EPA 1614A
Chlorinated Biphenyl Congeners in Water, Soil, Sediment, and Tissue by GC/HRMS	EPA 1668A/C
Pesticides in Water, Soil, Sediment, Biosolids, and Tissue by HRGC/HRMS	EPA 1699
Perfluorinated Alkyl Acids in Drinking Water by SPE and LC/MS/MS	EPA 537
Polychlorinated Dibenzo-p-Dioxins and Polychlorinated Dibenzofurans by GC/HRMS	EPA 8280A/B
Polychlorinated Dibenzodioxins (PCDDs) and Polychlorinated Dibenzofurans (PCDFs) by GC/HRMS	EPA 8290/8290A



# CHAIN OF CUSTODY

**For Laboratory Use Only**  
 Work Order #: 1904043 Temp: 3.0 °C  
 Storage ID: WR-2 Storage Secured: Yes  No

Project ID: Statewide Biosolids PO#: 60588767.01 Sampler: Lauren McNeely  
 (name)

TAT Standard:  21 days  
 (check one): Rush (surcharge may apply)  
 14 days  7 days Specify: \_\_\_\_\_

Invoice to: Name Stephanie Kammer Company EGLE Address 525 W. Allegan Street City Lansing State MI Ph# 517-897-1597 Fax# 517-241-3571

Relinquished by (printed name and signature) Lauren McNeely Date 11/7/2019 Time 1815 Received by (printed name and signature) \_\_\_\_\_ Date \_\_\_\_\_ Time \_\_\_\_\_  
*\* RECEIVED REISED COC VIA EMAIL 11-15-19 1441*  
*- SEE ORIGINAL COC FOR SIGNATURE - FE 11-16-19*

Sample ID	Date	Time	Location/Sample Description	Container(s)			Add Analysis(es) Requested					Comments	
				Quantity	Type	Matrix	PFAS Isotope Dilution	USEPA Method 537	PFAS List: 14	PFAS List: 6	PFAS List: 14		PFAS List: 6
SB1911071210LEM	11/7/19	1210	WIXO-02n05e02-BC01	1	PJ	SO			X				0-12"; DU2-SOILB
SB1911071215LEM	11/7/19	1215	WIXO-02n05e02-BC01	1	PJ	SO			X				0-12"; Incremental Sampling Prep - DU2-SOILC
SB1911071205LEM	11/7/19	1205	WIXO-02n05e02-BC01	1	PJ	SO			X				6-8"; DU2-SOILA
SB1911071355LEM	11/7/19	1355	WIXO-02n05e02-BC01	1	PJ	SO			X				0-12"; Incremental Sampling Prep - 'DU1-SOILC
SB1911071350LEM	11/7/19	1350	WIXO-02n05e02-BC01	1	PJ	SO			X				0-12"; DU1-SOILB
SB1911071345LEM	11/7/19	1345	WIXO-02n05e02-BC01	1	PJ	SO			X				6-8"; DU1-SOILA

Special Instructions/Comments: Send Results and Acknowledgements to the list provided Name: Stephanie Kammer  
 Company: EGLE  
 Address: 525 W. Allegan Street, Constitution Hall, 1st South West  
 City: Lansing State: MI Zip: 30242  
 Phone: 517-897-1597 Fax: 517-241-3571  
 Email: dorin.bogdan@aecom.com

Container Types: P= HDPE, PJ= HDPE Jar  
 Bottle Preservation Type: T = Thiosulfate, Matrix Types: AQ = Aqueous, DW = Drinking Water, EF = Effluent, PP = Pulp/Paper, SD = Sediment,  
 O = Other: \_\_\_\_\_ TZ = Trizma: \_\_\_\_\_ SL = Sludge, BS=Biosolids, SO = Soil, WW = Wastewater, B = Blood/Serum, O = Other: \_\_\_\_\_



# CHAIN OF CUSTODY

ID: LR - 537COC

1 of 3  
**1904043**

**For Laboratory Use Only**  
 Work Order #: 1903964 Temp: 3.0 °C  
 Storage ID: P-13, WR-2 Storage Secured: Yes  No

Project ID: Biosolids PO#: \_\_\_\_\_ Sampler: Lauren McNeely  
(name)

TAT Standard:  21 days  
 (check one): Rush (surcharge may apply)  
 14 days  7 days Specify: \_\_\_\_\_  
 State \_\_\_\_\_ Ph# \_\_\_\_\_ Fax# \_\_\_\_\_

Invoice to: Name Stephanie Kammer EGE Company \_\_\_\_\_ Address \_\_\_\_\_ City \_\_\_\_\_ State \_\_\_\_\_ Ph# \_\_\_\_\_ Fax# \_\_\_\_\_

Relinquished by (printed name and signature) Lauren McNeely Date 11/7/19 Time 1815 Received by (printed name and signature) Hayden Canai Date 11/08/19 Time 08:53  
 Relinquished by (printed name and signature) \_\_\_\_\_ Date \_\_\_\_\_ Time \_\_\_\_\_ Received by (printed name and signature) \_\_\_\_\_ Date \_\_\_\_\_ Time \_\_\_\_\_  
-SEE REVERSE COCS - FE 11-16-19

SHIP TO: Vista Analytical Laboratory  
 1104 Windfield Way  
 El Dorado Hills, CA 95762  
 (916) 673-1520 \* Fax (916) 673-0106

Method of Shipment: \_\_\_\_\_  
 Tracking No.: \_\_\_\_\_

ATTN: \_\_\_\_\_

Quantity	Type	Matrix	Add Analysis(es) Requested				Mod. EPA Method 537	EPA Method 537(DW only)	Comments
			PFOA/PFOS	UCMR3 PFAS Lists	537 List: 14	Full List or 20 of 20			

Sample ID	Date	Time	Location/Sample Description	Quantity	Type	Matrix	PFOA/PFOS	UCMR3 PFAS Lists	537 List: 14	Full List or 20 of 20	Other: Please List Below	PFOA/PFOS	UCMR3 PFAS Lists	PFAS List: 14	Comments
✓ SB1911071210 LEM	11/7/19	1210	DV2-SOILB	1	PJ	SO				X					
✓ SB1911071215 LEM	11/7/19	1215	DV2-SOILC	1	PJ	SO				X					Incremental Sampling Prep
✓ SB1911071205 LEM	11/7/19	1205	DV2-SOILA	1	PJ	SO				X					
✓ SB1911071355 LEM	11/7/19	1355	DV1-SOILC	1	PJ	SO				X					Incremental Sampling Prep
✓ SB1911071350 LEM	11/7/19	1350	DV1-SOILB	1	PJ	SO				X					
✓ SB1911071345 LEM	11/7/19	1345	DV1-SOILA	1	PJ	SO				X					
● SB1911071550 LEM	11/7/19	1550	SORG_SOIL2	1	PJ	SO				X					
● SB1911071515 LEM	11/7/19	1515	SORG_SOIL1	1	PJ	SO				X					
* WR1911060935 LEM	11/6/19	0935	6875 McClements	2	P	DW								X	
* WT1911061000 LEM	11/6/19	1000	LIVESTOCK WELL	2	P	DW								X	

Special Instructions/Comments:  
 ~ WO # = 1904043  
 Δ WO # = 1904042  
 \* WO # = 1903965  
 ● WO # = 1903964  
 @ WO # = 1903960

**SEND DOCUMENTATION AND RESULTS TO:**

Name: \_\_\_\_\_  
 Company: \_\_\_\_\_  
 Address: \_\_\_\_\_  
 City: \_\_\_\_\_ State: \_\_\_\_\_ Zip: \_\_\_\_\_  
 Phone: \_\_\_\_\_ Fax: \_\_\_\_\_  
 Email: \_\_\_\_\_

Container Types: P= HDPE, PJ= HDPE Jar  
 O = Other: \_\_\_\_\_  
 Bottle Preservation Type: T = Thiosulfate,  
 TZ = Trizma: \_\_\_\_\_  
 Matrix Types: AQ = Aqueous, DW = Drinking Water, EF = Effluent, PP = Pulp/Paper, SD = Sediment,  
 SL = Sludge, SO = Soil, WW = Wastewater, B = Blood/Serum, O = Other: \_\_\_\_\_



# CHAIN OF CUSTODY

ID: LR - 537COC

2 of 3  
1904043

**For Laboratory Use Only**  
Work Order #: 1903964 KE 11-16-19 Temp: 3.0 °C  
Storage ID: R-13, WR-2 Storage Secured: Yes  No

Project ID: Biosolids PO#: \_\_\_\_\_ Sampler: Lauren McNeely (name)

TAT (check one):  21 days  14 days  7 days Specify: \_\_\_\_\_  
Standard: 21 days (Rush (surcharge may apply))  
State: \_\_\_\_\_ Ph#: \_\_\_\_\_ Fax#: \_\_\_\_\_

Invoice to: Name Stephanie Kammer Company EGLE Address \_\_\_\_\_ City \_\_\_\_\_ State \_\_\_\_\_

Relinquished by (printed name and signature) Lauren McNeely Date 11/7/19 Time 1815 Received by (printed name and signature) Hagen Crans Date 11/08/19 Time 08:53

*- SEE REVISED COCS - KE 11-16-19*

SHIP TO: Vista Analytical Laboratory  
1104 Windfield Way  
El Dorado Hills, CA 95762  
(916) 673-1520 \* Fax (916) 673-0106  
Method of Shipment: \_\_\_\_\_  
Tracking No.: \_\_\_\_\_  
ATTN: \_\_\_\_\_

Sample ID	Date	Time	Location/Sample Description	Add Analysis(es) Requested							EPA Method 537(DW only)			Comments		
				Quantity	Type	Matrix	PFOA/PFOs	UICMR3 PFAS List6	537 List: 14	Full List of 28 2017 Other: Please List Below	PFOA/PFOs	UICMR3 PFAS List6	PFAS List: 14			
* WT1911071000LEM	11/7/19	1000	6795 McClements	2	P	DW										
* WT1911061255LEM	11/6/19	1255	65 S. Kellogg	2	P	DW										
* WT1911071015LEM	11/7/19	1015	7342 Golf Club	2	P	DW										
Δ SW1911061100LEM	11/6/19	1100	POND 1	2	P	SW				X						
Δ SW1911061135LEM	11/6/19	1135	POND 2	2	P	SW				X						
Δ SW1911061155LEM	11/6/19	1155	POND 3	2	P	SW				X						
Δ SW1911061235LEM	11/6/19	1235	POND 4	2	P	SW				X						
Δ SW1911061245LEM	11/6/19	1245	POND 5	2	P	SW				X						
@ EB1911071430LEM	11/7/19	1430	SW Sampler	2	P	AQ				X						
@ EB1911071435LEM	11/7/19	1435	Soil Sampler	2	P	AQ				X						

Special Instructions/Comments:  
 ~ WO # = 1904043  
 Δ WO # = 1904042  
 \* WO # = 1903965  
 ● WO # = 1903964  
 @ WO # = 1903960

**SEND DOCUMENTATION AND RESULTS TO:**

Name: \_\_\_\_\_  
 Company: \_\_\_\_\_  
 Address: \_\_\_\_\_  
 City: \_\_\_\_\_ State: \_\_\_\_\_ Zip: \_\_\_\_\_  
 Phone: \_\_\_\_\_ Fax: \_\_\_\_\_  
 Email: \_\_\_\_\_

Container Types: P= HDPE, PJ= HDPE Jar      Bottle Preservation Type: T = Thiosulfate, TZ = Trizma: \_\_\_\_\_  
 Matrix Types: AQ = Aqueous, DW = Drinking Water, EF = Effluent, PP = Pulp/Paper, SD = Sediment, SL = Sludge, SO = Soil, WW = Wastewater, B = Blood/Serum, O = Other: \_\_\_\_\_





**Sample Log-In Checklist**

1904043  
~~1903965~~

Page # 1 of 1

Vista Work Order #: 1903965 KE 11-16-19 TAT Std

Samples Arrival:	Date/Time		Initials:		Location: <u>WR-2</u>		
	<u>11/08/19 08:53</u>		<u>HOG</u>		Shelf/Rack: <u>NA</u>		
Delivered By:	<input checked="" type="checkbox"/> FedEx	<input type="checkbox"/> UPS	<input type="checkbox"/> On Trac	<input type="checkbox"/> GSO	<input type="checkbox"/> DHL	<input type="checkbox"/> Hand Delivered	<input type="checkbox"/> Other
Preservation:	<input checked="" type="checkbox"/> Ice		<input type="checkbox"/> Blue Ice		<input type="checkbox"/> Dry Ice		<input type="checkbox"/> None
Temp °C:	<u>3.0</u> (uncorrected)	Probe used: Y <input checked="" type="checkbox"/> N			Thermometer ID: <u>IR-3</u>		
Temp °C:	<u>3.0</u> (corrected)						

	YES	NO	NA
Shipping Container(s) Intact?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Shipping Custody Seals Intact?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
Airbill <u>✓</u> Trk # <u>7808 1634 0970</u>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Shipping Documentation Present?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Shipping Container	<input type="checkbox"/> Vista	<input checked="" type="checkbox"/> Client	<input type="checkbox"/> Retain
	<input type="checkbox"/>	<input checked="" type="checkbox"/> Return	<input type="checkbox"/> Dispose
Chain of Custody / Sample Documentation Present?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Chain of Custody / Sample Documentation Complete?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Holding Time Acceptable?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Logged In:	Date/Time <u>11/16/19 1746</u>	Initials: <u>KE</u>	Location: <u>R-13</u>	<u>WR-2</u>
	<del>11/09/19 1631</del> KE 11-16-19		Shelf/Rack: <u>A4</u>	<u>A4</u>
COC Anomaly/Sample Acceptance Form completed?			<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>

Comments: \*REVISED 11-16-19 KE PER EMAIL REQUEST

# CoC/Label Reconciliation Report WO# 1904043

LabNumber	CoC Sample ID		SampleAlias	Sample Date/Time		Container	BaseMatrix	Sample Comments
1904043-01	A SB1911071210LEM	<input checked="" type="checkbox"/>	WIXO-02n05e02-BC01	07-Nov-19 12:10	<input checked="" type="checkbox"/>	HDPE Jar, 6 oz	Solid	
1904043-02	A SB1911071215LEM	<input checked="" type="checkbox"/>	WIXO-02n05e02-BC01	07-Nov-19 12:15	<input checked="" type="checkbox"/>	HDPE Jar, 6 oz	Solid	
1904043-03	A SB1911071205LEM	<input checked="" type="checkbox"/>	WIXO-02n05e02-BC01	07-Nov-19 12:05	<input checked="" type="checkbox"/>	HDPE Jar, 6 oz	Solid	
1904043-04	A SB1911071355LEM	<input checked="" type="checkbox"/>	WIXO-02n05e02-BC01	07-Nov-19 13:55	<input checked="" type="checkbox"/>	HDPE Jar, 6 oz	Solid	
1904043-05	A SB1911071350LEM	<input checked="" type="checkbox"/>	WIXO-02n05e02-BC01	07-Nov-19 13:50	<input checked="" type="checkbox"/>	HDPE Jar, 6 oz	Solid	
1904043-06	A SB1911071345LEM	<input checked="" type="checkbox"/>	WIXO-02n05e02-BC01	07-Nov-19 13:45	<input checked="" type="checkbox"/>	HDPE Jar, 6 oz	Solid	

Checkmarks indicate that information on the COC reconciled with the sample label.  
Any discrepancies are noted in the following columns.

	Yes	No	NA	Comments:
Sample Container Intact?	<input checked="" type="checkbox"/>			
Sample Custody Seals Intact?			<input checked="" type="checkbox"/>	
Adequate Sample Volume?	<input checked="" type="checkbox"/>			
Container Type Appropriate for Analysis(es)	<input checked="" type="checkbox"/>			
Preservation Documented: Na2S2O3 Trizma None Other			<input checked="" type="checkbox"/>	
If Chlorinated or Drinking Water Samples, Acceptable Preservation?			<input checked="" type="checkbox"/>	

Verified by/Date: KE 11/17/19



December 16, 2019

**Vista Work Order No. 1903964**

Ms. Maya Murshak  
Merit Laboratories, Inc.  
2680 East Lansing Drive  
East Lansing, MI 48823

Dear Ms. Murshak,

Enclosed are the results for the sample set received at Vista Analytical Laboratory on November 08, 2019 under your Project Name 'Statewide Biosolids'.

Vista Analytical Laboratory is committed to serving you effectively. If you require additional information, please contact me at 916-673-1520 or by email at [mmaier@vista-analytical.com](mailto:mmaier@vista-analytical.com).

Thank you for choosing Vista as part of your analytical support team.

Sincerely,

Martha Maier  
Laboratory Director



*Vista Analytical Laboratory certifies that the report herein meets all the requirements set forth by NELAP for those applicable test methods. Results relate only to the samples as received by the laboratory. This report should not be reproduced except in full without the written approval of Vista.*

## **Vista Work Order No. 1903964**

### **Case Narrative**

#### **Sample Condition on Receipt:**

Two soil samples were received in good condition and within the method temperature requirements. The samples were received and stored securely in accordance with Vista standard operating procedures and EPA methodology. A revised Chain of Custody was received via email on November 15, 2019.

#### **Analytical Notes:**

##### **PFAS Isotope Dilution Method**

The samples were extracted and analyzed for a selected list of PFAS using VAL Method PFAS. The results for PFHxS, PFOA, PFOS, MeFOSAA and EtFOSAA include both linear and branched isomers. Results for all other analytes include the linear isomers only.

The samples were homogenized by the Incremental Sampling Method (ISM) prior to extraction.

##### **Holding Times**

The samples were extracted and analyzed within the hold times.

##### **Quality Control**

The Initial Calibration and Continuing Calibration Verifications met the method acceptance criteria.

A Method Blank and Ongoing Precision and Recovery (OPR) sample were extracted and analyzed with the preparation batch. No analytes were detected in the Method Blank above 1/2 the LOQ. The recovery of PFPeS is greater than 130% in the OPR. This analyte was not detected in the samples. The recoveries of all other analytes were within the method acceptance criteria.

The labeled standard recoveries for all QC and field samples were within the acceptance criteria.

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# Sample Inventory Report

<b>Vista Sample ID</b>	<b>Client Sample ID</b>	<b>Sampled</b>	<b>Received</b>	<b>Components/Containers</b>
1903964-01	SB1911071550LEM	07-Nov-19 15:50	08-Nov-19 08:53	HDPE Jar, 6 oz
1903964-02	SB1911071515LEM	07-Nov-19 15:15	08-Nov-19 08:53	HDPE Jar, 6 oz

## **ANALYTICAL RESULTS**

**Sample ID: Method Blank**
**PFAS Isotope Dilution Method**

Client Data				Laboratory Data							
Name:	Merit Laboratories, Inc.	Matrix:	Solid	Lab Sample:	B9K0254-BLK1	Column:	BEH C18				
Project:	Statewide Biosolids										

Analyte	CAS Number	Conc. (ng/g)	DL	LOD	LOQ	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
PFBA	375-22-4	ND	0.423	0.500	1.00		B9K0254	26-Nov-19	2.00 g	12-Dec-19 21:22	1
PFPeA	2706-90-3	ND	0.423	0.500	1.00		B9K0254	26-Nov-19	2.00 g	12-Dec-19 21:22	1
PFBS	375-73-5	ND	0.423	0.500	1.00		B9K0254	26-Nov-19	2.00 g	12-Dec-19 21:22	1
4:2 FTS	757124-72-4	ND	0.423	0.500	1.00		B9K0254	26-Nov-19	2.00 g	12-Dec-19 21:22	1
PFHxA	307-24-4	ND	0.423	0.500	1.00		B9K0254	26-Nov-19	2.00 g	12-Dec-19 21:22	1
PFPeS	2706-91-4	ND	0.423	0.500	1.00		B9K0254	26-Nov-19	2.00 g	12-Dec-19 21:22	1
PFHpA	375-85-9	ND	0.423	0.500	1.00		B9K0254	26-Nov-19	2.00 g	12-Dec-19 21:22	1
PFHxS	355-46-4	ND	0.423	0.500	1.00		B9K0254	26-Nov-19	2.00 g	12-Dec-19 21:22	1
6:2 FTS	27619-97-2	ND	0.423	0.500	1.00		B9K0254	26-Nov-19	2.00 g	12-Dec-19 21:22	1
PFOA	335-67-1	ND	0.423	0.500	1.00		B9K0254	26-Nov-19	2.00 g	12-Dec-19 21:22	1
PFHpS	375-92-8	ND	0.423	0.500	1.00		B9K0254	26-Nov-19	2.00 g	12-Dec-19 21:22	1
PFNA	375-95-1	ND	0.423	0.500	1.00		B9K0254	26-Nov-19	2.00 g	12-Dec-19 21:22	1
PFOSA	754-91-6	ND	0.423	0.500	1.00		B9K0254	26-Nov-19	2.00 g	12-Dec-19 21:22	1
PFOS	1763-23-1	ND	0.423	0.500	1.00		B9K0254	26-Nov-19	2.00 g	12-Dec-19 21:22	1
PFDA	335-76-2	ND	0.423	0.500	1.00		B9K0254	26-Nov-19	2.00 g	12-Dec-19 21:22	1
8:2 FTS	39108-34-4	ND	0.423	0.500	1.00		B9K0254	26-Nov-19	2.00 g	12-Dec-19 21:22	1
PFNS	68259-12-1	ND	0.715	0.750	1.00		B9K0254	26-Nov-19	2.00 g	12-Dec-19 21:22	1
MeFOSAA	2355-31-9	ND	0.423	0.500	1.00		B9K0254	26-Nov-19	2.00 g	12-Dec-19 21:22	1
EtFOSAA	2991-50-6	ND	0.423	0.500	1.00		B9K0254	26-Nov-19	2.00 g	12-Dec-19 21:22	1
PFOA	2058-94-8	ND	0.423	0.500	1.00		B9K0254	26-Nov-19	2.00 g	12-Dec-19 21:22	1
PFDS	335-77-3	ND	0.423	0.500	1.00		B9K0254	26-Nov-19	2.00 g	12-Dec-19 21:22	1
PFDoA	307-55-1	ND	0.423	0.500	1.00		B9K0254	26-Nov-19	2.00 g	12-Dec-19 21:22	1
PFTTrDA	72629-94-8	ND	0.423	0.500	1.00		B9K0254	26-Nov-19	2.00 g	12-Dec-19 21:22	1
PFTeDA	376-06-7	ND	0.423	0.500	1.00		B9K0254	26-Nov-19	2.00 g	12-Dec-19 21:22	1

Labeled Standards	Type	% Recovery	Limits	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
13C3-PFBA	IS	86.1	60 - 130		B9K0254	26-Nov-19	2.00 g	12-Dec-19 21:22	1
13C3-PFPeA	IS	84.6	60 - 150		B9K0254	26-Nov-19	2.00 g	12-Dec-19 21:22	1
13C3-PFBS	IS	63.8	60 - 150		B9K0254	26-Nov-19	2.00 g	12-Dec-19 21:22	1
13C2-4:2 FTS	IS	65.5	40 - 150		B9K0254	26-Nov-19	2.00 g	12-Dec-19 21:22	1
13C2-PFHxA	IS	92.5	70 - 130		B9K0254	26-Nov-19	2.00 g	12-Dec-19 21:22	1
13C4-PFHpA	IS	88.4	60 - 150		B9K0254	26-Nov-19	2.00 g	12-Dec-19 21:22	1
13C3-PFHxS	IS	76.7	60 - 130		B9K0254	26-Nov-19	2.00 g	12-Dec-19 21:22	1
13C2-6:2 FTS	IS	83.3	40 - 150		B9K0254	26-Nov-19	2.00 g	12-Dec-19 21:22	1
13C5-PFNA	IS	76.2	50 - 130		B9K0254	26-Nov-19	2.00 g	12-Dec-19 21:22	1
13C8-PFOSA	IS	60.0	20 - 150		B9K0254	26-Nov-19	2.00 g	12-Dec-19 21:22	1
13C2-PFOA	IS	88.1	60 - 130		B9K0254	26-Nov-19	2.00 g	12-Dec-19 21:22	1
13C8-PFOS	IS	83.7	60 - 130		B9K0254	26-Nov-19	2.00 g	12-Dec-19 21:22	1
13C2-PFDA	IS	78.0	60 - 130		B9K0254	26-Nov-19	2.00 g	12-Dec-19 21:22	1



**Sample ID: Method Blank** **PFAS Isotope Dilution Method**

<b>Client Data</b>				<b>Laboratory Data</b>			
Name:	Merit Laboratories, Inc.	Matrix:	Solid	Lab Sample:	B9K0254-BLK1	Column:	BEH C18
Project:	Statewide Biosolids						

Labeled Standards	Type	% Recovery	Limits	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
13C2-8:2 FTS	IS	88.9	40 - 150		B9K0254	26-Nov-19	2.00 g	12-Dec-19 21:22	1
d3-MeFOSAA	IS	52.4	50 - 150		B9K0254	26-Nov-19	2.00 g	12-Dec-19 21:22	1
13C2-PFUnA	IS	75.3	60 - 130		B9K0254	26-Nov-19	2.00 g	12-Dec-19 21:22	1
d5-EtFOSAA	IS	70.3	50 - 150		B9K0254	26-Nov-19	2.00 g	12-Dec-19 21:22	1
13C2-PFDoA	IS	61.8	30 - 130		B9K0254	26-Nov-19	2.00 g	12-Dec-19 21:22	1
13C2-PFTeDA	IS	73.7	20 - 150		B9K0254	26-Nov-19	2.00 g	12-Dec-19 21:22	1

DL - Detection Limit

LOD - Limit of Detection  
LOQ - Limit of quantitation

The results are reported in dry weight.  
The sample size is reported in wet weight.  
Results reported to the DL.

When reported, PFHxS, PFOA, PFOS, MeFOSAA and EtFOSAA include both linear and branched isomers. Only the linear isomer is reported for all other analytes.

**Sample ID: OPR**

**PFAS Isotope Dilution Method**

Client Data					Laboratory Data						
Name:	Merit Laboratories, Inc.		Matrix:	Solid	Lab Sample:	B9K0254-BS1	Column:	BEH C18			
Project:	Statewide Biosolids										

Analyte	CAS Number	Amt Found (ng/g)	Spike Amt	% Rec	Limits	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
PFBA	375-22-4	4.90	5.00	98.0	70 - 130		B9K0254	26-Nov-19	2.00 g	12-Dec-19 21:33	1
PFPeA	2706-90-3	5.22	5.00	104	70 - 130		B9K0254	26-Nov-19	2.00 g	12-Dec-19 21:33	1
PFBS	375-73-5	4.81	5.00	96.2	70 - 130		B9K0254	26-Nov-19	2.00 g	12-Dec-19 21:33	1
4:2 FTS	757124-72-4	4.61	5.00	92.3	70 - 130		B9K0254	26-Nov-19	2.00 g	12-Dec-19 21:33	1
PFHxA	307-24-4	5.08	5.00	102	70 - 130		B9K0254	26-Nov-19	2.00 g	12-Dec-19 21:33	1
PFPeS	2706-91-4	6.58	5.00	132	70 - 130	H	B9K0254	26-Nov-19	2.00 g	12-Dec-19 21:33	1
PFHpA	375-85-9	4.85	5.00	97.1	70 - 130		B9K0254	26-Nov-19	2.00 g	12-Dec-19 21:33	1
PFHxS	355-46-4	4.79	5.00	95.9	70 - 130		B9K0254	26-Nov-19	2.00 g	12-Dec-19 21:33	1
6:2 FTS	27619-97-2	4.78	5.00	95.6	60 - 130		B9K0254	26-Nov-19	2.00 g	12-Dec-19 21:33	1
PFOA	335-67-1	4.97	5.00	99.3	70 - 130		B9K0254	26-Nov-19	2.00 g	12-Dec-19 21:33	1
PFHpS	375-92-8	4.60	5.00	92.0	60 - 130		B9K0254	26-Nov-19	2.00 g	12-Dec-19 21:33	1
PFNA	375-95-1	4.41	5.00	88.1	70 - 130		B9K0254	26-Nov-19	2.00 g	12-Dec-19 21:33	1
PFOSA	754-91-6	5.10	5.00	102	70 - 130		B9K0254	26-Nov-19	2.00 g	12-Dec-19 21:33	1
PFOS	1763-23-1	4.73	5.01	94.3	70 - 130		B9K0254	26-Nov-19	2.00 g	12-Dec-19 21:33	1
PFDA	335-76-2	5.03	5.00	101	70 - 130		B9K0254	26-Nov-19	2.00 g	12-Dec-19 21:33	1
8:2 FTS	39108-34-4	4.93	5.00	98.5	60 - 130		B9K0254	26-Nov-19	2.00 g	12-Dec-19 21:33	1
PFNS	68259-12-1	4.12	5.00	82.3	70 - 130		B9K0254	26-Nov-19	2.00 g	12-Dec-19 21:33	1
MeFOSAA	2355-31-9	4.55	5.00	91.0	70 - 130		B9K0254	26-Nov-19	2.00 g	12-Dec-19 21:33	1
EtFOSAA	2991-50-6	4.23	5.00	84.6	70 - 130		B9K0254	26-Nov-19	2.00 g	12-Dec-19 21:33	1
PFUnA	2058-94-8	5.29	5.00	106	70 - 130		B9K0254	26-Nov-19	2.00 g	12-Dec-19 21:33	1
PFDS	335-77-3	3.94	5.01	78.6	60 - 130		B9K0254	26-Nov-19	2.00 g	12-Dec-19 21:33	1
PFDoA	307-55-1	4.91	5.00	98.3	70 - 130		B9K0254	26-Nov-19	2.00 g	12-Dec-19 21:33	1
PFTTrDA	72629-94-8	4.62	5.00	92.3	60 - 130		B9K0254	26-Nov-19	2.00 g	12-Dec-19 21:33	1
PFTeDA	376-06-7	5.01	5.00	100	70 - 130		B9K0254	26-Nov-19	2.00 g	12-Dec-19 21:33	1

Labeled Standards	Type	% Rec	Limits	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
13C3-PFBA	IS	87.6	60- 130		B9K0254	26-Nov-19	2.00 g	12-Dec-19 21:33	1
13C3-PFPeA	IS	87.4	60- 150		B9K0254	26-Nov-19	2.00 g	12-Dec-19 21:33	1
13C3-PFBS	IS	63.6	60- 150		B9K0254	26-Nov-19	2.00 g	12-Dec-19 21:33	1
13C2-4:2 FTS	IS	64.2	40- 150		B9K0254	26-Nov-19	2.00 g	12-Dec-19 21:33	1
13C2-PFHxA	IS	95.6	70- 130		B9K0254	26-Nov-19	2.00 g	12-Dec-19 21:33	1
13C4-PFHpA	IS	95.5	60- 150		B9K0254	26-Nov-19	2.00 g	12-Dec-19 21:33	1
13C3-PFHxS	IS	80.5	60- 130		B9K0254	26-Nov-19	2.00 g	12-Dec-19 21:33	1
13C2-6:2 FTS	IS	86.8	40- 150		B9K0254	26-Nov-19	2.00 g	12-Dec-19 21:33	1
13C5-PFNA	IS	98.5	50- 130		B9K0254	26-Nov-19	2.00 g	12-Dec-19 21:33	1
13C8-PFOSA	IS	58.2	20- 150		B9K0254	26-Nov-19	2.00 g	12-Dec-19 21:33	1

**Sample ID: OPR**

**PFAS Isotope Dilution Method**

**Client Data**

Name: Merit Laboratories, Inc.  
Project: Statewide Biosolids

Matrix: Solid

**Laboratory Data**

Lab Sample: B9K0254-BS1 Column: BEH C18

Labeled Standards	Type	% Rec	Limits	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
13C2-PFOA	IS	92.6	60- 130		B9K0254	26-Nov-19	2.00 g	12-Dec-19 21:33	1
13C8-PFOS	IS	94.4	60- 130		B9K0254	26-Nov-19	2.00 g	12-Dec-19 21:33	1
13C2-PFDA	IS	90.9	60- 130		B9K0254	26-Nov-19	2.00 g	12-Dec-19 21:33	1
13C2-8:2 FTS	IS	89.1	40- 150		B9K0254	26-Nov-19	2.00 g	12-Dec-19 21:33	1
d3-MeFOSAA	IS	61.5	50- 150		B9K0254	26-Nov-19	2.00 g	12-Dec-19 21:33	1
13C2-PFUnA	IS	70.5	60- 130		B9K0254	26-Nov-19	2.00 g	12-Dec-19 21:33	1
d5-EtFOSAA	IS	77.7	50- 150		B9K0254	26-Nov-19	2.00 g	12-Dec-19 21:33	1
13C2-PFDoA	IS	74.5	30- 130		B9K0254	26-Nov-19	2.00 g	12-Dec-19 21:33	1
13C2-PFTeDA	IS	70.7	20- 150		B9K0254	26-Nov-19	2.00 g	12-Dec-19 21:33	1

**Sample ID: SB1911071550LEM**
**PFAS Isotope Dilution Method**

Client Data				Laboratory Data			
Name:	Merit Laboratories, Inc.	Matrix:	Soil	Lab Sample:	1903964-01	Column:	BEH C18
Project:	Statewide Biosolids	Date Collected:	07-Nov-19 15:50	Date Received:	08-Nov-19 08:53		
Location:	WIXO-02n05e02-AG01			% Solids:	98.7		

Analyte	CAS Number	Conc. (ng/g)	DL	LOD	LOQ	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
PFBA	375-22-4	ND	0.426	0.504	1.01		B9K0254	26-Nov-19	2.01 g	12-Dec-19 21:43	1
PFPeA	2706-90-3	ND	0.426	0.504	1.01		B9K0254	26-Nov-19	2.01 g	12-Dec-19 21:43	1
PFBS	375-73-5	ND	0.426	0.504	1.01		B9K0254	26-Nov-19	2.01 g	12-Dec-19 21:43	1
4:2 FTS	757124-72-4	ND	0.426	0.504	1.01		B9K0254	26-Nov-19	2.01 g	12-Dec-19 21:43	1
PFHxA	307-24-4	ND	0.426	0.504	1.01		B9K0254	26-Nov-19	2.01 g	12-Dec-19 21:43	1
PFPeS	2706-91-4	ND	0.426	0.504	1.01		B9K0254	26-Nov-19	2.01 g	12-Dec-19 21:43	1
PFHpA	375-85-9	ND	0.426	0.504	1.01		B9K0254	26-Nov-19	2.01 g	12-Dec-19 21:43	1
PFHxS	355-46-4	ND	0.426	0.504	1.01		B9K0254	26-Nov-19	2.01 g	12-Dec-19 21:43	1
6:2 FTS	27619-97-2	ND	0.426	0.504	1.01		B9K0254	26-Nov-19	2.01 g	12-Dec-19 21:43	1
PFOA	335-67-1	0.434	0.426	0.504	1.01	J	B9K0254	26-Nov-19	2.01 g	12-Dec-19 21:43	1
PFHpS	375-92-8	ND	0.426	0.504	1.01		B9K0254	26-Nov-19	2.01 g	12-Dec-19 21:43	1
PFNA	375-95-1	ND	0.426	0.504	1.01		B9K0254	26-Nov-19	2.01 g	12-Dec-19 21:43	1
PFOSA	754-91-6	ND	0.426	0.504	1.01		B9K0254	26-Nov-19	2.01 g	12-Dec-19 21:43	1
PFOS	1763-23-1	14.1	0.426	0.504	1.01		B9K0254	26-Nov-19	2.01 g	12-Dec-19 21:43	1
PFDA	335-76-2	ND	0.426	0.504	1.01		B9K0254	26-Nov-19	2.01 g	12-Dec-19 21:43	1
8:2 FTS	39108-34-4	ND	0.426	0.504	1.01		B9K0254	26-Nov-19	2.01 g	12-Dec-19 21:43	1
PFNS	68259-12-1	ND	0.721	0.756	1.01		B9K0254	26-Nov-19	2.01 g	12-Dec-19 21:43	1
MeFOSAA	2355-31-9	ND	0.426	0.504	1.01		B9K0254	26-Nov-19	2.01 g	12-Dec-19 21:43	1
EtFOSAA	2991-50-6	ND	0.426	0.504	1.01		B9K0254	26-Nov-19	2.01 g	12-Dec-19 21:43	1
PFOA	2058-94-8	ND	0.426	0.504	1.01		B9K0254	26-Nov-19	2.01 g	12-Dec-19 21:43	1
PFDS	335-77-3	ND	0.426	0.504	1.01		B9K0254	26-Nov-19	2.01 g	12-Dec-19 21:43	1
PFDoA	307-55-1	ND	0.426	0.504	1.01		B9K0254	26-Nov-19	2.01 g	12-Dec-19 21:43	1
PFTTrDA	72629-94-8	ND	0.426	0.504	1.01		B9K0254	26-Nov-19	2.01 g	12-Dec-19 21:43	1
PFTeDA	376-06-7	ND	0.426	0.504	1.01		B9K0254	26-Nov-19	2.01 g	12-Dec-19 21:43	1

Labeled Standards	Type	% Recovery	Limits	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
13C3-PFBA	IS	88.3	60 - 130		B9K0254	26-Nov-19	2.01 g	12-Dec-19 21:43	1
13C3-PFPeA	IS	86.0	60 - 150		B9K0254	26-Nov-19	2.01 g	12-Dec-19 21:43	1
13C3-PFBS	IS	82.6	60 - 150		B9K0254	26-Nov-19	2.01 g	12-Dec-19 21:43	1
13C2-4:2 FTS	IS	119	40 - 150		B9K0254	26-Nov-19	2.01 g	12-Dec-19 21:43	1
13C2-PFHxA	IS	88.7	70 - 130		B9K0254	26-Nov-19	2.01 g	12-Dec-19 21:43	1
13C4-PFHpA	IS	92.8	60 - 150		B9K0254	26-Nov-19	2.01 g	12-Dec-19 21:43	1
13C3-PFHxS	IS	77.7	60 - 130		B9K0254	26-Nov-19	2.01 g	12-Dec-19 21:43	1
13C2-6:2 FTS	IS	98.7	40 - 150		B9K0254	26-Nov-19	2.01 g	12-Dec-19 21:43	1
13C5-PFNA	IS	84.4	50 - 130		B9K0254	26-Nov-19	2.01 g	12-Dec-19 21:43	1
13C8-PFOSA	IS	55.5	20 - 150		B9K0254	26-Nov-19	2.01 g	12-Dec-19 21:43	1
13C2-PFOA	IS	75.2	60 - 130		B9K0254	26-Nov-19	2.01 g	12-Dec-19 21:43	1
13C8-PFOS	IS	80.5	60 - 130		B9K0254	26-Nov-19	2.01 g	12-Dec-19 21:43	1
13C2-PFDA	IS	83.2	60 - 130		B9K0254	26-Nov-19	2.01 g	12-Dec-19 21:43	1

**Sample ID: SB1911071550LEM** **PFAS Isotope Dilution Method**

Client Data				Laboratory Data			
Name:	Merit Laboratories, Inc.	Matrix:	Soil	Lab Sample:	1903964-01	Column:	BEH C18
Project:	Statewide Biosolids	Date Collected:	07-Nov-19 15:50	Date Received:	08-Nov-19 08:53		
Location:	WIXO-02n05e02-AG01			% Solids:	98.7		

Labeled Standards	Type	% Recovery	Limits	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
13C2-8:2 FTS	IS	116	40 - 150		B9K0254	26-Nov-19	2.01 g	12-Dec-19 21:43	1
d3-MeFOSAA	IS	75.1	50 - 150		B9K0254	26-Nov-19	2.01 g	12-Dec-19 21:43	1
13C2-PFUnA	IS	67.8	60 - 130		B9K0254	26-Nov-19	2.01 g	12-Dec-19 21:43	1
d5-EtFOSAA	IS	86.4	50 - 150		B9K0254	26-Nov-19	2.01 g	12-Dec-19 21:43	1
13C2-PFDoA	IS	78.8	30 - 130		B9K0254	26-Nov-19	2.01 g	12-Dec-19 21:43	1
13C2-PFTeDA	IS	85.5	20 - 150		B9K0254	26-Nov-19	2.01 g	12-Dec-19 21:43	1

DL - Detection Limit

LOD - Limit of Detection  
LOQ - Limit of quantitation

The results are reported in dry weight.  
The sample size is reported in wet weight.  
Results reported to the DL.

When reported, PFHxS, PFOA, PFOS, MeFOSAA and EtFOSAA include both linear and branched isomers. Only the linear isomer is reported for all other analytes.

**Sample ID: SB1911071515LEM**
**PFAS Isotope Dilution Method**

Client Data				Laboratory Data			
Name:	Merit Laboratories, Inc.	Matrix:	Soil	Lab Sample:	1903964-02	Column:	BEH C18
Project:	Statewide Biosolids	Date Collected:	07-Nov-19 15:15	Date Received:	08-Nov-19 08:53		
Location:	WIXO-02n05e02-AG01			% Solids:	99.6		

Analyte	CAS Number	Conc. (ng/g)	DL	LOD	LOQ	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
PFBA	375-22-4	ND	0.424	0.502	1.00		B9K0254	26-Nov-19	2.00 g	12-Dec-19 21:54	1
PFPeA	2706-90-3	ND	0.424	0.502	1.00		B9K0254	26-Nov-19	2.00 g	12-Dec-19 21:54	1
PFBS	375-73-5	ND	0.424	0.502	1.00		B9K0254	26-Nov-19	2.00 g	12-Dec-19 21:54	1
4:2 FTS	757124-72-4	ND	0.424	0.502	1.00		B9K0254	26-Nov-19	2.00 g	12-Dec-19 21:54	1
PFHxA	307-24-4	ND	0.424	0.502	1.00		B9K0254	26-Nov-19	2.00 g	12-Dec-19 21:54	1
PFPeS	2706-91-4	ND	0.424	0.502	1.00		B9K0254	26-Nov-19	2.00 g	12-Dec-19 21:54	1
PFHpA	375-85-9	ND	0.424	0.502	1.00		B9K0254	26-Nov-19	2.00 g	12-Dec-19 21:54	1
PFHxS	355-46-4	ND	0.424	0.502	1.00		B9K0254	26-Nov-19	2.00 g	12-Dec-19 21:54	1
6:2 FTS	27619-97-2	ND	0.424	0.502	1.00		B9K0254	26-Nov-19	2.00 g	12-Dec-19 21:54	1
PFOA	335-67-1	ND	0.424	0.502	1.00		B9K0254	26-Nov-19	2.00 g	12-Dec-19 21:54	1
PFHpS	375-92-8	ND	0.424	0.502	1.00		B9K0254	26-Nov-19	2.00 g	12-Dec-19 21:54	1
PFNA	375-95-1	ND	0.424	0.502	1.00		B9K0254	26-Nov-19	2.00 g	12-Dec-19 21:54	1
PFOSA	754-91-6	ND	0.424	0.502	1.00		B9K0254	26-Nov-19	2.00 g	12-Dec-19 21:54	1
PFOS	1763-23-1	7.59	0.424	0.502	1.00		B9K0254	26-Nov-19	2.00 g	12-Dec-19 21:54	1
PFDA	335-76-2	ND	0.424	0.502	1.00		B9K0254	26-Nov-19	2.00 g	12-Dec-19 21:54	1
8:2 FTS	39108-34-4	ND	0.424	0.502	1.00		B9K0254	26-Nov-19	2.00 g	12-Dec-19 21:54	1
PFNS	68259-12-1	ND	0.718	0.753	1.00		B9K0254	26-Nov-19	2.00 g	12-Dec-19 21:54	1
MeFOSAA	2355-31-9	ND	0.424	0.502	1.00		B9K0254	26-Nov-19	2.00 g	12-Dec-19 21:54	1
EtFOSAA	2991-50-6	ND	0.424	0.502	1.00		B9K0254	26-Nov-19	2.00 g	12-Dec-19 21:54	1
PFOA	2058-94-8	ND	0.424	0.502	1.00		B9K0254	26-Nov-19	2.00 g	12-Dec-19 21:54	1
PFDS	335-77-3	ND	0.424	0.502	1.00		B9K0254	26-Nov-19	2.00 g	12-Dec-19 21:54	1
PFDoA	307-55-1	ND	0.424	0.502	1.00		B9K0254	26-Nov-19	2.00 g	12-Dec-19 21:54	1
PFTTrDA	72629-94-8	ND	0.424	0.502	1.00		B9K0254	26-Nov-19	2.00 g	12-Dec-19 21:54	1
PFTeDA	376-06-7	ND	0.424	0.502	1.00		B9K0254	26-Nov-19	2.00 g	12-Dec-19 21:54	1

Labeled Standards	Type	% Recovery	Limits	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
13C3-PFBA	IS	92.7	60 - 130		B9K0254	26-Nov-19	2.00 g	12-Dec-19 21:54	1
13C3-PFPeA	IS	92.0	60 - 150		B9K0254	26-Nov-19	2.00 g	12-Dec-19 21:54	1
13C3-PFBS	IS	83.0	60 - 150		B9K0254	26-Nov-19	2.00 g	12-Dec-19 21:54	1
13C2-4:2 FTS	IS	105	40 - 150		B9K0254	26-Nov-19	2.00 g	12-Dec-19 21:54	1
13C2-PFHxA	IS	100	70 - 130		B9K0254	26-Nov-19	2.00 g	12-Dec-19 21:54	1
13C4-PFHpA	IS	99.5	60 - 150		B9K0254	26-Nov-19	2.00 g	12-Dec-19 21:54	1
13C3-PFHxS	IS	86.0	60 - 130		B9K0254	26-Nov-19	2.00 g	12-Dec-19 21:54	1
13C2-6:2 FTS	IS	111	40 - 150		B9K0254	26-Nov-19	2.00 g	12-Dec-19 21:54	1
13C5-PFNA	IS	90.3	50 - 130		B9K0254	26-Nov-19	2.00 g	12-Dec-19 21:54	1
13C8-PFOSA	IS	49.7	20 - 150		B9K0254	26-Nov-19	2.00 g	12-Dec-19 21:54	1
13C2-PFOA	IS	88.6	60 - 130		B9K0254	26-Nov-19	2.00 g	12-Dec-19 21:54	1
13C8-PFOS	IS	91.5	60 - 130		B9K0254	26-Nov-19	2.00 g	12-Dec-19 21:54	1
13C2-PFDA	IS	88.4	60 - 130		B9K0254	26-Nov-19	2.00 g	12-Dec-19 21:54	1

**Sample ID: SB1911071515LEM** **PFAS Isotope Dilution Method**

Client Data				Laboratory Data			
Name:	Merit Laboratories, Inc.	Matrix:	Soil	Lab Sample:	1903964-02	Column:	BEH C18
Project:	Statewide Biosolids	Date Collected:	07-Nov-19 15:15	Date Received:	08-Nov-19 08:53		
Location:	WIXO-02n05e02-AG01			% Solids:	99.6		

Labeled Standards	Type	% Recovery	Limits	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
13C2-8:2 FTS	IS	131	40 - 150		B9K0254	26-Nov-19	2.00 g	12-Dec-19 21:54	1
d3-MeFOSAA	IS	65.5	50 - 150		B9K0254	26-Nov-19	2.00 g	12-Dec-19 21:54	1
13C2-PFUnA	IS	74.0	60 - 130		B9K0254	26-Nov-19	2.00 g	12-Dec-19 21:54	1
d5-EtFOSAA	IS	75.4	50 - 150		B9K0254	26-Nov-19	2.00 g	12-Dec-19 21:54	1
13C2-PFDoA	IS	79.6	30 - 130		B9K0254	26-Nov-19	2.00 g	12-Dec-19 21:54	1
13C2-PFTeDA	IS	65.3	20 - 150		B9K0254	26-Nov-19	2.00 g	12-Dec-19 21:54	1

DL - Detection Limit

LOD - Limit of Detection  
LOQ - Limit of quantitation

The results are reported in dry weight.  
The sample size is reported in wet weight.  
Results reported to the DL.

When reported, PFHxS, PFOA, PFOS, MeFOSAA and EtFOSAA include both linear and branched isomers. Only the linear isomer is reported for all other analytes.

## DATA QUALIFIERS & ABBREVIATIONS

B	This compound was also detected in the method blank
Conc.	Concentration
CRS	Cleanup Recovery Standard
D	Dilution
DL	Detection limit
E	The associated compound concentration exceeded the calibration range of the instrument
H	Recovery and/or RPD was outside laboratory acceptance limits
I	Chemical Interference
IS	Internal Standard
J	The amount detected is below the Reporting Limit/LOQ
LOD	Limit of Detection
LOQ	Limit of Quantitation
M	Estimated Maximum Possible Concentration (CA Region 2 projects only)
NA	Not applicable
ND	Not Detected
OPR	Ongoing Precision and Recovery sample
P	The reported concentration may include contribution from chlorinated diphenyl ether(s).
Q	The ion transition ratio is outside of the acceptance criteria.
RL	Reporting Limit
TEQ	Toxic Equivalency
U	Not Detected (specific projects only)
*	See Cover Letter

Unless otherwise noted, solid sample results are reported in dry weight. Tissue samples are reported in wet weight.



### Vista Analytical Laboratory Certifications

Accrediting Authority	Certificate Number
Alaska Department of Environmental Conservation	17-013
Arkansas Department of Environmental Quality	19-013-0
California Department of Health – ELAP	2892
DoD ELAP - A2LA Accredited - ISO/IEC 17025:2005	3091.01
Florida Department of Health	E87777-23
Hawaii Department of Health	N/A
Louisiana Department of Environmental Quality	01977
Maine Department of Health	2018017
Massachusetts Department of Environmental Protection	N/A
Michigan Department of Environmental Quality	9932
Minnesota Department of Health	1521520
New Hampshire Environmental Accreditation Program	207718-B
New Jersey Department of Environmental Protection	190001
New York Department of Health	11411
Oregon Laboratory Accreditation Program	4042-010
Pennsylvania Department of Environmental Protection	016
Texas Commission on Environmental Quality	T104704189-19-10
Vermont Department of Health	VT-4042
Virginia Department of General Services	10272
Washington Department of Ecology	C584-19
Wisconsin Department of Natural Resources	998036160

*Current certificates and lists of licensed parameters are located in the Quality Assurance office and are available upon request.*

## NELAP Accredited Test Methods

MATRIX: Air	
Description of Test	Method
Determination of Polychlorinated p-Dioxins & Polychlorinated Dibenzofurans	EPA 23
Determination of Polychlorinated p-Dioxins & Polychlorinated Dibenzofurans	EPA TO-9A

MATRIX: Biological Tissue	
Description of Test	Method
Tetra- through Octa-Chlorinated Dioxins and Furans by Isotope Dilution GC/HRMS	EPA 1613B
Brominated Diphenyl Ethers by HRGC/HRMS	EPA 1614A
Chlorinated Biphenyl Congeners in Water, Soil, Sediment, and Tissue by GC/HRMS	EPA 1668A/C
Pesticides in Water, Soil, Sediment, Biosolids, and Tissue by HRGC/HRMS	EPA 1699
Perfluorinated Alkyl Acids in Drinking Water by SPE and LC/MS/MS	EPA 537
Polychlorinated Dibenzo-p-Dioxins and Polychlorinated Dibenzofurans by GC/HRMS	EPA 8280A/B
Polychlorinated Dibenzodioxins (PCDDs) and Polychlorinated Dibenzofurans (PCDFs) by GC/HRMS	EPA 8290/8290A

MATRIX: Drinking Water	
Description of Test	Method
2,3,7,8-Tetrachlorodibenzo- p-dioxin (2,3,7,8-TCDD) GC/HRMS	EPA 1613/1613B
1,4-Dioxane (1,4-Diethyleneoxide) analysis by GC/HRMS	EPA 522
Perfluorinated Alkyl Acids in Drinking Water by SPE and LC/MS/MS	EPA 537
Perfluorinated Alkyl Acids in Drinking Water by SPE and LC/MS/MS	ISO 25101 2009

MATRIX: Non-Potable Water	
Description of Test	Method
Tetra- through Octa-Chlorinated Dioxins and Furans by Isotope Dilution GC/HRMS	EPA 1613B
Brominated Diphenyl Ethers by HRGC/HRMS	EPA 1614A
Chlorinated Biphenyl Congeners in Water, Soil, Sediment, and Tissue by GC/HRMS	EPA 1668A/C
Pesticides in Water, Soil, Sediment, Biosolids, and Tissue by HRGC/HRMS	EPA 1699
Perfluorinated Alkyl Acids in Drinking Water by SPE and LC/MS/MS	EPA 537
Dioxin by GC/HRMS	EPA 613
Polychlorinated Dibenzo-p-Dioxins and Polychlorinated Dibenzofurans by GC/HRMS	EPA 8280A/B
Polychlorinated Dibenzodioxins (PCDDs) and Polychlorinated Dibenzofurans (PCDFs) by GC/HRMS	EPA 8290/8290A

MATRIX: Solids	
Description of Test	Method
Tetra-Octa Chlorinated Dioxins and Furans by Isotope Dilution GC/HRMS	EPA 1613
Tetra- through Octa-Chlorinated Dioxins and Furans by Isotope Dilution GC/HRMS	EPA 1613B
Brominated Diphenyl Ethers by HRGC/HRMS	EPA 1614A
Chlorinated Biphenyl Congeners in Water, Soil, Sediment, and Tissue by GC/HRMS	EPA 1668A/C
Pesticides in Water, Soil, Sediment, Biosolids, and Tissue by HRGC/HRMS	EPA 1699
Perfluorinated Alkyl Acids in Drinking Water by SPE and LC/MS/MS	EPA 537
Polychlorinated Dibenzo-p-Dioxins and Polychlorinated Dibenzofurans by GC/HRMS	EPA 8280A/B
Polychlorinated Dibenzodioxins (PCDDs) and Polychlorinated Dibenzofurans (PCDFs) by GC/HRMS	EPA 8290/8290A



# CHAIN OF CUSTODY

**For Laboratory Use Only**  
 Work Order #: 1903964 Temp: 3.0 °C  
 Storage ID: WR-2 Storage Secured: Yes  No

Project ID: Statewide Biosolids PO#: 60588767.01 Sampler: Lauren McNeely (name)

TAT Standard:  21 days  
 (check one):  14 days  7 days Specify: \_\_\_\_\_  
 Rush (surcharge may apply)

Invoice to: Name Stephanie Kammer Company EGLE Address 525 W. Allegan Street City Lansing State MI Ph# 517-897-1597 Fax# 517-241-3571

Relinquished by (printed name and signature) Lauren McNeely Date 11/7/2019 Time 1815 Received by (printed name and signature) \*RECEIVED REVISED COC VIA EMAIL 11-15-19 K44 Date 11-15-19 Time 1441

Relinquished by (printed name and signature) \_\_\_\_\_ Date \_\_\_\_\_ Time \_\_\_\_\_ Received by (printed name and signature) SEE ORIGINAL COC FOR SIGNATURE KE11-16-19 Date \_\_\_\_\_ Time \_\_\_\_\_

Sample ID	Date	Time	Location/Sample Description	Container(s)			Add Analysis(es) Requested				PFAS Isotope Dilution	USEPA Method 537	Comments	
				Quantity	Type	Matrix	List of 21	List of 21 w/Isomers	List of 24	List of 24 w/Isomers				List of 28
SB1911071550LEM	11/7/19	1550	WIXO-02n05e02-AG01	1	PJ	SO			X					0-12"; SORG_SOIL2 - Sample 2
SB1911071515LEM	11/7/19	1515	WIXO-02n05e02-AG01	1	PJ	SO			X					0-12"; SORG_SOIL1 - Sample 1

Special Instructions/Comments: Send Results and Acknowledgements to the list provided

Name: Stephanie Kammer  
 Company: EGLE  
 Address: 525 W. Allegan Street, Constitution Hall, 1st South West  
 City: Lansing State: MI Zip: 30242  
 Phone: 517-897-1597 Fax: 517-241-3571  
 Email: dorin.bogdan@aecom.com

Container Types: P= HDPE, PJ= HDPE Jar  
 O = Other: \_\_\_\_\_

Bottle Preservation Type: T = Thiosulfate,  
 TZ = Trizma: \_\_\_\_\_

Matrix Types: AQ = Aqueous, DW = Drinking Water, EF = Effluent, PP = Pulp/Paper, SD = Sediment,  
 SL = Sludge, BS=Biosolids, SO = Soil, WW = Wastewater, B = Blood/Serum, O = Other: \_\_\_\_\_

1 of 3



# CHAIN OF CUSTODY

**For Laboratory Use Only**  
 Work Order #: 1903964 Temp: 3.0 °C  
 Storage ID: P-13, WR-2 Storage Secured: Yes  No

Project ID: Biosolids PO#: \_\_\_\_\_ Sampler: Lauren McNeely  
 (name)

TAT (check one):  21 days  
 14 days  7 days Specify: \_\_\_\_\_  
 Standard:  Rush (surcharge may apply)

Invoice to: Name Stephanie Kummer Company EGLE Address \_\_\_\_\_ City \_\_\_\_\_ State \_\_\_\_\_ Ph# \_\_\_\_\_ Fax# \_\_\_\_\_

Relinquished by (printed name and signature) Lauren McNeely Date 11/7/19 Time 1815 Received by (printed name and signature) Hayden Canai Date 11/08/19 Time 08:53  
 Relinquished by (printed name and signature) \_\_\_\_\_ Date \_\_\_\_\_ Time \_\_\_\_\_ Received by (printed name and signature) \_\_\_\_\_ Date \_\_\_\_\_ Time \_\_\_\_\_  
SEE REVISED COC's - KE 11-16-19

SHIP TO: Vista Analytical Laboratory  
 1104 Windfield Way  
 El Dorado Hills, CA 95762  
 (916) 673-1520 \* Fax (916) 673-0106  
 Method of Shipment: \_\_\_\_\_  
 ATTN: \_\_\_\_\_ Tracking No.: \_\_\_\_\_

Add Analysis(es) Requested  
 Container(s)  
 Mod. EPA Method 537  
 EPA Method 537(DW only)

Sample ID	Date	Time	Location/Sample Description	Quantity	Type	Matrix	PFOA/PFOS	ICMR3 PFAS List 6	537 List: 14	Full List of 28	Other, Please List Below	PFOA/PFOS	UcMR3 PFAS List 6	PFAS List: 14	Comments
SB1911071210 LEM	11/7/19	1210	DV2-SOILB	1	PJ	SO			X						
SB1911071215 LEM	11/7/19	1215	DV2-SOILC	1	PJ	SO			X						Incremental Sampling Prep
SB1911071205 LEM	11/7/19	1205	DV2-SOILA	1	PJ	SO			X						
SB1911071355 LEM	11/7/19	1355	DV1-SOILC	1	PJ	SO			X						Incremental Sampling Prep
SB1911071350 LEM	11/7/19	1350	DV1-SOILB	1	PJ	SO			X						
SB1911071345 LEM	11/7/19	1345	DV1-SOILA	1	PJ	SO			X						
SB1911071550 LEM	11/7/19	1550	SORG_SOIL2	1	PJ	SO			X						1903964
SB1911071515 LEM	11/7/19	1515	SORG_SOIL1	1	PJ	SO			X						1903964
* WR1911060935 LEM	11/6/19	0935	6875 McClements	2	P	DW							X		
* WT1911061000 LEM	11/6/19	1000	LIVESTOCK WELL	2	P	DW							X		

Special Instructions/Comments:  
~ WO # = 1904043  
\* WO # = 1903965  
@ WO # 1903964  
WO # = 1903964  
Δ WO # = 1904042

SEND DOCUMENTATION AND RESULTS TO:

Name: \_\_\_\_\_  
 Company: \_\_\_\_\_  
 Address: \_\_\_\_\_  
 City: \_\_\_\_\_ State: \_\_\_\_\_ Zip: \_\_\_\_\_  
 Phone: \_\_\_\_\_ Fax: \_\_\_\_\_  
 Email: \_\_\_\_\_

Container Types: P= HDPE, PJ= HDPE Jar  
 O = Other: \_\_\_\_\_  
 Bottle Preservation Type: T = Thiosulfate, TZ = Trizma; \_\_\_\_\_  
 Matrix Types: AQ = Aqueous, DW = Drinking Water, EF = Effluent, PP = Pulp/Paper, SD = Sediment, SL = Sludge, SO = Soil, WW = Wastewater, B = Blood/Serum, O = Other: \_\_\_\_\_

2 of 3



# CHAIN OF CUSTODY

**For Laboratory Use Only**  
 Work Order #: 1903964 Temp: 3.0 °C  
 Storage ID: R-13, WR-2 Storage Secured: Yes  No

Project ID: Biosolids PO#: \_\_\_\_\_ Sampler: Lauren McNeely  
 (name)

TAT (check one):  21 days  
 14 days  7 days Specify: \_\_\_\_\_  
 Rush (surcharge may apply)

Invoice to: Name \_\_\_\_\_ Company \_\_\_\_\_ Address \_\_\_\_\_ City \_\_\_\_\_ State \_\_\_\_\_ Ph# \_\_\_\_\_ Fax# \_\_\_\_\_

Relinquished by (printed name and signature) Lauren McNeely Date 11/7/19 Time 18:15  
 Received by (printed name and signature) Hayden Cranar Date 11/08/19 Time 08:53  
 Relinquished by (printed name and signature) \_\_\_\_\_ Date \_\_\_\_\_ Time \_\_\_\_\_  
 Received by (printed name and signature) \_\_\_\_\_ Date \_\_\_\_\_ Time \_\_\_\_\_  
- SEE REVISED COCS - FEB 11-16-19

SHIP TO: Vista Analytical Laboratory  
 1104 Windfield Way  
 El Dorado Hills, CA 95762  
 (916) 673-1520 \* Fax (916) 673-0106  
 Method of Shipment: \_\_\_\_\_  
 Tracking No.: \_\_\_\_\_  
 Add Analysis(es) Requested: \_\_\_\_\_  
 Container(s): \_\_\_\_\_  
 Mod. EPA Method 537  
 EPA Method 537(DW only)

Sample ID	Date	Time	Location/Sample Description	Quantity	Type	Matrix	PFOA/PFOS	1/CMR3 PFAS List 6	537 List 14	Full List of 28	Other: Please List Below	PFOA/PFOS	UCMR3 PFAS List 6	PFAS List 14	Comments
* WT1911071000LEM	11/7/19	1000	6795 McClements	2	P	DW									
* WT1911061255LEM	11/6/19	1255	65 S. Kellogg	2	P	DW									
* WT1911071015LEM	11/7/19	1015	7342 Golf Club	2	P	DW									
Δ SW1911061100LEM	11/6/19	1100	POND 1	2	P	SW			X						
Δ SW1911061135LEM	11/6/19	1135	POND 2	2	P	SW			X						
Δ SW1911061155LEM	11/6/19	1155	POND 3	2	P	SW			X						
Δ SW1911061235LEM	11/6/19	1235	POND 4	2	P	SW			X						
Δ SW1911061245LEM	11/6/19	1245	POND 5	2	P	SW			X						
@ EB1911071430LEM	11/7/19	1430	SW Sampler	2	P	AQ			X						
@ EB1911071435LEM	11/7/19	1435	Soil Sampler	2	P	AQ			X						

Special Instructions/Comments:  
Δ WO# 1904042  
\* WO# = 1903965  
@ WO# = 1903960  
● WO# = 1903964  
~ WO# = 1904043

SEND DOCUMENTATION AND RESULTS TO:

Name: \_\_\_\_\_  
 Company: \_\_\_\_\_  
 Address: \_\_\_\_\_  
 City: \_\_\_\_\_ State: \_\_\_\_\_ Zip: \_\_\_\_\_  
 Phone: \_\_\_\_\_ Fax: \_\_\_\_\_  
 Email: \_\_\_\_\_

Container Types: P= HDPE, PJ= HDPE Jar  
 O = Other: \_\_\_\_\_  
 Bottle Preservation Type: T = Thiosulfate, TZ = Trizma: \_\_\_\_\_  
 Matrix Types: AQ = Aqueous, DW = Drinking Water, EF = Effluent, PP = Pulp/Paper, SD = Sediment, SL = Sludge, SO = Soil, WW = Wastewater, B = Blood/Serum, O = Other: \_\_\_\_\_

3 of 3



# CHAIN OF CUSTODY

**For Laboratory Use Only**

Work Order #: 1903964 Temp: 3.0 °C  
Storage ID: ZB, WR-2 Storage Secured: Yes  No

Project ID: Biosolids PO#: \_\_\_\_\_ Sampler: Lauren McNeely  
(name)

TAT (check one):  21 days  
 14 days  7 days Specify: \_\_\_\_\_  
Standard:  Rush (surcharge may apply)

Invoice to: Name \_\_\_\_\_ Company \_\_\_\_\_ Address \_\_\_\_\_ City \_\_\_\_\_ State \_\_\_\_\_ Ph# \_\_\_\_\_ Fax# \_\_\_\_\_

Stephanie Kammer EBLE

Relinquished by (printed name and signature) \_\_\_\_\_ Date \_\_\_\_\_ Time \_\_\_\_\_ Received by (printed name and signature) \_\_\_\_\_ Date \_\_\_\_\_ Time \_\_\_\_\_  
Lauren McNeely 11/7/19 1815 Hayden Grant 11/08/19 08:53

SEE REVISED COCS - KE 11-16-19

SHIP TO: Vista Analytical Laboratory  
1104 Windfield Way  
El Dorado Hills, CA 95762  
(916) 673-1520 \* Fax (916) 673-0106  
Method of Shipment: \_\_\_\_\_  
ATTN: \_\_\_\_\_ Tracking No.: \_\_\_\_\_

Add Analysis(es) Requested		Container(s)		Mod. EPA Method 537		EPA Method 537(DW only)		Comments
Quantity	Type	Matrix	PFOA/PFOS	UCMR3 PFAS List 6	537 List 14	Full List of PFAS	Other: Please List Below	
<u>2</u>	<u>P AQ</u>				<u>X</u>			

Sample ID	Date	Time	Location/Sample Description
<u>@ EBL11071555LEM</u>	<u>11/7/19</u>	<u>1555</u>	<u>Garden Shears</u>

Special Instructions/Comments:  
2 WO# = 1904043 WO = 1903964  
Δ WO# 1904042 \* WO = 1903965  
WO#  
@ = 1903960

**SEND DOCUMENTATION AND RESULTS TO:**

Name: \_\_\_\_\_  
Company: \_\_\_\_\_  
Address: \_\_\_\_\_  
City: \_\_\_\_\_ State: \_\_\_\_\_ Zip: \_\_\_\_\_  
Phone: \_\_\_\_\_ Fax: \_\_\_\_\_  
Email: \_\_\_\_\_

Container Types: P= HDPE, PJ= HDPE Jar      Bottle Preservation Type: T = Thiosulfate,      Matrix Types: AQ = Aqueous, DW = Drinking Water, EF = Effluent, PP = Pulp/Paper, SD = Sediment, O = Other: \_\_\_\_\_      TZ = Trizma: \_\_\_\_\_      SL = Sludge, SO = Soil, WW = Wastewater, B = Blood/Serum, O = Other: \_\_\_\_\_

# Sample Log-In Checklist

Page # 1 of 1

Vista Work Order #: 1903964 TAT std

Samples Arrival:	Date/Time: <u>11/08/19 08:53</u>	Initials: <u>HOG</u>	Location: <u>WR-2</u>
			Shelf/Rack: <u>NA</u>
Delivered By:	<input checked="" type="checkbox"/> FedEx	<input type="checkbox"/> UPS	<input type="checkbox"/> On Trac
	<input type="checkbox"/> GSO	<input type="checkbox"/> DHL	<input type="checkbox"/> Hand Delivered
	<input type="checkbox"/> Other		
Preservation:	<input checked="" type="checkbox"/> Ice	<input type="checkbox"/> Blue Ice	<input type="checkbox"/> Dry Ice
	<input type="checkbox"/> None		
Temp °C: <u>3.0</u> (uncorrected)	Probe used: Y <input checked="" type="checkbox"/> N		Thermometer ID: <u>IR-3</u>
Temp °C: <u>3.0</u> (corrected)			

	YES	NO	NA
Shipping Container(s) Intact?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Shipping Custody Seals Intact?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
Airbill <u>✓</u> Trk # <u>7808 1634 0970</u>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Shipping Documentation Present?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Shipping Container	<input type="checkbox"/> Vista	<input checked="" type="checkbox"/> Client	<input type="checkbox"/> Retain
	<input type="checkbox"/> Return	<input type="checkbox"/> Dispose	
Chain of Custody / Sample Documentation Present?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Chain of Custody / Sample Documentation Complete?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Holding Time Acceptable?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Logged In:	Date/Time: <u>11/09/19 1606</u>	Initials: <u>KY</u>	Location: <u>R-13</u> / <u>WR-2</u>
			Shelf/Rack: <u>A4</u> / <u>F5</u> <u>SD = A5</u>
COC Anomaly/Sample Acceptance Form completed? *	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Comments: \* **SAMPLE ID DISCREPANCY** :  
 COC: SB1911071515 LEM LABEL: SB1911061515 LEM  
 COLLECTION: 11-07-19-1515 COLLECTION: 11-07-19 1515



# CoC/Label Reconciliation Report WO# 1903964

LabNumber	CoC Sample ID	SampleAlias	Sample Date/Time	Container	BaseMatrix	Sample Comments
1903964-01	A SB1911071550LEM <input checked="" type="checkbox"/>	WIXO-02n05e02-AG01	07-Nov-19 15:50 <input checked="" type="checkbox"/>	HDPE Jar, 6 oz	Solid	
1903964-02	A SB1911071515LEM <input checked="" type="checkbox"/> * <input type="checkbox"/> SB911061515LEM	WIXO-02n05e02-AG01	07-Nov-19 15:15 <input checked="" type="checkbox"/>	HDPE Jar, 6 oz	Solid	

Checkmarks indicate that information on the COC reconciled with the sample label.  
Any discrepancies are noted in the following columns.

	Yes	No	NA	Comments:
Sample Container Intact?	✓			
Sample Custody Seals Intact?			✓	
Adequate Sample Volume?	✓			
Container Type Appropriate for Analysis(es)	✓			
Preservation Documented: Na2S2O3 Trizma None Other			✓	
If Chlorinated or Drinking Water Samples, Acceptable Preservation?			✓	

Verified by/Date: KE 11/17/19



May 07, 2019

**Vista Work Order No. 1900762**

Ms. Maya Murshak  
Merit Laboratories, Inc.  
2680 East Lansing Drive  
East Lansing, MI 48823

Dear Ms. Murshak,

Enclosed are the results for the sample set received at Vista Analytical Laboratory on April 16, 2019 under your Project Name 'Statewide WWTP Biosolids PFAS Evaluation'.

Vista Analytical Laboratory is committed to serving you effectively. If you require additional information, please contact me at 916-673-1520 or by email at [mmaier@vista-analytical.com](mailto:mmaier@vista-analytical.com).

Thank you for choosing Vista as part of your analytical support team.

Sincerely,

Martha Maier  
Laboratory Director



*Vista Analytical Laboratory certifies that the report herein meets all the requirements set forth by NELAP for those applicable test methods. Results relate only to the samples as received by the laboratory. This report should not be reproduced except in full without the written approval of Vista.*

## **Vista Work Order No. 1900762**

### **Case Narrative**

#### **Sample Condition on Receipt:**

Eight aqueous samples and six soil samples were received in good condition and within the method temperature requirements. The samples were received and stored securely in accordance with Vista standard operating procedures and EPA methodology.

#### **Analytical Notes:**

##### **PFAS Isotope Dilution Method**

The aqueous samples were extracted and analyzed for a selected list of PFAS using Vista's PFAS Isotope Dilution Method. This method is listed on Vista's NELAP certificate as Modified EPA Method 537. The results for PFHxS, PFOA, PFOS, MeFOSAA and EtFOSAA include both linear and branched isomers. Results for all other analytes include the linear isomers only.

The samples contained particulate and were centrifuged prior to extraction.

##### Holding Times

The samples were extracted and analyzed within the method hold times.

##### Quality Control

The Initial Calibration and Continuing Calibration Verifications met the method acceptance criteria.

A Method Blank and Ongoing Precision and Recovery (OPR) sample were extracted and analyzed with the preparation batch. No analytes were detected in the Method Blank above 1/2 the LOQ. The OPR recoveries were within the method acceptance criteria.

The labeled standard recoveries outside the acceptance criteria are listed in the table below.

##### **VAL-PFAS Method**

The soil samples were extracted and analyzed for a selected list of PFAS using VAL Method PFAS. The results for PFHxS, PFOA, PFOS, MeFOSAA and EtFOSAA include both linear and branched isomers. Results for all other analytes include the linear isomers only.

##### Holding Times

The samples were extracted and analyzed within the hold times.

##### Quality Control

The Initial Calibration and Continuing Calibration Verifications met the method acceptance criteria.

A Method Blank and Ongoing Precision and Recovery (OPR) sample were extracted and analyzed with the preparation batch. No analytes were detected in the Method Blank above 1/2 the LOQ. The OPR recoveries were within the method acceptance criteria.

The labeled standard recoveries outside the acceptance criteria are listed in the table below.

#### QC Anomalies

LabNumber	SampleName	Analysis	Analyte	Flag	%Rec
1900762-03	SW011904111400RL-DUP	PFAS Isotope Dilution Method	13C2-PFUnA	H	53.6
1900762-09	PEW031904111525RL	PFAS Isotope Dilution Method	13C2-PFUnA	H	52.1
B9D0170-BLK1	B9D0170-BLK1	VAL - PFAS	d3-MeFOSAA	H	48.0
B9D0170-BLK1	B9D0170-BLK1	VAL - PFAS	d5-EtFOSAA	H	45.0
B9D0170-BLK1	B9D0170-BLK1	VAL - PFAS	13C2-PFUnA	H	55.6
B9D0170-BS1	B9D0170-BS1	VAL - PFAS	d5-EtFOSAA	H	48.2
B9D0170-BS1	B9D0170-BS1	VAL - PFAS	13C2-PFUnA	H	58.7

H = Recovery was outside laboratory acceptance criteria.

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# Sample Inventory Report

Vista Sample ID	Client Sample ID	Sampled	Received	Components/Containers
1900762-01	SW021904111345RL	11-Apr-19 13:45	16-Apr-19 09:58	HDPE Bottle, 250 mL HDPE Bottle, 250 mL
1900762-02	SW011904111355RL	11-Apr-19 13:55	16-Apr-19 09:58	HDPE Bottle, 250 mL HDPE Bottle, 250 mL
1900762-03	SW011904111400RL-DUP	11-Apr-19 14:00	16-Apr-19 09:58	HDPE Bottle, 250 mL HDPE Bottle, 250 mL
1900762-04	SXDU31904111405MK	11-Apr-19 14:05	16-Apr-19 09:58	HDPE Jar, 6 oz
1900762-05	SXDU21904111450MK	11-Apr-19 14:50	16-Apr-19 09:58	HDPE Jar, 6 oz
1900762-06	SXDU21904111455MK-DUP	11-Apr-19 14:55	16-Apr-19 09:58	HDPE Jar, 6 oz
1900762-07	PEW011904111510RL	11-Apr-19 15:10	16-Apr-19 09:58	HDPE Bottle, 250 mL HDPE Bottle, 250 mL
1900762-08	PEW021904111515RL	11-Apr-19 15:15	16-Apr-19 09:58	HDPE Bottle, 250 mL HDPE Bottle, 250 mL
1900762-09	PEW031904111525RL	11-Apr-19 15:25	16-Apr-19 09:58	HDPE Bottle, 250 mL HDPE Bottle, 250 mL
1900762-10	PEW011904111640RL	11-Apr-19 16:40	16-Apr-19 09:58	HDPE Bottle, 250 mL HDPE Bottle, 250 mL
1900762-11	SXDU11904111530MK	11-Apr-19 15:30	16-Apr-19 09:58	HDPE Jar, 6 oz
1900762-12	PEW021904111615RL	11-Apr-19 16:15	16-Apr-19 09:58	HDPE Bottle, 250 mL HDPE Bottle, 250 mL
1900762-13	SXDU21904111615MK	11-Apr-19 16:15	16-Apr-19 09:58	HDPE Jar, 6 oz
1900762-14	SXDU11904111655MK	11-Apr-19 16:55	16-Apr-19 09:58	HDPE Jar, 6 oz

## **ANALYTICAL RESULTS**

**Sample ID: Method Blank** **PFAS Isotope Dilution Method**

<b>Client Data</b>						<b>Laboratory Data</b>							
Name:	Merit Laboratories, Inc.			Matrix:	Aqueous			Lab Sample:	B9D0157-BLK1		Column:	BEH C18	
Project:	Statewide WWTP Biosolids PFAS Evaluation												

Analyte	CAS Number	Conc. (ng/L)	DL	LOD	LOQ	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
PFBA	375-22-4	ND	1.37	2.00	4.00		B9D0157	19-Apr-19	0.250 L	26-Apr-19 11:38	1
PFPeA	2706-90-3	ND	1.37	2.00	4.00		B9D0157	19-Apr-19	0.250 L	26-Apr-19 11:38	1
PFBS	375-73-5	ND	1.37	2.00	4.00		B9D0157	19-Apr-19	0.250 L	26-Apr-19 11:38	1
4:2 FTS	757124-72-4	ND	1.37	2.00	4.00		B9D0157	19-Apr-19	0.250 L	26-Apr-19 11:38	1
PFHxA	307-24-4	ND	1.37	2.00	4.00		B9D0157	19-Apr-19	0.250 L	26-Apr-19 11:38	1
PFPeS	2706-91-4	ND	1.37	2.00	4.00		B9D0157	19-Apr-19	0.250 L	26-Apr-19 11:38	1
PFHpA	375-85-9	ND	1.37	2.00	4.00		B9D0157	19-Apr-19	0.250 L	26-Apr-19 11:38	1
PFHxS	355-46-4	ND	1.37	2.00	4.00		B9D0157	19-Apr-19	0.250 L	26-Apr-19 11:38	1
6:2 FTS	27619-97-2	ND	1.37	2.00	4.00		B9D0157	19-Apr-19	0.250 L	26-Apr-19 11:38	1
PFOA	335-67-1	ND	1.37	2.00	4.00		B9D0157	19-Apr-19	0.250 L	26-Apr-19 11:38	1
PFHpS	375-92-8	ND	1.37	2.00	4.00		B9D0157	19-Apr-19	0.250 L	26-Apr-19 11:38	1
PFNA	375-95-1	ND	1.37	2.00	4.00		B9D0157	19-Apr-19	0.250 L	26-Apr-19 11:38	1
PFOSA	754-91-6	ND	1.37	2.00	4.00		B9D0157	19-Apr-19	0.250 L	26-Apr-19 11:38	1
PFOS	1763-23-1	ND	1.37	2.00	4.00		B9D0157	19-Apr-19	0.250 L	26-Apr-19 11:38	1
PFDA	335-76-2	ND	1.37	2.00	4.00		B9D0157	19-Apr-19	0.250 L	26-Apr-19 11:38	1
8:2 FTS	39108-34-4	ND	1.37	2.00	4.00		B9D0157	19-Apr-19	0.250 L	26-Apr-19 11:38	1
PFNS	68259-12-1	ND	1.94	2.00	4.00		B9D0157	19-Apr-19	0.250 L	26-Apr-19 11:38	1
MeFOSAA	2355-31-9	ND	1.37	2.00	4.00		B9D0157	19-Apr-19	0.250 L	26-Apr-19 11:38	1
EtFOSAA	2991-50-6	ND	1.37	2.00	4.00		B9D0157	19-Apr-19	0.250 L	26-Apr-19 11:38	1
PFOA	2058-94-8	ND	1.37	2.00	4.00		B9D0157	19-Apr-19	0.250 L	26-Apr-19 11:38	1
PFDS	335-77-3	ND	1.37	2.00	4.00		B9D0157	19-Apr-19	0.250 L	26-Apr-19 11:38	1
PFDoA	307-55-1	ND	1.37	2.00	4.00		B9D0157	19-Apr-19	0.250 L	26-Apr-19 11:38	1
PFTTrDA	72629-94-8	ND	1.37	2.00	4.00		B9D0157	19-Apr-19	0.250 L	26-Apr-19 11:38	1
PFTTeDA	376-06-7	ND	1.37	2.00	4.00		B9D0157	19-Apr-19	0.250 L	26-Apr-19 11:38	1

Labeled Standards	Type	% Recovery	Limits	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
13C3-PFBA	IS	94.9	60 - 130		B9D0157	19-Apr-19	0.250 L	26-Apr-19 11:38	1
13C3-PFPeA	IS	91.5	60 - 150		B9D0157	19-Apr-19	0.250 L	26-Apr-19 11:38	1
13C3-PFBS	IS	88.3	60 - 150		B9D0157	19-Apr-19	0.250 L	26-Apr-19 11:38	1
13C2-4:2 FTS	IS	92.4	20 - 150		B9D0157	19-Apr-19	0.250 L	26-Apr-19 11:38	1
13C2-PFHxA	IS	90.9	70 - 130		B9D0157	19-Apr-19	0.250 L	26-Apr-19 11:38	1
13C4-PFHpA	IS	92.1	60 - 150		B9D0157	19-Apr-19	0.250 L	26-Apr-19 11:38	1
13C3-PFHxS	IS	90.1	60 - 130		B9D0157	19-Apr-19	0.250 L	26-Apr-19 11:38	1
13C2-6:2 FTS	IS	87.9	40 - 150		B9D0157	19-Apr-19	0.250 L	26-Apr-19 11:38	1
13C2-PFOA	IS	82.6	60 - 130		B9D0157	19-Apr-19	0.250 L	26-Apr-19 11:38	1
13C5-PFNA	IS	76.9	50 - 130		B9D0157	19-Apr-19	0.250 L	26-Apr-19 11:38	1
13C8-PFOSA	IS	29.6	20 - 150		B9D0157	19-Apr-19	0.250 L	26-Apr-19 11:38	1
13C8-PFOS	IS	76.3	60 - 130		B9D0157	19-Apr-19	0.250 L	26-Apr-19 11:38	1
13C2-PFDA	IS	70.6	60 - 130		B9D0157	19-Apr-19	0.250 L	26-Apr-19 11:38	1





**Sample ID: OPR**

**PFAS Isotope Dilution Method**

Client Data					Laboratory Data						
Name:	Merit Laboratories, Inc.		Matrix:	Aqueous	Lab Sample:	B9D0157-BS1	Column:	BEH C18			
Project:	Statewide WWTP Biosolids PFAS Evaluation										

Analyte	CAS Number	Amt Found (ng/L)	Spike Amt	% Rec	Limits	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
PFBA	375-22-4	40.6	40.0	101	70 - 130		B9D0157	19-Apr-19	0.250 L	26-Apr-19 11:28	1
PFPeA	2706-90-3	40.0	40.0	99.9	70 - 130		B9D0157	19-Apr-19	0.250 L	26-Apr-19 11:28	1
PFBS	375-73-5	38.4	40.0	96.1	70 - 130		B9D0157	19-Apr-19	0.250 L	26-Apr-19 11:28	1
4:2 FTS	757124-72-4	38.4	40.0	96.0	70 - 130		B9D0157	19-Apr-19	0.250 L	26-Apr-19 11:28	1
PFHxA	307-24-4	40.5	40.0	101	70 - 130		B9D0157	19-Apr-19	0.250 L	26-Apr-19 11:28	1
PFPeS	2706-91-4	38.1	40.0	95.2	70 - 130		B9D0157	19-Apr-19	0.250 L	26-Apr-19 11:28	1
PFHpA	375-85-9	41.3	40.0	103	70 - 130		B9D0157	19-Apr-19	0.250 L	26-Apr-19 11:28	1
PFHxS	355-46-4	39.3	40.0	98.4	70 - 130		B9D0157	19-Apr-19	0.250 L	26-Apr-19 11:28	1
6:2 FTS	27619-97-2	39.6	40.0	98.9	60 - 130		B9D0157	19-Apr-19	0.250 L	26-Apr-19 11:28	1
PFOA	335-67-1	38.1	40.0	95.3	70 - 130		B9D0157	19-Apr-19	0.250 L	26-Apr-19 11:28	1
PFHpS	375-92-8	42.8	40.0	107	60 - 130		B9D0157	19-Apr-19	0.250 L	26-Apr-19 11:28	1
PFNA	375-95-1	37.1	40.0	92.6	70 - 130		B9D0157	19-Apr-19	0.250 L	26-Apr-19 11:28	1
PFOSA	754-91-6	39.5	40.0	98.8	70 - 130		B9D0157	19-Apr-19	0.250 L	26-Apr-19 11:28	1
PFOS	1763-23-1	37.8	40.0	94.6	70 - 130		B9D0157	19-Apr-19	0.250 L	26-Apr-19 11:28	1
PFDA	335-76-2	40.2	40.0	100	70 - 130		B9D0157	19-Apr-19	0.250 L	26-Apr-19 11:28	1
8:2 FTS	39108-34-4	38.5	40.0	96.3	60 - 130		B9D0157	19-Apr-19	0.250 L	26-Apr-19 11:28	1
PFNS	68259-12-1	37.6	40.0	94.1	70 - 130		B9D0157	19-Apr-19	0.250 L	26-Apr-19 11:28	1
MeFOSAA	2355-31-9	34.1	40.0	85.4	70 - 130		B9D0157	19-Apr-19	0.250 L	26-Apr-19 11:28	1
EtFOSAA	2991-50-6	40.0	40.0	100	70 - 130		B9D0157	19-Apr-19	0.250 L	26-Apr-19 11:28	1
PFUnA	2058-94-8	39.6	40.0	99.0	70 - 130		B9D0157	19-Apr-19	0.250 L	26-Apr-19 11:28	1
PFDS	335-77-3	33.5	40.0	83.9	60 - 130		B9D0157	19-Apr-19	0.250 L	26-Apr-19 11:28	1
PFDoA	307-55-1	39.9	40.0	99.7	70 - 130		B9D0157	19-Apr-19	0.250 L	26-Apr-19 11:28	1
PFTTrDA	72629-94-8	31.6	40.0	78.9	60 - 130		B9D0157	19-Apr-19	0.250 L	26-Apr-19 11:28	1
PFTeDA	376-06-7	38.3	40.0	95.8	70 - 130		B9D0157	19-Apr-19	0.250 L	26-Apr-19 11:28	1

Labeled Standards	Type	% Rec	Limits	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
13C3-PFBA	IS	96.6	60- 130		B9D0157	19-Apr-19	0.250 L	26-Apr-19 11:28	1
13C3-PFPeA	IS	93.2	60- 150		B9D0157	19-Apr-19	0.250 L	26-Apr-19 11:28	1
13C3-PFBS	IS	101	60- 150		B9D0157	19-Apr-19	0.250 L	26-Apr-19 11:28	1
13C2-4:2 FTS	IS	96.3	20- 150		B9D0157	19-Apr-19	0.250 L	26-Apr-19 11:28	1
13C2-PFHxA	IS	91.3	70- 130		B9D0157	19-Apr-19	0.250 L	26-Apr-19 11:28	1
13C4-PFHpA	IS	90.0	60- 150		B9D0157	19-Apr-19	0.250 L	26-Apr-19 11:28	1
13C3-PFHxS	IS	91.9	60- 130		B9D0157	19-Apr-19	0.250 L	26-Apr-19 11:28	1
13C2-6:2 FTS	IS	92.8	40- 150		B9D0157	19-Apr-19	0.250 L	26-Apr-19 11:28	1
13C2-PFOA	IS	92.1	60- 130		B9D0157	19-Apr-19	0.250 L	26-Apr-19 11:28	1
13C5-PFNA	IS	91.3	50- 130		B9D0157	19-Apr-19	0.250 L	26-Apr-19 11:28	1

**Sample ID: OPR**

**PFAS Isotope Dilution Method**

**Client Data**

Name: Merit Laboratories, Inc.  
 Project: Statewide WWTP Biosolids PFAS Evaluation

Matrix: Aqueous

**Laboratory Data**

Lab Sample: B9D0157-BS1      Column: BEH C18

Labeled Standards	Type	% Rec	Limits	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
13C8-PFOSA	IS	42.3	20- 150		B9D0157	19-Apr-19	0.250 L	26-Apr-19 11:28	1
13C8-PFOS	IS	84.7	60- 130		B9D0157	19-Apr-19	0.250 L	26-Apr-19 11:28	1
13C2-PFDA	IS	81.2	60- 130		B9D0157	19-Apr-19	0.250 L	26-Apr-19 11:28	1
13C2-8:2 FTS	IS	86.8	40- 150		B9D0157	19-Apr-19	0.250 L	26-Apr-19 11:28	1
d3-MeFOSAA	IS	74.7	50- 150		B9D0157	19-Apr-19	0.250 L	26-Apr-19 11:28	1
d5-EtFOSAA	IS	67.6	50- 150		B9D0157	19-Apr-19	0.250 L	26-Apr-19 11:28	1
13C2-PFUnA	IS	72.5	60- 130		B9D0157	19-Apr-19	0.250 L	26-Apr-19 11:28	1
13C2-PFDoA	IS	68.3	30- 130		B9D0157	19-Apr-19	0.250 L	26-Apr-19 11:28	1
13C2-PFTeDA	IS	41.0	20- 150		B9D0157	19-Apr-19	0.250 L	26-Apr-19 11:28	1

**Sample ID: SW021904111345RL**

**PFAS Isotope Dilution Method**

Client Data				Laboratory Data			
Name:	Merit Laboratories, Inc.	Matrix:	Aqueous	Lab Sample:	1900762-01	Column:	BEH C18
Project:	Statewide WWTP Biosolids PFAS Evaluation	Date Collected:	11-Apr-19 13:45	Date Received:	16-Apr-19 09:58		
Location:	WIXO-02N05E01-BC01						

Analyte	CAS Number	Conc. (ng/L)	DL	LOD	LOQ	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
PFBA	375-22-4	9.90	1.50	2.19	4.39		B9D0157	19-Apr-19	0.228 L	26-Apr-19 12:42	1
PFPeA	2706-90-3	9.36	1.50	2.19	4.39		B9D0157	19-Apr-19	0.228 L	26-Apr-19 12:42	1
PFBS	375-73-5	8.37	1.50	2.19	4.39		B9D0157	19-Apr-19	0.228 L	26-Apr-19 12:42	1
4:2 FTS	757124-72-4	ND	1.50	2.19	4.39		B9D0157	19-Apr-19	0.228 L	26-Apr-19 12:42	1
PFHxA	307-24-4	9.18	1.50	2.19	4.39		B9D0157	19-Apr-19	0.228 L	26-Apr-19 12:42	1
PFPeS	2706-91-4	ND	1.50	2.19	4.39		B9D0157	19-Apr-19	0.228 L	26-Apr-19 12:42	1
PFHpA	375-85-9	4.94	1.50	2.19	4.39		B9D0157	19-Apr-19	0.228 L	26-Apr-19 12:42	1
PFHxS	355-46-4	ND	1.50	2.19	4.39		B9D0157	19-Apr-19	0.228 L	26-Apr-19 12:42	1
6:2 FTS	27619-97-2	ND	1.50	2.19	4.39		B9D0157	19-Apr-19	0.228 L	26-Apr-19 12:42	1
PFOA	335-67-1	5.84	1.50	2.19	4.39		B9D0157	19-Apr-19	0.228 L	26-Apr-19 12:42	1
PFHpS	375-92-8	ND	1.50	2.19	4.39		B9D0157	19-Apr-19	0.228 L	26-Apr-19 12:42	1
PFNA	375-95-1	ND	1.50	2.19	4.39		B9D0157	19-Apr-19	0.228 L	26-Apr-19 12:42	1
PFOSA	754-91-6	ND	1.50	2.19	4.39		B9D0157	19-Apr-19	0.228 L	26-Apr-19 12:42	1
PFOS	1763-23-1	38.4	1.50	2.19	4.39		B9D0157	19-Apr-19	0.228 L	26-Apr-19 12:42	1
PFDA	335-76-2	ND	1.50	2.19	4.39		B9D0157	19-Apr-19	0.228 L	26-Apr-19 12:42	1
8:2 FTS	39108-34-4	ND	1.50	2.19	4.39		B9D0157	19-Apr-19	0.228 L	26-Apr-19 12:42	1
PFNS	68259-12-1	ND	2.12	2.19	4.39		B9D0157	19-Apr-19	0.228 L	26-Apr-19 12:42	1
MeFOSAA	2355-31-9	ND	1.50	2.19	4.39		B9D0157	19-Apr-19	0.228 L	26-Apr-19 12:42	1
EtFOSAA	2991-50-6	ND	1.50	2.19	4.39		B9D0157	19-Apr-19	0.228 L	26-Apr-19 12:42	1
PFUnA	2058-94-8	ND	1.50	2.19	4.39		B9D0157	19-Apr-19	0.228 L	26-Apr-19 12:42	1
PFDS	335-77-3	ND	1.50	2.19	4.39		B9D0157	19-Apr-19	0.228 L	26-Apr-19 12:42	1
PFDoA	307-55-1	ND	1.50	2.19	4.39		B9D0157	19-Apr-19	0.228 L	26-Apr-19 12:42	1
PFTTrDA	72629-94-8	ND	1.50	2.19	4.39		B9D0157	19-Apr-19	0.228 L	26-Apr-19 12:42	1
PFTeDA	376-06-7	ND	1.50	2.19	4.39		B9D0157	19-Apr-19	0.228 L	26-Apr-19 12:42	1

Labeled Standards	Type	% Recovery	Limits	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
13C3-PFBA	IS	97.8	60 - 130		B9D0157	19-Apr-19	0.228 L	26-Apr-19 12:42	1
13C3-PFPeA	IS	93.5	60 - 150		B9D0157	19-Apr-19	0.228 L	26-Apr-19 12:42	1
13C3-PFBS	IS	86.5	60 - 150		B9D0157	19-Apr-19	0.228 L	26-Apr-19 12:42	1
13C2-4:2 FTS	IS	90.0	20 - 150		B9D0157	19-Apr-19	0.228 L	26-Apr-19 12:42	1
13C2-PFHxA	IS	95.9	70 - 130		B9D0157	19-Apr-19	0.228 L	26-Apr-19 12:42	1
13C4-PFHpA	IS	98.0	60 - 150		B9D0157	19-Apr-19	0.228 L	26-Apr-19 12:42	1
13C3-PFHxS	IS	89.1	60 - 130		B9D0157	19-Apr-19	0.228 L	26-Apr-19 12:42	1
13C2-6:2 FTS	IS	88.9	40 - 150		B9D0157	19-Apr-19	0.228 L	26-Apr-19 12:42	1
13C2-PFOA	IS	98.4	60 - 130		B9D0157	19-Apr-19	0.228 L	26-Apr-19 12:42	1
13C5-PFNA	IS	83.1	50 - 130		B9D0157	19-Apr-19	0.228 L	26-Apr-19 12:42	1
13C8-PFOSA	IS	50.1	20 - 150		B9D0157	19-Apr-19	0.228 L	26-Apr-19 12:42	1
13C8-PFOS	IS	85.2	60 - 130		B9D0157	19-Apr-19	0.228 L	26-Apr-19 12:42	1
13C2-PFDA	IS	72.8	60 - 130		B9D0157	19-Apr-19	0.228 L	26-Apr-19 12:42	1

**Sample ID: SW021904111345RL** **PFAS Isotope Dilution Method**

<b>Client Data</b>				<b>Laboratory Data</b>			
Name:	Merit Laboratories, Inc.	Matrix:	Aqueous	Lab Sample:	1900762-01	Column:	BEH C18
Project:	Statewide WWTP Biosolids PFAS Evaluation	Date Collected:	11-Apr-19 13:45	Date Received:	16-Apr-19 09:58		
Location:	WIXO-02N05E01-BC01						

Labeled Standards	Type	% Recovery	Limits	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
13C2-8:2 FTS	IS	82.3	40 - 150		B9D0157	19-Apr-19	0.228 L	26-Apr-19 12:42	1
d3-MeFOSAA	IS	67.0	50 - 150		B9D0157	19-Apr-19	0.228 L	26-Apr-19 12:42	1
d5-EtFOSAA	IS	67.5	50 - 150		B9D0157	19-Apr-19	0.228 L	26-Apr-19 12:42	1
13C2-PFUnA	IS	73.1	60 - 130		B9D0157	19-Apr-19	0.228 L	26-Apr-19 12:42	1
13C2-PFDoA	IS	58.6	30 - 130		B9D0157	19-Apr-19	0.228 L	26-Apr-19 12:42	1
13C2-PFTeDA	IS	50.2	20 - 150		B9D0157	19-Apr-19	0.228 L	26-Apr-19 12:42	1

DL - Detection Limit

LOD - Limit of Detection  
LOQ - Limit of quantitation

Results reported to the DL.

When reported, PFHxS, PFOA, PFOS, MeFOSAA and EtFOSAA include both linear and branched isomers. Only the linear isomer is reported for all other analytes.

**Sample ID: SW011904111355RL**

**PFAS Isotope Dilution Method**

Client Data					Laboratory Data						
Name:	Merit Laboratories, Inc.		Matrix:	Aqueous	Lab Sample:	1900762-02		Column:	BEH C18		
Project:	Statewide WWTP Biosolids PFAS Evaluation		Date Collected:	11-Apr-19 13:55	Date Received:	16-Apr-19 09:58					
Location:	WIXO-02N05E01-BC01										

Analyte	CAS Number	Conc. (ng/L)	DL	LOD	LOQ	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
PFBA	375-22-4	55.8	1.64	2.39	4.78		B9D0157	19-Apr-19	0.209 L	26-Apr-19 13:24	1
PFPeA	2706-90-3	84.1	1.64	2.39	4.78		B9D0157	19-Apr-19	0.209 L	26-Apr-19 13:24	1
PFBS	375-73-5	73.7	1.64	2.39	4.78		B9D0157	19-Apr-19	0.209 L	26-Apr-19 13:24	1
4:2 FTS	757124-72-4	ND	1.64	2.39	4.78		B9D0157	19-Apr-19	0.209 L	26-Apr-19 13:24	1
PFHxA	307-24-4	78.3	1.64	2.39	4.78		B9D0157	19-Apr-19	0.209 L	26-Apr-19 13:24	1
PFPeS	2706-91-4	ND	1.64	2.39	4.78		B9D0157	19-Apr-19	0.209 L	26-Apr-19 13:24	1
PFHpA	375-85-9	29.6	1.64	2.39	4.78		B9D0157	19-Apr-19	0.209 L	26-Apr-19 13:24	1
PFHxS	355-46-4	3.58	1.64	2.39	4.78	J, Q	B9D0157	19-Apr-19	0.209 L	26-Apr-19 13:24	1
6:2 FTS	27619-97-2	ND	1.64	2.39	4.78		B9D0157	19-Apr-19	0.209 L	26-Apr-19 13:24	1
PFOA	335-67-1	11.7	1.64	2.39	4.78		B9D0157	19-Apr-19	0.209 L	26-Apr-19 13:24	1
PFHpS	375-92-8	ND	1.64	2.39	4.78		B9D0157	19-Apr-19	0.209 L	26-Apr-19 13:24	1
PFNA	375-95-1	ND	1.64	2.39	4.78		B9D0157	19-Apr-19	0.209 L	26-Apr-19 13:24	1
PFOSA	754-91-6	ND	1.64	2.39	4.78		B9D0157	19-Apr-19	0.209 L	26-Apr-19 13:24	1
PFOS	1763-23-1	49.7	1.64	2.39	4.78		B9D0157	19-Apr-19	0.209 L	26-Apr-19 13:24	1
PFDA	335-76-2	ND	1.64	2.39	4.78		B9D0157	19-Apr-19	0.209 L	26-Apr-19 13:24	1
8:2 FTS	39108-34-4	ND	1.64	2.39	4.78		B9D0157	19-Apr-19	0.209 L	26-Apr-19 13:24	1
PFNS	68259-12-1	ND	2.31	2.39	4.78		B9D0157	19-Apr-19	0.209 L	26-Apr-19 13:24	1
MeFOSAA	2355-31-9	ND	1.64	2.39	4.78		B9D0157	19-Apr-19	0.209 L	26-Apr-19 13:24	1
EtFOSAA	2991-50-6	ND	1.64	2.39	4.78		B9D0157	19-Apr-19	0.209 L	26-Apr-19 13:24	1
PFOA	2058-94-8	ND	1.64	2.39	4.78		B9D0157	19-Apr-19	0.209 L	26-Apr-19 13:24	1
PFDS	335-77-3	ND	1.64	2.39	4.78		B9D0157	19-Apr-19	0.209 L	26-Apr-19 13:24	1
PFDoA	307-55-1	ND	1.64	2.39	4.78		B9D0157	19-Apr-19	0.209 L	26-Apr-19 13:24	1
PFTTrDA	72629-94-8	ND	1.64	2.39	4.78		B9D0157	19-Apr-19	0.209 L	26-Apr-19 13:24	1
PFTeDA	376-06-7	ND	1.64	2.39	4.78		B9D0157	19-Apr-19	0.209 L	26-Apr-19 13:24	1

Labeled Standards	Type	% Recovery	Limits	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
13C3-PFBA	IS	96.3	60 - 130		B9D0157	19-Apr-19	0.209 L	26-Apr-19 13:24	1
13C3-PFPeA	IS	96.2	60 - 150		B9D0157	19-Apr-19	0.209 L	26-Apr-19 13:24	1
13C3-PFBS	IS	92.1	60 - 150		B9D0157	19-Apr-19	0.209 L	26-Apr-19 13:24	1
13C2-4:2 FTS	IS	88.5	20 - 150		B9D0157	19-Apr-19	0.209 L	26-Apr-19 13:24	1
13C2-PFHxA	IS	97.5	70 - 130		B9D0157	19-Apr-19	0.209 L	26-Apr-19 13:24	1
13C4-PFHpA	IS	99.6	60 - 150		B9D0157	19-Apr-19	0.209 L	26-Apr-19 13:24	1
13C3-PFHxS	IS	90.3	60 - 130		B9D0157	19-Apr-19	0.209 L	26-Apr-19 13:24	1
13C2-6:2 FTS	IS	102	40 - 150		B9D0157	19-Apr-19	0.209 L	26-Apr-19 13:24	1
13C2-PFOA	IS	93.4	60 - 130		B9D0157	19-Apr-19	0.209 L	26-Apr-19 13:24	1
13C5-PFNA	IS	84.4	50 - 130		B9D0157	19-Apr-19	0.209 L	26-Apr-19 13:24	1
13C8-PFOSA	IS	32.5	20 - 150		B9D0157	19-Apr-19	0.209 L	26-Apr-19 13:24	1
13C8-PFOS	IS	84.3	60 - 130		B9D0157	19-Apr-19	0.209 L	26-Apr-19 13:24	1
13C2-PFDA	IS	67.2	60 - 130		B9D0157	19-Apr-19	0.209 L	26-Apr-19 13:24	1

**Sample ID: SW011904111355RL** **PFAS Isotope Dilution Method**

Client Data	Laboratory Data
Name: Merit Laboratories, Inc.	Lab Sample: 1900762-02
Project: Statewide WWTP Biosolids PFAS Evaluation	Date Received: 16-Apr-19 09:58
Location: WIXO-02N05E01-BC01	Column: BEH C18
Matrix: Aqueous	
Date Collected: 11-Apr-19 13:55	

Labeled Standards	Type	% Recovery	Limits	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
13C2-8:2 FTS	IS	80.3	40 - 150		B9D0157	19-Apr-19	0.209 L	26-Apr-19 13:24	1
d3-MeFOSAA	IS	69.0	50 - 150		B9D0157	19-Apr-19	0.209 L	26-Apr-19 13:24	1
d5-EtFOSAA	IS	63.5	50 - 150		B9D0157	19-Apr-19	0.209 L	26-Apr-19 13:24	1
13C2-PFUnA	IS	63.9	60 - 130		B9D0157	19-Apr-19	0.209 L	26-Apr-19 13:24	1
13C2-PFDoA	IS	42.5	30 - 130		B9D0157	19-Apr-19	0.209 L	26-Apr-19 13:24	1
13C2-PFTeDA	IS	33.8	20 - 150		B9D0157	19-Apr-19	0.209 L	26-Apr-19 13:24	1

DL - Detection Limit

LOD - Limit of Detection  
LOQ - Limit of quantitation

Results reported to the DL.

When reported, PFHxS, PFOA, PFOS, MeFOSAA and EtFOSAA include both linear and branched isomers. Only the linear isomer is reported for all other analytes.

**Sample ID: SW011904111400RL-DUP**
**PFAS Isotope Dilution Method**

Client Data				Laboratory Data			
Name:	Merit Laboratories, Inc.	Matrix:	Aqueous	Lab Sample:	1900762-03	Column:	BEH C18
Project:	Statewide WWTP Biosolids PFAS Evaluation	Date Collected:	11-Apr-19 14:00	Date Received:	16-Apr-19 09:58		
Location:	WIXO-02N05E01-BC01						

Analyte	CAS Number	Conc. (ng/L)	DL	LOD	LOQ	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
PFBA	375-22-4	57.0	1.61	2.35	4.70		B9D0157	19-Apr-19	0.213 L	26-Apr-19 13:35	1
PFPeA	2706-90-3	86.9	1.61	2.35	4.70		B9D0157	19-Apr-19	0.213 L	26-Apr-19 13:35	1
PFBS	375-73-5	75.4	1.61	2.35	4.70		B9D0157	19-Apr-19	0.213 L	26-Apr-19 13:35	1
4:2 FTS	757124-72-4	ND	1.61	2.35	4.70		B9D0157	19-Apr-19	0.213 L	26-Apr-19 13:35	1
PFHxA	307-24-4	78.0	1.61	2.35	4.70		B9D0157	19-Apr-19	0.213 L	26-Apr-19 13:35	1
PFPeS	2706-91-4	ND	1.61	2.35	4.70		B9D0157	19-Apr-19	0.213 L	26-Apr-19 13:35	1
PFHpA	375-85-9	29.3	1.61	2.35	4.70		B9D0157	19-Apr-19	0.213 L	26-Apr-19 13:35	1
PFHxS	355-46-4	3.04	1.61	2.35	4.70	J	B9D0157	19-Apr-19	0.213 L	26-Apr-19 13:35	1
6:2 FTS	27619-97-2	ND	1.61	2.35	4.70		B9D0157	19-Apr-19	0.213 L	26-Apr-19 13:35	1
PFOA	335-67-1	12.0	1.61	2.35	4.70		B9D0157	19-Apr-19	0.213 L	26-Apr-19 13:35	1
PFHpS	375-92-8	ND	1.61	2.35	4.70		B9D0157	19-Apr-19	0.213 L	26-Apr-19 13:35	1
PFNA	375-95-1	ND	1.61	2.35	4.70		B9D0157	19-Apr-19	0.213 L	26-Apr-19 13:35	1
PFOSA	754-91-6	ND	1.61	2.35	4.70		B9D0157	19-Apr-19	0.213 L	26-Apr-19 13:35	1
PFOS	1763-23-1	50.7	1.61	2.35	4.70		B9D0157	19-Apr-19	0.213 L	26-Apr-19 13:35	1
PFDA	335-76-2	ND	1.61	2.35	4.70		B9D0157	19-Apr-19	0.213 L	26-Apr-19 13:35	1
8:2 FTS	39108-34-4	ND	1.61	2.35	4.70		B9D0157	19-Apr-19	0.213 L	26-Apr-19 13:35	1
PFNS	68259-12-1	ND	2.27	2.35	4.70		B9D0157	19-Apr-19	0.213 L	26-Apr-19 13:35	1
MeFOSAA	2355-31-9	ND	1.61	2.35	4.70		B9D0157	19-Apr-19	0.213 L	26-Apr-19 13:35	1
EtFOSAA	2991-50-6	ND	1.61	2.35	4.70		B9D0157	19-Apr-19	0.213 L	26-Apr-19 13:35	1
PFUnA	2058-94-8	ND	1.61	2.35	4.70		B9D0157	19-Apr-19	0.213 L	26-Apr-19 13:35	1
PFDS	335-77-3	ND	1.61	2.35	4.70		B9D0157	19-Apr-19	0.213 L	26-Apr-19 13:35	1
PFDoA	307-55-1	ND	1.61	2.35	4.70		B9D0157	19-Apr-19	0.213 L	26-Apr-19 13:35	1
PFTTrDA	72629-94-8	ND	1.61	2.35	4.70		B9D0157	19-Apr-19	0.213 L	26-Apr-19 13:35	1
PFTeDA	376-06-7	ND	1.61	2.35	4.70		B9D0157	19-Apr-19	0.213 L	26-Apr-19 13:35	1

Labeled Standards	Type	% Recovery	Limits	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
13C3-PFBA	IS	93.8	60 - 130		B9D0157	19-Apr-19	0.213 L	26-Apr-19 13:35	1
13C3-PFPeA	IS	89.3	60 - 150		B9D0157	19-Apr-19	0.213 L	26-Apr-19 13:35	1
13C3-PFBS	IS	89.6	60 - 150		B9D0157	19-Apr-19	0.213 L	26-Apr-19 13:35	1
13C2-4:2 FTS	IS	91.1	20 - 150		B9D0157	19-Apr-19	0.213 L	26-Apr-19 13:35	1
13C2-PFHxA	IS	90.4	70 - 130		B9D0157	19-Apr-19	0.213 L	26-Apr-19 13:35	1
13C4-PFHpA	IS	91.7	60 - 150		B9D0157	19-Apr-19	0.213 L	26-Apr-19 13:35	1
13C3-PFHxS	IS	88.4	60 - 130		B9D0157	19-Apr-19	0.213 L	26-Apr-19 13:35	1
13C2-6:2 FTS	IS	96.6	40 - 150		B9D0157	19-Apr-19	0.213 L	26-Apr-19 13:35	1
13C2-PFOA	IS	87.0	60 - 130		B9D0157	19-Apr-19	0.213 L	26-Apr-19 13:35	1
13C5-PFNA	IS	79.6	50 - 130		B9D0157	19-Apr-19	0.213 L	26-Apr-19 13:35	1
13C8-PFOSA	IS	51.6	20 - 150		B9D0157	19-Apr-19	0.213 L	26-Apr-19 13:35	1
13C8-PFOS	IS	83.4	60 - 130		B9D0157	19-Apr-19	0.213 L	26-Apr-19 13:35	1
13C2-PFDA	IS	66.6	60 - 130		B9D0157	19-Apr-19	0.213 L	26-Apr-19 13:35	1



**Sample ID: SW011904111400RL-DUP** **PFAS Isotope Dilution Method**

Client Data	Laboratory Data
Name: Merit Laboratories, Inc.	Lab Sample: 1900762-03
Project: Statewide WWTP Biosolids PFAS Evaluation	Date Received: 16-Apr-19 09:58
Location: WIXO-02N05E01-BC01	Column: BEH C18
Matrix: Aqueous	
Date Collected: 11-Apr-19 14:00	

Labeled Standards	Type	% Recovery	Limits	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
13C2-8:2 FTS	IS	88.2	40 - 150		B9D0157	19-Apr-19	0.213 L	26-Apr-19 13:35	1
d3-MeFOSAA	IS	59.1	50 - 150		B9D0157	19-Apr-19	0.213 L	26-Apr-19 13:35	1
d5-EtFOSAA	IS	58.3	50 - 150		B9D0157	19-Apr-19	0.213 L	26-Apr-19 13:35	1
13C2-PFUnA	IS	53.6	60 - 130	H	B9D0157	19-Apr-19	0.213 L	26-Apr-19 13:35	1
13C2-PFDoA	IS	41.3	30 - 130		B9D0157	19-Apr-19	0.213 L	26-Apr-19 13:35	1
13C2-PFTeDA	IS	34.2	20 - 150		B9D0157	19-Apr-19	0.213 L	26-Apr-19 13:35	1

DL - Detection Limit

LOD - Limit of Detection  
LOQ - Limit of quantitation

Results reported to the DL.

When reported, PFHxS, PFOA, PFOS, MeFOSAA and EtFOSAA include both linear and branched isomers. Only the linear isomer is reported for all other analytes.

**Sample ID: PEW011904111510RL**

**PFAS Isotope Dilution Method**

Client Data				Laboratory Data			
Name:	Merit Laboratories, Inc.	Matrix:	Aqueous	Lab Sample:	1900762-07	Column:	BEH C18
Project:	Statewide WWTP Biosolids PFAS Evaluation	Date Collected:	11-Apr-19 15:10	Date Received:	16-Apr-19 09:58		
Location:	WIXO-02N05E01-BC01						

Analyte	CAS Number	Conc. (ng/L)	DL	LOD	LOQ	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
PFBA	375-22-4	53.1	1.56	2.28	4.57		B9D0157	19-Apr-19	0.219 L	26-Apr-19 13:45	1
PFPeA	2706-90-3	91.2	1.56	2.28	4.57		B9D0157	19-Apr-19	0.219 L	26-Apr-19 13:45	1
PFBS	375-73-5	108	1.56	2.28	4.57		B9D0157	19-Apr-19	0.219 L	26-Apr-19 13:45	1
4:2 FTS	757124-72-4	ND	1.56	2.28	4.57		B9D0157	19-Apr-19	0.219 L	26-Apr-19 13:45	1
PFHxA	307-24-4	90.5	1.56	2.28	4.57		B9D0157	19-Apr-19	0.219 L	26-Apr-19 13:45	1
PFPeS	2706-91-4	ND	1.56	2.28	4.57		B9D0157	19-Apr-19	0.219 L	26-Apr-19 13:45	1
PFHpA	375-85-9	40.1	1.56	2.28	4.57		B9D0157	19-Apr-19	0.219 L	26-Apr-19 13:45	1
PFHxS	355-46-4	5.81	1.56	2.28	4.57		B9D0157	19-Apr-19	0.219 L	26-Apr-19 13:45	1
6:2 FTS	27619-97-2	ND	1.56	2.28	4.57		B9D0157	19-Apr-19	0.219 L	26-Apr-19 13:45	1
PFOA	335-67-1	37.7	1.56	2.28	4.57		B9D0157	19-Apr-19	0.219 L	26-Apr-19 13:45	1
PFHpS	375-92-8	2.28	1.56	2.28	4.57	J	B9D0157	19-Apr-19	0.219 L	26-Apr-19 13:45	1
PFNA	375-95-1	6.31	1.56	2.28	4.57		B9D0157	19-Apr-19	0.219 L	26-Apr-19 13:45	1
PFOSA	754-91-6	ND	1.56	2.28	4.57		B9D0157	19-Apr-19	0.219 L	26-Apr-19 13:45	1
PFOS	1763-23-1	533	1.56	2.28	4.57		B9D0157	19-Apr-19	0.219 L	26-Apr-19 13:45	1
PFDA	335-76-2	ND	1.56	2.28	4.57		B9D0157	19-Apr-19	0.219 L	26-Apr-19 13:45	1
8:2 FTS	39108-34-4	ND	1.56	2.28	4.57		B9D0157	19-Apr-19	0.219 L	26-Apr-19 13:45	1
PFNS	68259-12-1	ND	2.21	2.28	4.57		B9D0157	19-Apr-19	0.219 L	26-Apr-19 13:45	1
MeFOSAA	2355-31-9	ND	1.56	2.28	4.57		B9D0157	19-Apr-19	0.219 L	26-Apr-19 13:45	1
EtFOSAA	2991-50-6	ND	1.56	2.28	4.57		B9D0157	19-Apr-19	0.219 L	26-Apr-19 13:45	1
PFUnA	2058-94-8	ND	1.56	2.28	4.57		B9D0157	19-Apr-19	0.219 L	26-Apr-19 13:45	1
PFDS	335-77-3	ND	1.56	2.28	4.57		B9D0157	19-Apr-19	0.219 L	26-Apr-19 13:45	1
PFDoA	307-55-1	ND	1.56	2.28	4.57		B9D0157	19-Apr-19	0.219 L	26-Apr-19 13:45	1
PFTTrDA	72629-94-8	ND	1.56	2.28	4.57		B9D0157	19-Apr-19	0.219 L	26-Apr-19 13:45	1
PFTeDA	376-06-7	ND	1.56	2.28	4.57		B9D0157	19-Apr-19	0.219 L	26-Apr-19 13:45	1

Labeled Standards	Type	% Recovery	Limits	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
13C3-PFBA	IS	94.0	60 - 130		B9D0157	19-Apr-19	0.219 L	26-Apr-19 13:45	1
13C3-PFPeA	IS	90.8	60 - 150		B9D0157	19-Apr-19	0.219 L	26-Apr-19 13:45	1
13C3-PFBS	IS	89.6	60 - 150		B9D0157	19-Apr-19	0.219 L	26-Apr-19 13:45	1
13C2-4:2 FTS	IS	94.0	20 - 150		B9D0157	19-Apr-19	0.219 L	26-Apr-19 13:45	1
13C2-PFHxA	IS	89.7	70 - 130		B9D0157	19-Apr-19	0.219 L	26-Apr-19 13:45	1
13C4-PFHpA	IS	96.2	60 - 150		B9D0157	19-Apr-19	0.219 L	26-Apr-19 13:45	1
13C3-PFHxS	IS	92.2	60 - 130		B9D0157	19-Apr-19	0.219 L	26-Apr-19 13:45	1
13C2-6:2 FTS	IS	105	40 - 150		B9D0157	19-Apr-19	0.219 L	26-Apr-19 13:45	1
13C2-PFOA	IS	86.4	60 - 130		B9D0157	19-Apr-19	0.219 L	26-Apr-19 13:45	1
13C5-PFNA	IS	79.9	50 - 130		B9D0157	19-Apr-19	0.219 L	26-Apr-19 13:45	1
13C8-PFOSA	IS	46.7	20 - 150		B9D0157	19-Apr-19	0.219 L	26-Apr-19 13:45	1
13C8-PFOS	IS	87.8	60 - 130		B9D0157	19-Apr-19	0.219 L	26-Apr-19 13:45	1
13C2-PFDA	IS	74.3	60 - 130		B9D0157	19-Apr-19	0.219 L	26-Apr-19 13:45	1

**Sample ID: PEW011904111510RL** **PFAS Isotope Dilution Method**

Client Data	Laboratory Data
Name: Merit Laboratories, Inc.	Lab Sample: 1900762-07
Project: Statewide WWTP Biosolids PFAS Evaluation	Date Received: 16-Apr-19 09:58
Location: WIXO-02N05E01-BC01	Column: BEH C18
Matrix: Aqueous	
Date Collected: 11-Apr-19 15:10	

Labeled Standards	Type	% Recovery	Limits	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
13C2-8:2 FTS	IS	87.5	40 - 150		B9D0157	19-Apr-19	0.219 L	26-Apr-19 13:45	1
d3-MeFOSAA	IS	54.3	50 - 150		B9D0157	19-Apr-19	0.219 L	26-Apr-19 13:45	1
d5-EtFOSAA	IS	58.1	50 - 150		B9D0157	19-Apr-19	0.219 L	26-Apr-19 13:45	1
13C2-PFUnA	IS	61.7	60 - 130		B9D0157	19-Apr-19	0.219 L	26-Apr-19 13:45	1
13C2-PFDoA	IS	41.9	30 - 130		B9D0157	19-Apr-19	0.219 L	26-Apr-19 13:45	1
13C2-PFTeDA	IS	21.3	20 - 150		B9D0157	19-Apr-19	0.219 L	26-Apr-19 13:45	1

DL - Detection Limit

LOD - Limit of Detection  
LOQ - Limit of quantitation

Results reported to the DL.

When reported, PFHxS, PFOA, PFOS, MeFOSAA and EtFOSAA include both linear and branched isomers. Only the linear isomer is reported for all other analytes.

**Sample ID: PEW021904111515RL**

**PFAS Isotope Dilution Method**

Client Data				Laboratory Data			
Name:	Merit Laboratories, Inc.	Matrix:	Aqueous	Lab Sample:	1900762-08	Column:	BEH C18
Project:	Statewide WWTP Biosolids PFAS Evaluation	Date Collected:	11-Apr-19 15:15	Date Received:	16-Apr-19 09:58		
Location:	WIXO-02N05E01-BC01						

Analyte	CAS Number	Conc. (ng/L)	DL	LOD	LOQ	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
PFBA	375-22-4	49.9	1.54	2.25	4.51		B9D0157	19-Apr-19	0.222 L	26-Apr-19 13:56	1
PFPeA	2706-90-3	89.8	1.54	2.25	4.51		B9D0157	19-Apr-19	0.222 L	26-Apr-19 13:56	1
PFBS	375-73-5	109	1.54	2.25	4.51		B9D0157	19-Apr-19	0.222 L	26-Apr-19 13:56	1
4:2 FTS	757124-72-4	ND	1.54	2.25	4.51		B9D0157	19-Apr-19	0.222 L	26-Apr-19 13:56	1
PFHxA	307-24-4	82.2	1.54	2.25	4.51		B9D0157	19-Apr-19	0.222 L	26-Apr-19 13:56	1
PFPeS	2706-91-4	ND	1.54	2.25	4.51		B9D0157	19-Apr-19	0.222 L	26-Apr-19 13:56	1
PFHpA	375-85-9	36.2	1.54	2.25	4.51		B9D0157	19-Apr-19	0.222 L	26-Apr-19 13:56	1
PFHxS	355-46-4	4.62	1.54	2.25	4.51		B9D0157	19-Apr-19	0.222 L	26-Apr-19 13:56	1
6:2 FTS	27619-97-2	ND	1.54	2.25	4.51		B9D0157	19-Apr-19	0.222 L	26-Apr-19 13:56	1
PFOA	335-67-1	38.6	1.54	2.25	4.51		B9D0157	19-Apr-19	0.222 L	26-Apr-19 13:56	1
PFHpS	375-92-8	1.70	1.54	2.25	4.51	J	B9D0157	19-Apr-19	0.222 L	26-Apr-19 13:56	1
PFNA	375-95-1	4.73	1.54	2.25	4.51		B9D0157	19-Apr-19	0.222 L	26-Apr-19 13:56	1
PFOSA	754-91-6	ND	1.54	2.25	4.51		B9D0157	19-Apr-19	0.222 L	26-Apr-19 13:56	1
PFOS	1763-23-1	401	1.54	2.25	4.51		B9D0157	19-Apr-19	0.222 L	26-Apr-19 13:56	1
PFDA	335-76-2	ND	1.54	2.25	4.51		B9D0157	19-Apr-19	0.222 L	26-Apr-19 13:56	1
8:2 FTS	39108-34-4	ND	1.54	2.25	4.51		B9D0157	19-Apr-19	0.222 L	26-Apr-19 13:56	1
PFNS	68259-12-1	ND	2.18	2.25	4.51		B9D0157	19-Apr-19	0.222 L	26-Apr-19 13:56	1
MeFOSAA	2355-31-9	ND	1.54	2.25	4.51		B9D0157	19-Apr-19	0.222 L	26-Apr-19 13:56	1
EtFOSAA	2991-50-6	ND	1.54	2.25	4.51		B9D0157	19-Apr-19	0.222 L	26-Apr-19 13:56	1
PFOA	2058-94-8	ND	1.54	2.25	4.51		B9D0157	19-Apr-19	0.222 L	26-Apr-19 13:56	1
PFDS	335-77-3	ND	1.54	2.25	4.51		B9D0157	19-Apr-19	0.222 L	26-Apr-19 13:56	1
PFDoA	307-55-1	ND	1.54	2.25	4.51		B9D0157	19-Apr-19	0.222 L	26-Apr-19 13:56	1
PFTTrDA	72629-94-8	ND	1.54	2.25	4.51		B9D0157	19-Apr-19	0.222 L	26-Apr-19 13:56	1
PFTeDA	376-06-7	ND	1.54	2.25	4.51		B9D0157	19-Apr-19	0.222 L	26-Apr-19 13:56	1

Labeled Standards	Type	% Recovery	Limits	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
13C3-PFBA	IS	93.6	60 - 130		B9D0157	19-Apr-19	0.222 L	26-Apr-19 13:56	1
13C3-PFPeA	IS	86.5	60 - 150		B9D0157	19-Apr-19	0.222 L	26-Apr-19 13:56	1
13C3-PFBS	IS	87.0	60 - 150		B9D0157	19-Apr-19	0.222 L	26-Apr-19 13:56	1
13C2-4:2 FTS	IS	92.1	20 - 150		B9D0157	19-Apr-19	0.222 L	26-Apr-19 13:56	1
13C2-PFHxA	IS	90.7	70 - 130		B9D0157	19-Apr-19	0.222 L	26-Apr-19 13:56	1
13C4-PFHpA	IS	97.0	60 - 150		B9D0157	19-Apr-19	0.222 L	26-Apr-19 13:56	1
13C3-PFHxS	IS	93.8	60 - 130		B9D0157	19-Apr-19	0.222 L	26-Apr-19 13:56	1
13C2-6:2 FTS	IS	93.3	40 - 150		B9D0157	19-Apr-19	0.222 L	26-Apr-19 13:56	1
13C2-PFOA	IS	87.8	60 - 130		B9D0157	19-Apr-19	0.222 L	26-Apr-19 13:56	1
13C5-PFNA	IS	81.2	50 - 130		B9D0157	19-Apr-19	0.222 L	26-Apr-19 13:56	1
13C8-PFOSA	IS	45.8	20 - 150		B9D0157	19-Apr-19	0.222 L	26-Apr-19 13:56	1
13C8-PFOS	IS	81.3	60 - 130		B9D0157	19-Apr-19	0.222 L	26-Apr-19 13:56	1
13C2-PFDA	IS	75.3	60 - 130		B9D0157	19-Apr-19	0.222 L	26-Apr-19 13:56	1

**Sample ID: PEW021904111515RL** **PFAS Isotope Dilution Method**

Client Data	Laboratory Data
Name: Merit Laboratories, Inc.	Matrix: Aqueous
Project: Statewide WWTP Biosolids PFAS Evaluation	Date Collected: 11-Apr-19 15:15
Location: WIXO-02N05E01-BC01	Lab Sample: 1900762-08
	Date Received: 16-Apr-19 09:58
	Column: BEH C18

Labeled Standards	Type	% Recovery	Limits	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
13C2-8:2 FTS	IS	76.9	40 - 150		B9D0157	19-Apr-19	0.222 L	26-Apr-19 13:56	1
d3-MeFOSAA	IS	69.3	50 - 150		B9D0157	19-Apr-19	0.222 L	26-Apr-19 13:56	1
d5-EtFOSAA	IS	69.3	50 - 150		B9D0157	19-Apr-19	0.222 L	26-Apr-19 13:56	1
13C2-PFUnA	IS	65.9	60 - 130		B9D0157	19-Apr-19	0.222 L	26-Apr-19 13:56	1
13C2-PFDoA	IS	45.5	30 - 130		B9D0157	19-Apr-19	0.222 L	26-Apr-19 13:56	1
13C2-PFTeDA	IS	30.4	20 - 150		B9D0157	19-Apr-19	0.222 L	26-Apr-19 13:56	1

DL - Detection Limit

LOD - Limit of Detection  
LOQ - Limit of quantitation

Results reported to the DL.

When reported, PFHxS, PFOA, PFOS, MeFOSAA and EtFOSAA include both linear and branched isomers. Only the linear isomer is reported for all other analytes.

**Sample ID: PEW031904111525RL**

**PFAS Isotope Dilution Method**

Client Data				Laboratory Data			
Name:	Merit Laboratories, Inc.	Matrix:	Aqueous	Lab Sample:	1900762-09	Column:	BEH C18
Project:	Statewide WWTP Biosolids PFAS Evaluation	Date Collected:	11-Apr-19 15:25	Date Received:	16-Apr-19 09:58		
Location:	WIXO-02N05E01-BC01						

Analyte	CAS Number	Conc. (ng/L)	DL	LOD	LOQ	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
PFBA	375-22-4	95.6	1.61	2.35	4.69		B9D0157	19-Apr-19	0.213 L	26-Apr-19 14:07	1
PFPeA	2706-90-3	171	1.61	2.35	4.69		B9D0157	19-Apr-19	0.213 L	26-Apr-19 14:07	1
PFBS	375-73-5	173	1.61	2.35	4.69		B9D0157	19-Apr-19	0.213 L	26-Apr-19 14:07	1
4:2 FTS	757124-72-4	ND	1.61	2.35	4.69		B9D0157	19-Apr-19	0.213 L	26-Apr-19 14:07	1
PFHxA	307-24-4	153	1.61	2.35	4.69		B9D0157	19-Apr-19	0.213 L	26-Apr-19 14:07	1
PFPeS	2706-91-4	ND	1.61	2.35	4.69		B9D0157	19-Apr-19	0.213 L	26-Apr-19 14:07	1
PFHpA	375-85-9	57.6	1.61	2.35	4.69		B9D0157	19-Apr-19	0.213 L	26-Apr-19 14:07	1
PFHxS	355-46-4	7.27	1.61	2.35	4.69		B9D0157	19-Apr-19	0.213 L	26-Apr-19 14:07	1
6:2 FTS	27619-97-2	ND	1.61	2.35	4.69		B9D0157	19-Apr-19	0.213 L	26-Apr-19 14:07	1
PFOA	335-67-1	45.0	1.61	2.35	4.69		B9D0157	19-Apr-19	0.213 L	26-Apr-19 14:07	1
PFHpS	375-92-8	ND	1.61	2.35	4.69		B9D0157	19-Apr-19	0.213 L	26-Apr-19 14:07	1
PFNA	375-95-1	3.64	1.61	2.35	4.69	J	B9D0157	19-Apr-19	0.213 L	26-Apr-19 14:07	1
PFOSA	754-91-6	ND	1.61	2.35	4.69		B9D0157	19-Apr-19	0.213 L	26-Apr-19 14:07	1
PFOS	1763-23-1	246	1.61	2.35	4.69		B9D0157	19-Apr-19	0.213 L	26-Apr-19 14:07	1
PFDA	335-76-2	ND	1.61	2.35	4.69		B9D0157	19-Apr-19	0.213 L	26-Apr-19 14:07	1
8:2 FTS	39108-34-4	ND	1.61	2.35	4.69		B9D0157	19-Apr-19	0.213 L	26-Apr-19 14:07	1
PFNS	68259-12-1	ND	2.27	2.35	4.69		B9D0157	19-Apr-19	0.213 L	26-Apr-19 14:07	1
MeFOSAA	2355-31-9	ND	1.61	2.35	4.69		B9D0157	19-Apr-19	0.213 L	26-Apr-19 14:07	1
EtFOSAA	2991-50-6	ND	1.61	2.35	4.69		B9D0157	19-Apr-19	0.213 L	26-Apr-19 14:07	1
PFOA	2058-94-8	ND	1.61	2.35	4.69		B9D0157	19-Apr-19	0.213 L	26-Apr-19 14:07	1
PFDS	335-77-3	ND	1.61	2.35	4.69		B9D0157	19-Apr-19	0.213 L	26-Apr-19 14:07	1
PFDoA	307-55-1	ND	1.61	2.35	4.69		B9D0157	19-Apr-19	0.213 L	26-Apr-19 14:07	1
PFTTrDA	72629-94-8	ND	1.61	2.35	4.69		B9D0157	19-Apr-19	0.213 L	26-Apr-19 14:07	1
PFTeDA	376-06-7	ND	1.61	2.35	4.69		B9D0157	19-Apr-19	0.213 L	26-Apr-19 14:07	1

Labeled Standards	Type	% Recovery	Limits	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
13C3-PFBA	IS	92.5	60 - 130		B9D0157	19-Apr-19	0.213 L	26-Apr-19 14:07	1
13C3-PFPeA	IS	90.4	60 - 150		B9D0157	19-Apr-19	0.213 L	26-Apr-19 14:07	1
13C3-PFBS	IS	88.3	60 - 150		B9D0157	19-Apr-19	0.213 L	26-Apr-19 14:07	1
13C2-4:2 FTS	IS	88.0	20 - 150		B9D0157	19-Apr-19	0.213 L	26-Apr-19 14:07	1
13C2-PFHxA	IS	89.7	70 - 130		B9D0157	19-Apr-19	0.213 L	26-Apr-19 14:07	1
13C4-PFHpA	IS	95.9	60 - 150		B9D0157	19-Apr-19	0.213 L	26-Apr-19 14:07	1
13C3-PFHxS	IS	92.1	60 - 130		B9D0157	19-Apr-19	0.213 L	26-Apr-19 14:07	1
13C2-6:2 FTS	IS	97.6	40 - 150		B9D0157	19-Apr-19	0.213 L	26-Apr-19 14:07	1
13C2-PFOA	IS	96.0	60 - 130		B9D0157	19-Apr-19	0.213 L	26-Apr-19 14:07	1
13C5-PFNA	IS	76.3	50 - 130		B9D0157	19-Apr-19	0.213 L	26-Apr-19 14:07	1
13C8-PFOSA	IS	30.2	20 - 150		B9D0157	19-Apr-19	0.213 L	26-Apr-19 14:07	1
13C8-PFOS	IS	80.8	60 - 130		B9D0157	19-Apr-19	0.213 L	26-Apr-19 14:07	1
13C2-PFDA	IS	65.0	60 - 130		B9D0157	19-Apr-19	0.213 L	26-Apr-19 14:07	1

**Sample ID: PEW031904111525RL** **PFAS Isotope Dilution Method**

Client Data	Laboratory Data
Name: Merit Laboratories, Inc.	Lab Sample: 1900762-09
Project: Statewide WWTP Biosolids PFAS Evaluation	Date Received: 16-Apr-19 09:58
Location: WIXO-02N05E01-BC01	Column: BEH C18
Matrix: Aqueous	
Date Collected: 11-Apr-19 15:25	

Labeled Standards	Type	% Recovery	Limits	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
13C2-8:2 FTS	IS	71.0	40 - 150		B9D0157	19-Apr-19	0.213 L	26-Apr-19 14:07	1
d3-MeFOSAA	IS	54.8	50 - 150		B9D0157	19-Apr-19	0.213 L	26-Apr-19 14:07	1
d5-EtFOSAA	IS	58.3	50 - 150		B9D0157	19-Apr-19	0.213 L	26-Apr-19 14:07	1
13C2-PFUnA	IS	52.1	60 - 130	H	B9D0157	19-Apr-19	0.213 L	26-Apr-19 14:07	1
13C2-PFDoA	IS	42.2	30 - 130		B9D0157	19-Apr-19	0.213 L	26-Apr-19 14:07	1
13C2-PFTeDA	IS	29.9	20 - 150		B9D0157	19-Apr-19	0.213 L	26-Apr-19 14:07	1

DL - Detection Limit

LOD - Limit of Detection  
LOQ - Limit of quantitation

Results reported to the DL.

When reported, PFHxS, PFOA, PFOS, MeFOSAA and EtFOSAA include both linear and branched isomers. Only the linear isomer is reported for all other analytes.

**Sample ID: PEW011904111640RL**

**PFAS Isotope Dilution Method**

Client Data				Laboratory Data			
Name:	Merit Laboratories, Inc.	Matrix:	Aqueous	Lab Sample:	1900762-10	Column:	BEH C18
Project:	Statewide WWTP Biosolids PFAS Evaluation	Date Collected:	11-Apr-19 16:40	Date Received:	16-Apr-19 09:58		
Location:	WIXO-02N05E01-BC02						

Analyte	CAS Number	Conc. (ng/L)	DL	LOD	LOQ	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
PFBA	375-22-4	7.27	1.49	2.18	4.36		B9D0157	19-Apr-19	0.229 L	26-Apr-19 14:17	1
PFPeA	2706-90-3	ND	1.49	2.18	4.36		B9D0157	19-Apr-19	0.229 L	26-Apr-19 14:17	1
PFBS	375-73-5	4.56	1.49	2.18	4.36		B9D0157	19-Apr-19	0.229 L	26-Apr-19 14:17	1
4:2 FTS	757124-72-4	ND	1.49	2.18	4.36		B9D0157	19-Apr-19	0.229 L	26-Apr-19 14:17	1
PFHxA	307-24-4	2.95	1.49	2.18	4.36	J	B9D0157	19-Apr-19	0.229 L	26-Apr-19 14:17	1
PFPeS	2706-91-4	ND	1.49	2.18	4.36		B9D0157	19-Apr-19	0.229 L	26-Apr-19 14:17	1
PFHpA	375-85-9	2.52	1.49	2.18	4.36	J	B9D0157	19-Apr-19	0.229 L	26-Apr-19 14:17	1
PFHxS	355-46-4	ND	1.49	2.18	4.36		B9D0157	19-Apr-19	0.229 L	26-Apr-19 14:17	1
6:2 FTS	27619-97-2	ND	1.49	2.18	4.36		B9D0157	19-Apr-19	0.229 L	26-Apr-19 14:17	1
PFOA	335-67-1	3.11	1.49	2.18	4.36	J	B9D0157	19-Apr-19	0.229 L	26-Apr-19 14:17	1
PFHpS	375-92-8	ND	1.49	2.18	4.36		B9D0157	19-Apr-19	0.229 L	26-Apr-19 14:17	1
PFNA	375-95-1	ND	1.49	2.18	4.36		B9D0157	19-Apr-19	0.229 L	26-Apr-19 14:17	1
PFOSA	754-91-6	ND	1.49	2.18	4.36		B9D0157	19-Apr-19	0.229 L	26-Apr-19 14:17	1
PFOS	1763-23-1	16.4	1.49	2.18	4.36		B9D0157	19-Apr-19	0.229 L	26-Apr-19 14:17	1
PFDA	335-76-2	ND	1.49	2.18	4.36		B9D0157	19-Apr-19	0.229 L	26-Apr-19 14:17	1
8:2 FTS	39108-34-4	ND	1.49	2.18	4.36		B9D0157	19-Apr-19	0.229 L	26-Apr-19 14:17	1
PFNS	68259-12-1	ND	2.11	2.18	4.36		B9D0157	19-Apr-19	0.229 L	26-Apr-19 14:17	1
MeFOSAA	2355-31-9	ND	1.49	2.18	4.36		B9D0157	19-Apr-19	0.229 L	26-Apr-19 14:17	1
EtFOSAA	2991-50-6	ND	1.49	2.18	4.36		B9D0157	19-Apr-19	0.229 L	26-Apr-19 14:17	1
PFOA	2058-94-8	ND	1.49	2.18	4.36		B9D0157	19-Apr-19	0.229 L	26-Apr-19 14:17	1
PFDS	335-77-3	ND	1.49	2.18	4.36		B9D0157	19-Apr-19	0.229 L	26-Apr-19 14:17	1
PFDoA	307-55-1	ND	1.49	2.18	4.36		B9D0157	19-Apr-19	0.229 L	26-Apr-19 14:17	1
PFTTrDA	72629-94-8	ND	1.49	2.18	4.36		B9D0157	19-Apr-19	0.229 L	26-Apr-19 14:17	1
PFTeDA	376-06-7	ND	1.49	2.18	4.36		B9D0157	19-Apr-19	0.229 L	26-Apr-19 14:17	1

Labeled Standards	Type	% Recovery	Limits	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
13C3-PFBA	IS	92.3	60 - 130		B9D0157	19-Apr-19	0.229 L	26-Apr-19 14:17	1
13C3-PFPeA	IS	91.2	60 - 150		B9D0157	19-Apr-19	0.229 L	26-Apr-19 14:17	1
13C3-PFBS	IS	90.4	60 - 150		B9D0157	19-Apr-19	0.229 L	26-Apr-19 14:17	1
13C2-4:2 FTS	IS	99.7	20 - 150		B9D0157	19-Apr-19	0.229 L	26-Apr-19 14:17	1
13C2-PFHxA	IS	96.3	70 - 130		B9D0157	19-Apr-19	0.229 L	26-Apr-19 14:17	1
13C4-PFHpA	IS	96.3	60 - 150		B9D0157	19-Apr-19	0.229 L	26-Apr-19 14:17	1
13C3-PFHxS	IS	91.8	60 - 130		B9D0157	19-Apr-19	0.229 L	26-Apr-19 14:17	1
13C2-6:2 FTS	IS	83.5	40 - 150		B9D0157	19-Apr-19	0.229 L	26-Apr-19 14:17	1
13C2-PFOA	IS	89.3	60 - 130		B9D0157	19-Apr-19	0.229 L	26-Apr-19 14:17	1
13C5-PFNA	IS	78.7	50 - 130		B9D0157	19-Apr-19	0.229 L	26-Apr-19 14:17	1
13C8-PFOSA	IS	36.6	20 - 150		B9D0157	19-Apr-19	0.229 L	26-Apr-19 14:17	1
13C8-PFOS	IS	76.3	60 - 130		B9D0157	19-Apr-19	0.229 L	26-Apr-19 14:17	1
13C2-PFDA	IS	65.1	60 - 130		B9D0157	19-Apr-19	0.229 L	26-Apr-19 14:17	1



**Sample ID: PEW011904111640RL** **PFAS Isotope Dilution Method**

Client Data	Laboratory Data
Name: Merit Laboratories, Inc.	Lab Sample: 1900762-10
Project: Statewide WWTP Biosolids PFAS Evaluation	Date Received: 16-Apr-19 09:58
Location: WIXO-02N05E01-BC02	Column: BEH C18
Matrix: Aqueous	
Date Collected: 11-Apr-19 16:40	

Labeled Standards	Type	% Recovery	Limits	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
13C2-8:2 FTS	IS	76.4	40 - 150		B9D0157	19-Apr-19	0.229 L	26-Apr-19 14:17	1
d3-MeFOSAA	IS	67.0	50 - 150		B9D0157	19-Apr-19	0.229 L	26-Apr-19 14:17	1
d5-EtFOSAA	IS	66.2	50 - 150		B9D0157	19-Apr-19	0.229 L	26-Apr-19 14:17	1
13C2-PFUnA	IS	62.5	60 - 130		B9D0157	19-Apr-19	0.229 L	26-Apr-19 14:17	1
13C2-PFDoA	IS	48.2	30 - 130		B9D0157	19-Apr-19	0.229 L	26-Apr-19 14:17	1
13C2-PFTeDA	IS	30.0	20 - 150		B9D0157	19-Apr-19	0.229 L	26-Apr-19 14:17	1

DL - Detection Limit

LOD - Limit of Detection  
LOQ - Limit of quantitation

Results reported to the DL.

When reported, PFHxS, PFOA, PFOS, MeFOSAA and EtFOSAA include both linear and branched isomers. Only the linear isomer is reported for all other analytes.

**Sample ID: PEW021904111615RL**

**PFAS Isotope Dilution Method**

Client Data				Laboratory Data			
Name:	Merit Laboratories, Inc.	Matrix:	Aqueous	Lab Sample:	1900762-12	Column:	BEH C18
Project:	Statewide WWTP Biosolids PFAS Evaluation	Date Collected:	11-Apr-19 16:15	Date Received:	16-Apr-19 09:58		
Location:	WIXO-02N05E01-BC02						

Analyte	CAS Number	Conc. (ng/L)	DL	LOD	LOQ	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
PFBA	375-22-4	6.73	1.53	2.23	4.47		B9D0157	19-Apr-19	0.224 L	26-Apr-19 14:28	1
PFPeA	2706-90-3	4.72	1.53	2.23	4.47		B9D0157	19-Apr-19	0.224 L	26-Apr-19 14:28	1
PFBS	375-73-5	6.24	1.53	2.23	4.47		B9D0157	19-Apr-19	0.224 L	26-Apr-19 14:28	1
4:2 FTS	757124-72-4	ND	1.53	2.23	4.47		B9D0157	19-Apr-19	0.224 L	26-Apr-19 14:28	1
PFHxA	307-24-4	4.42	1.53	2.23	4.47	J	B9D0157	19-Apr-19	0.224 L	26-Apr-19 14:28	1
PFPeS	2706-91-4	ND	1.53	2.23	4.47		B9D0157	19-Apr-19	0.224 L	26-Apr-19 14:28	1
PFHpA	375-85-9	2.74	1.53	2.23	4.47	J	B9D0157	19-Apr-19	0.224 L	26-Apr-19 14:28	1
PFHxS	355-46-4	ND	1.53	2.23	4.47		B9D0157	19-Apr-19	0.224 L	26-Apr-19 14:28	1
6:2 FTS	27619-97-2	ND	1.53	2.23	4.47		B9D0157	19-Apr-19	0.224 L	26-Apr-19 14:28	1
PFOA	335-67-1	3.97	1.53	2.23	4.47	J	B9D0157	19-Apr-19	0.224 L	26-Apr-19 14:28	1
PFHpS	375-92-8	ND	1.53	2.23	4.47		B9D0157	19-Apr-19	0.224 L	26-Apr-19 14:28	1
PFNA	375-95-1	ND	1.53	2.23	4.47		B9D0157	19-Apr-19	0.224 L	26-Apr-19 14:28	1
PFOSA	754-91-6	ND	1.53	2.23	4.47		B9D0157	19-Apr-19	0.224 L	26-Apr-19 14:28	1
PFOS	1763-23-1	57.2	1.53	2.23	4.47		B9D0157	19-Apr-19	0.224 L	26-Apr-19 14:28	1
PFDA	335-76-2	ND	1.53	2.23	4.47		B9D0157	19-Apr-19	0.224 L	26-Apr-19 14:28	1
8:2 FTS	39108-34-4	ND	1.53	2.23	4.47		B9D0157	19-Apr-19	0.224 L	26-Apr-19 14:28	1
PFNS	68259-12-1	ND	2.16	2.23	4.47		B9D0157	19-Apr-19	0.224 L	26-Apr-19 14:28	1
MeFOSAA	2355-31-9	ND	1.53	2.23	4.47		B9D0157	19-Apr-19	0.224 L	26-Apr-19 14:28	1
EtFOSAA	2991-50-6	ND	1.53	2.23	4.47		B9D0157	19-Apr-19	0.224 L	26-Apr-19 14:28	1
PFUnA	2058-94-8	ND	1.53	2.23	4.47		B9D0157	19-Apr-19	0.224 L	26-Apr-19 14:28	1
PFDS	335-77-3	ND	1.53	2.23	4.47		B9D0157	19-Apr-19	0.224 L	26-Apr-19 14:28	1
PFDoA	307-55-1	ND	1.53	2.23	4.47		B9D0157	19-Apr-19	0.224 L	26-Apr-19 14:28	1
PFTTrDA	72629-94-8	ND	1.53	2.23	4.47		B9D0157	19-Apr-19	0.224 L	26-Apr-19 14:28	1
PFTeDA	376-06-7	ND	1.53	2.23	4.47		B9D0157	19-Apr-19	0.224 L	26-Apr-19 14:28	1

Labeled Standards	Type	% Recovery	Limits	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
13C3-PFBA	IS	97.1	60 - 130		B9D0157	19-Apr-19	0.224 L	26-Apr-19 14:28	1
13C3-PFPeA	IS	94.6	60 - 150		B9D0157	19-Apr-19	0.224 L	26-Apr-19 14:28	1
13C3-PFBS	IS	93.5	60 - 150		B9D0157	19-Apr-19	0.224 L	26-Apr-19 14:28	1
13C2-4:2 FTS	IS	98.2	20 - 150		B9D0157	19-Apr-19	0.224 L	26-Apr-19 14:28	1
13C2-PFHxA	IS	96.1	70 - 130		B9D0157	19-Apr-19	0.224 L	26-Apr-19 14:28	1
13C4-PFHpA	IS	101	60 - 150		B9D0157	19-Apr-19	0.224 L	26-Apr-19 14:28	1
13C3-PFHxS	IS	96.7	60 - 130		B9D0157	19-Apr-19	0.224 L	26-Apr-19 14:28	1
13C2-6:2 FTS	IS	101	40 - 150		B9D0157	19-Apr-19	0.224 L	26-Apr-19 14:28	1
13C2-PFOA	IS	92.4	60 - 130		B9D0157	19-Apr-19	0.224 L	26-Apr-19 14:28	1
13C5-PFNA	IS	87.3	50 - 130		B9D0157	19-Apr-19	0.224 L	26-Apr-19 14:28	1
13C8-PFOSA	IS	49.3	20 - 150		B9D0157	19-Apr-19	0.224 L	26-Apr-19 14:28	1
13C8-PFOS	IS	94.0	60 - 130		B9D0157	19-Apr-19	0.224 L	26-Apr-19 14:28	1
13C2-PFDA	IS	82.2	60 - 130		B9D0157	19-Apr-19	0.224 L	26-Apr-19 14:28	1

**Sample ID: PEW021904111615RL** **PFAS Isotope Dilution Method**

Client Data				Laboratory Data			
Name:	Merit Laboratories, Inc.	Matrix:	Aqueous	Lab Sample:	1900762-12	Column:	BEH C18
Project:	Statewide WWTP Biosolids PFAS Evaluation	Date Collected:	11-Apr-19 16:15	Date Received:	16-Apr-19 09:58		
Location:	WIXO-02N05E01-BC02						

Labeled Standards	Type	% Recovery	Limits	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
13C2-8:2 FTS	IS	92.7	40 - 150		B9D0157	19-Apr-19	0.224 L	26-Apr-19 14:28	1
d3-MeFOSAA	IS	67.5	50 - 150		B9D0157	19-Apr-19	0.224 L	26-Apr-19 14:28	1
d5-EtFOSAA	IS	66.9	50 - 150		B9D0157	19-Apr-19	0.224 L	26-Apr-19 14:28	1
13C2-PFUnA	IS	66.1	60 - 130		B9D0157	19-Apr-19	0.224 L	26-Apr-19 14:28	1
13C2-PFDoA	IS	54.1	30 - 130		B9D0157	19-Apr-19	0.224 L	26-Apr-19 14:28	1
13C2-PFTeDA	IS	36.6	20 - 150		B9D0157	19-Apr-19	0.224 L	26-Apr-19 14:28	1

DL - Detection Limit      LOD - Limit of Detection      Results reported to the DL.      When reported, PFHxS, PFOA, PFOS, MeFOSAA and EtFOSAA include both linear and branched isomers. Only the linear isomer is reported for all other analytes.

LOQ - Limit of quantitation

**Sample ID: Method Blank**
**VAL - PFAS**

Client Data					Laboratory Data						
Name:	Merit Laboratories, Inc.	Matrix:	Solid		Lab Sample:	B9D0170-BLK1		Column:	BEH C18		
Project:	Statewide WWTP Biosolids PFAS Evaluation										

Analyte	CAS Number	Conc. (ng/g)	DL	LOD	LOQ	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
PFBA	375-22-4	ND	0.845	1.00	2.00		B9D0170	01-May-19	1.00 g	04-May-19 18:01	1
PFPeA	2706-90-3	ND	0.845	1.00	2.00		B9D0170	01-May-19	1.00 g	04-May-19 18:01	1
PFBS	375-73-5	ND	0.845	1.00	2.00		B9D0170	01-May-19	1.00 g	04-May-19 18:01	1
4:2 FTS	757124-72-4	ND	0.845	1.00	2.00		B9D0170	01-May-19	1.00 g	04-May-19 18:01	1
PFHxA	307-24-4	ND	0.845	1.00	2.00		B9D0170	01-May-19	1.00 g	04-May-19 18:01	1
PFPeS	2706-91-4	ND	0.845	1.00	2.00		B9D0170	01-May-19	1.00 g	04-May-19 18:01	1
PFHpA	375-85-9	ND	0.845	1.00	2.00		B9D0170	01-May-19	1.00 g	04-May-19 18:01	1
PFHxS	355-46-4	ND	0.845	1.00	2.00		B9D0170	01-May-19	1.00 g	04-May-19 18:01	1
6:2 FTS	27619-97-2	ND	0.845	1.00	2.00		B9D0170	01-May-19	1.00 g	04-May-19 18:01	1
PFOA	335-67-1	ND	0.845	1.00	2.00		B9D0170	01-May-19	1.00 g	04-May-19 18:01	1
PFHpS	375-92-8	ND	0.845	1.00	2.00		B9D0170	01-May-19	1.00 g	04-May-19 18:01	1
PFNA	375-95-1	ND	0.845	1.00	2.00		B9D0170	01-May-19	1.00 g	04-May-19 18:01	1
PFOSA	754-91-6	ND	0.845	1.00	2.00		B9D0170	01-May-19	1.00 g	04-May-19 18:01	1
PFOS	1763-23-1	ND	0.845	1.00	2.00		B9D0170	01-May-19	1.00 g	04-May-19 18:01	1
PFDA	335-76-2	ND	0.845	1.00	2.00		B9D0170	01-May-19	1.00 g	04-May-19 18:01	1
8:2 FTS	39108-34-4	ND	0.845	1.00	2.00		B9D0170	01-May-19	1.00 g	04-May-19 18:01	1
PFNS	68259-12-1	ND	1.43	1.50	2.00		B9D0170	01-May-19	1.00 g	04-May-19 18:01	1
MeFOSAA	2355-31-9	ND	0.845	1.00	2.00		B9D0170	01-May-19	1.00 g	04-May-19 18:01	1
EtFOSAA	2991-50-6	ND	0.845	1.00	2.00		B9D0170	01-May-19	1.00 g	04-May-19 18:01	1
PFUnA	2058-94-8	ND	0.845	1.00	2.00		B9D0170	01-May-19	1.00 g	04-May-19 18:01	1
PFDS	335-77-3	ND	0.845	1.00	2.00		B9D0170	01-May-19	1.00 g	04-May-19 18:01	1
PFDoA	307-55-1	ND	0.845	1.00	2.00		B9D0170	01-May-19	1.00 g	04-May-19 18:01	1
PFTrDA	72629-94-8	ND	0.845	1.00	2.00		B9D0170	01-May-19	1.00 g	04-May-19 18:01	1
PFTeDA	376-06-7	ND	0.845	1.00	2.00		B9D0170	01-May-19	1.00 g	04-May-19 18:01	1

Labeled Standards	Type	% Recovery	Limits	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
13C3-PFBA	IS	89.7	60 - 130		B9D0170	01-May-19	1.00 g	04-May-19 18:01	1
13C3-PFPeA	IS	94.7	60 - 150		B9D0170	01-May-19	1.00 g	04-May-19 18:01	1
13C3-PFBS	IS	87.4	60 - 150		B9D0170	01-May-19	1.00 g	04-May-19 18:01	1
13C2-4:2 FTS	IS	94.4	40 - 150		B9D0170	01-May-19	1.00 g	04-May-19 18:01	1
13C2-PFHxA	IS	90.8	70 - 130		B9D0170	01-May-19	1.00 g	04-May-19 18:01	1
13C4-PFHpA	IS	96.6	60 - 150		B9D0170	01-May-19	1.00 g	04-May-19 18:01	1
13C3-PFHxS	IS	98.1	60 - 130		B9D0170	01-May-19	1.00 g	04-May-19 18:01	1
13C2-6:2 FTS	IS	102	40 - 150		B9D0170	01-May-19	1.00 g	04-May-19 18:01	1
13C2-PFOA	IS	82.4	60 - 130		B9D0170	01-May-19	1.00 g	04-May-19 18:01	1
13C5-PFNA	IS	83.6	50 - 130		B9D0170	01-May-19	1.00 g	04-May-19 18:01	1
13C8-PFOSA	IS	38.2	20 - 150		B9D0170	01-May-19	1.00 g	04-May-19 18:01	1
13C8-PFOS	IS	87.9	60 - 130		B9D0170	01-May-19	1.00 g	04-May-19 18:01	1
13C2-PFDA	IS	68.5	60 - 130		B9D0170	01-May-19	1.00 g	04-May-19 18:01	1

**Sample ID: Method Blank** **VAL - PFAS**

<b>Client Data</b>	<b>Laboratory Data</b>
Name: Merit Laboratories, Inc.      Matrix: Solid	Lab Sample: B9D0170-BLK1      Column: BEH C18
Project: Statewide WWTP Biosolids PFAS Evaluation	

Labeled Standards	Type	% Recovery	Limits	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
13C2-8:2 FTS	IS	92.3	40 - 150		B9D0170	01-May-19	1.00 g	04-May-19 18:01	1
d3-MeFOSAA	IS	48.0	50 - 150	H	B9D0170	01-May-19	1.00 g	04-May-19 18:01	1
d5-EtFOSAA	IS	45.0	50 - 150	H	B9D0170	01-May-19	1.00 g	04-May-19 18:01	1
13C2-PFUnA	IS	55.6	60 - 130	H	B9D0170	01-May-19	1.00 g	04-May-19 18:01	1
13C2-PFDoA	IS	58.5	30 - 130		B9D0170	01-May-19	1.00 g	04-May-19 18:01	1
13C2-PFTeDA	IS	62.4	20 - 150		B9D0170	01-May-19	1.00 g	04-May-19 18:01	1

DL - Detection Limit

LOD - Limit of Detection  
LOQ - Limit of quantitation

The results are reported in dry weight.  
The sample size is reported in wet weight.  
Results reported to the DL.

When reported, PFHxS, PFOA, PFOS, MeFOSAA and EtFOSAA include both linear and branched isomers. Only the linear isomer is reported for all other analytes.

**Sample ID: OPR**

**VAL - PFAS**

Client Data					Laboratory Data						
Name:	Merit Laboratories, Inc.		Matrix:	Solid	Lab Sample:	B9D0170-BS1	Column:	BEH C18			
Project:	Statewide WWTP Biosolids PFAS Evaluation										

Analyte	CAS Number	Amt Found (ng/g)	Spike Amt	% Rec	Limits	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
PFBA	375-22-4	9.64	10.0	96.4	70 - 130		B9D0170	01-May-19	1.00 g	04-May-19 17:50	1
PFPeA	2706-90-3	9.22	10.0	92.2	70 - 130		B9D0170	01-May-19	1.00 g	04-May-19 17:50	1
PFBS	375-73-5	9.26	10.0	92.6	70 - 130		B9D0170	01-May-19	1.00 g	04-May-19 17:50	1
4:2 FTS	757124-72-4	11.0	10.0	110	70 - 130		B9D0170	01-May-19	1.00 g	04-May-19 17:50	1
PFHxA	307-24-4	10.2	10.0	102	70 - 130		B9D0170	01-May-19	1.00 g	04-May-19 17:50	1
PFPeS	2706-91-4	10.4	10.0	104	70 - 130		B9D0170	01-May-19	1.00 g	04-May-19 17:50	1
PFHpA	375-85-9	9.36	10.0	93.6	70 - 130		B9D0170	01-May-19	1.00 g	04-May-19 17:50	1
PFHxS	355-46-4	9.58	10.0	95.8	70 - 130		B9D0170	01-May-19	1.00 g	04-May-19 17:50	1
6:2 FTS	27619-97-2	10.8	10.0	108	60 - 130		B9D0170	01-May-19	1.00 g	04-May-19 17:50	1
PFOA	335-67-1	9.00	10.0	90.0	70 - 130		B9D0170	01-May-19	1.00 g	04-May-19 17:50	1
PFHpS	375-92-8	10.6	10.0	106	60 - 130		B9D0170	01-May-19	1.00 g	04-May-19 17:50	1
PFNA	375-95-1	10.4	10.0	104	70 - 130		B9D0170	01-May-19	1.00 g	04-May-19 17:50	1
PFOSA	754-91-6	10.2	10.0	102	70 - 130		B9D0170	01-May-19	1.00 g	04-May-19 17:50	1
PFOS	1763-23-1	9.49	10.0	94.9	70 - 130		B9D0170	01-May-19	1.00 g	04-May-19 17:50	1
PFDA	335-76-2	10.6	10.0	106	70 - 130		B9D0170	01-May-19	1.00 g	04-May-19 17:50	1
8:2 FTS	39108-34-4	11.3	10.0	113	60 - 130		B9D0170	01-May-19	1.00 g	04-May-19 17:50	1
PFNS	68259-12-1	9.35	10.0	93.5	70 - 130		B9D0170	01-May-19	1.00 g	04-May-19 17:50	1
MeFOSAA	2355-31-9	10.5	10.0	105	70 - 130		B9D0170	01-May-19	1.00 g	04-May-19 17:50	1
EtFOSAA	2991-50-6	10.1	10.0	101	70 - 130		B9D0170	01-May-19	1.00 g	04-May-19 17:50	1
PFUnA	2058-94-8	9.54	10.0	95.4	70 - 130		B9D0170	01-May-19	1.00 g	04-May-19 17:50	1
PFDS	335-77-3	8.77	10.0	87.7	60 - 130		B9D0170	01-May-19	1.00 g	04-May-19 17:50	1
PFDoA	307-55-1	9.51	10.0	95.1	70 - 130		B9D0170	01-May-19	1.00 g	04-May-19 17:50	1
PFTTrDA	72629-94-8	11.1	10.0	111	60 - 130		B9D0170	01-May-19	1.00 g	04-May-19 17:50	1
PFTeDA	376-06-7	10.1	10.0	101	70 - 130		B9D0170	01-May-19	1.00 g	04-May-19 17:50	1

Labeled Standards	Type	% Rec	Limits	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
13C3-PFBA	IS	94.0	60- 130		B9D0170	01-May-19	1.00 g	04-May-19 17:50	1
13C3-PFPeA	IS	93.0	60- 150		B9D0170	01-May-19	1.00 g	04-May-19 17:50	1
13C3-PFBS	IS	92.4	60- 150		B9D0170	01-May-19	1.00 g	04-May-19 17:50	1
13C2-4:2 FTS	IS	86.8	40- 150		B9D0170	01-May-19	1.00 g	04-May-19 17:50	1
13C2-PFHxA	IS	88.7	70- 130		B9D0170	01-May-19	1.00 g	04-May-19 17:50	1
13C4-PFHpA	IS	96.8	60- 150		B9D0170	01-May-19	1.00 g	04-May-19 17:50	1
13C3-PFHxS	IS	89.3	60- 130		B9D0170	01-May-19	1.00 g	04-May-19 17:50	1
13C2-6:2 FTS	IS	97.9	40- 150		B9D0170	01-May-19	1.00 g	04-May-19 17:50	1
13C2-PFOA	IS	87.7	60- 130		B9D0170	01-May-19	1.00 g	04-May-19 17:50	1
13C5-PFNA	IS	76.2	50- 130		B9D0170	01-May-19	1.00 g	04-May-19 17:50	1

**Sample ID: OPR**

**VAL - PFAS**

Client Data				Laboratory Data			
Name:	Merit Laboratories, Inc.	Matrix:	Solid	Lab Sample:	B9D0170-BS1	Column:	BEH C18
Project:	Statewide WWTP Biosolids PFAS Evaluation						

Labeled Standards	Type	% Rec	Limits	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
13C8-PFOSA	IS	41.2	20- 150		B9D0170	01-May-19	1.00 g	04-May-19 17:50	1
13C8-PFOS	IS	88.4	60- 130		B9D0170	01-May-19	1.00 g	04-May-19 17:50	1
13C2-PFDA	IS	67.4	60- 130		B9D0170	01-May-19	1.00 g	04-May-19 17:50	1
13C2-8:2 FTS	IS	87.2	40- 150		B9D0170	01-May-19	1.00 g	04-May-19 17:50	1
d3-MeFOSAA	IS	50.5	50- 150		B9D0170	01-May-19	1.00 g	04-May-19 17:50	1
d5-EtFOSAA	IS	48.2	50- 150	H	B9D0170	01-May-19	1.00 g	04-May-19 17:50	1
13C2-PFUnA	IS	58.7	60- 130	H	B9D0170	01-May-19	1.00 g	04-May-19 17:50	1
13C2-PFDoA	IS	64.5	30- 130		B9D0170	01-May-19	1.00 g	04-May-19 17:50	1
13C2-PFTeDA	IS	62.6	20- 150		B9D0170	01-May-19	1.00 g	04-May-19 17:50	1

**Sample ID: SXDU31904111405MK**

**VAL - PFAS**

Client Data				Laboratory Data			
Name:	Merit Laboratories, Inc.	Matrix:	Soil	Lab Sample:	1900762-04	Column:	BEH C18
Project:	Statewide WWTP Biosolids PFAS Evaluation	Date Collected:	11-Apr-19 14:05	Date Received:	16-Apr-19 09:58		
Location:	WIXO-02N05E01-BC01			% Solids:	81.4		

Analyte	CAS Number	Conc. (ng/g)	DL	LOD	LOQ	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
PFBA	375-22-4	ND	0.805	0.953	1.91		B9D0170	01-May-19	1.29 g	04-May-19 20:40	1
PFPeA	2706-90-3	ND	0.805	0.953	1.91		B9D0170	01-May-19	1.29 g	04-May-19 20:40	1
PFBS	375-73-5	ND	0.805	0.953	1.91		B9D0170	01-May-19	1.29 g	04-May-19 20:40	1
4:2 FTS	757124-72-4	ND	0.805	0.953	1.91		B9D0170	01-May-19	1.29 g	04-May-19 20:40	1
PFHxA	307-24-4	ND	0.805	0.953	1.91		B9D0170	01-May-19	1.29 g	04-May-19 20:40	1
PFPeS	2706-91-4	ND	0.805	0.953	1.91		B9D0170	01-May-19	1.29 g	04-May-19 20:40	1
PFHpA	375-85-9	ND	0.805	0.953	1.91		B9D0170	01-May-19	1.29 g	04-May-19 20:40	1
PFHxS	355-46-4	ND	0.805	0.953	1.91		B9D0170	01-May-19	1.29 g	04-May-19 20:40	1
6:2 FTS	27619-97-2	ND	0.805	0.953	1.91		B9D0170	01-May-19	1.29 g	04-May-19 20:40	1
PFOA	335-67-1	ND	0.805	0.953	1.91		B9D0170	01-May-19	1.29 g	04-May-19 20:40	1
PFHpS	375-92-8	ND	0.805	0.953	1.91		B9D0170	01-May-19	1.29 g	04-May-19 20:40	1
PFNA	375-95-1	ND	0.805	0.953	1.91		B9D0170	01-May-19	1.29 g	04-May-19 20:40	1
PFOSA	754-91-6	ND	0.805	0.953	1.91		B9D0170	01-May-19	1.29 g	04-May-19 20:40	1
PFOS	1763-23-1	19.6	0.805	0.953	1.91		B9D0170	01-May-19	1.29 g	04-May-19 20:40	1
PFDA	335-76-2	ND	0.805	0.953	1.91		B9D0170	01-May-19	1.29 g	04-May-19 20:40	1
8:2 FTS	39108-34-4	ND	0.805	0.953	1.91		B9D0170	01-May-19	1.29 g	04-May-19 20:40	1
PFNS	68259-12-1	ND	1.36	1.43	1.91		B9D0170	01-May-19	1.29 g	04-May-19 20:40	1
MeFOSAA	2355-31-9	ND	0.805	0.953	1.91		B9D0170	01-May-19	1.29 g	04-May-19 20:40	1
EtFOSAA	2991-50-6	ND	0.805	0.953	1.91		B9D0170	01-May-19	1.29 g	04-May-19 20:40	1
PFUnA	2058-94-8	ND	0.805	0.953	1.91		B9D0170	01-May-19	1.29 g	04-May-19 20:40	1
PFDS	335-77-3	ND	0.805	0.953	1.91		B9D0170	01-May-19	1.29 g	04-May-19 20:40	1
PFDoA	307-55-1	ND	0.805	0.953	1.91		B9D0170	01-May-19	1.29 g	04-May-19 20:40	1
PFTTrDA	72629-94-8	ND	0.805	0.953	1.91		B9D0170	01-May-19	1.29 g	04-May-19 20:40	1
PFTeDA	376-06-7	ND	0.805	0.953	1.91		B9D0170	01-May-19	1.29 g	04-May-19 20:40	1

Labeled Standards	Type	% Recovery	Limits	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
13C3-PFBA	IS	92.1	60 - 130		B9D0170	01-May-19	1.29 g	04-May-19 20:40	1
13C3-PFPeA	IS	90.8	60 - 150		B9D0170	01-May-19	1.29 g	04-May-19 20:40	1
13C3-PFBS	IS	91.2	60 - 150		B9D0170	01-May-19	1.29 g	04-May-19 20:40	1
13C2-4:2 FTS	IS	112	40 - 150		B9D0170	01-May-19	1.29 g	04-May-19 20:40	1
13C2-PFHxA	IS	86.5	70 - 130		B9D0170	01-May-19	1.29 g	04-May-19 20:40	1
13C4-PFHpA	IS	97.3	60 - 150		B9D0170	01-May-19	1.29 g	04-May-19 20:40	1
13C3-PFHxS	IS	89.8	60 - 130		B9D0170	01-May-19	1.29 g	04-May-19 20:40	1
13C2-6:2 FTS	IS	110	40 - 150		B9D0170	01-May-19	1.29 g	04-May-19 20:40	1
13C2-PFOA	IS	87.9	60 - 130		B9D0170	01-May-19	1.29 g	04-May-19 20:40	1
13C5-PFNA	IS	83.7	50 - 130		B9D0170	01-May-19	1.29 g	04-May-19 20:40	1
13C8-PFOSA	IS	53.7	20 - 150		B9D0170	01-May-19	1.29 g	04-May-19 20:40	1
13C8-PFOS	IS	86.2	60 - 130		B9D0170	01-May-19	1.29 g	04-May-19 20:40	1
13C2-PFDA	IS	75.0	60 - 130		B9D0170	01-May-19	1.29 g	04-May-19 20:40	1



**Sample ID: SXDU31904111405MK** **VAL - PFAS**

Client Data				Laboratory Data			
Name:	Merit Laboratories, Inc.	Matrix:	Soil	Lab Sample:	1900762-04	Column:	BEH C18
Project:	Statewide WWTP Biosolids PFAS Evaluation	Date Collected:	11-Apr-19 14:05	Date Received:	16-Apr-19 09:58		
Location:	WIXO-02N05E01-BC01			% Solids:	81.4		

Labeled Standards	Type	% Recovery	Limits	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
13C2-8:2 FTS	IS	96.5	40 - 150		B9D0170	01-May-19	1.29 g	04-May-19 20:40	1
d3-MeFOSAA	IS	68.5	50 - 150		B9D0170	01-May-19	1.29 g	04-May-19 20:40	1
d5-EtFOSAA	IS	68.5	50 - 150		B9D0170	01-May-19	1.29 g	04-May-19 20:40	1
13C2-PFUnA	IS	68.4	60 - 130		B9D0170	01-May-19	1.29 g	04-May-19 20:40	1
13C2-PFDoA	IS	73.7	30 - 130		B9D0170	01-May-19	1.29 g	04-May-19 20:40	1
13C2-PFTeDA	IS	71.7	20 - 150		B9D0170	01-May-19	1.29 g	04-May-19 20:40	1

DL - Detection Limit	LOD - Limit of Detection	The results are reported in dry weight.	When reported, PFHxS, PFOA, PFOS, MeFOSAA and EtFOSAA include both linear and branched isomers. Only the linear isomer is reported for all other analytes.
	LOQ - Limit of quantitation	The sample size is reported in wet weight. Results reported to the DL.	

**Sample ID: SXDU21904111450MK**

**VAL - PFAS**

Client Data				Laboratory Data			
Name:	Merit Laboratories, Inc.	Matrix:	Soil	Lab Sample:	1900762-05	Column:	BEH C18
Project:	Statewide WWTP Biosolids PFAS Evaluation	Date Collected:	11-Apr-19 14:50	Date Received:	16-Apr-19 09:58		
Location:	WIXO-02N05E01-BC01			% Solids:	82.0		

Analyte	CAS Number	Conc. (ng/g)	DL	LOD	LOQ	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
PFBA	375-22-4	ND	0.844	0.999	2.00		B9D0170	01-May-19	1.22 g	04-May-19 20:50	1
PFPeA	2706-90-3	ND	0.844	0.999	2.00		B9D0170	01-May-19	1.22 g	04-May-19 20:50	1
PFBS	375-73-5	ND	0.844	0.999	2.00		B9D0170	01-May-19	1.22 g	04-May-19 20:50	1
4:2 FTS	757124-72-4	ND	0.844	0.999	2.00		B9D0170	01-May-19	1.22 g	04-May-19 20:50	1
PFHxA	307-24-4	ND	0.844	0.999	2.00		B9D0170	01-May-19	1.22 g	04-May-19 20:50	1
PFPeS	2706-91-4	ND	0.844	0.999	2.00		B9D0170	01-May-19	1.22 g	04-May-19 20:50	1
PFHpA	375-85-9	ND	0.844	0.999	2.00		B9D0170	01-May-19	1.22 g	04-May-19 20:50	1
PFHxS	355-46-4	ND	0.844	0.999	2.00		B9D0170	01-May-19	1.22 g	04-May-19 20:50	1
6:2 FTS	27619-97-2	ND	0.844	0.999	2.00		B9D0170	01-May-19	1.22 g	04-May-19 20:50	1
PFOA	335-67-1	ND	0.844	0.999	2.00		B9D0170	01-May-19	1.22 g	04-May-19 20:50	1
PFHpS	375-92-8	ND	0.844	0.999	2.00		B9D0170	01-May-19	1.22 g	04-May-19 20:50	1
PFNA	375-95-1	ND	0.844	0.999	2.00		B9D0170	01-May-19	1.22 g	04-May-19 20:50	1
PFOSA	754-91-6	ND	0.844	0.999	2.00		B9D0170	01-May-19	1.22 g	04-May-19 20:50	1
PFOS	1763-23-1	23.5	0.844	0.999	2.00		B9D0170	01-May-19	1.22 g	04-May-19 20:50	1
PFDA	335-76-2	ND	0.844	0.999	2.00		B9D0170	01-May-19	1.22 g	04-May-19 20:50	1
8:2 FTS	39108-34-4	ND	0.844	0.999	2.00		B9D0170	01-May-19	1.22 g	04-May-19 20:50	1
PFNS	68259-12-1	ND	1.43	1.50	2.00		B9D0170	01-May-19	1.22 g	04-May-19 20:50	1
MeFOSAA	2355-31-9	ND	0.844	0.999	2.00		B9D0170	01-May-19	1.22 g	04-May-19 20:50	1
EtFOSAA	2991-50-6	ND	0.844	0.999	2.00		B9D0170	01-May-19	1.22 g	04-May-19 20:50	1
PFOA	2058-94-8	ND	0.844	0.999	2.00		B9D0170	01-May-19	1.22 g	04-May-19 20:50	1
PFDS	335-77-3	ND	0.844	0.999	2.00		B9D0170	01-May-19	1.22 g	04-May-19 20:50	1
PFDoA	307-55-1	ND	0.844	0.999	2.00		B9D0170	01-May-19	1.22 g	04-May-19 20:50	1
PFTTrDA	72629-94-8	ND	0.844	0.999	2.00		B9D0170	01-May-19	1.22 g	04-May-19 20:50	1
PFTeDA	376-06-7	ND	0.844	0.999	2.00		B9D0170	01-May-19	1.22 g	04-May-19 20:50	1

Labeled Standards	Type	% Recovery	Limits	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
13C3-PFBA	IS	95.4	60 - 130		B9D0170	01-May-19	1.22 g	04-May-19 20:50	1
13C3-PFPeA	IS	94.6	60 - 150		B9D0170	01-May-19	1.22 g	04-May-19 20:50	1
13C3-PFBS	IS	94.6	60 - 150		B9D0170	01-May-19	1.22 g	04-May-19 20:50	1
13C2-4:2 FTS	IS	112	40 - 150		B9D0170	01-May-19	1.22 g	04-May-19 20:50	1
13C2-PFHxA	IS	89.4	70 - 130		B9D0170	01-May-19	1.22 g	04-May-19 20:50	1
13C4-PFHpA	IS	97.4	60 - 150		B9D0170	01-May-19	1.22 g	04-May-19 20:50	1
13C3-PFHxS	IS	91.3	60 - 130		B9D0170	01-May-19	1.22 g	04-May-19 20:50	1
13C2-6:2 FTS	IS	105	40 - 150		B9D0170	01-May-19	1.22 g	04-May-19 20:50	1
13C2-PFOA	IS	94.5	60 - 130		B9D0170	01-May-19	1.22 g	04-May-19 20:50	1
13C5-PFNA	IS	82.1	50 - 130		B9D0170	01-May-19	1.22 g	04-May-19 20:50	1
13C8-PFOSA	IS	50.4	20 - 150		B9D0170	01-May-19	1.22 g	04-May-19 20:50	1
13C8-PFOS	IS	100	60 - 130		B9D0170	01-May-19	1.22 g	04-May-19 20:50	1
13C2-PFDA	IS	72.6	60 - 130		B9D0170	01-May-19	1.22 g	04-May-19 20:50	1

**Sample ID: SXDU21904111450MK** **VAL - PFAS**

Client Data				Laboratory Data			
Name:	Merit Laboratories, Inc.	Matrix:	Soil	Lab Sample:	1900762-05	Column:	BEH C18
Project:	Statewide WWTP Biosolids PFAS Evaluation	Date Collected:	11-Apr-19 14:50	Date Received:	16-Apr-19 09:58		
Location:	WIXO-02N05E01-BC01			% Solids:	82.0		

Labeled Standards	Type	% Recovery	Limits	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
13C2-8:2 FTS	IS	109	40 - 150		B9D0170	01-May-19	1.22 g	04-May-19 20:50	1
d3-MeFOSAA	IS	67.1	50 - 150		B9D0170	01-May-19	1.22 g	04-May-19 20:50	1
d5-EtFOSAA	IS	70.7	50 - 150		B9D0170	01-May-19	1.22 g	04-May-19 20:50	1
13C2-PFUnA	IS	73.7	60 - 130		B9D0170	01-May-19	1.22 g	04-May-19 20:50	1
13C2-PFDoA	IS	81.4	30 - 130		B9D0170	01-May-19	1.22 g	04-May-19 20:50	1
13C2-PFTeDA	IS	58.0	20 - 150		B9D0170	01-May-19	1.22 g	04-May-19 20:50	1

DL - Detection Limit	LOD - Limit of Detection	The results are reported in dry weight.	When reported, PFHxS, PFOA, PFOS, MeFOSAA and EtFOSAA include both linear and branched isomers. Only the linear isomer is reported for all other analytes.
	LOQ - Limit of quantitation	The sample size is reported in wet weight.	
		Results reported to the DL.	

**Sample ID: SXDU21904111455MK-DUP**
**VAL - PFAS**

Client Data				Laboratory Data			
Name:	Merit Laboratories, Inc.	Matrix:	Soil	Lab Sample:	1900762-06	Column:	BEH C18
Project:	Statewide WWTP Biosolids PFAS Evaluation	Date Collected:	11-Apr-19 14:55	Date Received:	16-Apr-19 09:58		
Location:	WIXO-02N05E01-BC01			% Solids:	83.1		

Analyte	CAS Number	Conc. (ng/g)	DL	LOD	LOQ	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
PFBA	375-22-4	ND	0.840	0.994	1.99		B9D0170	01-May-19	1.21 g	04-May-19 21:01	1
PFPeA	2706-90-3	ND	0.840	0.994	1.99		B9D0170	01-May-19	1.21 g	04-May-19 21:01	1
PFBS	375-73-5	ND	0.840	0.994	1.99		B9D0170	01-May-19	1.21 g	04-May-19 21:01	1
4:2 FTS	757124-72-4	ND	0.840	0.994	1.99		B9D0170	01-May-19	1.21 g	04-May-19 21:01	1
PFHxA	307-24-4	ND	0.840	0.994	1.99		B9D0170	01-May-19	1.21 g	04-May-19 21:01	1
PFPeS	2706-91-4	ND	0.840	0.994	1.99		B9D0170	01-May-19	1.21 g	04-May-19 21:01	1
PFHpA	375-85-9	ND	0.840	0.994	1.99		B9D0170	01-May-19	1.21 g	04-May-19 21:01	1
PFHxS	355-46-4	ND	0.840	0.994	1.99		B9D0170	01-May-19	1.21 g	04-May-19 21:01	1
6:2 FTS	27619-97-2	ND	0.840	0.994	1.99		B9D0170	01-May-19	1.21 g	04-May-19 21:01	1
PFOA	335-67-1	ND	0.840	0.994	1.99		B9D0170	01-May-19	1.21 g	04-May-19 21:01	1
PFHpS	375-92-8	ND	0.840	0.994	1.99		B9D0170	01-May-19	1.21 g	04-May-19 21:01	1
PFNA	375-95-1	ND	0.840	0.994	1.99		B9D0170	01-May-19	1.21 g	04-May-19 21:01	1
PFOSA	754-91-6	ND	0.840	0.994	1.99		B9D0170	01-May-19	1.21 g	04-May-19 21:01	1
PFOS	1763-23-1	26.5	0.840	0.994	1.99		B9D0170	01-May-19	1.21 g	04-May-19 21:01	1
PFDA	335-76-2	ND	0.840	0.994	1.99		B9D0170	01-May-19	1.21 g	04-May-19 21:01	1
8:2 FTS	39108-34-4	ND	0.840	0.994	1.99		B9D0170	01-May-19	1.21 g	04-May-19 21:01	1
PFNS	68259-12-1	ND	1.42	1.49	1.99		B9D0170	01-May-19	1.21 g	04-May-19 21:01	1
MeFOSAA	2355-31-9	ND	0.840	0.994	1.99		B9D0170	01-May-19	1.21 g	04-May-19 21:01	1
EtFOSAA	2991-50-6	ND	0.840	0.994	1.99		B9D0170	01-May-19	1.21 g	04-May-19 21:01	1
PFOA	2058-94-8	ND	0.840	0.994	1.99		B9D0170	01-May-19	1.21 g	04-May-19 21:01	1
PFDS	335-77-3	ND	0.840	0.994	1.99		B9D0170	01-May-19	1.21 g	04-May-19 21:01	1
PFDoA	307-55-1	ND	0.840	0.994	1.99		B9D0170	01-May-19	1.21 g	04-May-19 21:01	1
PFTTrDA	72629-94-8	ND	0.840	0.994	1.99		B9D0170	01-May-19	1.21 g	04-May-19 21:01	1
PFTeDA	376-06-7	ND	0.840	0.994	1.99		B9D0170	01-May-19	1.21 g	04-May-19 21:01	1

Labeled Standards	Type	% Recovery	Limits	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
13C3-PFBA	IS	97.2	60 - 130		B9D0170	01-May-19	1.21 g	04-May-19 21:01	1
13C3-PFPeA	IS	86.9	60 - 150		B9D0170	01-May-19	1.21 g	04-May-19 21:01	1
13C3-PFBS	IS	94.0	60 - 150		B9D0170	01-May-19	1.21 g	04-May-19 21:01	1
13C2-4:2 FTS	IS	109	40 - 150		B9D0170	01-May-19	1.21 g	04-May-19 21:01	1
13C2-PFHxA	IS	90.5	70 - 130		B9D0170	01-May-19	1.21 g	04-May-19 21:01	1
13C4-PFHpA	IS	90.4	60 - 150		B9D0170	01-May-19	1.21 g	04-May-19 21:01	1
13C3-PFHxS	IS	91.2	60 - 130		B9D0170	01-May-19	1.21 g	04-May-19 21:01	1
13C2-6:2 FTS	IS	117	40 - 150		B9D0170	01-May-19	1.21 g	04-May-19 21:01	1
13C2-PFOA	IS	84.1	60 - 130		B9D0170	01-May-19	1.21 g	04-May-19 21:01	1
13C5-PFNA	IS	79.4	50 - 130		B9D0170	01-May-19	1.21 g	04-May-19 21:01	1
13C8-PFOSA	IS	49.3	20 - 150		B9D0170	01-May-19	1.21 g	04-May-19 21:01	1
13C8-PFOS	IS	96.4	60 - 130		B9D0170	01-May-19	1.21 g	04-May-19 21:01	1
13C2-PFDA	IS	72.7	60 - 130		B9D0170	01-May-19	1.21 g	04-May-19 21:01	1

**Sample ID: SXDU21904111455MK-DUP** **VAL - PFAS**

Client Data				Laboratory Data			
Name:	Merit Laboratories, Inc.	Matrix:	Soil	Lab Sample:	1900762-06	Column:	BEH C18
Project:	Statewide WWTP Biosolids PFAS Evaluation	Date Collected:	11-Apr-19 14:55	Date Received:	16-Apr-19 09:58		
Location:	WIXO-02N05E01-BC01			% Solids:	83.1		

Labeled Standards	Type	% Recovery	Limits	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
13C2-8:2 FTS	IS	97.7	40 - 150		B9D0170	01-May-19	1.21 g	04-May-19 21:01	1
d3-MeFOSAA	IS	62.4	50 - 150		B9D0170	01-May-19	1.21 g	04-May-19 21:01	1
d5-EtFOSAA	IS	65.2	50 - 150		B9D0170	01-May-19	1.21 g	04-May-19 21:01	1
13C2-PFUnA	IS	67.8	60 - 130		B9D0170	01-May-19	1.21 g	04-May-19 21:01	1
13C2-PFDoA	IS	74.9	30 - 130		B9D0170	01-May-19	1.21 g	04-May-19 21:01	1
13C2-PFTeDA	IS	51.2	20 - 150		B9D0170	01-May-19	1.21 g	04-May-19 21:01	1

DL - Detection Limit

LOD - Limit of Detection  
LOQ - Limit of quantitation

The results are reported in dry weight.  
The sample size is reported in wet weight.  
Results reported to the DL.

When reported, PFHxS, PFOA, PFOS, MeFOSAA and EtFOSAA include both linear and branched isomers. Only the linear isomer is reported for all other analytes.

**Sample ID: SXDU11904111530MK**

**VAL - PFAS**

Client Data				Laboratory Data			
Name:	Merit Laboratories, Inc.	Matrix:	Soil	Lab Sample:	1900762-11	Column:	BEH C18
Project:	Statewide WWTP Biosolids PFAS Evaluation	Date Collected:	11-Apr-19 15:30	Date Received:	16-Apr-19 09:58		
Location:	WIXO-02N05E01-BC01			% Solids:	81.9		

Analyte	CAS Number	Conc. (ng/g)	DL	LOD	LOQ	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
PFBA	375-22-4	ND	0.839	0.992	1.98		B9D0170	01-May-19	1.23 g	04-May-19 21:43	1
PFPeA	2706-90-3	0.943	0.839	0.992	1.98	J	B9D0170	01-May-19	1.23 g	04-May-19 21:43	1
PFBS	375-73-5	ND	0.839	0.992	1.98		B9D0170	01-May-19	1.23 g	04-May-19 21:43	1
4:2 FTS	757124-72-4	ND	0.839	0.992	1.98		B9D0170	01-May-19	1.23 g	04-May-19 21:43	1
PFHxA	307-24-4	ND	0.839	0.992	1.98		B9D0170	01-May-19	1.23 g	04-May-19 21:43	1
PFPeS	2706-91-4	ND	0.839	0.992	1.98		B9D0170	01-May-19	1.23 g	04-May-19 21:43	1
PFHpA	375-85-9	ND	0.839	0.992	1.98		B9D0170	01-May-19	1.23 g	04-May-19 21:43	1
PFHxS	355-46-4	ND	0.839	0.992	1.98		B9D0170	01-May-19	1.23 g	04-May-19 21:43	1
6:2 FTS	27619-97-2	ND	0.839	0.992	1.98		B9D0170	01-May-19	1.23 g	04-May-19 21:43	1
PFOA	335-67-1	ND	0.839	0.992	1.98		B9D0170	01-May-19	1.23 g	04-May-19 21:43	1
PFHpS	375-92-8	ND	0.839	0.992	1.98		B9D0170	01-May-19	1.23 g	04-May-19 21:43	1
PFNA	375-95-1	ND	0.839	0.992	1.98		B9D0170	01-May-19	1.23 g	04-May-19 21:43	1
PFOSA	754-91-6	ND	0.839	0.992	1.98		B9D0170	01-May-19	1.23 g	04-May-19 21:43	1
PFOS	1763-23-1	18.0	0.839	0.992	1.98	Q	B9D0170	01-May-19	1.23 g	04-May-19 21:43	1
PFDA	335-76-2	0.983	0.839	0.992	1.98	J	B9D0170	01-May-19	1.23 g	04-May-19 21:43	1
8:2 FTS	39108-34-4	ND	0.839	0.992	1.98		B9D0170	01-May-19	1.23 g	04-May-19 21:43	1
PFNS	68259-12-1	ND	1.42	1.49	1.98		B9D0170	01-May-19	1.23 g	04-May-19 21:43	1
MeFOSAA	2355-31-9	ND	0.839	0.992	1.98		B9D0170	01-May-19	1.23 g	04-May-19 21:43	1
EtFOSAA	2991-50-6	ND	0.839	0.992	1.98		B9D0170	01-May-19	1.23 g	04-May-19 21:43	1
PFOA	2058-94-8	ND	0.839	0.992	1.98		B9D0170	01-May-19	1.23 g	04-May-19 21:43	1
PFDS	335-77-3	ND	0.839	0.992	1.98		B9D0170	01-May-19	1.23 g	04-May-19 21:43	1
PFDoA	307-55-1	ND	0.839	0.992	1.98		B9D0170	01-May-19	1.23 g	04-May-19 21:43	1
PFTTrDA	72629-94-8	ND	0.839	0.992	1.98		B9D0170	01-May-19	1.23 g	04-May-19 21:43	1
PFTeDA	376-06-7	ND	0.839	0.992	1.98		B9D0170	01-May-19	1.23 g	04-May-19 21:43	1

Labeled Standards	Type	% Recovery	Limits	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
13C3-PFBA	IS	87.3	60 - 130		B9D0170	01-May-19	1.23 g	04-May-19 21:43	1
13C3-PFPeA	IS	92.3	60 - 150		B9D0170	01-May-19	1.23 g	04-May-19 21:43	1
13C3-PFBS	IS	92.4	60 - 150		B9D0170	01-May-19	1.23 g	04-May-19 21:43	1
13C2-4:2 FTS	IS	113	40 - 150		B9D0170	01-May-19	1.23 g	04-May-19 21:43	1
13C2-PFHxA	IS	90.1	70 - 130		B9D0170	01-May-19	1.23 g	04-May-19 21:43	1
13C4-PFHpA	IS	99.8	60 - 150		B9D0170	01-May-19	1.23 g	04-May-19 21:43	1
13C3-PFHxS	IS	89.7	60 - 130		B9D0170	01-May-19	1.23 g	04-May-19 21:43	1
13C2-6:2 FTS	IS	96.0	40 - 150		B9D0170	01-May-19	1.23 g	04-May-19 21:43	1
13C2-PFOA	IS	85.1	60 - 130		B9D0170	01-May-19	1.23 g	04-May-19 21:43	1
13C5-PFNA	IS	79.9	50 - 130		B9D0170	01-May-19	1.23 g	04-May-19 21:43	1
13C8-PFOSA	IS	49.8	20 - 150		B9D0170	01-May-19	1.23 g	04-May-19 21:43	1
13C8-PFOS	IS	86.9	60 - 130		B9D0170	01-May-19	1.23 g	04-May-19 21:43	1
13C2-PFDA	IS	70.3	60 - 130		B9D0170	01-May-19	1.23 g	04-May-19 21:43	1

**Sample ID: SXDU11904111530MK** **VAL - PFAS**

Client Data				Laboratory Data			
Name:	Merit Laboratories, Inc.	Matrix:	Soil	Lab Sample:	1900762-11	Column:	BEH C18
Project:	Statewide WWTP Biosolids PFAS Evaluation	Date Collected:	11-Apr-19 15:30	Date Received:	16-Apr-19 09:58		
Location:	WIXO-02N05E01-BC01			% Solids:	81.9		

Labeled Standards	Type	% Recovery	Limits	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
13C2-8:2 FTS	IS	98.9	40 - 150		B9D0170	01-May-19	1.23 g	04-May-19 21:43	1
d3-MeFOSAA	IS	64.7	50 - 150		B9D0170	01-May-19	1.23 g	04-May-19 21:43	1
d5-EtFOSAA	IS	71.0	50 - 150		B9D0170	01-May-19	1.23 g	04-May-19 21:43	1
13C2-PFUnA	IS	73.1	60 - 130		B9D0170	01-May-19	1.23 g	04-May-19 21:43	1
13C2-PFDoA	IS	75.8	30 - 130		B9D0170	01-May-19	1.23 g	04-May-19 21:43	1
13C2-PFTeDA	IS	65.3	20 - 150		B9D0170	01-May-19	1.23 g	04-May-19 21:43	1

DL - Detection Limit	LOD - Limit of Detection LOQ - Limit of quantitation	The results are reported in dry weight. The sample size is reported in wet weight. Results reported to the DL.	When reported, PFHxS, PFOA, PFOS, MeFOSAA and EtFOSAA include both linear and branched isomers. Only the linear isomer is reported for all other analytes.
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**Sample ID: SXDU21904111615MK**

**VAL - PFAS**

Client Data				Laboratory Data			
Name:	Merit Laboratories, Inc.	Matrix:	Soil	Lab Sample:	1900762-13	Column:	BEH C18
Project:	Statewide WWTP Biosolids PFAS Evaluation	Date Collected:	11-Apr-19 16:15	Date Received:	16-Apr-19 09:58		
Location:	WIXO-02N05E01-BC02			% Solids:	84.7		

Analyte	CAS Number	Conc. (ng/g)	DL	LOD	LOQ	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
PFBA	375-22-4	ND	0.839	0.993	1.99		B9D0170	01-May-19	1.19 g	04-May-19 21:54	1
PFPeA	2706-90-3	ND	0.839	0.993	1.99		B9D0170	01-May-19	1.19 g	04-May-19 21:54	1
PFBS	375-73-5	ND	0.839	0.993	1.99		B9D0170	01-May-19	1.19 g	04-May-19 21:54	1
4:2 FTS	757124-72-4	ND	0.839	0.993	1.99		B9D0170	01-May-19	1.19 g	04-May-19 21:54	1
PFHxA	307-24-4	ND	0.839	0.993	1.99		B9D0170	01-May-19	1.19 g	04-May-19 21:54	1
PFPeS	2706-91-4	ND	0.839	0.993	1.99		B9D0170	01-May-19	1.19 g	04-May-19 21:54	1
PFHpA	375-85-9	ND	0.839	0.993	1.99		B9D0170	01-May-19	1.19 g	04-May-19 21:54	1
PFHxS	355-46-4	ND	0.839	0.993	1.99		B9D0170	01-May-19	1.19 g	04-May-19 21:54	1
6:2 FTS	27619-97-2	ND	0.839	0.993	1.99		B9D0170	01-May-19	1.19 g	04-May-19 21:54	1
PFOA	335-67-1	ND	0.839	0.993	1.99		B9D0170	01-May-19	1.19 g	04-May-19 21:54	1
PFHpS	375-92-8	ND	0.839	0.993	1.99		B9D0170	01-May-19	1.19 g	04-May-19 21:54	1
PFNA	375-95-1	ND	0.839	0.993	1.99		B9D0170	01-May-19	1.19 g	04-May-19 21:54	1
PFOSA	754-91-6	ND	0.839	0.993	1.99		B9D0170	01-May-19	1.19 g	04-May-19 21:54	1
PFOS	1763-23-1	33.5	0.839	0.993	1.99		B9D0170	01-May-19	1.19 g	04-May-19 21:54	1
PFDA	335-76-2	ND	0.839	0.993	1.99		B9D0170	01-May-19	1.19 g	04-May-19 21:54	1
8:2 FTS	39108-34-4	ND	0.839	0.993	1.99		B9D0170	01-May-19	1.19 g	04-May-19 21:54	1
PFNS	68259-12-1	ND	1.42	1.49	1.99		B9D0170	01-May-19	1.19 g	04-May-19 21:54	1
MeFOSAA	2355-31-9	ND	0.839	0.993	1.99		B9D0170	01-May-19	1.19 g	04-May-19 21:54	1
EtFOSAA	2991-50-6	ND	0.839	0.993	1.99		B9D0170	01-May-19	1.19 g	04-May-19 21:54	1
PFOA	2058-94-8	ND	0.839	0.993	1.99		B9D0170	01-May-19	1.19 g	04-May-19 21:54	1
PFDS	335-77-3	2.03	0.839	0.993	1.99		B9D0170	01-May-19	1.19 g	04-May-19 21:54	1
PFDoA	307-55-1	ND	0.839	0.993	1.99		B9D0170	01-May-19	1.19 g	04-May-19 21:54	1
PFTTrDA	72629-94-8	ND	0.839	0.993	1.99		B9D0170	01-May-19	1.19 g	04-May-19 21:54	1
PFTeDA	376-06-7	ND	0.839	0.993	1.99		B9D0170	01-May-19	1.19 g	04-May-19 21:54	1

Labeled Standards	Type	% Recovery	Limits	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
13C3-PFBA	IS	93.5	60 - 130		B9D0170	01-May-19	1.19 g	04-May-19 21:54	1
13C3-PFPeA	IS	98.1	60 - 150		B9D0170	01-May-19	1.19 g	04-May-19 21:54	1
13C3-PFBS	IS	91.3	60 - 150		B9D0170	01-May-19	1.19 g	04-May-19 21:54	1
13C2-4:2 FTS	IS	114	40 - 150		B9D0170	01-May-19	1.19 g	04-May-19 21:54	1
13C2-PFHxA	IS	96.6	70 - 130		B9D0170	01-May-19	1.19 g	04-May-19 21:54	1
13C4-PFHpA	IS	100	60 - 150		B9D0170	01-May-19	1.19 g	04-May-19 21:54	1
13C3-PFHxS	IS	96.9	60 - 130		B9D0170	01-May-19	1.19 g	04-May-19 21:54	1
13C2-6:2 FTS	IS	107	40 - 150		B9D0170	01-May-19	1.19 g	04-May-19 21:54	1
13C2-PFOA	IS	86.7	60 - 130		B9D0170	01-May-19	1.19 g	04-May-19 21:54	1
13C5-PFNA	IS	79.2	50 - 130		B9D0170	01-May-19	1.19 g	04-May-19 21:54	1
13C8-PFOSA	IS	52.2	20 - 150		B9D0170	01-May-19	1.19 g	04-May-19 21:54	1
13C8-PFOS	IS	88.8	60 - 130		B9D0170	01-May-19	1.19 g	04-May-19 21:54	1
13C2-PFDA	IS	69.4	60 - 130		B9D0170	01-May-19	1.19 g	04-May-19 21:54	1



**Sample ID: SXDU21904111615MK** **VAL - PFAS**

Client Data				Laboratory Data			
Name:	Merit Laboratories, Inc.	Matrix:	Soil	Lab Sample:	1900762-13	Column:	BEH C18
Project:	Statewide WWTP Biosolids PFAS Evaluation	Date Collected:	11-Apr-19 16:15	Date Received:	16-Apr-19 09:58		
Location:	WIXO-02N05E01-BC02			% Solids:	84.7		

Labeled Standards	Type	% Recovery	Limits	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
13C2-8:2 FTS	IS	95.8	40 - 150		B9D0170	01-May-19	1.19 g	04-May-19 21:54	1
d3-MeFOSAA	IS	66.0	50 - 150		B9D0170	01-May-19	1.19 g	04-May-19 21:54	1
d5-EtFOSAA	IS	75.4	50 - 150		B9D0170	01-May-19	1.19 g	04-May-19 21:54	1
13C2-PFUnA	IS	72.8	60 - 130		B9D0170	01-May-19	1.19 g	04-May-19 21:54	1
13C2-PFDoA	IS	73.1	30 - 130		B9D0170	01-May-19	1.19 g	04-May-19 21:54	1
13C2-PFTeDA	IS	74.2	20 - 150		B9D0170	01-May-19	1.19 g	04-May-19 21:54	1

DL - Detection Limit	LOD - Limit of Detection	The results are reported in dry weight.	When reported, PFHxS, PFOA, PFOS, MeFOSAA and EtFOSAA include both linear and branched isomers. Only the linear isomer is reported for all other analytes.
	LOQ - Limit of quantitation	The sample size is reported in wet weight.	
		Results reported to the DL.	

**Sample ID: SXDU11904111655MK**

**VAL - PFAS**

Client Data				Laboratory Data			
Name:	Merit Laboratories, Inc.	Matrix:	Soil	Lab Sample:	1900762-14	Column:	BEH C18
Project:	Statewide WWTP Biosolids PFAS Evaluation	Date Collected:	11-Apr-19 16:55	Date Received:	16-Apr-19 09:58		
Location:	WIXO-02N05E01-BC02			% Solids:	82.8		

Analyte	CAS Number	Conc. (ng/g)	DL	LOD	LOQ	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
PFBA	375-22-4	ND	0.843	0.998	2.00		B9D0170	01-May-19	1.21 g	04-May-19 22:04	1
PFPeA	2706-90-3	ND	0.843	0.998	2.00		B9D0170	01-May-19	1.21 g	04-May-19 22:04	1
PFBS	375-73-5	ND	0.843	0.998	2.00		B9D0170	01-May-19	1.21 g	04-May-19 22:04	1
4:2 FTS	757124-72-4	ND	0.843	0.998	2.00		B9D0170	01-May-19	1.21 g	04-May-19 22:04	1
PFHxA	307-24-4	ND	0.843	0.998	2.00		B9D0170	01-May-19	1.21 g	04-May-19 22:04	1
PFPeS	2706-91-4	ND	0.843	0.998	2.00		B9D0170	01-May-19	1.21 g	04-May-19 22:04	1
PFHpA	375-85-9	ND	0.843	0.998	2.00		B9D0170	01-May-19	1.21 g	04-May-19 22:04	1
PFHxS	355-46-4	ND	0.843	0.998	2.00		B9D0170	01-May-19	1.21 g	04-May-19 22:04	1
6:2 FTS	27619-97-2	ND	0.843	0.998	2.00		B9D0170	01-May-19	1.21 g	04-May-19 22:04	1
PFOA	335-67-1	ND	0.843	0.998	2.00		B9D0170	01-May-19	1.21 g	04-May-19 22:04	1
PFHpS	375-92-8	ND	0.843	0.998	2.00		B9D0170	01-May-19	1.21 g	04-May-19 22:04	1
PFNA	375-95-1	ND	0.843	0.998	2.00		B9D0170	01-May-19	1.21 g	04-May-19 22:04	1
PFOSA	754-91-6	ND	0.843	0.998	2.00		B9D0170	01-May-19	1.21 g	04-May-19 22:04	1
PFOS	1763-23-1	28.4	0.843	0.998	2.00		B9D0170	01-May-19	1.21 g	04-May-19 22:04	1
PFDA	335-76-2	ND	0.843	0.998	2.00		B9D0170	01-May-19	1.21 g	04-May-19 22:04	1
8:2 FTS	39108-34-4	ND	0.843	0.998	2.00		B9D0170	01-May-19	1.21 g	04-May-19 22:04	1
PFNS	68259-12-1	ND	1.43	1.50	2.00		B9D0170	01-May-19	1.21 g	04-May-19 22:04	1
MeFOSAA	2355-31-9	ND	0.843	0.998	2.00		B9D0170	01-May-19	1.21 g	04-May-19 22:04	1
EtFOSAA	2991-50-6	ND	0.843	0.998	2.00		B9D0170	01-May-19	1.21 g	04-May-19 22:04	1
PFUnA	2058-94-8	ND	0.843	0.998	2.00		B9D0170	01-May-19	1.21 g	04-May-19 22:04	1
PFDS	335-77-3	2.29	0.843	0.998	2.00		B9D0170	01-May-19	1.21 g	04-May-19 22:04	1
PFDoA	307-55-1	ND	0.843	0.998	2.00		B9D0170	01-May-19	1.21 g	04-May-19 22:04	1
PFTTrDA	72629-94-8	ND	0.843	0.998	2.00		B9D0170	01-May-19	1.21 g	04-May-19 22:04	1
PFTeDA	376-06-7	ND	0.843	0.998	2.00		B9D0170	01-May-19	1.21 g	04-May-19 22:04	1

Labeled Standards	Type	% Recovery	Limits	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
13C3-PFBA	IS	95.2	60 - 130		B9D0170	01-May-19	1.21 g	04-May-19 22:04	1
13C3-PFPeA	IS	95.7	60 - 150		B9D0170	01-May-19	1.21 g	04-May-19 22:04	1
13C3-PFBS	IS	96.4	60 - 150		B9D0170	01-May-19	1.21 g	04-May-19 22:04	1
13C2-4:2 FTS	IS	119	40 - 150		B9D0170	01-May-19	1.21 g	04-May-19 22:04	1
13C2-PFHxA	IS	96.0	70 - 130		B9D0170	01-May-19	1.21 g	04-May-19 22:04	1
13C4-PFHpA	IS	96.6	60 - 150		B9D0170	01-May-19	1.21 g	04-May-19 22:04	1
13C3-PFHxS	IS	93.2	60 - 130		B9D0170	01-May-19	1.21 g	04-May-19 22:04	1
13C2-6:2 FTS	IS	106	40 - 150		B9D0170	01-May-19	1.21 g	04-May-19 22:04	1
13C2-PFOA	IS	88.6	60 - 130		B9D0170	01-May-19	1.21 g	04-May-19 22:04	1
13C5-PFNA	IS	76.8	50 - 130		B9D0170	01-May-19	1.21 g	04-May-19 22:04	1
13C8-PFOSA	IS	48.9	20 - 150		B9D0170	01-May-19	1.21 g	04-May-19 22:04	1
13C8-PFOS	IS	87.5	60 - 130		B9D0170	01-May-19	1.21 g	04-May-19 22:04	1
13C2-PFDA	IS	72.2	60 - 130		B9D0170	01-May-19	1.21 g	04-May-19 22:04	1

**Sample ID: SXDU11904111655MK** **VAL - PFAS**

Client Data				Laboratory Data			
Name:	Merit Laboratories, Inc.	Matrix:	Soil	Lab Sample:	1900762-14	Column:	BEH C18
Project:	Statewide WWTP Biosolids PFAS Evaluation	Date Collected:	11-Apr-19 16:55	Date Received:	16-Apr-19 09:58		
Location:	WIXO-02N05E01-BC02			% Solids:	82.8		

Labeled Standards	Type	% Recovery	Limits	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
13C2-8:2 FTS	IS	90.5	40 - 150		B9D0170	01-May-19	1.21 g	04-May-19 22:04	1
d3-MeFOSAA	IS	68.0	50 - 150		B9D0170	01-May-19	1.21 g	04-May-19 22:04	1
d5-EtFOSAA	IS	72.4	50 - 150		B9D0170	01-May-19	1.21 g	04-May-19 22:04	1
13C2-PFUnA	IS	73.4	60 - 130		B9D0170	01-May-19	1.21 g	04-May-19 22:04	1
13C2-PFDoA	IS	71.4	30 - 130		B9D0170	01-May-19	1.21 g	04-May-19 22:04	1
13C2-PFTeDA	IS	84.8	20 - 150		B9D0170	01-May-19	1.21 g	04-May-19 22:04	1

DL - Detection Limit

LOD - Limit of Detection  
LOQ - Limit of quantitation

The results are reported in dry weight.  
The sample size is reported in wet weight.  
Results reported to the DL.

When reported, PFHxS, PFOA, PFOS, MeFOSAA and EtFOSAA include both linear and branched isomers. Only the linear isomer is reported for all other analytes.

## DATA QUALIFIERS & ABBREVIATIONS

B	This compound was also detected in the method blank
Conc.	Concentration
D	Dilution
DL	Detection limit
E	The associated compound concentration exceeded the calibration range of the instrument
H	Recovery and/or RPD was outside laboratory acceptance limits
I	Chemical Interference
J	The amount detected is below the Reporting Limit/LOQ
LOD	Limits of Detection
LOQ	Limits of Quantitation
M	Estimated Maximum Possible Concentration (CA Region 2 projects only)
NA	Not applicable
ND	Not Detected
P	The reported concentration may include contribution from chlorinated diphenyl ether(s).
Q	The ion transition ratio is outside of the acceptance criteria.
TEQ	Toxic Equivalency
U	Not Detected (specific projects only)
*	See Cover Letter

Unless otherwise noted, solid sample results are reported in dry weight. Tissue samples are reported in wet weight.

### Vista Analytical Laboratory Certifications

Accrediting Authority	Certificate Number
Alaska Department of Environmental Conservation	17-013
Arkansas Department of Environmental Quality	19-013-0
California Department of Health – ELAP	2892
DoD ELAP - A2LA Accredited - ISO/IEC 17025:2005	3091.01
Florida Department of Health	E87777
Hawaii Department of Health	N/A
Louisiana Department of Environmental Quality	01977
Maine Department of Health	2018017
Michigan Department of Environmental Quality	9932
Minnesota Department of Health	1521520
New Hampshire Environmental Accreditation Program	207718
New Jersey Department of Environmental Protection	CA003
New York Department of Health	11411
Oregon Laboratory Accreditation Program	4042-010
Pennsylvania Department of Environmental Protection	015
Texas Commission on Environmental Quality	T104704189-19-10
Virginia Department of General Services	9618
Washington Department of Ecology	C584-19
Wisconsin Department of Natural Resources	998036160

*Current certificates and lists of licensed parameters are located in the Quality Assurance office and are available upon request.*

## NELAP Accredited Test Methods

MATRIX: Air	
Description of Test	Method
Determination of Polychlorinated p-Dioxins & Polychlorinated Dibenzofurans	EPA 23
Determination of Polychlorinated p-Dioxins & Polychlorinated Dibenzofurans	EPA TO-9A

MATRIX: Biological Tissue	
Description of Test	Method
Tetra- through Octa-Chlorinated Dioxins and Furans by Isotope Dilution GC/HRMS	EPA 1613B
Brominated Diphenyl Ethers by HRGC/HRMS	EPA 1614A
Chlorinated Biphenyl Congeners in Water, Soil, Sediment, and Tissue by GC/HRMS	EPA 1668A/C
Pesticides in Water, Soil, Sediment, Biosolids, and Tissue by HRGC/HRMS	EPA 1699
Perfluorinated Alkyl Acids in Drinking Water by SPE and LC/MS/MS	EPA 537
Polychlorinated Dibenzo-p-Dioxins and Polychlorinated Dibenzofurans by GC/HRMS	EPA 8280A/B
Polychlorinated Dibenzodioxins (PCDDs) and Polychlorinated Dibenzofurans (PCDFs) by GC/HRMS	EPA 8290/8290A

MATRIX: Drinking Water	
Description of Test	Method
2,3,7,8-Tetrachlorodibenzo- p-dioxin (2,3,7,8-TCDD) GC/HRMS	EPA 1613/1613B
1,4-Dioxane (1,4-Diethyleneoxide) analysis by GC/HRMS	EPA 522
Perfluorinated Alkyl Acids in Drinking Water by SPE and LC/MS/MS	EPA 537
Perfluorinated Alkyl Acids in Drinking Water by SPE and LC/MS/MS	ISO 25101 2009

MATRIX: Non-Potable Water	
Description of Test	Method
Tetra- through Octa-Chlorinated Dioxins and Furans by Isotope Dilution GC/HRMS	EPA 1613B
Brominated Diphenyl Ethers by HRGC/HRMS	EPA 1614A
Chlorinated Biphenyl Congeners in Water, Soil, Sediment, and Tissue by GC/HRMS	EPA 1668A/C
Pesticides in Water, Soil, Sediment, Biosolids, and Tissue by HRGC/HRMS	EPA 1699
Perfluorinated Alkyl Acids in Drinking Water by SPE and LC/MS/MS	EPA 537
Dioxin by GC/HRMS	EPA 613
Polychlorinated Dibenzo-p-Dioxins and Polychlorinated Dibenzofurans by GC/HRMS	EPA 8280A/B
Polychlorinated Dibenzodioxins (PCDDs) and Polychlorinated Dibenzofurans (PCDFs) by GC/HRMS	EPA 8290/8290A

MATRIX: Solids	
Description of Test	Method
Tetra-Octa Chlorinated Dioxins and Furans by Isotope Dilution GC/HRMS	EPA 1613
Tetra- through Octa-Chlorinated Dioxins and Furans by Isotope Dilution GC/HRMS	EPA 1613B
Brominated Diphenyl Ethers by HRGC/HRMS	EPA 1614A
Chlorinated Biphenyl Congeners in Water, Soil, Sediment, and Tissue by GC/HRMS	EPA 1668A/C
Pesticides in Water, Soil, Sediment, Biosolids, and Tissue by HRGC/HRMS	EPA 1699
Perfluorinated Alkyl Acids in Drinking Water by SPE and LC/MS/MS	EPA 537
Polychlorinated Dibenzo-p-Dioxins and Polychlorinated Dibenzofurans by GC/HRMS	EPA 8280A/B
Polychlorinated Dibenzodioxins (PCDDs) and Polychlorinated Dibenzofurans (PCDFs) by GC/HRMS	EPA 8290/8290A



# CHAIN OF CUSTODY

*For Laboratory Use Only*  
 Work Order #: 1900762 Temp: 0.4 °C  
 Storage ID: WR-2 Storage Secured: Yes  No

Project ID: Statewide WWTP Biosolids PFAS Evaluation PO#: 60588767.01 Sampler: Michal Kosciarz + Rachel Lopez  
 (name)

TAT Standard:  21 days  
 (check one): Rush (surcharge may apply)  
 14 days  7 days Specify:

Invoice to: Name Stephanie Kammer Company MDEQ Address 525 W. Allegan Street City Lansing State MI Ph# 517-897-1597 Fax# 517-241-3571

Relinquished by (printed name and signature) Michal Kosciarz Date 4/10/2019 Time 1830 Received by (printed name and signature) RECEIVED VIA EMAIL [Signature] Date 04/16/19 Time 0958

SHIP TO: Vista Analytical Laboratory 1104 Windfield Way El Dorado Hills, CA 95762 Ph: (916) 673-1520; Fax: (916) 673-0106				Method of Shipment:		Add Analysis(es) Requested										Comments
ATTN: <u>Jennifer Miller</u>				Tracking No.:		Container(s)										
Sample ID	Date	Time	Location/Sample Description	Quantity	Type	Matrix	List of 21	List of 21 w/Isomers	List of 24	List of 24 w/Isomers	List of 28	Other: Please List Below	PFAS Isotope Dilution	USEPA Method 537		
SW021904111345RL	04.11.19	1345	WIXO-02N05E01-BC01	2	P	AQ		X								
SW011904111355RL	04.11.19	1355	WIXO-02N05E01-BC01	2	P	AQ		X								
SW011904111400RL-DUP	04.11.19	1400	WIXO-02N05E01-BC01	2	P	AQ		X								
SXDU31904111405MK	04.11.19	1405	WIXO-02N05E01-BC01	1	PJ	SO		X								
SXDU21904111450MK	04.11.19	1450	WIXO-02N05E01-BC01	1	PJ	SO		X								
SXDU21904111455MK-DUP	04.11.19	1455	WIXO-02N05E01-BC01	1	PJ	SO		X								
PEW011904111510RL	04.11.19	1510	WIXO-02N05E01-BC01	2	P	AQ		X								
PEW021904111515RL	04.11.19	1515	WIXO-02N05E01-BC01	2	P	AQ		X								
PEW031904111525RL	04.11.19	1525	WIXO-02N05E01-BC01	2	P	AQ		X								
PEW011904111640RL	04.11.19	1640	WIXO-02N05E01-BC02	2	P	AQ		X								

Special Instructions/Comments: Send Results and Acknowledgements to the list provided

**SEND DOCUMENTATION AND RESULTS TO:**

Name: Stephanie Kammer  
 Company: MDEQ  
 Address: 525 W. Allegan Street, Constitution Hall, 1st South West  
 City: Lansing State: MI Zip: 30242  
 Phone: 517-897-1597 Fax: 517-241-3571  
 Email: dorin.bogdan@aecom.com

Container Types: P= HDPE, PJ= HDPE Jar  
 Bottle Preservation Type: T = Thiosulfate,  
 O = Other: \_\_\_\_\_ TZ = Trizma: \_\_\_\_\_  
 Matrix Types: AQ = Aqueous, DW = Drinking Water, EF = Effluent, PP = Pulp/Paper, SD = Sediment,  
 SL = Sludge, BS=Biosolids, SO = Soil, WW = Wastewater, B = Blood/Serum, O = Other: \_\_\_\_\_

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# CHAIN OF CUSTODY

**For Laboratory Use Only**  
 Work Order #: 1900762 Temp: 0.4 °C  
 Storage ID: WR-2 Storage Secured: Yes  No

Project ID: Statewide WWTP Biosolids PFAS Evaluation PO#: 60588767.01 Sampler: Michal Kosciarz + Rachel Lopez  
 (name)

TAT Standard:  21 days  
 (check one): Rush (surcharge may apply)  
 14 days  7 days Specify:

Invoice to: Name Stephanie Kammer Company MDEQ Address 525 W. Allegan Street City Lansing State MI Ph# 517-897-1597 Fax# 517-241-3571

Relinquished by (printed name and signature) Michal Kosciarz Date \_\_\_\_\_ Time \_\_\_\_\_ Received by (printed name and signature) RECEIVED VIA EMAIL (A E) 04/16/19 Date 0958 Time \_\_\_\_\_

SHIP TO: Vista Analytical Laboratory 1104 Windfield Way El Dorado Hills, CA 95762 Ph: (916) 673-1520; Fax: (916) 673-0106				Method of Shipment:		Add Analysis(es) Requested										Comments
ATTN: <u>Jennifer Miller</u>				Tracking No.:		Container(s)										
Sample ID	Date	Time	Location/Sample Description	Quantity	Type	Matrix	List of 21	List of 21 w/Isomers	List of 24	List of 24 w/Isomers	List of 28	Other: Please List Below	PFOS/PFOA	UCMRA PFAS List 6	PFAS List 14	USEPA Method 537
SXDU11904111530MK	04.11.19	1530	WIXO-02N05E01-BC01	1	PJ	SO		X								
PEW021904111615RRL	04.11.19	1615	WIXO-02N05E01-BC02	2	P	AQ		X								
SXDU21904111615MK	04.11.19	1615	WIXO-02N05E01-BC02	1	PJ	SO		X								
SXDU11904111655MK	04.11.19	1655	WIXO-02N05E01-BC02	1	PJ	SO		X								

Special Instructions/Comments: Send Results and Acknowledgements to the list provided

**SEND DOCUMENTATION AND RESULTS TO:**

Name: Stephanie Kammer  
 Company: MDEQ  
 Address: 525 W. Allegan Street, Constitution Hall, 1st South West  
 City: Lansing State: MI Zip: 30242  
 Phone: 517-897-1597 Fax: 517-241-3571  
 Email: dorin.bogdan@aecom.com

Container Types: P= HDPE, PJ= HDPE Jar      Bottle Preservation Type: T = Thiosulfate,      Matrix Types: AQ = Aqueous, DW = Drinking Water, EF = Effluent, PP = Pulp/Paper, SD = Sediment,  
 O = Other;      TZ = Trizma;      SL = Sludge, BS=Biosolids, SO = Soil, WW = Wastewater, B = Blood/Serum, O = Other:

3 pgs



# CHAIN OF CUSTODY

Page 2 of 5

**For Laboratory Use Only**  
 Work Order #: 1900762 Temp: 0.4 °C  
 Storage ID: WR-2 Storage Secured: Yes  No

Project ID: Statewide WWTP Biosolids PFAS Evaluation PO#: 60588767.01 Sampler: Michal Kosciarz + Rachel Lopez  
 (name)

TAT Standard:  21 days  
 (check one):  14 days  7 days Specify: \_\_\_\_\_  
 Rush (surcharge may apply)

Invoice to: Name Stephanie Kammer Company MDEQ Address 525 W. Allegan Street City Lansing State MI Ph# 517-897-1597 Fax# 517-241-3571

Relinquished by (printed name and signature) Michal Kosciarz Date 4/15/19 Time 1700 Received by (printed name and signature) Marissa Sparks Date 04/16/19 Time 0958  
 Relinquished by (printed name and signature) \_\_\_\_\_ Date \_\_\_\_\_ Time \_\_\_\_\_ Received by (printed name and signature) \_\_\_\_\_ Date \_\_\_\_\_ Time \_\_\_\_\_

SHIP TO: Vista Analytical Laboratory 1104 Windfield Way El Dorado Hills, CA 95762 Ph: (916) 673-1520; Fax: (916) 673-0106				Method of Shipment:		Add Analysis(es) Requested										Comments
ATTN: <u>Jennifer Miller</u>				Tracking No.:		Container(s)		PFAS Isotope Dilution				USEPA Method 537				
Sample ID	Date	Time	Location/Sample Description	Quantity	Type	Matrix	List of 21	List of 21 w/Isomers	List of 24	List of 24 w/Isomers	List of 28	Other: Please List Below	PFOM/PCOS	UCMR3 PFAS List	PFAS List: 14	
SW021904111345RL	04.11.19	1345	WIXO-02N05E01-BC01	2	P	AQ		X								
SW011904111355RL	04.11.19	1355	WIXO-02N05E01-BC01	2	P	AQ		X								
SW011904111400RL-DUP	04.11.19	1400	WIXO-02N05E01-BC01	2	P	AQ		X								
SXDU31904111405MK	04.11.19	1405	WIXO-02N05E01-BC01	1	PJ	SO		X								
SXDU21904111450MK	04.11.19	1450	WIXO-02N05E01-BC01	1	PJ	SO		X								
SXDU21904111455MK-DUP	04.11.19	1455	WIXO-02N05E01-BC01	1	PJ	SO		X								
PEW011904111510RL	04.11.19	1510	WIXO-02N05E01-BC01	2	P	AQ		X								
PEW021904111515RL	04.11.19	1515	WIXO-02N05E01-BC01	2	P	AQ		X								
PEW031904111525RL	04.11.19	1525	WIXO-02N05E01-BC01	2	P	AQ		X								
PEW011904111640RL	04.11.19	1640	WIXO-02N05E01-BC02	2	P	AQ		X								

Special Instructions/Comments: Send Results and Acknowledgements to the list provided

**SEND DOCUMENTATION AND RESULTS TO:**

Name: Stephanie Kammer  
 Company: MDEQ  
 Address: 525 W. Allegan Street, Constitution Hall, 1st South West  
 City: Lansing State: MI Zip: 30242  
 Phone: 517-897-1597 Fax: 517-241-3571  
 Email: dorin.bogdan@aecom.com

Container Types: P= HDPE, PJ= HDPE Jar  
 Bottle Preservation Type: T = Thiosulfate, TZ = Trizma  
 Matrix Types: AQ = Aqueous, DW = Drinking Water, EF = Effluent, PP = Pulp/Paper, SD = Sediment, SL = Sludge, BS=Biosolids, SO = Soil, WW = Wastewater, B = Blood/Serum, O = Other:



Page 3 of 4

# CHAIN OF CUSTODY

**For Laboratory Use Only**  
 Work Order #: 1900762 Temp: 0.4 °C  
 Storage ID: WR-2 Storage Secured: Yes  No

Project ID: Statewide WWTP Biosolids PFAS Evaluation PO#: 60588767.01 Sampler: Michal Kosciarz + Rachel Lopez  
 (name)

TAT Standard:  21 days  
 (check one): Rush (surcharge may apply)  
 14 days  7 days Specify: \_\_\_\_\_

Invoice to: Name Stephanie Kammer Company MDEQ Address 525 W. Allegan Street City Lansing State MI Ph# 517-897-1597 Fax# 517-241-3571

Relinquished by (printed name and signature) Michal Kosciarz Date 4/15/19 Time 1700 Received by (printed name and signature) Marissa Sparks Date 04/16/19 Time 0958

Sample ID	Date	Time	Location/Sample Description	Quantity		Matrix	Add Analysis(es) Requested					PFAS Isotope Dilution	USEPA Method 537	Comments	
				Type	Container(s)		List of 21	List of 21 w/Isomers	List of 24	List of 24 w/Isomers	List of 28				Other: Please List Below
SXDU11904111530MK	04.11.19	1530	WIXO-02N05E01-BC01	1	PJ	SO			X						
PEW021904111615RL	04.11.19	1615	WIXO-02N05E01-BC02	2	P	AQ			X						
SXDU21904111615MK	04.11.19	1615	WIXO-02N05E01-BC02	1	PJ	SO			X						
SXDU11904111655MK	04.11.19	1655	WIXO-02N05E01-BC02	1	PJ	SO			X						

Special Instructions/Comments: Send Results and Acknowledgements to the list provided

**SEND DOCUMENTATION AND RESULTS TO:**

Name: Stephanie Kammer  
 Company: MDEQ  
 Address: 525 W. Allegan Street, Constitution Hall, 1st South West  
 City: Lansing State: MI Zip: 30242  
 Phone: 517-897-1597 Fax: 517-241-3571  
 Email: dorin.bogdan@aeocom.com

Container Types: P= HDPE, PJ= HDPE Jar  
 O = Other: \_\_\_\_\_

Bottle Preservation Type: T = Thiosulfate,  
 TZ = Trizma: \_\_\_\_\_

Matrix Types: AQ = Aqueous, DW = Drinking Water, EF = Effluent, PP = Pulp/Paper, SD = Sediment,  
 SL = Sludge, BS=Biosolids, SO = Soil, WW = Wastewater, B = Blood/Serum, O = Other: \_\_\_\_\_





May 07, 2019

**Vista Work Order No. 1900761**

Ms. Maya Murshak  
Merit Laboratories, Inc.  
2680 East Lansing Drive  
East Lansing, MI 48823

Dear Ms. Murshak,

Enclosed are the results for the sample set received at Vista Analytical Laboratory on April 16, 2019 under your Project Name 'Statewide WWTP Biosolids PFAS Evaluation'.

Vista Analytical Laboratory is committed to serving you effectively. If you require additional information, please contact me at 916-673-1520 or by email at [mmaier@vista-analytical.com](mailto:mmaier@vista-analytical.com).

Thank you for choosing Vista as part of your analytical support team.

Sincerely,

Martha Maier  
Laboratory Director



*Vista Analytical Laboratory certifies that the report herein meets all the requirements set forth by NELAP for those applicable test methods. Results relate only to the samples as received by the laboratory. This report should not be reproduced except in full without the written approval of Vista.*

**Vista Work Order No. 1900761**

**Case Narrative**

**Sample Condition on Receipt:**

Five aqueous samples and five soil samples were received in good condition and within the method temperature requirements. The samples were received and stored securely in accordance with Vista standard operating procedures and EPA methodology.

**Analytical Notes:**

**PFAS Isotope Dilution Method**

The aqueous samples were extracted and analyzed for a selected list of PFAS using Vista's PFAS Isotope Dilution Method. This method is listed on Vista's NELAP certificate as Modified EPA Method 537. The results for PFHxS, PFOA, PFOS, MeFOSAA and EtFOSAA include both linear and branched isomers. Results for all other analytes include the linear isomers only.

The following samples contained particulate and were centrifuged prior to extraction:

<u>Laboratory ID</u>	<u>Sample Name</u>
1900761-01	SW031904110940RL
1900761-03	PEW011904111015RL
1900761-10	TD011904111225RL

Holding Times

The samples were extracted and analyzed within the method hold times.

Quality Control

The Initial Calibration and Continuing Calibration Verifications met the method acceptance criteria.

A Method Blank and Ongoing Precision and Recovery (OPR) sample were extracted and analyzed with the preparation batch. No analytes were detected in the Method Blank above 1/2 the LOQ. The OPR recoveries were within the method acceptance criteria.

The labeled standard recoveries outside the acceptance criteria are listed in the table below.

**VAL-PFAS Method**

The soil samples were extracted and analyzed for a selected list of PFAS using VAL Method PFAS. The results for PFHxS, PFOA, PFOS, MeFOSAA and EtFOSAA include both linear and branched isomers. Results for all other analytes include the linear isomers only.

Holding Times

The samples were extracted and analyzed within the hold times.

### Quality Control

The Initial Calibration and Continuing Calibration Verifications met the method acceptance criteria.

A Method Blank and Ongoing Precision and Recovery (OPR) sample were extracted and analyzed with the preparation batch. No analytes were detected in the Method Blank above 1/2 the LOQ. The OPR recoveries were within the method acceptance criteria.

The labeled standard recoveries outside the acceptance criteria are listed in the table below.

### QC Anomalies

LabNumber	SampleName	Analysis	Analyte	Flag	%Rec
1900761-03	PEW011904111015RL	PFAS Isotope Dilution Method	13C2-PFUnA	H	59.3
1900761-07	PEW021904111210RL	PFAS Isotope Dilution Method	13C2-PFUnA	H	52.5
B9D0170-BLK1	B9D0170-BLK1	VAL - PFAS	d3-MeFOSAA	H	48.0
B9D0170-BLK1	B9D0170-BLK1	VAL - PFAS	d5-EtFOSAA	H	45.0
B9D0170-BLK1	B9D0170-BLK1	VAL - PFAS	13C2-PFUnA	H	55.6
B9D0170-BS1	B9D0170-BS1	VAL - PFAS	d5-EtFOSAA	H	48.2
B9D0170-BS1	B9D0170-BS1	VAL - PFAS	13C2-PFUnA	H	58.7

H = Recovery was outside laboratory acceptance criteria.

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# Sample Inventory Report

Vista Sample ID	Client Sample ID	Sampled	Received	Components/Containers
1900761-01	SW031904110940RL	11-Apr-19 09:40	16-Apr-19 09:58	HDPE Bottle, 250 mL HDPE Bottle, 250 mL
1900761-02	SXDU21904110945MK	11-Apr-19 09:45	16-Apr-19 09:58	HDPE Jar, 6 oz
1900761-03	PEW011904111015RL	11-Apr-19 10:15	16-Apr-19 09:58	HDPE Bottle, 250 mL HDPE Bottle, 250 mL
1900761-04	SXDU11904111040MK	11-Apr-19 10:40	16-Apr-19 09:58	HDPE Jar, 6 oz
1900761-05	SXDU21904111125MK	11-Apr-19 11:25	16-Apr-19 09:58	HDPE Jar, 6 oz
1900761-06	SXDU21904111130MK-DUP	11-Apr-19 11:30	16-Apr-19 09:58	HDPE Jar, 6 oz
1900761-07	PEW021904111210RL	11-Apr-19 12:10	16-Apr-19 09:58	HDPE Bottle, 250 mL HDPE Bottle, 250 mL
1900761-08	SXDU11904111220MK	11-Apr-19 12:20	16-Apr-19 09:58	HDPE Jar, 6 oz
1900761-09	SW011904111220RL	11-Apr-19 12:20	16-Apr-19 09:58	HDPE Bottle, 250 mL HDPE Bottle, 250 mL
1900761-10	TD011904111225RL	11-Apr-19 12:25	16-Apr-19 09:58	HDPE Bottle, 250 mL HDPE Bottle, 250 mL

## **ANALYTICAL RESULTS**

**Sample ID: Method Blank**
**PFAS Isotope Dilution Method**

Client Data					Laboratory Data						
Name:	Merit Laboratories, Inc.		Matrix:	Aqueous	Lab Sample:	B9D0161-BLK1		Column:	BEH C18		
Project:	Statewide WWTP Biosolids PFAS Evaluation										

Analyte	CAS Number	Conc. (ng/L)	DL	LOD	LOQ	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
PFBA	375-22-4	ND	1.37	2.00	4.00		B9D0161	24-Apr-19	0.250 L	28-Apr-19 10:02	1
PFPeA	2706-90-3	ND	1.37	2.00	4.00		B9D0161	24-Apr-19	0.250 L	28-Apr-19 10:02	1
PFBS	375-73-5	ND	1.37	2.00	4.00		B9D0161	24-Apr-19	0.250 L	28-Apr-19 10:02	1
4:2 FTS	757124-72-4	ND	1.37	2.00	4.00		B9D0161	24-Apr-19	0.250 L	28-Apr-19 10:02	1
PFHxA	307-24-4	ND	1.37	2.00	4.00		B9D0161	24-Apr-19	0.250 L	28-Apr-19 10:02	1
PFPeS	2706-91-4	ND	1.37	2.00	4.00		B9D0161	24-Apr-19	0.250 L	28-Apr-19 10:02	1
PFHpA	375-85-9	ND	1.37	2.00	4.00		B9D0161	24-Apr-19	0.250 L	28-Apr-19 10:02	1
PFHxS	355-46-4	ND	1.37	2.00	4.00		B9D0161	24-Apr-19	0.250 L	28-Apr-19 10:02	1
6:2 FTS	27619-97-2	ND	1.37	2.00	4.00		B9D0161	24-Apr-19	0.250 L	28-Apr-19 10:02	1
PFOA	335-67-1	ND	1.37	2.00	4.00		B9D0161	24-Apr-19	0.250 L	28-Apr-19 10:02	1
PFHpS	375-92-8	ND	1.37	2.00	4.00		B9D0161	24-Apr-19	0.250 L	28-Apr-19 10:02	1
PFNA	375-95-1	ND	1.37	2.00	4.00		B9D0161	24-Apr-19	0.250 L	28-Apr-19 10:02	1
PFOSA	754-91-6	ND	1.37	2.00	4.00		B9D0161	24-Apr-19	0.250 L	28-Apr-19 10:02	1
PFOS	1763-23-1	ND	1.37	2.00	4.00		B9D0161	24-Apr-19	0.250 L	28-Apr-19 10:02	1
PFDA	335-76-2	ND	1.37	2.00	4.00		B9D0161	24-Apr-19	0.250 L	28-Apr-19 10:02	1
8:2 FTS	39108-34-4	ND	1.37	2.00	4.00		B9D0161	24-Apr-19	0.250 L	28-Apr-19 10:02	1
PFNS	68259-12-1	ND	1.94	2.00	4.00		B9D0161	24-Apr-19	0.250 L	28-Apr-19 10:02	1
MeFOSAA	2355-31-9	ND	1.37	2.00	4.00		B9D0161	24-Apr-19	0.250 L	28-Apr-19 10:02	1
EtFOSAA	2991-50-6	ND	1.37	2.00	4.00		B9D0161	24-Apr-19	0.250 L	28-Apr-19 10:02	1
PFOA	2058-94-8	ND	1.37	2.00	4.00		B9D0161	24-Apr-19	0.250 L	28-Apr-19 10:02	1
PFDS	335-77-3	ND	1.37	2.00	4.00		B9D0161	24-Apr-19	0.250 L	28-Apr-19 10:02	1
PFDoA	307-55-1	ND	1.37	2.00	4.00		B9D0161	24-Apr-19	0.250 L	28-Apr-19 10:02	1
PFTTrDA	72629-94-8	ND	1.37	2.00	4.00		B9D0161	24-Apr-19	0.250 L	28-Apr-19 10:02	1
PFTTeDA	376-06-7	ND	1.37	2.00	4.00		B9D0161	24-Apr-19	0.250 L	28-Apr-19 10:02	1

Labeled Standards	Type	% Recovery	Limits	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
13C3-PFBA	IS	92.5	60 - 130		B9D0161	24-Apr-19	0.250 L	28-Apr-19 10:02	1
13C3-PFPeA	IS	94.4	60 - 150		B9D0161	24-Apr-19	0.250 L	28-Apr-19 10:02	1
13C3-PFBS	IS	88.7	60 - 150		B9D0161	24-Apr-19	0.250 L	28-Apr-19 10:02	1
13C2-4:2 FTS	IS	80.3	20 - 150		B9D0161	24-Apr-19	0.250 L	28-Apr-19 10:02	1
13C2-PFHxA	IS	89.0	70 - 130		B9D0161	24-Apr-19	0.250 L	28-Apr-19 10:02	1
13C4-PFHpA	IS	86.1	60 - 150		B9D0161	24-Apr-19	0.250 L	28-Apr-19 10:02	1
13C3-PFHxS	IS	83.3	60 - 130		B9D0161	24-Apr-19	0.250 L	28-Apr-19 10:02	1
13C2-6:2 FTS	IS	80.8	40 - 150		B9D0161	24-Apr-19	0.250 L	28-Apr-19 10:02	1
13C2-PFOA	IS	73.5	60 - 130		B9D0161	24-Apr-19	0.250 L	28-Apr-19 10:02	1
13C5-PFNA	IS	73.5	50 - 130		B9D0161	24-Apr-19	0.250 L	28-Apr-19 10:02	1
13C8-PFOSA	IS	37.8	20 - 150		B9D0161	24-Apr-19	0.250 L	28-Apr-19 10:02	1
13C8-PFOS	IS	80.1	60 - 130		B9D0161	24-Apr-19	0.250 L	28-Apr-19 10:02	1
13C2-PFDA	IS	60.0	60 - 130		B9D0161	24-Apr-19	0.250 L	28-Apr-19 10:02	1



**Sample ID: OPR**

**PFAS Isotope Dilution Method**

Client Data					Laboratory Data						
Name:	Merit Laboratories, Inc.		Matrix:	Aqueous	Lab Sample:	B9D0161-BS1	Column:	BEH C18			
Project:	Statewide WWTP Biosolids PFAS Evaluation										

Analyte	CAS Number	Amt Found (ng/L)	Spike Amt	% Rec	Limits	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
PFBA	375-22-4	43.0	40.0	107	70 - 130		B9D0161	24-Apr-19	0.250 L	28-Apr-19 09:52	1
PFPeA	2706-90-3	40.4	40.0	101	70 - 130		B9D0161	24-Apr-19	0.250 L	28-Apr-19 09:52	1
PFBS	375-73-5	41.5	40.0	104	70 - 130		B9D0161	24-Apr-19	0.250 L	28-Apr-19 09:52	1
4:2 FTS	757124-72-4	45.9	40.0	115	70 - 130		B9D0161	24-Apr-19	0.250 L	28-Apr-19 09:52	1
PFHxA	307-24-4	43.6	40.0	109	70 - 130		B9D0161	24-Apr-19	0.250 L	28-Apr-19 09:52	1
PFPeS	2706-91-4	44.9	40.0	112	70 - 130		B9D0161	24-Apr-19	0.250 L	28-Apr-19 09:52	1
PFHpA	375-85-9	41.1	40.0	103	70 - 130		B9D0161	24-Apr-19	0.250 L	28-Apr-19 09:52	1
PFHxS	355-46-4	40.7	40.0	102	70 - 130		B9D0161	24-Apr-19	0.250 L	28-Apr-19 09:52	1
6:2 FTS	27619-97-2	41.1	40.0	103	60 - 130		B9D0161	24-Apr-19	0.250 L	28-Apr-19 09:52	1
PFOA	335-67-1	42.0	40.0	105	70 - 130		B9D0161	24-Apr-19	0.250 L	28-Apr-19 09:52	1
PFHpS	375-92-8	42.9	40.0	107	60 - 130		B9D0161	24-Apr-19	0.250 L	28-Apr-19 09:52	1
PFNA	375-95-1	41.4	40.0	103	70 - 130		B9D0161	24-Apr-19	0.250 L	28-Apr-19 09:52	1
PFOSA	754-91-6	40.3	40.0	101	70 - 130	Q	B9D0161	24-Apr-19	0.250 L	28-Apr-19 09:52	1
PFOS	1763-23-1	40.1	40.0	100	70 - 130		B9D0161	24-Apr-19	0.250 L	28-Apr-19 09:52	1
PFDA	335-76-2	44.2	40.0	110	70 - 130		B9D0161	24-Apr-19	0.250 L	28-Apr-19 09:52	1
8:2 FTS	39108-34-4	49.8	40.0	124	60 - 130		B9D0161	24-Apr-19	0.250 L	28-Apr-19 09:52	1
PFNS	68259-12-1	38.1	40.0	95.3	70 - 130		B9D0161	24-Apr-19	0.250 L	28-Apr-19 09:52	1
MeFOSAA	2355-31-9	40.5	40.0	101	70 - 130		B9D0161	24-Apr-19	0.250 L	28-Apr-19 09:52	1
EtFOSAA	2991-50-6	39.1	40.0	97.8	70 - 130		B9D0161	24-Apr-19	0.250 L	28-Apr-19 09:52	1
PFUnA	2058-94-8	46.0	40.0	115	70 - 130		B9D0161	24-Apr-19	0.250 L	28-Apr-19 09:52	1
PFDS	335-77-3	37.8	40.0	94.4	60 - 130		B9D0161	24-Apr-19	0.250 L	28-Apr-19 09:52	1
PFDoA	307-55-1	43.2	40.0	108	70 - 130		B9D0161	24-Apr-19	0.250 L	28-Apr-19 09:52	1
PFTTrDA	72629-94-8	39.2	40.0	97.9	60 - 130		B9D0161	24-Apr-19	0.250 L	28-Apr-19 09:52	1
PFTeDA	376-06-7	40.5	40.0	101	70 - 130		B9D0161	24-Apr-19	0.250 L	28-Apr-19 09:52	1

Labeled Standards	Type	% Rec	Limits	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
13C3-PFBA	IS	95.8	60- 130		B9D0161	24-Apr-19	0.250 L	28-Apr-19 09:52	1
13C3-PFPeA	IS	97.5	60- 150		B9D0161	24-Apr-19	0.250 L	28-Apr-19 09:52	1
13C3-PFBS	IS	91.6	60- 150		B9D0161	24-Apr-19	0.250 L	28-Apr-19 09:52	1
13C2-4:2 FTS	IS	87.1	20- 150		B9D0161	24-Apr-19	0.250 L	28-Apr-19 09:52	1
13C2-PFHxA	IS	90.4	70- 130		B9D0161	24-Apr-19	0.250 L	28-Apr-19 09:52	1
13C4-PFHpA	IS	93.3	60- 150		B9D0161	24-Apr-19	0.250 L	28-Apr-19 09:52	1
13C3-PFHxS	IS	90.7	60- 130		B9D0161	24-Apr-19	0.250 L	28-Apr-19 09:52	1
13C2-6:2 FTS	IS	75.4	40- 150		B9D0161	24-Apr-19	0.250 L	28-Apr-19 09:52	1
13C2-PFOA	IS	90.5	60- 130		B9D0161	24-Apr-19	0.250 L	28-Apr-19 09:52	1
13C5-PFNA	IS	80.9	50- 130		B9D0161	24-Apr-19	0.250 L	28-Apr-19 09:52	1

**Sample ID: OPR**

**PFAS Isotope Dilution Method**

Client Data				Laboratory Data			
Name:	Merit Laboratories, Inc.	Matrix:	Aqueous	Lab Sample:	B9D0161-BS1	Column:	BEH C18
Project:	Statewide WWTP Biosolids PFAS Evaluation						

Labeled Standards	Type	% Rec	Limits	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
13C8-PFOA	IS	46.3	20- 150		B9D0161	24-Apr-19	0.250 L	28-Apr-19 09:52	1
13C8-PFOS	IS	81.1	60- 130		B9D0161	24-Apr-19	0.250 L	28-Apr-19 09:52	1
13C2-PFDA	IS	68.6	60- 130		B9D0161	24-Apr-19	0.250 L	28-Apr-19 09:52	1
13C2-8:2 FTS	IS	62.6	40- 150		B9D0161	24-Apr-19	0.250 L	28-Apr-19 09:52	1
d3-MeFOSAA	IS	59.0	50- 150		B9D0161	24-Apr-19	0.250 L	28-Apr-19 09:52	1
d5-EtFOSAA	IS	61.1	50- 150		B9D0161	24-Apr-19	0.250 L	28-Apr-19 09:52	1
13C2-PFUnA	IS	65.7	60- 130		B9D0161	24-Apr-19	0.250 L	28-Apr-19 09:52	1
13C2-PFDoA	IS	63.1	30- 130		B9D0161	24-Apr-19	0.250 L	28-Apr-19 09:52	1
13C2-PFTeDA	IS	40.9	20- 150		B9D0161	24-Apr-19	0.250 L	28-Apr-19 09:52	1

**Sample ID: SW031904110940RL**

**PFAS Isotope Dilution Method**

Client Data				Laboratory Data			
Name:	Merit Laboratories, Inc.	Matrix:	Aqueous	Lab Sample:	1900761-01	Column:	BEH C18
Project:	Statewide WWTP Biosolids PFAS Evaluation	Date Collected:	11-Apr-19 09:40	Date Received:	16-Apr-19 09:58		
Location:	WIXO-03N06E04-JW05						

Analyte	CAS Number	Conc. (ng/L)	DL	LOD	LOQ	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
PFBA	375-22-4	2.73	1.54	2.24	4.48	J	B9D0161	24-Apr-19	0.223 L	28-Apr-19 12:31	1
PFPeA	2706-90-3	ND	1.54	2.24	4.48		B9D0161	24-Apr-19	0.223 L	28-Apr-19 12:31	1
PFBS	375-73-5	1.67	1.54	2.24	4.48	J	B9D0161	24-Apr-19	0.223 L	28-Apr-19 12:31	1
4:2 FTS	757124-72-4	ND	1.54	2.24	4.48		B9D0161	24-Apr-19	0.223 L	28-Apr-19 12:31	1
PFHxA	307-24-4	ND	1.54	2.24	4.48		B9D0161	24-Apr-19	0.223 L	28-Apr-19 12:31	1
PFPeS	2706-91-4	ND	1.54	2.24	4.48		B9D0161	24-Apr-19	0.223 L	28-Apr-19 12:31	1
PFHpA	375-85-9	ND	1.54	2.24	4.48		B9D0161	24-Apr-19	0.223 L	28-Apr-19 12:31	1
PFHxS	355-46-4	ND	1.54	2.24	4.48		B9D0161	24-Apr-19	0.223 L	28-Apr-19 12:31	1
6:2 FTS	27619-97-2	ND	1.54	2.24	4.48		B9D0161	24-Apr-19	0.223 L	28-Apr-19 12:31	1
PFOA	335-67-1	ND	1.54	2.24	4.48		B9D0161	24-Apr-19	0.223 L	28-Apr-19 12:31	1
PFHpS	375-92-8	ND	1.54	2.24	4.48		B9D0161	24-Apr-19	0.223 L	28-Apr-19 12:31	1
PFNA	375-95-1	ND	1.54	2.24	4.48		B9D0161	24-Apr-19	0.223 L	28-Apr-19 12:31	1
PFOSA	754-91-6	ND	1.54	2.24	4.48		B9D0161	24-Apr-19	0.223 L	28-Apr-19 12:31	1
PFOS	1763-23-1	ND	1.54	2.24	4.48		B9D0161	24-Apr-19	0.223 L	28-Apr-19 12:31	1
PFDA	335-76-2	ND	1.54	2.24	4.48		B9D0161	24-Apr-19	0.223 L	28-Apr-19 12:31	1
8:2 FTS	39108-34-4	ND	1.54	2.24	4.48		B9D0161	24-Apr-19	0.223 L	28-Apr-19 12:31	1
PFNS	68259-12-1	ND	2.17	2.24	4.48		B9D0161	24-Apr-19	0.223 L	28-Apr-19 12:31	1
MeFOSAA	2355-31-9	ND	1.54	2.24	4.48		B9D0161	24-Apr-19	0.223 L	28-Apr-19 12:31	1
EtFOSAA	2991-50-6	ND	1.54	2.24	4.48		B9D0161	24-Apr-19	0.223 L	28-Apr-19 12:31	1
PFOA	2058-94-8	ND	1.54	2.24	4.48		B9D0161	24-Apr-19	0.223 L	28-Apr-19 12:31	1
PFDS	335-77-3	ND	1.54	2.24	4.48		B9D0161	24-Apr-19	0.223 L	28-Apr-19 12:31	1
PFDoA	307-55-1	ND	1.54	2.24	4.48		B9D0161	24-Apr-19	0.223 L	28-Apr-19 12:31	1
PFTTrDA	72629-94-8	ND	1.54	2.24	4.48		B9D0161	24-Apr-19	0.223 L	28-Apr-19 12:31	1
PFTeDA	376-06-7	ND	1.54	2.24	4.48		B9D0161	24-Apr-19	0.223 L	28-Apr-19 12:31	1

Labeled Standards	Type	% Recovery	Limits	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
13C3-PFBA	IS	95.6	60 - 130		B9D0161	24-Apr-19	0.223 L	28-Apr-19 12:31	1
13C3-PFPeA	IS	97.4	60 - 150		B9D0161	24-Apr-19	0.223 L	28-Apr-19 12:31	1
13C3-PFBS	IS	102	60 - 150		B9D0161	24-Apr-19	0.223 L	28-Apr-19 12:31	1
13C2-4:2 FTS	IS	103	20 - 150		B9D0161	24-Apr-19	0.223 L	28-Apr-19 12:31	1
13C2-PFHxA	IS	93.4	70 - 130		B9D0161	24-Apr-19	0.223 L	28-Apr-19 12:31	1
13C4-PFHpA	IS	90.3	60 - 150		B9D0161	24-Apr-19	0.223 L	28-Apr-19 12:31	1
13C3-PFHxS	IS	101	60 - 130		B9D0161	24-Apr-19	0.223 L	28-Apr-19 12:31	1
13C2-6:2 FTS	IS	92.1	40 - 150		B9D0161	24-Apr-19	0.223 L	28-Apr-19 12:31	1
13C2-PFOA	IS	91.2	60 - 130		B9D0161	24-Apr-19	0.223 L	28-Apr-19 12:31	1
13C5-PFNA	IS	78.4	50 - 130		B9D0161	24-Apr-19	0.223 L	28-Apr-19 12:31	1
13C8-PFOSA	IS	43.8	20 - 150		B9D0161	24-Apr-19	0.223 L	28-Apr-19 12:31	1
13C8-PFOS	IS	90.8	60 - 130		B9D0161	24-Apr-19	0.223 L	28-Apr-19 12:31	1
13C2-PFDA	IS	81.1	60 - 130		B9D0161	24-Apr-19	0.223 L	28-Apr-19 12:31	1

**Sample ID: SW031904110940RL** **PFAS Isotope Dilution Method**

Client Data	Laboratory Data
Name: Merit Laboratories, Inc.	Lab Sample: 1900761-01
Project: Statewide WWTP Biosolids PFAS Evaluation	Date Received: 16-Apr-19 09:58
Location: WIXO-03N06E04-JW05	Column: BEH C18
Matrix: Aqueous	
Date Collected: 11-Apr-19 09:40	

Labeled Standards	Type	% Recovery	Limits	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
13C2-8:2 FTS	IS	87.6	40 - 150		B9D0161	24-Apr-19	0.223 L	28-Apr-19 12:31	1
d3-MeFOSAA	IS	69.4	50 - 150		B9D0161	24-Apr-19	0.223 L	28-Apr-19 12:31	1
d5-EtFOSAA	IS	71.8	50 - 150		B9D0161	24-Apr-19	0.223 L	28-Apr-19 12:31	1
13C2-PFUnA	IS	74.7	60 - 130		B9D0161	24-Apr-19	0.223 L	28-Apr-19 12:31	1
13C2-PFDoA	IS	55.4	30 - 130		B9D0161	24-Apr-19	0.223 L	28-Apr-19 12:31	1
13C2-PFTeDA	IS	50.5	20 - 150		B9D0161	24-Apr-19	0.223 L	28-Apr-19 12:31	1

DL - Detection Limit

LOD - Limit of Detection  
LOQ - Limit of quantitation

Results reported to the DL.

When reported, PFHxS, PFOA, PFOS, MeFOSAA and EtFOSAA include both linear and branched isomers. Only the linear isomer is reported for all other analytes.



**Sample ID: PEW011904111015RL**

**PFAS Isotope Dilution Method**

Client Data				Laboratory Data			
Name:	Merit Laboratories, Inc.	Matrix:	Aqueous	Lab Sample:	1900761-03	Column:	BEH C18
Project:	Statewide WWTP Biosolids PFAS Evaluation	Date Collected:	11-Apr-19 10:15	Date Received:	16-Apr-19 09:58		
Location:	WIXO-03N06E04-JW01						

Analyte	CAS Number	Conc. (ng/L)	DL	LOD	LOQ	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
PFBA	375-22-4	16.1	1.47	2.15	4.30		B9D0161	24-Apr-19	0.233 L	28-Apr-19 12:41	1
PFPeA	2706-90-3	12.3	1.47	2.15	4.30		B9D0161	24-Apr-19	0.233 L	28-Apr-19 12:41	1
PFBS	375-73-5	2.75	1.47	2.15	4.30	J	B9D0161	24-Apr-19	0.233 L	28-Apr-19 12:41	1
4:2 FTS	757124-72-4	ND	1.47	2.15	4.30		B9D0161	24-Apr-19	0.233 L	28-Apr-19 12:41	1
PFHxA	307-24-4	11.9	1.47	2.15	4.30		B9D0161	24-Apr-19	0.233 L	28-Apr-19 12:41	1
PFPeS	2706-91-4	ND	1.47	2.15	4.30		B9D0161	24-Apr-19	0.233 L	28-Apr-19 12:41	1
PFHpA	375-85-9	7.06	1.47	2.15	4.30		B9D0161	24-Apr-19	0.233 L	28-Apr-19 12:41	1
PFHxS	355-46-4	2.75	1.47	2.15	4.30	J	B9D0161	24-Apr-19	0.233 L	28-Apr-19 12:41	1
6:2 FTS	27619-97-2	ND	1.47	2.15	4.30		B9D0161	24-Apr-19	0.233 L	28-Apr-19 12:41	1
PFOA	335-67-1	6.14	1.47	2.15	4.30		B9D0161	24-Apr-19	0.233 L	28-Apr-19 12:41	1
PFHpS	375-92-8	ND	1.47	2.15	4.30		B9D0161	24-Apr-19	0.233 L	28-Apr-19 12:41	1
PFNA	375-95-1	ND	1.47	2.15	4.30		B9D0161	24-Apr-19	0.233 L	28-Apr-19 12:41	1
PFOSA	754-91-6	ND	1.47	2.15	4.30		B9D0161	24-Apr-19	0.233 L	28-Apr-19 12:41	1
PFOS	1763-23-1	ND	1.47	2.15	4.30		B9D0161	24-Apr-19	0.233 L	28-Apr-19 12:41	1
PFDA	335-76-2	ND	1.47	2.15	4.30		B9D0161	24-Apr-19	0.233 L	28-Apr-19 12:41	1
8:2 FTS	39108-34-4	ND	1.47	2.15	4.30		B9D0161	24-Apr-19	0.233 L	28-Apr-19 12:41	1
PFNS	68259-12-1	ND	2.08	2.15	4.30		B9D0161	24-Apr-19	0.233 L	28-Apr-19 12:41	1
MeFOSAA	2355-31-9	ND	1.47	2.15	4.30		B9D0161	24-Apr-19	0.233 L	28-Apr-19 12:41	1
EtFOSAA	2991-50-6	ND	1.47	2.15	4.30		B9D0161	24-Apr-19	0.233 L	28-Apr-19 12:41	1
PFOA	2058-94-8	ND	1.47	2.15	4.30		B9D0161	24-Apr-19	0.233 L	28-Apr-19 12:41	1
PFDS	335-77-3	ND	1.47	2.15	4.30		B9D0161	24-Apr-19	0.233 L	28-Apr-19 12:41	1
PFDoA	307-55-1	ND	1.47	2.15	4.30		B9D0161	24-Apr-19	0.233 L	28-Apr-19 12:41	1
PFTTrDA	72629-94-8	ND	1.47	2.15	4.30		B9D0161	24-Apr-19	0.233 L	28-Apr-19 12:41	1
PFTTeDA	376-06-7	ND	1.47	2.15	4.30		B9D0161	24-Apr-19	0.233 L	28-Apr-19 12:41	1

Labeled Standards	Type	% Recovery	Limits	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
13C3-PFBA	IS	92.7	60 - 130		B9D0161	24-Apr-19	0.233 L	28-Apr-19 12:41	1
13C3-PFPeA	IS	87.1	60 - 150		B9D0161	24-Apr-19	0.233 L	28-Apr-19 12:41	1
13C3-PFBS	IS	93.9	60 - 150		B9D0161	24-Apr-19	0.233 L	28-Apr-19 12:41	1
13C2-4:2 FTS	IS	99.6	20 - 150		B9D0161	24-Apr-19	0.233 L	28-Apr-19 12:41	1
13C2-PFHxA	IS	87.6	70 - 130		B9D0161	24-Apr-19	0.233 L	28-Apr-19 12:41	1
13C4-PFHpA	IS	92.8	60 - 150		B9D0161	24-Apr-19	0.233 L	28-Apr-19 12:41	1
13C3-PFHxS	IS	89.0	60 - 130		B9D0161	24-Apr-19	0.233 L	28-Apr-19 12:41	1
13C2-6:2 FTS	IS	89.8	40 - 150		B9D0161	24-Apr-19	0.233 L	28-Apr-19 12:41	1
13C2-PFOA	IS	88.8	60 - 130		B9D0161	24-Apr-19	0.233 L	28-Apr-19 12:41	1
13C5-PFNA	IS	86.9	50 - 130		B9D0161	24-Apr-19	0.233 L	28-Apr-19 12:41	1
13C8-PFOSA	IS	38.2	20 - 150		B9D0161	24-Apr-19	0.233 L	28-Apr-19 12:41	1
13C8-PFOS	IS	92.1	60 - 130		B9D0161	24-Apr-19	0.233 L	28-Apr-19 12:41	1
13C2-PFDA	IS	74.7	60 - 130		B9D0161	24-Apr-19	0.233 L	28-Apr-19 12:41	1

**Sample ID: PEW011904111015RL** **PFAS Isotope Dilution Method**

Client Data				Laboratory Data			
Name:	Merit Laboratories, Inc.	Matrix:	Aqueous	Lab Sample:	1900761-03	Column:	BEH C18
Project:	Statewide WWTP Biosolids PFAS Evaluation	Date Collected:	11-Apr-19 10:15	Date Received:	16-Apr-19 09:58		
Location:	WIXO-03N06E04-JW01						

Labeled Standards	Type	% Recovery	Limits	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
13C2-8:2 FTS	IS	96.7	40 - 150		B9D0161	24-Apr-19	0.233 L	28-Apr-19 12:41	1
d3-MeFOSAA	IS	51.2	50 - 150		B9D0161	24-Apr-19	0.233 L	28-Apr-19 12:41	1
d5-EtFOSAA	IS	63.7	50 - 150		B9D0161	24-Apr-19	0.233 L	28-Apr-19 12:41	1
13C2-PFUnA	IS	59.3	60 - 130	H	B9D0161	24-Apr-19	0.233 L	28-Apr-19 12:41	1
13C2-PFDoA	IS	56.0	30 - 130		B9D0161	24-Apr-19	0.233 L	28-Apr-19 12:41	1
13C2-PFTeDA	IS	44.6	20 - 150		B9D0161	24-Apr-19	0.233 L	28-Apr-19 12:41	1

DL - Detection Limit

LOD - Limit of Detection  
LOQ - Limit of quantitation

Results reported to the DL.

When reported, PFHxS, PFOA, PFOS, MeFOSAA and EtFOSAA include both linear and branched isomers. Only the linear isomer is reported for all other analytes.

**Sample ID: PEW021904111210RL**

**PFAS Isotope Dilution Method**

Client Data				Laboratory Data			
Name:	Merit Laboratories, Inc.	Matrix:	Aqueous	Lab Sample:	1900761-07	Column:	BEH C18
Project:	Statewide WWTP Biosolids PFAS Evaluation	Date Collected:	11-Apr-19 12:10	Date Received:	16-Apr-19 09:58		
Location:	WIXO-03N06E04-JW01						

Analyte	CAS Number	Conc. (ng/L)	DL	LOD	LOQ	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
PFBA	375-22-4	5.35	1.42	2.07	4.14		B9D0161	24-Apr-19	0.242 L	28-Apr-19 12:52	1
PFPeA	2706-90-3	1.72	1.42	2.07	4.14	J	B9D0161	24-Apr-19	0.242 L	28-Apr-19 12:52	1
PFBS	375-73-5	4.92	1.42	2.07	4.14		B9D0161	24-Apr-19	0.242 L	28-Apr-19 12:52	1
4:2 FTS	757124-72-4	ND	1.42	2.07	4.14		B9D0161	24-Apr-19	0.242 L	28-Apr-19 12:52	1
PFHxA	307-24-4	1.94	1.42	2.07	4.14	J	B9D0161	24-Apr-19	0.242 L	28-Apr-19 12:52	1
PFPeS	2706-91-4	ND	1.42	2.07	4.14		B9D0161	24-Apr-19	0.242 L	28-Apr-19 12:52	1
PFHpA	375-85-9	ND	1.42	2.07	4.14		B9D0161	24-Apr-19	0.242 L	28-Apr-19 12:52	1
PFHxS	355-46-4	ND	1.42	2.07	4.14		B9D0161	24-Apr-19	0.242 L	28-Apr-19 12:52	1
6:2 FTS	27619-97-2	ND	1.42	2.07	4.14		B9D0161	24-Apr-19	0.242 L	28-Apr-19 12:52	1
PFOA	335-67-1	1.62	1.42	2.07	4.14	J	B9D0161	24-Apr-19	0.242 L	28-Apr-19 12:52	1
PFHpS	375-92-8	ND	1.42	2.07	4.14		B9D0161	24-Apr-19	0.242 L	28-Apr-19 12:52	1
PFNA	375-95-1	ND	1.42	2.07	4.14		B9D0161	24-Apr-19	0.242 L	28-Apr-19 12:52	1
PFOSA	754-91-6	ND	1.42	2.07	4.14		B9D0161	24-Apr-19	0.242 L	28-Apr-19 12:52	1
PFOS	1763-23-1	1.90	1.42	2.07	4.14	J, Q	B9D0161	24-Apr-19	0.242 L	28-Apr-19 12:52	1
PFDA	335-76-2	ND	1.42	2.07	4.14		B9D0161	24-Apr-19	0.242 L	28-Apr-19 12:52	1
8:2 FTS	39108-34-4	ND	1.42	2.07	4.14		B9D0161	24-Apr-19	0.242 L	28-Apr-19 12:52	1
PFNS	68259-12-1	ND	2.00	2.07	4.14		B9D0161	24-Apr-19	0.242 L	28-Apr-19 12:52	1
MeFOSAA	2355-31-9	ND	1.42	2.07	4.14		B9D0161	24-Apr-19	0.242 L	28-Apr-19 12:52	1
EtFOSAA	2991-50-6	ND	1.42	2.07	4.14		B9D0161	24-Apr-19	0.242 L	28-Apr-19 12:52	1
PFUnA	2058-94-8	ND	1.42	2.07	4.14		B9D0161	24-Apr-19	0.242 L	28-Apr-19 12:52	1
PFDS	335-77-3	ND	1.42	2.07	4.14		B9D0161	24-Apr-19	0.242 L	28-Apr-19 12:52	1
PFDoA	307-55-1	ND	1.42	2.07	4.14		B9D0161	24-Apr-19	0.242 L	28-Apr-19 12:52	1
PFTTrDA	72629-94-8	ND	1.42	2.07	4.14		B9D0161	24-Apr-19	0.242 L	28-Apr-19 12:52	1
PFTeDA	376-06-7	ND	1.42	2.07	4.14		B9D0161	24-Apr-19	0.242 L	28-Apr-19 12:52	1

Labeled Standards	Type	% Recovery	Limits	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
13C3-PFBA	IS	97.9	60 - 130		B9D0161	24-Apr-19	0.242 L	28-Apr-19 12:52	1
13C3-PFPeA	IS	94.4	60 - 150		B9D0161	24-Apr-19	0.242 L	28-Apr-19 12:52	1
13C3-PFBS	IS	90.5	60 - 150		B9D0161	24-Apr-19	0.242 L	28-Apr-19 12:52	1
13C2-4:2 FTS	IS	87.4	20 - 150		B9D0161	24-Apr-19	0.242 L	28-Apr-19 12:52	1
13C2-PFHxA	IS	92.0	70 - 130		B9D0161	24-Apr-19	0.242 L	28-Apr-19 12:52	1
13C4-PFHpA	IS	96.2	60 - 150		B9D0161	24-Apr-19	0.242 L	28-Apr-19 12:52	1
13C3-PFHxS	IS	89.0	60 - 130		B9D0161	24-Apr-19	0.242 L	28-Apr-19 12:52	1
13C2-6:2 FTS	IS	101	40 - 150		B9D0161	24-Apr-19	0.242 L	28-Apr-19 12:52	1
13C2-PFOA	IS	92.8	60 - 130		B9D0161	24-Apr-19	0.242 L	28-Apr-19 12:52	1
13C5-PFNA	IS	91.0	50 - 130		B9D0161	24-Apr-19	0.242 L	28-Apr-19 12:52	1
13C8-PFOSA	IS	33.6	20 - 150		B9D0161	24-Apr-19	0.242 L	28-Apr-19 12:52	1
13C8-PFOS	IS	83.2	60 - 130		B9D0161	24-Apr-19	0.242 L	28-Apr-19 12:52	1
13C2-PFDA	IS	65.2	60 - 130		B9D0161	24-Apr-19	0.242 L	28-Apr-19 12:52	1

**Sample ID: PEW021904111210RL** **PFAS Isotope Dilution Method**

Client Data				Laboratory Data			
Name:	Merit Laboratories, Inc.	Matrix:	Aqueous	Lab Sample:	1900761-07	Column:	BEH C18
Project:	Statewide WWTP Biosolids PFAS Evaluation	Date Collected:	11-Apr-19 12:10	Date Received:	16-Apr-19 09:58		
Location:	WIXO-03N06E04-JW01						

Labeled Standards	Type	% Recovery	Limits	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
13C2-8:2 FTS	IS	77.4	40 - 150		B9D0161	24-Apr-19	0.242 L	28-Apr-19 12:52	1
d3-MeFOSAA	IS	54.0	50 - 150		B9D0161	24-Apr-19	0.242 L	28-Apr-19 12:52	1
d5-EtFOSAA	IS	55.2	50 - 150		B9D0161	24-Apr-19	0.242 L	28-Apr-19 12:52	1
13C2-PFUnA	IS	52.5	60 - 130	H	B9D0161	24-Apr-19	0.242 L	28-Apr-19 12:52	1
13C2-PFDoA	IS	45.8	30 - 130		B9D0161	24-Apr-19	0.242 L	28-Apr-19 12:52	1
13C2-PFTeDA	IS	54.3	20 - 150		B9D0161	24-Apr-19	0.242 L	28-Apr-19 12:52	1

DL - Detection Limit

LOD - Limit of Detection  
LOQ - Limit of quantitation

Results reported to the DL.

When reported, PFHxS, PFOA, PFOS, MeFOSAA and EtFOSAA include both linear and branched isomers. Only the linear isomer is reported for all other analytes.

**Sample ID: SW011904111220RL**

**PFAS Isotope Dilution Method**

Client Data				Laboratory Data			
Name:	Merit Laboratories, Inc.	Matrix:	Aqueous	Lab Sample:	1900761-09	Column:	BEH C18
Project:	Statewide WWTP Biosolids PFAS Evaluation	Date Collected:	11-Apr-19 12:20	Date Received:	16-Apr-19 09:58		
Location:	WIXO-03N06E04-JW01						

Analyte	CAS Number	Conc. (ng/L)	DL	LOD	LOQ	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
PFBA	375-22-4	5.29	1.49	2.17	4.34		B9D0161	24-Apr-19	0.230 L	28-Apr-19 13:03	1
PFPeA	2706-90-3	2.20	1.49	2.17	4.34	J	B9D0161	24-Apr-19	0.230 L	28-Apr-19 13:03	1
PFBS	375-73-5	ND	1.49	2.17	4.34		B9D0161	24-Apr-19	0.230 L	28-Apr-19 13:03	1
4:2 FTS	757124-72-4	ND	1.49	2.17	4.34		B9D0161	24-Apr-19	0.230 L	28-Apr-19 13:03	1
PFHxA	307-24-4	1.94	1.49	2.17	4.34	J	B9D0161	24-Apr-19	0.230 L	28-Apr-19 13:03	1
PFPeS	2706-91-4	ND	1.49	2.17	4.34		B9D0161	24-Apr-19	0.230 L	28-Apr-19 13:03	1
PFHpA	375-85-9	ND	1.49	2.17	4.34		B9D0161	24-Apr-19	0.230 L	28-Apr-19 13:03	1
PFHxS	355-46-4	ND	1.49	2.17	4.34		B9D0161	24-Apr-19	0.230 L	28-Apr-19 13:03	1
6:2 FTS	27619-97-2	ND	1.49	2.17	4.34		B9D0161	24-Apr-19	0.230 L	28-Apr-19 13:03	1
PFOA	335-67-1	ND	1.49	2.17	4.34		B9D0161	24-Apr-19	0.230 L	28-Apr-19 13:03	1
PFHpS	375-92-8	ND	1.49	2.17	4.34		B9D0161	24-Apr-19	0.230 L	28-Apr-19 13:03	1
PFNA	375-95-1	ND	1.49	2.17	4.34		B9D0161	24-Apr-19	0.230 L	28-Apr-19 13:03	1
PFOSA	754-91-6	ND	1.49	2.17	4.34		B9D0161	24-Apr-19	0.230 L	28-Apr-19 13:03	1
PFOS	1763-23-1	ND	1.49	2.17	4.34		B9D0161	24-Apr-19	0.230 L	28-Apr-19 13:03	1
PFDA	335-76-2	ND	1.49	2.17	4.34		B9D0161	24-Apr-19	0.230 L	28-Apr-19 13:03	1
8:2 FTS	39108-34-4	ND	1.49	2.17	4.34		B9D0161	24-Apr-19	0.230 L	28-Apr-19 13:03	1
PFNS	68259-12-1	ND	2.10	2.17	4.34		B9D0161	24-Apr-19	0.230 L	28-Apr-19 13:03	1
MeFOSAA	2355-31-9	ND	1.49	2.17	4.34		B9D0161	24-Apr-19	0.230 L	28-Apr-19 13:03	1
EtFOSAA	2991-50-6	ND	1.49	2.17	4.34		B9D0161	24-Apr-19	0.230 L	28-Apr-19 13:03	1
PFOA	2058-94-8	ND	1.49	2.17	4.34		B9D0161	24-Apr-19	0.230 L	28-Apr-19 13:03	1
PFDS	335-77-3	ND	1.49	2.17	4.34		B9D0161	24-Apr-19	0.230 L	28-Apr-19 13:03	1
PFDoA	307-55-1	ND	1.49	2.17	4.34		B9D0161	24-Apr-19	0.230 L	28-Apr-19 13:03	1
PFTTrDA	72629-94-8	ND	1.49	2.17	4.34		B9D0161	24-Apr-19	0.230 L	28-Apr-19 13:03	1
PFTTeDA	376-06-7	ND	1.49	2.17	4.34		B9D0161	24-Apr-19	0.230 L	28-Apr-19 13:03	1

Labeled Standards	Type	% Recovery	Limits	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
13C3-PFBA	IS	98.0	60 - 130		B9D0161	24-Apr-19	0.230 L	28-Apr-19 13:03	1
13C3-PFPeA	IS	100	60 - 150		B9D0161	24-Apr-19	0.230 L	28-Apr-19 13:03	1
13C3-PFBS	IS	101	60 - 150		B9D0161	24-Apr-19	0.230 L	28-Apr-19 13:03	1
13C2-4:2 FTS	IS	98.2	20 - 150		B9D0161	24-Apr-19	0.230 L	28-Apr-19 13:03	1
13C2-PFHxA	IS	96.2	70 - 130		B9D0161	24-Apr-19	0.230 L	28-Apr-19 13:03	1
13C4-PFHpA	IS	104	60 - 150		B9D0161	24-Apr-19	0.230 L	28-Apr-19 13:03	1
13C3-PFHxS	IS	104	60 - 130		B9D0161	24-Apr-19	0.230 L	28-Apr-19 13:03	1
13C2-6:2 FTS	IS	93.6	40 - 150		B9D0161	24-Apr-19	0.230 L	28-Apr-19 13:03	1
13C2-PFOA	IS	85.3	60 - 130		B9D0161	24-Apr-19	0.230 L	28-Apr-19 13:03	1
13C5-PFNA	IS	91.5	50 - 130		B9D0161	24-Apr-19	0.230 L	28-Apr-19 13:03	1
13C8-PFOSA	IS	46.1	20 - 150		B9D0161	24-Apr-19	0.230 L	28-Apr-19 13:03	1
13C8-PFOS	IS	89.8	60 - 130		B9D0161	24-Apr-19	0.230 L	28-Apr-19 13:03	1
13C2-PFDA	IS	72.9	60 - 130		B9D0161	24-Apr-19	0.230 L	28-Apr-19 13:03	1

**Sample ID: SW011904111220RL** **PFAS Isotope Dilution Method**

Client Data	Laboratory Data
Name: Merit Laboratories, Inc.	Lab Sample: 1900761-09
Project: Statewide WWTP Biosolids PFAS Evaluation	Date Received: 16-Apr-19 09:58
Location: WIXO-03N06E04-JW01	Column: BEH C18
Matrix: Aqueous	
Date Collected: 11-Apr-19 12:20	

Labeled Standards	Type	% Recovery	Limits	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
13C2-8:2 FTS	IS	105	40 - 150		B9D0161	24-Apr-19	0.230 L	28-Apr-19 13:03	1
d3-MeFOSAA	IS	69.7	50 - 150		B9D0161	24-Apr-19	0.230 L	28-Apr-19 13:03	1
d5-EtFOSAA	IS	80.9	50 - 150		B9D0161	24-Apr-19	0.230 L	28-Apr-19 13:03	1
13C2-PFUnA	IS	76.5	60 - 130		B9D0161	24-Apr-19	0.230 L	28-Apr-19 13:03	1
13C2-PFDoA	IS	67.4	30 - 130		B9D0161	24-Apr-19	0.230 L	28-Apr-19 13:03	1
13C2-PFTeDA	IS	70.6	20 - 150		B9D0161	24-Apr-19	0.230 L	28-Apr-19 13:03	1

DL - Detection Limit

LOD - Limit of Detection  
LOQ - Limit of quantitation

Results reported to the DL.

When reported, PFHxS, PFOA, PFOS, MeFOSAA and EtFOSAA include both linear and branched isomers. Only the linear isomer is reported for all other analytes.

**Sample ID: TD011904111225RL**

**PFAS Isotope Dilution Method**

Client Data				Laboratory Data			
Name:	Merit Laboratories, Inc.	Matrix:	Aqueous	Lab Sample:	1900761-10	Column:	BEH C18
Project:	Statewide WWTP Biosolids PFAS Evaluation	Date Collected:	11-Apr-19 12:25	Date Received:	16-Apr-19 09:58		
Location:	WIXO-03N06E04-JW01						

Analyte	CAS Number	Conc. (ng/L)	DL	LOD	LOQ	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
PFBA	375-22-4	4.55	1.49	2.16	4.34		B9D0161	24-Apr-19	0.231 L	28-Apr-19 13:13	1
PFPeA	2706-90-3	4.24	1.49	2.16	4.34	J	B9D0161	24-Apr-19	0.231 L	28-Apr-19 13:13	1
PFBS	375-73-5	2.62	1.49	2.16	4.34	J	B9D0161	24-Apr-19	0.231 L	28-Apr-19 13:13	1
4:2 FTS	757124-72-4	ND	1.49	2.16	4.34		B9D0161	24-Apr-19	0.231 L	28-Apr-19 13:13	1
PFHxA	307-24-4	4.46	1.49	2.16	4.34		B9D0161	24-Apr-19	0.231 L	28-Apr-19 13:13	1
PFPeS	2706-91-4	ND	1.49	2.16	4.34		B9D0161	24-Apr-19	0.231 L	28-Apr-19 13:13	1
PFHpA	375-85-9	2.13	1.49	2.16	4.34	J	B9D0161	24-Apr-19	0.231 L	28-Apr-19 13:13	1
PFHxS	355-46-4	8.42	1.49	2.16	4.34		B9D0161	24-Apr-19	0.231 L	28-Apr-19 13:13	1
6:2 FTS	27619-97-2	ND	1.49	2.16	4.34		B9D0161	24-Apr-19	0.231 L	28-Apr-19 13:13	1
PFOA	335-67-1	5.98	1.49	2.16	4.34		B9D0161	24-Apr-19	0.231 L	28-Apr-19 13:13	1
PFHpS	375-92-8	ND	1.49	2.16	4.34		B9D0161	24-Apr-19	0.231 L	28-Apr-19 13:13	1
PFNA	375-95-1	ND	1.49	2.16	4.34		B9D0161	24-Apr-19	0.231 L	28-Apr-19 13:13	1
PFOSA	754-91-6	ND	1.49	2.16	4.34		B9D0161	24-Apr-19	0.231 L	28-Apr-19 13:13	1
PFOS	1763-23-1	17.6	1.49	2.16	4.34	Q	B9D0161	24-Apr-19	0.231 L	28-Apr-19 13:13	1
PFDA	335-76-2	ND	1.49	2.16	4.34		B9D0161	24-Apr-19	0.231 L	28-Apr-19 13:13	1
8:2 FTS	39108-34-4	ND	1.49	2.16	4.34		B9D0161	24-Apr-19	0.231 L	28-Apr-19 13:13	1
PFNS	68259-12-1	ND	2.10	2.16	4.34		B9D0161	24-Apr-19	0.231 L	28-Apr-19 13:13	1
MeFOSAA	2355-31-9	ND	1.49	2.16	4.34		B9D0161	24-Apr-19	0.231 L	28-Apr-19 13:13	1
EtFOSAA	2991-50-6	ND	1.49	2.16	4.34		B9D0161	24-Apr-19	0.231 L	28-Apr-19 13:13	1
PFOA	2058-94-8	ND	1.49	2.16	4.34		B9D0161	24-Apr-19	0.231 L	28-Apr-19 13:13	1
PFDS	335-77-3	ND	1.49	2.16	4.34		B9D0161	24-Apr-19	0.231 L	28-Apr-19 13:13	1
PFDoA	307-55-1	ND	1.49	2.16	4.34		B9D0161	24-Apr-19	0.231 L	28-Apr-19 13:13	1
PFTTrDA	72629-94-8	ND	1.49	2.16	4.34		B9D0161	24-Apr-19	0.231 L	28-Apr-19 13:13	1
PFTTeDA	376-06-7	ND	1.49	2.16	4.34		B9D0161	24-Apr-19	0.231 L	28-Apr-19 13:13	1

Labeled Standards	Type	% Recovery	Limits	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
13C3-PFBA	IS	99.6	60 - 130		B9D0161	24-Apr-19	0.231 L	28-Apr-19 13:13	1
13C3-PFPeA	IS	104	60 - 150		B9D0161	24-Apr-19	0.231 L	28-Apr-19 13:13	1
13C3-PFBS	IS	98.7	60 - 150		B9D0161	24-Apr-19	0.231 L	28-Apr-19 13:13	1
13C2-4:2 FTS	IS	95.5	20 - 150		B9D0161	24-Apr-19	0.231 L	28-Apr-19 13:13	1
13C2-PFHxA	IS	97.2	70 - 130		B9D0161	24-Apr-19	0.231 L	28-Apr-19 13:13	1
13C4-PFHpA	IS	102	60 - 150		B9D0161	24-Apr-19	0.231 L	28-Apr-19 13:13	1
13C3-PFHxS	IS	99.6	60 - 130		B9D0161	24-Apr-19	0.231 L	28-Apr-19 13:13	1
13C2-6:2 FTS	IS	88.5	40 - 150		B9D0161	24-Apr-19	0.231 L	28-Apr-19 13:13	1
13C2-PFOA	IS	96.5	60 - 130		B9D0161	24-Apr-19	0.231 L	28-Apr-19 13:13	1
13C5-PFNA	IS	95.7	50 - 130		B9D0161	24-Apr-19	0.231 L	28-Apr-19 13:13	1
13C8-PFOSA	IS	58.9	20 - 150		B9D0161	24-Apr-19	0.231 L	28-Apr-19 13:13	1
13C8-PFOS	IS	98.1	60 - 130		B9D0161	24-Apr-19	0.231 L	28-Apr-19 13:13	1
13C2-PFDA	IS	75.1	60 - 130		B9D0161	24-Apr-19	0.231 L	28-Apr-19 13:13	1

**Sample ID: TD011904111225RL** **PFAS Isotope Dilution Method**

Client Data	Laboratory Data
Name: Merit Laboratories, Inc.	Lab Sample: 1900761-10
Project: Statewide WWTP Biosolids PFAS Evaluation	Date Received: 16-Apr-19 09:58
Location: WIXO-03N06E04-JW01	Column: BEH C18
Matrix: Aqueous	
Date Collected: 11-Apr-19 12:25	

Labeled Standards	Type	% Recovery	Limits	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
13C2-8:2 FTS	IS	96.5	40 - 150		B9D0161	24-Apr-19	0.231 L	28-Apr-19 13:13	1
d3-MeFOSAA	IS	74.1	50 - 150		B9D0161	24-Apr-19	0.231 L	28-Apr-19 13:13	1
d5-EtFOSAA	IS	78.4	50 - 150		B9D0161	24-Apr-19	0.231 L	28-Apr-19 13:13	1
13C2-PFUnA	IS	74.5	60 - 130		B9D0161	24-Apr-19	0.231 L	28-Apr-19 13:13	1
13C2-PFDoA	IS	77.3	30 - 130		B9D0161	24-Apr-19	0.231 L	28-Apr-19 13:13	1
13C2-PFTeDA	IS	85.7	20 - 150		B9D0161	24-Apr-19	0.231 L	28-Apr-19 13:13	1

DL - Detection Limit

LOD - Limit of Detection  
LOQ - Limit of quantitation

Results reported to the DL.

When reported, PFHxS, PFOA, PFOS, MeFOSAA and EtFOSAA include both linear and branched isomers. Only the linear isomer is reported for all other analytes.



**Sample ID: Method Blank**
**VAL - PFAS**

Client Data					Laboratory Data						
Name:	Merit Laboratories, Inc.		Matrix:	Solid	Lab Sample:	B9D0170-BLK1		Column:	BEH C18		
Project:	Statewide WWTP Biosolids PFAS Evaluation										

Analyte	CAS Number	Conc. (ng/g)	DL	LOD	LOQ	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
PFBA	375-22-4	ND	0.845	1.00	2.00		B9D0170	01-May-19	1.00 g	04-May-19 18:01	1
PFPeA	2706-90-3	ND	0.845	1.00	2.00		B9D0170	01-May-19	1.00 g	04-May-19 18:01	1
PFBS	375-73-5	ND	0.845	1.00	2.00		B9D0170	01-May-19	1.00 g	04-May-19 18:01	1
4:2 FTS	757124-72-4	ND	0.845	1.00	2.00		B9D0170	01-May-19	1.00 g	04-May-19 18:01	1
PFHxA	307-24-4	ND	0.845	1.00	2.00		B9D0170	01-May-19	1.00 g	04-May-19 18:01	1
PFPeS	2706-91-4	ND	0.845	1.00	2.00		B9D0170	01-May-19	1.00 g	04-May-19 18:01	1
PFHpA	375-85-9	ND	0.845	1.00	2.00		B9D0170	01-May-19	1.00 g	04-May-19 18:01	1
PFHxS	355-46-4	ND	0.845	1.00	2.00		B9D0170	01-May-19	1.00 g	04-May-19 18:01	1
6:2 FTS	27619-97-2	ND	0.845	1.00	2.00		B9D0170	01-May-19	1.00 g	04-May-19 18:01	1
PFOA	335-67-1	ND	0.845	1.00	2.00		B9D0170	01-May-19	1.00 g	04-May-19 18:01	1
PFHpS	375-92-8	ND	0.845	1.00	2.00		B9D0170	01-May-19	1.00 g	04-May-19 18:01	1
PFNA	375-95-1	ND	0.845	1.00	2.00		B9D0170	01-May-19	1.00 g	04-May-19 18:01	1
PFOSA	754-91-6	ND	0.845	1.00	2.00		B9D0170	01-May-19	1.00 g	04-May-19 18:01	1
PFOS	1763-23-1	ND	0.845	1.00	2.00		B9D0170	01-May-19	1.00 g	04-May-19 18:01	1
PFDA	335-76-2	ND	0.845	1.00	2.00		B9D0170	01-May-19	1.00 g	04-May-19 18:01	1
8:2 FTS	39108-34-4	ND	0.845	1.00	2.00		B9D0170	01-May-19	1.00 g	04-May-19 18:01	1
PFNS	68259-12-1	ND	1.43	1.50	2.00		B9D0170	01-May-19	1.00 g	04-May-19 18:01	1
MeFOSAA	2355-31-9	ND	0.845	1.00	2.00		B9D0170	01-May-19	1.00 g	04-May-19 18:01	1
EtFOSAA	2991-50-6	ND	0.845	1.00	2.00		B9D0170	01-May-19	1.00 g	04-May-19 18:01	1
PFUnA	2058-94-8	ND	0.845	1.00	2.00		B9D0170	01-May-19	1.00 g	04-May-19 18:01	1
PFDS	335-77-3	ND	0.845	1.00	2.00		B9D0170	01-May-19	1.00 g	04-May-19 18:01	1
PFDoA	307-55-1	ND	0.845	1.00	2.00		B9D0170	01-May-19	1.00 g	04-May-19 18:01	1
PFTrDA	72629-94-8	ND	0.845	1.00	2.00		B9D0170	01-May-19	1.00 g	04-May-19 18:01	1
PFTeDA	376-06-7	ND	0.845	1.00	2.00		B9D0170	01-May-19	1.00 g	04-May-19 18:01	1

Labeled Standards	Type	% Recovery	Limits	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
13C3-PFBA	IS	89.7	60 - 130		B9D0170	01-May-19	1.00 g	04-May-19 18:01	1
13C3-PFPeA	IS	94.7	60 - 150		B9D0170	01-May-19	1.00 g	04-May-19 18:01	1
13C3-PFBS	IS	87.4	60 - 150		B9D0170	01-May-19	1.00 g	04-May-19 18:01	1
13C2-4:2 FTS	IS	94.4	40 - 150		B9D0170	01-May-19	1.00 g	04-May-19 18:01	1
13C2-PFHxA	IS	90.8	70 - 130		B9D0170	01-May-19	1.00 g	04-May-19 18:01	1
13C4-PFHpA	IS	96.6	60 - 150		B9D0170	01-May-19	1.00 g	04-May-19 18:01	1
13C3-PFHxS	IS	98.1	60 - 130		B9D0170	01-May-19	1.00 g	04-May-19 18:01	1
13C2-6:2 FTS	IS	102	40 - 150		B9D0170	01-May-19	1.00 g	04-May-19 18:01	1
13C2-PFOA	IS	82.4	60 - 130		B9D0170	01-May-19	1.00 g	04-May-19 18:01	1
13C5-PFNA	IS	83.6	50 - 130		B9D0170	01-May-19	1.00 g	04-May-19 18:01	1
13C8-PFOSA	IS	38.2	20 - 150		B9D0170	01-May-19	1.00 g	04-May-19 18:01	1
13C8-PFOS	IS	87.9	60 - 130		B9D0170	01-May-19	1.00 g	04-May-19 18:01	1
13C2-PFDA	IS	68.5	60 - 130		B9D0170	01-May-19	1.00 g	04-May-19 18:01	1

**Sample ID: Method Blank** **VAL - PFAS**

<b>Client Data</b>	<b>Laboratory Data</b>
Name: Merit Laboratories, Inc.      Matrix: Solid	Lab Sample: B9D0170-BLK1      Column: BEH C18
Project: Statewide WWTP Biosolids PFAS Evaluation	

Labeled Standards	Type	% Recovery	Limits	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
13C2-8:2 FTS	IS	92.3	40 - 150		B9D0170	01-May-19	1.00 g	04-May-19 18:01	1
d3-MeFOSAA	IS	48.0	50 - 150	H	B9D0170	01-May-19	1.00 g	04-May-19 18:01	1
d5-EtFOSAA	IS	45.0	50 - 150	H	B9D0170	01-May-19	1.00 g	04-May-19 18:01	1
13C2-PFUnA	IS	55.6	60 - 130	H	B9D0170	01-May-19	1.00 g	04-May-19 18:01	1
13C2-PFDoA	IS	58.5	30 - 130		B9D0170	01-May-19	1.00 g	04-May-19 18:01	1
13C2-PFTeDA	IS	62.4	20 - 150		B9D0170	01-May-19	1.00 g	04-May-19 18:01	1

DL - Detection Limit

LOD - Limit of Detection  
LOQ - Limit of quantitation

The results are reported in dry weight.  
The sample size is reported in wet weight.  
Results reported to the DL.

When reported, PFHxS, PFOA, PFOS, MeFOSAA and EtFOSAA include both linear and branched isomers. Only the linear isomer is reported for all other analytes.

**Sample ID: OPR**

**VAL - PFAS**

Client Data					Laboratory Data						
Name:	Merit Laboratories, Inc.		Matrix:	Solid	Lab Sample:	B9D0170-BS1	Column:	BEH C18			
Project:	Statewide WWTP Biosolids PFAS Evaluation										

Analyte	CAS Number	Amt Found (ng/g)	Spike Amt	% Rec	Limits	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
PFBA	375-22-4	9.64	10.0	96.4	70 - 130		B9D0170	01-May-19	1.00 g	04-May-19 17:50	1
PFPeA	2706-90-3	9.22	10.0	92.2	70 - 130		B9D0170	01-May-19	1.00 g	04-May-19 17:50	1
PFBS	375-73-5	9.26	10.0	92.6	70 - 130		B9D0170	01-May-19	1.00 g	04-May-19 17:50	1
4:2 FTS	757124-72-4	11.0	10.0	110	70 - 130		B9D0170	01-May-19	1.00 g	04-May-19 17:50	1
PFHxA	307-24-4	10.2	10.0	102	70 - 130		B9D0170	01-May-19	1.00 g	04-May-19 17:50	1
PFPeS	2706-91-4	10.4	10.0	104	70 - 130		B9D0170	01-May-19	1.00 g	04-May-19 17:50	1
PFHpA	375-85-9	9.36	10.0	93.6	70 - 130		B9D0170	01-May-19	1.00 g	04-May-19 17:50	1
PFHxS	355-46-4	9.58	10.0	95.8	70 - 130		B9D0170	01-May-19	1.00 g	04-May-19 17:50	1
6:2 FTS	27619-97-2	10.8	10.0	108	60 - 130		B9D0170	01-May-19	1.00 g	04-May-19 17:50	1
PFOA	335-67-1	9.00	10.0	90.0	70 - 130		B9D0170	01-May-19	1.00 g	04-May-19 17:50	1
PFHpS	375-92-8	10.6	10.0	106	60 - 130		B9D0170	01-May-19	1.00 g	04-May-19 17:50	1
PFNA	375-95-1	10.4	10.0	104	70 - 130		B9D0170	01-May-19	1.00 g	04-May-19 17:50	1
PFOSA	754-91-6	10.2	10.0	102	70 - 130		B9D0170	01-May-19	1.00 g	04-May-19 17:50	1
PFOS	1763-23-1	9.49	10.0	94.9	70 - 130		B9D0170	01-May-19	1.00 g	04-May-19 17:50	1
PFDA	335-76-2	10.6	10.0	106	70 - 130		B9D0170	01-May-19	1.00 g	04-May-19 17:50	1
8:2 FTS	39108-34-4	11.3	10.0	113	60 - 130		B9D0170	01-May-19	1.00 g	04-May-19 17:50	1
PFNS	68259-12-1	9.35	10.0	93.5	70 - 130		B9D0170	01-May-19	1.00 g	04-May-19 17:50	1
MeFOSAA	2355-31-9	10.5	10.0	105	70 - 130		B9D0170	01-May-19	1.00 g	04-May-19 17:50	1
EtFOSAA	2991-50-6	10.1	10.0	101	70 - 130		B9D0170	01-May-19	1.00 g	04-May-19 17:50	1
PFUnA	2058-94-8	9.54	10.0	95.4	70 - 130		B9D0170	01-May-19	1.00 g	04-May-19 17:50	1
PFDS	335-77-3	8.77	10.0	87.7	60 - 130		B9D0170	01-May-19	1.00 g	04-May-19 17:50	1
PFDoA	307-55-1	9.51	10.0	95.1	70 - 130		B9D0170	01-May-19	1.00 g	04-May-19 17:50	1
PFTTrDA	72629-94-8	11.1	10.0	111	60 - 130		B9D0170	01-May-19	1.00 g	04-May-19 17:50	1
PFTeDA	376-06-7	10.1	10.0	101	70 - 130		B9D0170	01-May-19	1.00 g	04-May-19 17:50	1

Labeled Standards	Type	% Rec	Limits	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
13C3-PFBA	IS	94.0	60- 130		B9D0170	01-May-19	1.00 g	04-May-19 17:50	1
13C3-PFPeA	IS	93.0	60- 150		B9D0170	01-May-19	1.00 g	04-May-19 17:50	1
13C3-PFBS	IS	92.4	60- 150		B9D0170	01-May-19	1.00 g	04-May-19 17:50	1
13C2-4:2 FTS	IS	86.8	40- 150		B9D0170	01-May-19	1.00 g	04-May-19 17:50	1
13C2-PFHxA	IS	88.7	70- 130		B9D0170	01-May-19	1.00 g	04-May-19 17:50	1
13C4-PFHpA	IS	96.8	60- 150		B9D0170	01-May-19	1.00 g	04-May-19 17:50	1
13C3-PFHxS	IS	89.3	60- 130		B9D0170	01-May-19	1.00 g	04-May-19 17:50	1
13C2-6:2 FTS	IS	97.9	40- 150		B9D0170	01-May-19	1.00 g	04-May-19 17:50	1
13C2-PFOA	IS	87.7	60- 130		B9D0170	01-May-19	1.00 g	04-May-19 17:50	1
13C5-PFNA	IS	76.2	50- 130		B9D0170	01-May-19	1.00 g	04-May-19 17:50	1

**Sample ID: OPR**

**VAL - PFAS**

Client Data				Laboratory Data			
Name:	Merit Laboratories, Inc.	Matrix:	Solid	Lab Sample:	B9D0170-BS1	Column:	BEH C18
Project:	Statewide WWTP Biosolids PFAS Evaluation						

Labeled Standards	Type	% Rec	Limits	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
13C8-PFOA	IS	41.2	20- 150		B9D0170	01-May-19	1.00 g	04-May-19 17:50	1
13C8-PFOS	IS	88.4	60- 130		B9D0170	01-May-19	1.00 g	04-May-19 17:50	1
13C2-PFDA	IS	67.4	60- 130		B9D0170	01-May-19	1.00 g	04-May-19 17:50	1
13C2-8:2 FTS	IS	87.2	40- 150		B9D0170	01-May-19	1.00 g	04-May-19 17:50	1
d3-MeFOSAA	IS	50.5	50- 150		B9D0170	01-May-19	1.00 g	04-May-19 17:50	1
d5-EtFOSAA	IS	48.2	50- 150	H	B9D0170	01-May-19	1.00 g	04-May-19 17:50	1
13C2-PFUnA	IS	58.7	60- 130	H	B9D0170	01-May-19	1.00 g	04-May-19 17:50	1
13C2-PFDoA	IS	64.5	30- 130		B9D0170	01-May-19	1.00 g	04-May-19 17:50	1
13C2-PFTeDA	IS	62.6	20- 150		B9D0170	01-May-19	1.00 g	04-May-19 17:50	1

**Sample ID: SXDU21904110945MK**

**VAL - PFAS**

Client Data				Laboratory Data			
Name:	Merit Laboratories, Inc.	Matrix:	Soil	Lab Sample:	1900761-02	Column:	BEH C18
Project:	Statewide WWTP Biosolids PFAS Evaluation	Date Collected:	11-Apr-19 09:45	Date Received:	16-Apr-19 09:58		
Location:	WIXO-03N06E04-JW05			% Solids:	79.5		

Analyte	CAS Number	Conc. (ng/g)	DL	LOD	LOQ	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
PFBA	375-22-4	ND	0.818	0.968	1.94		B9D0170	01-May-19	1.30 g	04-May-19 19:47	1
PFPeA	2706-90-3	ND	0.818	0.968	1.94		B9D0170	01-May-19	1.30 g	04-May-19 19:47	1
PFBS	375-73-5	ND	0.818	0.968	1.94		B9D0170	01-May-19	1.30 g	04-May-19 19:47	1
4:2 FTS	757124-72-4	ND	0.818	0.968	1.94		B9D0170	01-May-19	1.30 g	04-May-19 19:47	1
PFHxA	307-24-4	ND	0.818	0.968	1.94		B9D0170	01-May-19	1.30 g	04-May-19 19:47	1
PFPeS	2706-91-4	ND	0.818	0.968	1.94		B9D0170	01-May-19	1.30 g	04-May-19 19:47	1
PFHpA	375-85-9	ND	0.818	0.968	1.94		B9D0170	01-May-19	1.30 g	04-May-19 19:47	1
PFHxS	355-46-4	ND	0.818	0.968	1.94		B9D0170	01-May-19	1.30 g	04-May-19 19:47	1
6:2 FTS	27619-97-2	ND	0.818	0.968	1.94		B9D0170	01-May-19	1.30 g	04-May-19 19:47	1
PFOA	335-67-1	ND	0.818	0.968	1.94		B9D0170	01-May-19	1.30 g	04-May-19 19:47	1
PFHpS	375-92-8	ND	0.818	0.968	1.94		B9D0170	01-May-19	1.30 g	04-May-19 19:47	1
PFNA	375-95-1	ND	0.818	0.968	1.94		B9D0170	01-May-19	1.30 g	04-May-19 19:47	1
PFOSA	754-91-6	ND	0.818	0.968	1.94		B9D0170	01-May-19	1.30 g	04-May-19 19:47	1
PFOS	1763-23-1	2.48	0.818	0.968	1.94	Q	B9D0170	01-May-19	1.30 g	04-May-19 19:47	1
PFDA	335-76-2	ND	0.818	0.968	1.94		B9D0170	01-May-19	1.30 g	04-May-19 19:47	1
8:2 FTS	39108-34-4	ND	0.818	0.968	1.94		B9D0170	01-May-19	1.30 g	04-May-19 19:47	1
PFNS	68259-12-1	ND	1.38	1.45	1.94		B9D0170	01-May-19	1.30 g	04-May-19 19:47	1
MeFOSAA	2355-31-9	ND	0.818	0.968	1.94		B9D0170	01-May-19	1.30 g	04-May-19 19:47	1
EtFOSAA	2991-50-6	ND	0.818	0.968	1.94		B9D0170	01-May-19	1.30 g	04-May-19 19:47	1
PFOA	2058-94-8	ND	0.818	0.968	1.94		B9D0170	01-May-19	1.30 g	04-May-19 19:47	1
PFDS	335-77-3	ND	0.818	0.968	1.94		B9D0170	01-May-19	1.30 g	04-May-19 19:47	1
PFDoA	307-55-1	ND	0.818	0.968	1.94		B9D0170	01-May-19	1.30 g	04-May-19 19:47	1
PFTTrDA	72629-94-8	ND	0.818	0.968	1.94		B9D0170	01-May-19	1.30 g	04-May-19 19:47	1
PFTeDA	376-06-7	ND	0.818	0.968	1.94		B9D0170	01-May-19	1.30 g	04-May-19 19:47	1

Labeled Standards	Type	% Recovery	Limits	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
13C3-PFBA	IS	90.0	60 - 130		B9D0170	01-May-19	1.30 g	04-May-19 19:47	1
13C3-PFPeA	IS	90.7	60 - 150		B9D0170	01-May-19	1.30 g	04-May-19 19:47	1
13C3-PFBS	IS	92.8	60 - 150		B9D0170	01-May-19	1.30 g	04-May-19 19:47	1
13C2-4:2 FTS	IS	104	40 - 150		B9D0170	01-May-19	1.30 g	04-May-19 19:47	1
13C2-PFHxA	IS	91.7	70 - 130		B9D0170	01-May-19	1.30 g	04-May-19 19:47	1
13C4-PFHpA	IS	95.6	60 - 150		B9D0170	01-May-19	1.30 g	04-May-19 19:47	1
13C3-PFHxS	IS	88.5	60 - 130		B9D0170	01-May-19	1.30 g	04-May-19 19:47	1
13C2-6:2 FTS	IS	101	40 - 150		B9D0170	01-May-19	1.30 g	04-May-19 19:47	1
13C2-PFOA	IS	86.6	60 - 130		B9D0170	01-May-19	1.30 g	04-May-19 19:47	1
13C5-PFNA	IS	76.6	50 - 130		B9D0170	01-May-19	1.30 g	04-May-19 19:47	1
13C8-PFOSA	IS	46.9	20 - 150		B9D0170	01-May-19	1.30 g	04-May-19 19:47	1
13C8-PFOS	IS	84.3	60 - 130		B9D0170	01-May-19	1.30 g	04-May-19 19:47	1
13C2-PFDA	IS	66.7	60 - 130		B9D0170	01-May-19	1.30 g	04-May-19 19:47	1

**Sample ID: SXDU21904110945MK** **VAL - PFAS**

Client Data	Laboratory Data
Name: Merit Laboratories, Inc.	Matrix: Soil
Project: Statewide WWTP Biosolids PFAS Evaluation	Date Collected: 11-Apr-19 09:45
Location: WIXO-03N06E04-JW05	Lab Sample: 1900761-02
	Date Received: 16-Apr-19 09:58
	Column: BEH C18
	% Solids: 79.5

Labeled Standards	Type	% Recovery	Limits	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
13C2-8:2 FTS	IS	87.4	40 - 150		B9D0170	01-May-19	1.30 g	04-May-19 19:47	1
d3-MeFOSAA	IS	63.8	50 - 150		B9D0170	01-May-19	1.30 g	04-May-19 19:47	1
d5-EtFOSAA	IS	65.9	50 - 150		B9D0170	01-May-19	1.30 g	04-May-19 19:47	1
13C2-PFUnA	IS	64.5	60 - 130		B9D0170	01-May-19	1.30 g	04-May-19 19:47	1
13C2-PFDoA	IS	71.2	30 - 130		B9D0170	01-May-19	1.30 g	04-May-19 19:47	1
13C2-PFTeDA	IS	66.5	20 - 150		B9D0170	01-May-19	1.30 g	04-May-19 19:47	1

DL - Detection Limit

LOD - Limit of Detection  
LOQ - Limit of quantitation

The results are reported in dry weight.  
The sample size is reported in wet weight.  
Results reported to the DL.

When reported, PFHxS, PFOA, PFOS, MeFOSAA and EtFOSAA include both linear and branched isomers. Only the linear isomer is reported for all other analytes.

**Sample ID: SXDU11904111040MK**

**VAL - PFAS**

Client Data				Laboratory Data			
Name:	Merit Laboratories, Inc.	Matrix:	Soil	Lab Sample:	1900761-04	Column:	BEH C18
Project:	Statewide WWTP Biosolids PFAS Evaluation	Date Collected:	11-Apr-19 10:40	Date Received:	16-Apr-19 09:58		
Location:	WIXO-03N06E04-JW05			% Solids:	81.5		

Analyte	CAS Number	Conc. (ng/g)	DL	LOD	LOQ	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
PFBA	375-22-4	ND	0.816	0.966	1.93		B9D0170	01-May-19	1.27 g	04-May-19 19:57	1
PFPeA	2706-90-3	ND	0.816	0.966	1.93		B9D0170	01-May-19	1.27 g	04-May-19 19:57	1
PFBS	375-73-5	ND	0.816	0.966	1.93		B9D0170	01-May-19	1.27 g	04-May-19 19:57	1
4:2 FTS	757124-72-4	ND	0.816	0.966	1.93		B9D0170	01-May-19	1.27 g	04-May-19 19:57	1
PFHxA	307-24-4	ND	0.816	0.966	1.93		B9D0170	01-May-19	1.27 g	04-May-19 19:57	1
PFPeS	2706-91-4	ND	0.816	0.966	1.93		B9D0170	01-May-19	1.27 g	04-May-19 19:57	1
PFHpA	375-85-9	ND	0.816	0.966	1.93		B9D0170	01-May-19	1.27 g	04-May-19 19:57	1
PFHxS	355-46-4	ND	0.816	0.966	1.93		B9D0170	01-May-19	1.27 g	04-May-19 19:57	1
6:2 FTS	27619-97-2	ND	0.816	0.966	1.93		B9D0170	01-May-19	1.27 g	04-May-19 19:57	1
PFOA	335-67-1	ND	0.816	0.966	1.93		B9D0170	01-May-19	1.27 g	04-May-19 19:57	1
PFHpS	375-92-8	ND	0.816	0.966	1.93		B9D0170	01-May-19	1.27 g	04-May-19 19:57	1
PFNA	375-95-1	ND	0.816	0.966	1.93		B9D0170	01-May-19	1.27 g	04-May-19 19:57	1
PFOSA	754-91-6	ND	0.816	0.966	1.93		B9D0170	01-May-19	1.27 g	04-May-19 19:57	1
PFOS	1763-23-1	2.85	0.816	0.966	1.93	Q	B9D0170	01-May-19	1.27 g	04-May-19 19:57	1
PFDA	335-76-2	ND	0.816	0.966	1.93		B9D0170	01-May-19	1.27 g	04-May-19 19:57	1
8:2 FTS	39108-34-4	ND	0.816	0.966	1.93		B9D0170	01-May-19	1.27 g	04-May-19 19:57	1
PFNS	68259-12-1	ND	1.38	1.45	1.93		B9D0170	01-May-19	1.27 g	04-May-19 19:57	1
MeFOSAA	2355-31-9	ND	0.816	0.966	1.93		B9D0170	01-May-19	1.27 g	04-May-19 19:57	1
EtFOSAA	2991-50-6	ND	0.816	0.966	1.93		B9D0170	01-May-19	1.27 g	04-May-19 19:57	1
PFUnA	2058-94-8	ND	0.816	0.966	1.93		B9D0170	01-May-19	1.27 g	04-May-19 19:57	1
PFDS	335-77-3	0.896	0.816	0.966	1.93	J	B9D0170	01-May-19	1.27 g	04-May-19 19:57	1
PFDoA	307-55-1	ND	0.816	0.966	1.93		B9D0170	01-May-19	1.27 g	04-May-19 19:57	1
PFTrDA	72629-94-8	ND	0.816	0.966	1.93		B9D0170	01-May-19	1.27 g	04-May-19 19:57	1
PFTeDA	376-06-7	ND	0.816	0.966	1.93		B9D0170	01-May-19	1.27 g	04-May-19 19:57	1

Labeled Standards	Type	% Recovery	Limits	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
13C3-PFBA	IS	87.7	60 - 130		B9D0170	01-May-19	1.27 g	04-May-19 19:57	1
13C3-PFPeA	IS	90.3	60 - 150		B9D0170	01-May-19	1.27 g	04-May-19 19:57	1
13C3-PFBS	IS	98.3	60 - 150		B9D0170	01-May-19	1.27 g	04-May-19 19:57	1
13C2-4:2 FTS	IS	123	40 - 150		B9D0170	01-May-19	1.27 g	04-May-19 19:57	1
13C2-PFHxA	IS	88.8	70 - 130		B9D0170	01-May-19	1.27 g	04-May-19 19:57	1
13C4-PFHpA	IS	93.6	60 - 150		B9D0170	01-May-19	1.27 g	04-May-19 19:57	1
13C3-PFHxS	IS	93.4	60 - 130		B9D0170	01-May-19	1.27 g	04-May-19 19:57	1
13C2-6:2 FTS	IS	116	40 - 150		B9D0170	01-May-19	1.27 g	04-May-19 19:57	1
13C2-PFOA	IS	87.9	60 - 130		B9D0170	01-May-19	1.27 g	04-May-19 19:57	1
13C5-PFNA	IS	80.0	50 - 130		B9D0170	01-May-19	1.27 g	04-May-19 19:57	1
13C8-PFOSA	IS	42.2	20 - 150		B9D0170	01-May-19	1.27 g	04-May-19 19:57	1
13C8-PFOS	IS	91.3	60 - 130		B9D0170	01-May-19	1.27 g	04-May-19 19:57	1
13C2-PFDA	IS	64.6	60 - 130		B9D0170	01-May-19	1.27 g	04-May-19 19:57	1

**Sample ID: SXDU11904111040MK** **VAL - PFAS**

Client Data	Laboratory Data
Name: Merit Laboratories, Inc.	Matrix: Soil
Project: Statewide WWTP Biosolids PFAS Evaluation	Date Collected: 11-Apr-19 10:40
Location: WIXO-03N06E04-JW05	Lab Sample: 1900761-04
	Date Received: 16-Apr-19 09:58
	Column: BEH C18
	% Solids: 81.5

Labeled Standards	Type	% Recovery	Limits	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
13C2-8:2 FTS	IS	104	40 - 150		B9D0170	01-May-19	1.27 g	04-May-19 19:57	1
d3-MeFOSAA	IS	61.2	50 - 150		B9D0170	01-May-19	1.27 g	04-May-19 19:57	1
d5-EtFOSAA	IS	55.1	50 - 150		B9D0170	01-May-19	1.27 g	04-May-19 19:57	1
13C2-PFUnA	IS	68.0	60 - 130		B9D0170	01-May-19	1.27 g	04-May-19 19:57	1
13C2-PFDoA	IS	73.2	30 - 130		B9D0170	01-May-19	1.27 g	04-May-19 19:57	1
13C2-PFTeDA	IS	78.4	20 - 150		B9D0170	01-May-19	1.27 g	04-May-19 19:57	1

DL - Detection Limit

LOD - Limit of Detection  
LOQ - Limit of quantitation

The results are reported in dry weight.  
The sample size is reported in wet weight.  
Results reported to the DL.

When reported, PFHxS, PFOA, PFOS, MeFOSAA and EtFOSAA include both linear and branched isomers. Only the linear isomer is reported for all other analytes.



**Sample ID: SXDU21904111125MK**

**VAL - PFAS**

Client Data				Laboratory Data			
Name:	Merit Laboratories, Inc.	Matrix:	Soil	Lab Sample:	1900761-05	Column:	BEH C18
Project:	Statewide WWTP Biosolids PFAS Evaluation	Date Collected:	11-Apr-19 11:25	Date Received:	16-Apr-19 09:58		
Location:	WIXO-03N06E04-JW01			% Solids:	85.1		

Analyte	CAS Number	Conc. (ng/g)	DL	LOD	LOQ	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
PFBA	375-22-4	ND	0.828	0.980	1.96		B9D0170	01-May-19	1.20 g	04-May-19 20:08	1
PFPeA	2706-90-3	ND	0.828	0.980	1.96		B9D0170	01-May-19	1.20 g	04-May-19 20:08	1
PFBS	375-73-5	ND	0.828	0.980	1.96		B9D0170	01-May-19	1.20 g	04-May-19 20:08	1
4:2 FTS	757124-72-4	ND	0.828	0.980	1.96		B9D0170	01-May-19	1.20 g	04-May-19 20:08	1
PFHxA	307-24-4	ND	0.828	0.980	1.96		B9D0170	01-May-19	1.20 g	04-May-19 20:08	1
PFPeS	2706-91-4	ND	0.828	0.980	1.96		B9D0170	01-May-19	1.20 g	04-May-19 20:08	1
PFHpA	375-85-9	ND	0.828	0.980	1.96		B9D0170	01-May-19	1.20 g	04-May-19 20:08	1
PFHxS	355-46-4	ND	0.828	0.980	1.96		B9D0170	01-May-19	1.20 g	04-May-19 20:08	1
6:2 FTS	27619-97-2	ND	0.828	0.980	1.96		B9D0170	01-May-19	1.20 g	04-May-19 20:08	1
PFOA	335-67-1	ND	0.828	0.980	1.96		B9D0170	01-May-19	1.20 g	04-May-19 20:08	1
PFHpS	375-92-8	ND	0.828	0.980	1.96		B9D0170	01-May-19	1.20 g	04-May-19 20:08	1
PFNA	375-95-1	ND	0.828	0.980	1.96		B9D0170	01-May-19	1.20 g	04-May-19 20:08	1
PFOSA	754-91-6	ND	0.828	0.980	1.96		B9D0170	01-May-19	1.20 g	04-May-19 20:08	1
PFOS	1763-23-1	4.18	0.828	0.980	1.96		B9D0170	01-May-19	1.20 g	04-May-19 20:08	1
PFDA	335-76-2	ND	0.828	0.980	1.96		B9D0170	01-May-19	1.20 g	04-May-19 20:08	1
8:2 FTS	39108-34-4	ND	0.828	0.980	1.96		B9D0170	01-May-19	1.20 g	04-May-19 20:08	1
PFNS	68259-12-1	ND	1.40	1.47	1.96		B9D0170	01-May-19	1.20 g	04-May-19 20:08	1
MeFOSAA	2355-31-9	ND	0.828	0.980	1.96		B9D0170	01-May-19	1.20 g	04-May-19 20:08	1
EtFOSAA	2991-50-6	ND	0.828	0.980	1.96		B9D0170	01-May-19	1.20 g	04-May-19 20:08	1
PFUnA	2058-94-8	ND	0.828	0.980	1.96		B9D0170	01-May-19	1.20 g	04-May-19 20:08	1
PFDS	335-77-3	2.00	0.828	0.980	1.96		B9D0170	01-May-19	1.20 g	04-May-19 20:08	1
PFDoA	307-55-1	ND	0.828	0.980	1.96		B9D0170	01-May-19	1.20 g	04-May-19 20:08	1
PFTrDA	72629-94-8	ND	0.828	0.980	1.96		B9D0170	01-May-19	1.20 g	04-May-19 20:08	1
PFTeDA	376-06-7	ND	0.828	0.980	1.96		B9D0170	01-May-19	1.20 g	04-May-19 20:08	1

Labeled Standards	Type	% Recovery	Limits	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
13C3-PFBA	IS	94.2	60 - 130		B9D0170	01-May-19	1.20 g	04-May-19 20:08	1
13C3-PFPeA	IS	93.0	60 - 150		B9D0170	01-May-19	1.20 g	04-May-19 20:08	1
13C3-PFBS	IS	94.3	60 - 150		B9D0170	01-May-19	1.20 g	04-May-19 20:08	1
13C2-4:2 FTS	IS	104	40 - 150		B9D0170	01-May-19	1.20 g	04-May-19 20:08	1
13C2-PFHxA	IS	93.7	70 - 130		B9D0170	01-May-19	1.20 g	04-May-19 20:08	1
13C4-PFHpA	IS	96.6	60 - 150		B9D0170	01-May-19	1.20 g	04-May-19 20:08	1
13C3-PFHxS	IS	92.9	60 - 130		B9D0170	01-May-19	1.20 g	04-May-19 20:08	1
13C2-6:2 FTS	IS	105	40 - 150		B9D0170	01-May-19	1.20 g	04-May-19 20:08	1
13C2-PFOA	IS	87.8	60 - 130		B9D0170	01-May-19	1.20 g	04-May-19 20:08	1
13C5-PFNA	IS	84.3	50 - 130		B9D0170	01-May-19	1.20 g	04-May-19 20:08	1
13C8-PFOSA	IS	51.4	20 - 150		B9D0170	01-May-19	1.20 g	04-May-19 20:08	1
13C8-PFOS	IS	93.2	60 - 130		B9D0170	01-May-19	1.20 g	04-May-19 20:08	1
13C2-PFDA	IS	76.8	60 - 130		B9D0170	01-May-19	1.20 g	04-May-19 20:08	1

**Sample ID: SXDU21904111125MK** **VAL - PFAS**

Client Data	Laboratory Data
Name: Merit Laboratories, Inc.	Matrix: Soil
Project: Statewide WWTP Biosolids PFAS Evaluation	Date Collected: 11-Apr-19 11:25
Location: WIXO-03N06E04-JW01	Lab Sample: 1900761-05
	Date Received: 16-Apr-19 09:58
	Column: BEH C18
	% Solids: 85.1

Labeled Standards	Type	% Recovery	Limits	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
13C2-8:2 FTS	IS	89.5	40 - 150		B9D0170	01-May-19	1.20 g	04-May-19 20:08	1
d3-MeFOSAA	IS	62.2	50 - 150		B9D0170	01-May-19	1.20 g	04-May-19 20:08	1
d5-EtFOSAA	IS	66.3	50 - 150		B9D0170	01-May-19	1.20 g	04-May-19 20:08	1
13C2-PFUnA	IS	76.6	60 - 130		B9D0170	01-May-19	1.20 g	04-May-19 20:08	1
13C2-PFDoA	IS	82.4	30 - 130		B9D0170	01-May-19	1.20 g	04-May-19 20:08	1
13C2-PFTeDA	IS	81.3	20 - 150		B9D0170	01-May-19	1.20 g	04-May-19 20:08	1

DL - Detection Limit

LOD - Limit of Detection  
LOQ - Limit of quantitation

The results are reported in dry weight.  
The sample size is reported in wet weight.  
Results reported to the DL.

When reported, PFHxS, PFOA, PFOS, MeFOSAA and EtFOSAA include both linear and branched isomers. Only the linear isomer is reported for all other analytes.

**Sample ID: SXDU21904111130MK-DUP**
**VAL - PFAS**

Client Data				Laboratory Data			
Name:	Merit Laboratories, Inc.	Matrix:	Soil	Lab Sample:	1900761-06	Column:	BEH C18
Project:	Statewide WWTP Biosolids PFAS Evaluation	Date Collected:	11-Apr-19 11:30	Date Received:	16-Apr-19 09:58		
Location:	WIXO-03N06E04-JW01			% Solids:	85.1		

Analyte	CAS Number	Conc. (ng/g)	DL	LOD	LOQ	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
PFBA	375-22-4	ND	0.849	1.00	2.01		B9D0170	01-May-19	1.17 g	04-May-19 20:18	1
PFPeA	2706-90-3	ND	0.849	1.00	2.01		B9D0170	01-May-19	1.17 g	04-May-19 20:18	1
PFBS	375-73-5	ND	0.849	1.00	2.01		B9D0170	01-May-19	1.17 g	04-May-19 20:18	1
4:2 FTS	757124-72-4	ND	0.849	1.00	2.01		B9D0170	01-May-19	1.17 g	04-May-19 20:18	1
PFHxA	307-24-4	ND	0.849	1.00	2.01		B9D0170	01-May-19	1.17 g	04-May-19 20:18	1
PFPeS	2706-91-4	ND	0.849	1.00	2.01		B9D0170	01-May-19	1.17 g	04-May-19 20:18	1
PFHpA	375-85-9	ND	0.849	1.00	2.01		B9D0170	01-May-19	1.17 g	04-May-19 20:18	1
PFHxS	355-46-4	ND	0.849	1.00	2.01		B9D0170	01-May-19	1.17 g	04-May-19 20:18	1
6:2 FTS	27619-97-2	ND	0.849	1.00	2.01		B9D0170	01-May-19	1.17 g	04-May-19 20:18	1
PFOA	335-67-1	ND	0.849	1.00	2.01		B9D0170	01-May-19	1.17 g	04-May-19 20:18	1
PFHpS	375-92-8	ND	0.849	1.00	2.01		B9D0170	01-May-19	1.17 g	04-May-19 20:18	1
PFNA	375-95-1	ND	0.849	1.00	2.01		B9D0170	01-May-19	1.17 g	04-May-19 20:18	1
PFOSA	754-91-6	ND	0.849	1.00	2.01		B9D0170	01-May-19	1.17 g	04-May-19 20:18	1
PFOS	1763-23-1	5.71	0.849	1.00	2.01	Q	B9D0170	01-May-19	1.17 g	04-May-19 20:18	1
PFDA	335-76-2	0.895	0.849	1.00	2.01	J	B9D0170	01-May-19	1.17 g	04-May-19 20:18	1
8:2 FTS	39108-34-4	ND	0.849	1.00	2.01		B9D0170	01-May-19	1.17 g	04-May-19 20:18	1
PFNS	68259-12-1	ND	1.44	1.51	2.01		B9D0170	01-May-19	1.17 g	04-May-19 20:18	1
MeFOSAA	2355-31-9	ND	0.849	1.00	2.01		B9D0170	01-May-19	1.17 g	04-May-19 20:18	1
EtFOSAA	2991-50-6	ND	0.849	1.00	2.01		B9D0170	01-May-19	1.17 g	04-May-19 20:18	1
PFUnA	2058-94-8	ND	0.849	1.00	2.01		B9D0170	01-May-19	1.17 g	04-May-19 20:18	1
PFDS	335-77-3	4.28	0.849	1.00	2.01		B9D0170	01-May-19	1.17 g	04-May-19 20:18	1
PFDoA	307-55-1	ND	0.849	1.00	2.01		B9D0170	01-May-19	1.17 g	04-May-19 20:18	1
PFTTrDA	72629-94-8	ND	0.849	1.00	2.01		B9D0170	01-May-19	1.17 g	04-May-19 20:18	1
PFTeDA	376-06-7	ND	0.849	1.00	2.01		B9D0170	01-May-19	1.17 g	04-May-19 20:18	1

Labeled Standards	Type	% Recovery	Limits	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
13C3-PFBA	IS	91.8	60 - 130		B9D0170	01-May-19	1.17 g	04-May-19 20:18	1
13C3-PFPeA	IS	91.8	60 - 150		B9D0170	01-May-19	1.17 g	04-May-19 20:18	1
13C3-PFBS	IS	95.1	60 - 150		B9D0170	01-May-19	1.17 g	04-May-19 20:18	1
13C2-4:2 FTS	IS	112	40 - 150		B9D0170	01-May-19	1.17 g	04-May-19 20:18	1
13C2-PFHxA	IS	89.5	70 - 130		B9D0170	01-May-19	1.17 g	04-May-19 20:18	1
13C4-PFHpA	IS	96.0	60 - 150		B9D0170	01-May-19	1.17 g	04-May-19 20:18	1
13C3-PFHxS	IS	91.3	60 - 130		B9D0170	01-May-19	1.17 g	04-May-19 20:18	1
13C2-6:2 FTS	IS	116	40 - 150		B9D0170	01-May-19	1.17 g	04-May-19 20:18	1
13C2-PFOA	IS	91.2	60 - 130		B9D0170	01-May-19	1.17 g	04-May-19 20:18	1
13C5-PFNA	IS	84.9	50 - 130		B9D0170	01-May-19	1.17 g	04-May-19 20:18	1
13C8-PFOSA	IS	61.7	20 - 150		B9D0170	01-May-19	1.17 g	04-May-19 20:18	1
13C8-PFOS	IS	92.0	60 - 130		B9D0170	01-May-19	1.17 g	04-May-19 20:18	1
13C2-PFDA	IS	72.0	60 - 130		B9D0170	01-May-19	1.17 g	04-May-19 20:18	1

**Sample ID: SXDU21904111130MK-DUP** **VAL - PFAS**

Client Data				Laboratory Data			
Name:	Merit Laboratories, Inc.	Matrix:	Soil	Lab Sample:	1900761-06	Column:	BEH C18
Project:	Statewide WWTP Biosolids PFAS Evaluation	Date Collected:	11-Apr-19 11:30	Date Received:	16-Apr-19 09:58		
Location:	WIXO-03N06E04-JW01			% Solids:	85.1		

Labeled Standards	Type	% Recovery	Limits	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
13C2-8:2 FTS	IS	106	40 - 150		B9D0170	01-May-19	1.17 g	04-May-19 20:18	1
d3-MeFOSAA	IS	70.6	50 - 150		B9D0170	01-May-19	1.17 g	04-May-19 20:18	1
d5-EtFOSAA	IS	75.3	50 - 150		B9D0170	01-May-19	1.17 g	04-May-19 20:18	1
13C2-PFUnA	IS	80.4	60 - 130		B9D0170	01-May-19	1.17 g	04-May-19 20:18	1
13C2-PFDoA	IS	75.6	30 - 130		B9D0170	01-May-19	1.17 g	04-May-19 20:18	1
13C2-PFTeDA	IS	84.5	20 - 150		B9D0170	01-May-19	1.17 g	04-May-19 20:18	1

DL - Detection Limit

LOD - Limit of Detection  
LOQ - Limit of quantitation

The results are reported in dry weight.  
The sample size is reported in wet weight.  
Results reported to the DL.

When reported, PFHxS, PFOA, PFOS, MeFOSAA and EtFOSAA include both linear and branched isomers. Only the linear isomer is reported for all other analytes.

**Sample ID: SXDU11904111220MK**

**VAL - PFAS**

Client Data					Laboratory Data						
Name:	Merit Laboratories, Inc.	Matrix:	Soil	Lab Sample:	1900761-08	Column:	BEH C18				
Project:	Statewide WWTP Biosolids PFAS Evaluation	Date Collected:	11-Apr-19 12:20	Date Received:	16-Apr-19 09:58						
Location:	WIXO-03N06E04-JW01				% Solids:	83.3					

Analyte	CAS Number	Conc. (ng/g)	DL	LOD	LOQ	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
PFBA	375-22-4	ND	0.825	0.976	1.95		B9D0170	01-May-19	1.23 g	04-May-19 20:29	1
PFPeA	2706-90-3	ND	0.825	0.976	1.95		B9D0170	01-May-19	1.23 g	04-May-19 20:29	1
PFBS	375-73-5	ND	0.825	0.976	1.95		B9D0170	01-May-19	1.23 g	04-May-19 20:29	1
4:2 FTS	757124-72-4	ND	0.825	0.976	1.95		B9D0170	01-May-19	1.23 g	04-May-19 20:29	1
PFHxA	307-24-4	ND	0.825	0.976	1.95		B9D0170	01-May-19	1.23 g	04-May-19 20:29	1
PFPeS	2706-91-4	ND	0.825	0.976	1.95		B9D0170	01-May-19	1.23 g	04-May-19 20:29	1
PFHpA	375-85-9	ND	0.825	0.976	1.95		B9D0170	01-May-19	1.23 g	04-May-19 20:29	1
PFHxS	355-46-4	ND	0.825	0.976	1.95		B9D0170	01-May-19	1.23 g	04-May-19 20:29	1
6:2 FTS	27619-97-2	ND	0.825	0.976	1.95		B9D0170	01-May-19	1.23 g	04-May-19 20:29	1
PFOA	335-67-1	ND	0.825	0.976	1.95		B9D0170	01-May-19	1.23 g	04-May-19 20:29	1
PFHpS	375-92-8	ND	0.825	0.976	1.95		B9D0170	01-May-19	1.23 g	04-May-19 20:29	1
PFNA	375-95-1	ND	0.825	0.976	1.95		B9D0170	01-May-19	1.23 g	04-May-19 20:29	1
PFOSA	754-91-6	ND	0.825	0.976	1.95		B9D0170	01-May-19	1.23 g	04-May-19 20:29	1
PFOS	1763-23-1	3.39	0.825	0.976	1.95	Q	B9D0170	01-May-19	1.23 g	04-May-19 20:29	1
PFDA	335-76-2	ND	0.825	0.976	1.95		B9D0170	01-May-19	1.23 g	04-May-19 20:29	1
8:2 FTS	39108-34-4	ND	0.825	0.976	1.95		B9D0170	01-May-19	1.23 g	04-May-19 20:29	1
PFNS	68259-12-1	ND	1.40	1.46	1.95		B9D0170	01-May-19	1.23 g	04-May-19 20:29	1
MeFOSAA	2355-31-9	ND	0.825	0.976	1.95		B9D0170	01-May-19	1.23 g	04-May-19 20:29	1
EtFOSAA	2991-50-6	ND	0.825	0.976	1.95		B9D0170	01-May-19	1.23 g	04-May-19 20:29	1
PFOA	2058-94-8	ND	0.825	0.976	1.95		B9D0170	01-May-19	1.23 g	04-May-19 20:29	1
PFDS	335-77-3	2.98	0.825	0.976	1.95		B9D0170	01-May-19	1.23 g	04-May-19 20:29	1
PFDoA	307-55-1	ND	0.825	0.976	1.95		B9D0170	01-May-19	1.23 g	04-May-19 20:29	1
PFTTrDA	72629-94-8	ND	0.825	0.976	1.95		B9D0170	01-May-19	1.23 g	04-May-19 20:29	1
PFTeDA	376-06-7	ND	0.825	0.976	1.95		B9D0170	01-May-19	1.23 g	04-May-19 20:29	1

Labeled Standards	Type	% Recovery	Limits	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
13C3-PFBA	IS	93.8	60 - 130		B9D0170	01-May-19	1.23 g	04-May-19 20:29	1
13C3-PFPeA	IS	93.5	60 - 150		B9D0170	01-May-19	1.23 g	04-May-19 20:29	1
13C3-PFBS	IS	96.0	60 - 150		B9D0170	01-May-19	1.23 g	04-May-19 20:29	1
13C2-4:2 FTS	IS	112	40 - 150		B9D0170	01-May-19	1.23 g	04-May-19 20:29	1
13C2-PFHxA	IS	96.1	70 - 130		B9D0170	01-May-19	1.23 g	04-May-19 20:29	1
13C4-PFHpA	IS	95.9	60 - 150		B9D0170	01-May-19	1.23 g	04-May-19 20:29	1
13C3-PFHxS	IS	92.8	60 - 130		B9D0170	01-May-19	1.23 g	04-May-19 20:29	1
13C2-6:2 FTS	IS	116	40 - 150		B9D0170	01-May-19	1.23 g	04-May-19 20:29	1
13C2-PFOA	IS	88.3	60 - 130		B9D0170	01-May-19	1.23 g	04-May-19 20:29	1
13C5-PFNA	IS	87.4	50 - 130		B9D0170	01-May-19	1.23 g	04-May-19 20:29	1
13C8-PFOSA	IS	55.1	20 - 150		B9D0170	01-May-19	1.23 g	04-May-19 20:29	1
13C8-PFOS	IS	100	60 - 130		B9D0170	01-May-19	1.23 g	04-May-19 20:29	1
13C2-PFDA	IS	70.4	60 - 130		B9D0170	01-May-19	1.23 g	04-May-19 20:29	1

**Sample ID: SXDU11904111220MK** **VAL - PFAS**

Client Data				Laboratory Data			
Name:	Merit Laboratories, Inc.	Matrix:	Soil	Lab Sample:	1900761-08	Column:	BEH C18
Project:	Statewide WWTP Biosolids PFAS Evaluation	Date Collected:	11-Apr-19 12:20	Date Received:	16-Apr-19 09:58		
Location:	WIXO-03N06E04-JW01			% Solids:	83.3		

Labeled Standards	Type	% Recovery	Limits	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
13C2-8:2 FTS	IS	106	40 - 150		B9D0170	01-May-19	1.23 g	04-May-19 20:29	1
d3-MeFOSAA	IS	65.1	50 - 150		B9D0170	01-May-19	1.23 g	04-May-19 20:29	1
d5-EtFOSAA	IS	69.9	50 - 150		B9D0170	01-May-19	1.23 g	04-May-19 20:29	1
13C2-PFUnA	IS	76.5	60 - 130		B9D0170	01-May-19	1.23 g	04-May-19 20:29	1
13C2-PFDoA	IS	79.4	30 - 130		B9D0170	01-May-19	1.23 g	04-May-19 20:29	1
13C2-PFTeDA	IS	80.9	20 - 150		B9D0170	01-May-19	1.23 g	04-May-19 20:29	1

DL - Detection Limit

LOD - Limit of Detection  
LOQ - Limit of quantitation

The results are reported in dry weight.  
The sample size is reported in wet weight.  
Results reported to the DL.

When reported, PFHxS, PFOA, PFOS, MeFOSAA and EtFOSAA include both linear and branched isomers. Only the linear isomer is reported for all other analytes.

## DATA QUALIFIERS & ABBREVIATIONS

B	This compound was also detected in the method blank
Conc.	Concentration
D	Dilution
DL	Detection limit
E	The associated compound concentration exceeded the calibration range of the instrument
H	Recovery and/or RPD was outside laboratory acceptance limits
I	Chemical Interference
J	The amount detected is below the Reporting Limit/LOQ
LOD	Limits of Detection
LOQ	Limits of Quantitation
M	Estimated Maximum Possible Concentration (CA Region 2 projects only)
NA	Not applicable
ND	Not Detected
P	The reported concentration may include contribution from chlorinated diphenyl ether(s).
Q	The ion transition ratio is outside of the acceptance criteria.
TEQ	Toxic Equivalency
U	Not Detected (specific projects only)
*	See Cover Letter

Unless otherwise noted, solid sample results are reported in dry weight. Tissue samples are reported in wet weight.

### Vista Analytical Laboratory Certifications

Accrediting Authority	Certificate Number
Alaska Department of Environmental Conservation	17-013
Arkansas Department of Environmental Quality	19-013-0
California Department of Health – ELAP	2892
DoD ELAP - A2LA Accredited - ISO/IEC 17025:2005	3091.01
Florida Department of Health	E87777
Hawaii Department of Health	N/A
Louisiana Department of Environmental Quality	01977
Maine Department of Health	2018017
Michigan Department of Environmental Quality	9932
Minnesota Department of Health	1521520
New Hampshire Environmental Accreditation Program	207718
New Jersey Department of Environmental Protection	CA003
New York Department of Health	11411
Oregon Laboratory Accreditation Program	4042-010
Pennsylvania Department of Environmental Protection	015
Texas Commission on Environmental Quality	T104704189-19-10
Virginia Department of General Services	9618
Washington Department of Ecology	C584-19
Wisconsin Department of Natural Resources	998036160

*Current certificates and lists of licensed parameters are located in the Quality Assurance office and are available upon request.*



## NELAP Accredited Test Methods

MATRIX: Air	
Description of Test	Method
Determination of Polychlorinated p-Dioxins & Polychlorinated Dibenzofurans	EPA 23
Determination of Polychlorinated p-Dioxins & Polychlorinated Dibenzofurans	EPA TO-9A

MATRIX: Biological Tissue	
Description of Test	Method
Tetra- through Octa-Chlorinated Dioxins and Furans by Isotope Dilution GC/HRMS	EPA 1613B
Brominated Diphenyl Ethers by HRGC/HRMS	EPA 1614A
Chlorinated Biphenyl Congeners in Water, Soil, Sediment, and Tissue by GC/HRMS	EPA 1668A/C
Pesticides in Water, Soil, Sediment, Biosolids, and Tissue by HRGC/HRMS	EPA 1699
Perfluorinated Alkyl Acids in Drinking Water by SPE and LC/MS/MS	EPA 537
Polychlorinated Dibenzo-p-Dioxins and Polychlorinated Dibenzofurans by GC/HRMS	EPA 8280A/B
Polychlorinated Dibenzodioxins (PCDDs) and Polychlorinated Dibenzofurans (PCDFs) by GC/HRMS	EPA 8290/8290A

MATRIX: Drinking Water	
Description of Test	Method
2,3,7,8-Tetrachlorodibenzo- p-dioxin (2,3,7,8-TCDD) GC/HRMS	EPA 1613/1613B
1,4-Dioxane (1,4-Diethyleneoxide) analysis by GC/HRMS	EPA 522
Perfluorinated Alkyl Acids in Drinking Water by SPE and LC/MS/MS	EPA 537
Perfluorinated Alkyl Acids in Drinking Water by SPE and LC/MS/MS	ISO 25101 2009

MATRIX: Non-Potable Water	
Description of Test	Method
Tetra- through Octa-Chlorinated Dioxins and Furans by Isotope Dilution GC/HRMS	EPA 1613B
Brominated Diphenyl Ethers by HRGC/HRMS	EPA 1614A
Chlorinated Biphenyl Congeners in Water, Soil, Sediment, and Tissue by GC/HRMS	EPA 1668A/C
Pesticides in Water, Soil, Sediment, Biosolids, and Tissue by HRGC/HRMS	EPA 1699
Perfluorinated Alkyl Acids in Drinking Water by SPE and LC/MS/MS	EPA 537
Dioxin by GC/HRMS	EPA 613
Polychlorinated Dibenzo-p-Dioxins and Polychlorinated Dibenzofurans by GC/HRMS	EPA 8280A/B
Polychlorinated Dibenzodioxins (PCDDs) and Polychlorinated Dibenzofurans (PCDFs) by GC/HRMS	EPA 8290/8290A

MATRIX: Solids	
Description of Test	Method
Tetra-Octa Chlorinated Dioxins and Furans by Isotope Dilution GC/HRMS	EPA 1613
Tetra- through Octa-Chlorinated Dioxins and Furans by Isotope Dilution GC/HRMS	EPA 1613B
Brominated Diphenyl Ethers by HRGC/HRMS	EPA 1614A
Chlorinated Biphenyl Congeners in Water, Soil, Sediment, and Tissue by GC/HRMS	EPA 1668A/C
Pesticides in Water, Soil, Sediment, Biosolids, and Tissue by HRGC/HRMS	EPA 1699
Perfluorinated Alkyl Acids in Drinking Water by SPE and LC/MS/MS	EPA 537
Polychlorinated Dibenzo-p-Dioxins and Polychlorinated Dibenzofurans by GC/HRMS	EPA 8280A/B
Polychlorinated Dibenzodioxins (PCDDs) and Polychlorinated Dibenzofurans (PCDFs) by GC/HRMS	EPA 8290/8290A



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# CHAIN OF CUSTODY

**For Laboratory Use Only**  
 Work Order #: 1900761 Temp: 0.4 °C  
 Storage ID: WR-2 Storage Secured: Yes  No

Project ID: Statewide WWTP Biosolids PFAS Evaluation PO#: 60588767.01 Sampler: Michal Kosciarz + Rachel Lopez  
 (name)

TAT Standard:  21 days  
 (check one): Rush (surcharge may apply)  14 days  7 days Specify: \_\_\_\_\_

Invoice to: Name Stephanie Kammer Company MDEQ Address 525 W. Allegan Street City Lansing State MI Ph# 517-897-1597 Fax# 517-241-3571

Relinquished by (printed name and signature) Michal Kosciarz Date 4/15/19 Time 1700 Received by (printed name and signature) Marissa Sparks Date 04/16/19 Time 0958

SHIP TO: Vista Analytical Laboratory 1104 Windfield Way El Dorado Hills, CA 95762 Ph: (916) 673-1520; Fax: (916) 673-0106				Method of Shipment:		Add Analysis(es) Requested										Comments
ATTN: <u>Jennifer Miller</u>				Tracking No.:		Container(s)		PFAS Isotope Dilution				USEPA Method 537				
Sample ID	Date	Time	Location/Sample Description	Quantity	Type	Matrix	List of 21	List of 21 w/Isomers	List of 24	List of 24 w/Isomers	List of 28	Other: Please List Below	PFOM PFOS	UCMRA PFAS List 6	PFAS List 14	
* SW031904110940RL	04.11.19	0940	WIXO-03N06E04-JW05	2	P	AQ		X								
* SXDU21904110945MK	04.11.19	0945	WIXO-03N06E04-JW05	1	PJ	SO		X								
* PEW011904111015RL	04.11.19	1015	WIXO-03N06E04-JW01	2	P	AQ		X								
- SXDU11904111040MK	04.11.19	1040	WIXO-03N06E04-JW05	1	PJ	SO		X								
* SXDU21904111125MK	04.11.19	1125	WIXO-03N06E04-JW01	1	PJ	SO		X								
* SXDU21904111130MK-DUP	04.11.19	1130	WIXO-03N06E04-JW01	1	PJ	SO		X								
* PEW021904111210RL	04.11.19	1210	WIXO-03N06E04-JW01	2	P	AQ		X								
- SXDU11904111220MK	04.11.19	1220	WIXO-03N06E04-JW01	1	PJ	SO		X								
* SW011904111220RL	04.11.19	1220	WIXO-03N06E04-JW01	2	P	AQ		X								
* TD011904111225RL	04.11.19	1225	WIXO-03N06E04-JW01	2	P	AQ		X								

Special Instructions/Comments: Send Results and Acknowledgements to the list provided

**SEND DOCUMENTATION AND RESULTS TO:**

Name: Stephanie Kammer  
 Company: MDEQ  
 Address: 525 W. Allegan Street, Constitution Hall, 1st South West  
 City: Lansing State: MI Zip: 30242  
 Phone: 517-897-1597 Fax: 517-241-3571  
 Email: dorin.bogdan@aecom.com

Container Types: P= HDPE, PJ= HDPE Jar  
 O = Other: \_\_\_\_\_  
 Bottle Preservation Type: T = Thiosulfate, TZ = Trizma: \_\_\_\_\_  
 Matrix Types: AQ = Aqueous, DW = Drinking Water, EF = Effluent, PP = Pulp/Paper, SD = Sediment, SL = Sludge, BS=Biosolids, SO = Soil, WW = Wastewater, B = Blood/Serum, O = Other: \_\_\_\_\_



# CHAIN OF CUSTODY

**For Laboratory Use Only**  
 Work Order #: 1900761 Temp: 0.4 °C  
 Storage ID: WR-2 Storage Secured: Yes  No

Project ID: Statewide WWTP Biosolids PFAS Evaluation PO#: 60588767.01 Sampler: Michal Kosciarz + Rachel Lopez  
 (name)

TAT Standard:  21 days  
 (check one): Rush (surcharge may apply)  
 14 days  7 days Specify: \_\_\_\_\_

Invoice to: Name Stephanie Kammer Company MDEQ Address 525 W. Allegan Street City Lansing State MI Ph# 517-897-1597 Fax# 517-241-3571

Relinquished by (printed name and signature) Michal Kosciarz Date \_\_\_\_\_ Time \_\_\_\_\_ Received by (printed name and signature) RECEIVED VIA EMAIL [Signature] Date 04/16/19 Time 0958

SHIP TO: Vista Analytical Laboratory 1104 Windfield Way El Dorado Hills, CA 95762 Ph: (916) 673-1520; Fax: (916) 673-0106				Method of Shipment:		Add Analysis(es) Requested										Comments
ATTN: Jennifer Miller				Tracking No.:		Container(s)										
Sample ID	Date	Time	Location/Sample Description	Quantity	Type	Matrix	List of 21	List of 21 w/Isomers	List of 24	List of 24 w/Isomers	List of 28	Other: Please List Below	PFAS Isotope Dilution	USEPA Method 537		
SW031904110940RL	04.11.19	0940	WIXO-03N06E04-JW05	2	P	AQ		X								
SXDU21904110945MK	04.11.19	0945	WIXO-03N06E04-JW05	1	PJ	SO		X								
PEW011904111015RRL	04.11.19	1015	WIXO-03N06E04-JW01	2	P	AQ		X								
SXDU11904111040MK	04.11.19	1040	WIXO-03N06E04-JW05	1	PJ	SO		X								
SXDU21904111125MK	04.11.19	1125	WIXO-03N06E04-JW01	1	PJ	SO		X								
SXDU21904111130MK-DUP	04.11.19	1130	WIXO-03N06E04-JW01	1	PJ	SO		X								
PEW021904111210RL	04.11.19	1210	WIXO-03N06E04-JW01	2	P	AQ		X								
SXDU11904111220MK	04.11.19	1220	WIXO-03N06E04-JW01	1	PJ	SO		X								
SW011904111220RL	04.11.19	1220	WIXO-03N06E04-JW01	2	P	AQ		X								
TD011904111225RL	04.11.19	1225	WIXO-03N06E04-JW01	2	P	AQ		X								

Special Instructions/Comments: Send Results and Acknowledgements to the list provided

**SEND DOCUMENTATION AND RESULTS TO:**

Name: Stephanie Kammer  
 Company: MDEQ  
 Address: 525 W. Allegan Street, Constitution Hall, 1st South West  
 City: Lansing State: MI Zip: 30242  
 Phone: 517-897-1597 Fax: 517-241-3571  
 Email: dorin.bogdan@aecom.com

Container Types: P= HDPE, PJ= HDPE Jar  
 O = Other: \_\_\_\_\_

Bottle Preservation Type: T = Thiosulfate,  
 TZ = Trizma: \_\_\_\_\_

Matrix Types: AQ = Aqueous, DW = Drinking Water, EF = Effluent, PP = Pulp/Paper, SD = Sediment,  
 SL = Sludge, BS=Biosolids, SO = Soil, WW = Wastewater, B = Blood/Serum, O = Other: \_\_\_\_\_

# Sample Log-In Checklist

 Page # 1 of 1

 Vista Work Order #: 1900761

 TAT std

<b>Samples Arrival:</b>	<b>Date/Time</b> 04/16/19 0958	<b>Initials:</b> WWS	<b>Location:</b> WR-2
			<b>Shelf/Rack:</b> N/8
<b>Logged In:</b>	<b>Date/Time</b> 04/16/19 1200	<b>Initials:</b> KE	<b>Location:</b> WR-2
			<b>Shelf/Rack:</b> A345/A4
<b>Delivered By:</b>	<input checked="" type="checkbox"/> FedEx	<input type="checkbox"/> UPS	<input type="checkbox"/> On Trac
		<input type="checkbox"/> GSO	<input type="checkbox"/> DHL
		<input type="checkbox"/> Hand Delivered	<input type="checkbox"/> Other
<b>Preservation:</b>	<input checked="" type="checkbox"/> Ice	<input type="checkbox"/> Blue Ice	<input type="checkbox"/> Dry Ice
	<input type="checkbox"/> None		
<b>Temp °C:</b> 0.5 (uncorrected)	<b>Probe used:</b> Y / <input checked="" type="checkbox"/> N		<b>Thermometer ID:</b> IR-4
<b>Temp °C:</b> 0.4 (corrected)			

	YES	NO	NA
Adequate Sample Volume Received?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Holding Time Acceptable?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Shipping Container(s) Intact?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Shipping Custody Seals Intact?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Shipping Documentation Present?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Airbill _____			
Trk # 4894 6695 8570	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Sample Container Intact?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Sample Custody Seals Intact?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
Chain of Custody / Sample Documentation Present?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
COC Anomaly/Sample Acceptance Form completed?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
If Chlorinated or Drinking Water Samples, Acceptable Preservation?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
<b>Preservation Documented:</b>	<input type="checkbox"/> Yes	<input type="checkbox"/> No	<input checked="" type="checkbox"/> NA
	<input type="checkbox"/> Na <sub>2</sub> S <sub>2</sub> O <sub>3</sub>	<input type="checkbox"/> Trizma	<input checked="" type="checkbox"/> None
	<input type="checkbox"/> Other		
<b>Shipping Container</b>	<input type="checkbox"/> Vista	<input checked="" type="checkbox"/> Client	<input type="checkbox"/> Retain
			<input checked="" type="checkbox"/> Return
			<input type="checkbox"/> Dispose

Comments:



September 13, 2019

**Vista Work Order No. 1902819**

Ms. Maya Murshak  
Merit Laboratories, Inc.  
2680 East Lansing Drive  
East Lansing, MI 48823

Dear Ms. Murshak,

Enclosed are the results for the sample set received at Vista Analytical Laboratory on August 23, 2019 under your Project Name 'Statewide WWTP Biosolids PFAS Evaluation'.

Vista Analytical Laboratory is committed to serving you effectively. If you require additional information, please contact me at 916-673-1520 or by email at [mmaier@vista-analytical.com](mailto:mmaier@vista-analytical.com).

Thank you for choosing Vista as part of your analytical support team.

Sincerely,

Martha Maier  
Laboratory Director



*Vista Analytical Laboratory certifies that the report herein meets all the requirements set forth by NELAP for those applicable test methods. Results relate only to the samples as received by the laboratory. This report should not be reproduced except in full without the written approval of Vista.*

## **Vista Work Order No. 1902819**

### **Case Narrative**

#### **Sample Condition on Receipt:**

Three aqueous samples were received in good condition and within the method temperature requirements. The samples were received and stored securely in accordance with Vista standard operating procedures and EPA methodology. A revised CoC was received by email on September 5, 2019.

#### **Analytical Notes:**

##### **PFAS Isotope Dilution Method**

The samples were extracted and analyzed for a selected list of PFAS using the PFAS Isotope Dilution Method (Modified EPA Method 537). The results for PFHxS, PFOA, PFOS, MeFOSAA and EtFOSAA include both linear and branched isomers. Results for all other analytes include the linear isomers only.

##### **Holding Times**

The samples were extracted and analyzed within the method hold times.

##### **Quality Control**

The Initial Calibration and Continuing Calibration Verifications met the method acceptance criteria.

A Method Blank and Ongoing Precision and Recovery (OPR) sample were extracted and analyzed with the preparation batch. No analytes were detected in the Method Blank above 1/2 the LOQ. The OPR recoveries were within the method acceptance criteria.

The labeled standard recoveries for all QC and field samples were within the acceptance criteria.

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# Sample Inventory Report

<b>Vista Sample ID</b>	<b>Client Sample ID</b>	<b>Sampled</b>	<b>Received</b>	<b>Components/Containers</b>
1902819-01	EB02-190822	22-Aug-19 14:05	23-Aug-19 09:59	HDPE Bottle, 250 mL HDPE Bottle, 250 mL
1902819-02	EB03-190822	22-Aug-19 14:30	23-Aug-19 09:59	HDPE Bottle, 250 mL HDPE Bottle, 250 mL
1902819-03	EB01-190822	22-Aug-19 14:35	23-Aug-19 09:59	HDPE Bottle, 250 mL HDPE Bottle, 250 mL

## **ANALYTICAL RESULTS**

**Sample ID: Method Blank**
**PFAS Isotope Dilution Method**

Client Data					Laboratory Data						
Name:	Merit Laboratories, Inc.		Matrix:	Aqueous	Lab Sample:	B9H0278-BLK1		Column:	BEH C18		
Project:	Statewide WWTP Biosolids PFAS Evaluation										

Analyte	CAS Number	Conc. (ng/L)	DL	LOD	LOQ	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
PFBA	375-22-4	ND	1.37	2.00	4.00		B9H0278	30-Aug-19	0.250 L	11-Sep-19 03:15	1
PFPeA	2706-90-3	ND	1.37	2.00	4.00		B9H0278	30-Aug-19	0.250 L	11-Sep-19 03:15	1
PFBS	375-73-5	ND	1.37	2.00	4.00		B9H0278	30-Aug-19	0.250 L	11-Sep-19 03:15	1
4:2 FTS	757124-72-4	ND	1.37	2.00	4.00		B9H0278	30-Aug-19	0.250 L	11-Sep-19 03:15	1
PFHxA	307-24-4	ND	1.37	2.00	4.00		B9H0278	30-Aug-19	0.250 L	11-Sep-19 03:15	1
PFPeS	2706-91-4	ND	1.37	2.00	4.00		B9H0278	30-Aug-19	0.250 L	11-Sep-19 03:15	1
PFHpA	375-85-9	ND	1.37	2.00	4.00		B9H0278	30-Aug-19	0.250 L	11-Sep-19 03:15	1
PFHxS	355-46-4	ND	1.37	2.00	4.00		B9H0278	30-Aug-19	0.250 L	11-Sep-19 03:15	1
6:2 FTS	27619-97-2	ND	1.37	2.00	4.00		B9H0278	30-Aug-19	0.250 L	11-Sep-19 03:15	1
PFOA	335-67-1	ND	1.37	2.00	4.00		B9H0278	30-Aug-19	0.250 L	11-Sep-19 03:15	1
PFHpS	375-92-8	ND	1.37	2.00	4.00		B9H0278	30-Aug-19	0.250 L	11-Sep-19 03:15	1
PFNA	375-95-1	ND	1.37	2.00	4.00		B9H0278	30-Aug-19	0.250 L	11-Sep-19 03:15	1
PFOSA	754-91-6	ND	1.37	2.00	4.00		B9H0278	30-Aug-19	0.250 L	11-Sep-19 03:15	1
PFOS	1763-23-1	ND	1.37	2.00	4.00		B9H0278	30-Aug-19	0.250 L	11-Sep-19 03:15	1
PFDA	335-76-2	ND	1.37	2.00	4.00		B9H0278	30-Aug-19	0.250 L	11-Sep-19 03:15	1
8:2 FTS	39108-34-4	ND	1.37	2.00	4.00		B9H0278	30-Aug-19	0.250 L	11-Sep-19 03:15	1
PFNS	68259-12-1	ND	1.94	2.00	4.00		B9H0278	30-Aug-19	0.250 L	11-Sep-19 03:15	1
MeFOSAA	2355-31-9	ND	1.37	2.00	4.00		B9H0278	30-Aug-19	0.250 L	11-Sep-19 03:15	1
EtFOSAA	2991-50-6	ND	1.37	2.00	4.00		B9H0278	30-Aug-19	0.250 L	11-Sep-19 03:15	1
PFUnA	2058-94-8	ND	1.37	2.00	4.00		B9H0278	30-Aug-19	0.250 L	11-Sep-19 03:15	1
PFDS	335-77-3	ND	1.37	2.00	4.00		B9H0278	30-Aug-19	0.250 L	11-Sep-19 03:15	1
PFDoA	307-55-1	ND	1.37	2.00	4.00		B9H0278	30-Aug-19	0.250 L	11-Sep-19 03:15	1
PFTTrDA	72629-94-8	ND	1.37	2.00	4.00		B9H0278	30-Aug-19	0.250 L	11-Sep-19 03:15	1
PFTeDA	376-06-7	ND	1.37	2.00	4.00		B9H0278	30-Aug-19	0.250 L	11-Sep-19 03:15	1

Labeled Standards	Type	% Recovery	Limits	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
13C3-PFBA	IS	96.0	60 - 130		B9H0278	30-Aug-19	0.250 L	11-Sep-19 03:15	1
13C3-PFPeA	IS	93.0	60 - 150		B9H0278	30-Aug-19	0.250 L	11-Sep-19 03:15	1
13C3-PFBS	IS	89.2	60 - 150		B9H0278	30-Aug-19	0.250 L	11-Sep-19 03:15	1
13C2-4:2 FTS	IS	88.0	20 - 150		B9H0278	30-Aug-19	0.250 L	11-Sep-19 03:15	1
13C2-PFHxA	IS	85.0	70 - 130		B9H0278	30-Aug-19	0.250 L	11-Sep-19 03:15	1
13C4-PFHpA	IS	98.8	60 - 150		B9H0278	30-Aug-19	0.250 L	11-Sep-19 03:15	1
13C3-PFHxS	IS	83.3	60 - 130		B9H0278	30-Aug-19	0.250 L	11-Sep-19 03:15	1
13C2-6:2 FTS	IS	88.1	40 - 150		B9H0278	30-Aug-19	0.250 L	11-Sep-19 03:15	1
13C5-PFNA	IS	93.3	50 - 130		B9H0278	30-Aug-19	0.250 L	11-Sep-19 03:15	1
13C8-PFOSA	IS	30.0	20 - 150		B9H0278	30-Aug-19	0.250 L	11-Sep-19 03:15	1
13C2-PFOA	IS	96.0	60 - 130		B9H0278	30-Aug-19	0.250 L	11-Sep-19 03:15	1
13C8-PFOS	IS	81.8	60 - 130		B9H0278	30-Aug-19	0.250 L	11-Sep-19 03:15	1
13C2-PFDA	IS	90.8	60 - 130		B9H0278	30-Aug-19	0.250 L	11-Sep-19 03:15	1



**Sample ID: OPR**
**PFAS Isotope Dilution Method**

Client Data					Laboratory Data						
Name:	Merit Laboratories, Inc.		Matrix:	Aqueous	Lab Sample:	B9H0278-BS1	Column:	BEH C18			
Project:	Statewide WWTP Biosolids PFAS Evaluation										

Analyte	CAS Number	Amt Found (ng/L)	Spike Amt	% Rec	Limits	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
PFBA	375-22-4	44.8	40.0	112	70 - 130		B9H0278	30-Aug-19	0.250 L	13-Sep-19 01:37	1
PFPeA	2706-90-3	43.2	40.0	108	70 - 130		B9H0278	30-Aug-19	0.250 L	13-Sep-19 01:37	1
PFBS	375-73-5	46.7	40.0	117	70 - 130		B9H0278	30-Aug-19	0.250 L	13-Sep-19 01:37	1
4:2 FTS	757124-72-4	47.4	40.0	119	70 - 130		B9H0278	30-Aug-19	0.250 L	13-Sep-19 01:37	1
PFHxA	307-24-4	45.1	40.0	113	70 - 130		B9H0278	30-Aug-19	0.250 L	13-Sep-19 01:37	1
PFPeS	2706-91-4	45.6	40.0	114	70 - 130		B9H0278	30-Aug-19	0.250 L	13-Sep-19 01:37	1
PFHpA	375-85-9	44.8	40.0	112	70 - 130		B9H0278	30-Aug-19	0.250 L	13-Sep-19 01:37	1
PFHxS	355-46-4	43.8	40.0	110	70 - 130		B9H0278	30-Aug-19	0.250 L	13-Sep-19 01:37	1
6:2 FTS	27619-97-2	50.6	40.0	127	60 - 130		B9H0278	30-Aug-19	0.250 L	13-Sep-19 01:37	1
PFOA	335-67-1	48.5	40.0	121	70 - 130		B9H0278	30-Aug-19	0.250 L	13-Sep-19 01:37	1
PFHpS	375-92-8	46.1	40.0	115	60 - 130		B9H0278	30-Aug-19	0.250 L	13-Sep-19 01:37	1
PFNA	375-95-1	49.6	40.0	124	70 - 130		B9H0278	30-Aug-19	0.250 L	13-Sep-19 01:37	1
PFOSA	754-91-6	38.8	40.0	96.9	70 - 130		B9H0278	30-Aug-19	0.250 L	13-Sep-19 01:37	1
PFOS	1763-23-1	42.1	40.0	105	70 - 130		B9H0278	30-Aug-19	0.250 L	13-Sep-19 01:37	1
PFDA	335-76-2	48.1	40.0	120	70 - 130		B9H0278	30-Aug-19	0.250 L	13-Sep-19 01:37	1
8:2 FTS	39108-34-4	49.7	40.0	124	60 - 130		B9H0278	30-Aug-19	0.250 L	13-Sep-19 01:37	1
PFNS	68259-12-1	44.8	40.0	112	70 - 130		B9H0278	30-Aug-19	0.250 L	13-Sep-19 01:37	1
MeFOSAA	2355-31-9	49.2	40.0	123	70 - 130		B9H0278	30-Aug-19	0.250 L	13-Sep-19 01:37	1
EtFOSAA	2991-50-6	50.9	40.0	127	70 - 130		B9H0278	30-Aug-19	0.250 L	13-Sep-19 01:37	1
PFUnA	2058-94-8	44.8	40.0	112	70 - 130		B9H0278	30-Aug-19	0.250 L	13-Sep-19 01:37	1
PFDS	335-77-3	44.5	40.0	111	60 - 130		B9H0278	30-Aug-19	0.250 L	13-Sep-19 01:37	1
PFDoA	307-55-1	44.8	40.0	112	70 - 130		B9H0278	30-Aug-19	0.250 L	13-Sep-19 01:37	1
PFTTrDA	72629-94-8	42.9	40.0	107	60 - 130		B9H0278	30-Aug-19	0.250 L	13-Sep-19 01:37	1
PFTeDA	376-06-7	46.5	40.0	116	70 - 130		B9H0278	30-Aug-19	0.250 L	13-Sep-19 01:37	1

Labeled Standards	Type	% Rec	Limits	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
13C3-PFBA	IS	102	60- 130		B9H0278	30-Aug-19	0.250 L	13-Sep-19 01:37	1
13C3-PFPeA	IS	99.4	60- 150		B9H0278	30-Aug-19	0.250 L	13-Sep-19 01:37	1
13C3-PFBS	IS	95.7	60- 150		B9H0278	30-Aug-19	0.250 L	13-Sep-19 01:37	1
13C2-4:2 FTS	IS	98.0	20- 150		B9H0278	30-Aug-19	0.250 L	13-Sep-19 01:37	1
13C2-PFHxA	IS	97.0	70- 130		B9H0278	30-Aug-19	0.250 L	13-Sep-19 01:37	1
13C4-PFHpA	IS	101	60- 150		B9H0278	30-Aug-19	0.250 L	13-Sep-19 01:37	1
13C3-PFHxS	IS	94.2	60- 130		B9H0278	30-Aug-19	0.250 L	13-Sep-19 01:37	1
13C2-6:2 FTS	IS	81.1	40- 150		B9H0278	30-Aug-19	0.250 L	13-Sep-19 01:37	1
13C5-PFNA	IS	95.3	50- 130		B9H0278	30-Aug-19	0.250 L	13-Sep-19 01:37	1
13C8-PFOSA	IS	33.2	20- 150		B9H0278	30-Aug-19	0.250 L	13-Sep-19 01:37	1

**Sample ID: OPR**

**PFAS Isotope Dilution Method**

**Client Data**

Name: Merit Laboratories, Inc.  
 Project: Statewide WWTP Biosolids PFAS Evaluation

Matrix: Aqueous

**Laboratory Data**

Lab Sample: B9H0278-BS1      Column: BEH C18

Labeled Standards	Type	% Rec	Limits	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
13C2-PFOA	IS	95.3	60- 130		B9H0278	30-Aug-19	0.250 L	13-Sep-19 01:37	1
13C8-PFOS	IS	96.2	60- 130		B9H0278	30-Aug-19	0.250 L	13-Sep-19 01:37	1
13C2-PFDA	IS	90.4	60- 130		B9H0278	30-Aug-19	0.250 L	13-Sep-19 01:37	1
13C2-8:2 FTS	IS	88.8	40- 150		B9H0278	30-Aug-19	0.250 L	13-Sep-19 01:37	1
d3-MeFOSAA	IS	75.8	50- 150		B9H0278	30-Aug-19	0.250 L	13-Sep-19 01:37	1
13C2-PFUnA	IS	87.6	60- 130		B9H0278	30-Aug-19	0.250 L	13-Sep-19 01:37	1
d5-EtFOSAA	IS	70.0	50- 150		B9H0278	30-Aug-19	0.250 L	13-Sep-19 01:37	1
13C2-PFDoA	IS	75.2	30- 130		B9H0278	30-Aug-19	0.250 L	13-Sep-19 01:37	1
13C2-PFTeDA	IS	62.0	20- 150		B9H0278	30-Aug-19	0.250 L	13-Sep-19 01:37	1

**Sample ID: EB02-190822**

**PFAS Isotope Dilution Method**

Client Data				Laboratory Data			
Name:	Merit Laboratories, Inc.	Matrix:	Aqueous	Lab Sample:	1902819-01	Column:	BEH C18
Project:	Statewide WWTP Biosolids PFAS Evaluation	Date Collected:	22-Aug-19 14:05	Date Received:	23-Aug-19 09:59		
Location:	WIXO-Aluminum Tank						

Analyte	CAS Number	Conc. (ng/L)	DL	LOD	LOQ	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
PFBA	375-22-4	ND	1.38	2.01	4.02		B9H0278	30-Aug-19	0.249 L	11-Sep-19 03:25	1
PFPeA	2706-90-3	ND	1.38	2.01	4.02		B9H0278	30-Aug-19	0.249 L	11-Sep-19 03:25	1
PFBS	375-73-5	ND	1.38	2.01	4.02		B9H0278	30-Aug-19	0.249 L	11-Sep-19 03:25	1
4:2 FTS	757124-72-4	ND	1.38	2.01	4.02		B9H0278	30-Aug-19	0.249 L	11-Sep-19 03:25	1
PFHxA	307-24-4	ND	1.38	2.01	4.02		B9H0278	30-Aug-19	0.249 L	11-Sep-19 03:25	1
PFPeS	2706-91-4	ND	1.38	2.01	4.02		B9H0278	30-Aug-19	0.249 L	11-Sep-19 03:25	1
PFHpA	375-85-9	ND	1.38	2.01	4.02		B9H0278	30-Aug-19	0.249 L	11-Sep-19 03:25	1
PFHxS	355-46-4	ND	1.38	2.01	4.02		B9H0278	30-Aug-19	0.249 L	11-Sep-19 03:25	1
6:2 FTS	27619-97-2	ND	1.38	2.01	4.02		B9H0278	30-Aug-19	0.249 L	11-Sep-19 03:25	1
PFOA	335-67-1	ND	1.38	2.01	4.02		B9H0278	30-Aug-19	0.249 L	11-Sep-19 03:25	1
PFHpS	375-92-8	ND	1.38	2.01	4.02		B9H0278	30-Aug-19	0.249 L	11-Sep-19 03:25	1
PFNA	375-95-1	ND	1.38	2.01	4.02		B9H0278	30-Aug-19	0.249 L	11-Sep-19 03:25	1
PFOSA	754-91-6	ND	1.38	2.01	4.02		B9H0278	30-Aug-19	0.249 L	11-Sep-19 03:25	1
PFOS	1763-23-1	ND	1.38	2.01	4.02		B9H0278	30-Aug-19	0.249 L	11-Sep-19 03:25	1
PFDA	335-76-2	ND	1.38	2.01	4.02		B9H0278	30-Aug-19	0.249 L	11-Sep-19 03:25	1
8:2 FTS	39108-34-4	ND	1.38	2.01	4.02		B9H0278	30-Aug-19	0.249 L	11-Sep-19 03:25	1
PFNS	68259-12-1	ND	1.94	2.01	4.02		B9H0278	30-Aug-19	0.249 L	11-Sep-19 03:25	1
MeFOSAA	2355-31-9	ND	1.38	2.01	4.02		B9H0278	30-Aug-19	0.249 L	11-Sep-19 03:25	1
EtFOSAA	2991-50-6	ND	1.38	2.01	4.02		B9H0278	30-Aug-19	0.249 L	11-Sep-19 03:25	1
PFOA	2058-94-8	ND	1.38	2.01	4.02		B9H0278	30-Aug-19	0.249 L	11-Sep-19 03:25	1
PFDS	335-77-3	ND	1.38	2.01	4.02		B9H0278	30-Aug-19	0.249 L	11-Sep-19 03:25	1
PFDoA	307-55-1	ND	1.38	2.01	4.02		B9H0278	30-Aug-19	0.249 L	11-Sep-19 03:25	1
PFTTrDA	72629-94-8	ND	1.38	2.01	4.02		B9H0278	30-Aug-19	0.249 L	11-Sep-19 03:25	1
PFTeDA	376-06-7	ND	1.38	2.01	4.02		B9H0278	30-Aug-19	0.249 L	11-Sep-19 03:25	1

Labeled Standards	Type	% Recovery	Limits	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
13C3-PFBA	IS	86.7	60 - 130		B9H0278	30-Aug-19	0.249 L	11-Sep-19 03:25	1
13C3-PFPeA	IS	92.1	60 - 150		B9H0278	30-Aug-19	0.249 L	11-Sep-19 03:25	1
13C3-PFBS	IS	90.1	60 - 150		B9H0278	30-Aug-19	0.249 L	11-Sep-19 03:25	1
13C2-4:2 FTS	IS	89.5	20 - 150		B9H0278	30-Aug-19	0.249 L	11-Sep-19 03:25	1
13C2-PFHxA	IS	92.3	70 - 130		B9H0278	30-Aug-19	0.249 L	11-Sep-19 03:25	1
13C4-PFHpA	IS	94.5	60 - 150		B9H0278	30-Aug-19	0.249 L	11-Sep-19 03:25	1
13C3-PFHxS	IS	89.3	60 - 130		B9H0278	30-Aug-19	0.249 L	11-Sep-19 03:25	1
13C2-6:2 FTS	IS	91.0	40 - 150		B9H0278	30-Aug-19	0.249 L	11-Sep-19 03:25	1
13C5-PFNA	IS	91.6	50 - 130		B9H0278	30-Aug-19	0.249 L	11-Sep-19 03:25	1
13C8-PFOSA	IS	52.7	20 - 150		B9H0278	30-Aug-19	0.249 L	11-Sep-19 03:25	1
13C2-PFOA	IS	88.5	60 - 130		B9H0278	30-Aug-19	0.249 L	11-Sep-19 03:25	1
13C8-PFOS	IS	96.7	60 - 130		B9H0278	30-Aug-19	0.249 L	11-Sep-19 03:25	1
13C2-PFDA	IS	97.6	60 - 130		B9H0278	30-Aug-19	0.249 L	11-Sep-19 03:25	1

**Sample ID: EB02-190822** **PFAS Isotope Dilution Method**

Client Data				Laboratory Data			
Name:	Merit Laboratories, Inc.	Matrix:	Aqueous	Lab Sample:	1902819-01	Column:	BEH C18
Project:	Statewide WWTP Biosolids PFAS Evaluation	Date Collected:	22-Aug-19 14:05	Date Received:	23-Aug-19 09:59		
Location:	WIXO-Aluminum Tank						

Labeled Standards	Type	% Recovery	Limits	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
13C2-8:2 FTS	IS	110	40 - 150		B9H0278	30-Aug-19	0.249 L	11-Sep-19 03:25	1
d3-MeFOSAA	IS	93.0	50 - 150		B9H0278	30-Aug-19	0.249 L	11-Sep-19 03:25	1
13C2-PFUnA	IS	87.3	60 - 130		B9H0278	30-Aug-19	0.249 L	11-Sep-19 03:25	1
d5-EtFOSAA	IS	93.4	50 - 150		B9H0278	30-Aug-19	0.249 L	11-Sep-19 03:25	1
13C2-PFDoA	IS	74.8	30 - 130		B9H0278	30-Aug-19	0.249 L	11-Sep-19 03:25	1
13C2-PFTeDA	IS	60.8	20 - 150		B9H0278	30-Aug-19	0.249 L	11-Sep-19 03:25	1

DL - Detection Limit

LOD - Limit of Detection  
LOQ - Limit of quantitation

Results reported to the DL.

When reported, PFHxS, PFOA, PFOS, MeFOSAA and EtFOSAA include both linear and branched isomers. Only the linear isomer is reported for all other analytes.



**Sample ID: EB03-190822**

**PFAS Isotope Dilution Method**

Client Data				Laboratory Data			
Name:	Merit Laboratories, Inc.	Matrix:	Aqueous	Lab Sample:	1902819-02	Column:	BEH C18
Project:	Statewide WWTP Biosolids PFAS Evaluation	Date Collected:	22-Aug-19 14:30	Date Received:	23-Aug-19 09:59		
Location:	WIXO-Poly Tank Auger Rack						

Analyte	CAS Number	Conc. (ng/L)	DL	LOD	LOQ	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
PFBA	375-22-4	ND	1.46	2.13	4.26		B9H0278	30-Aug-19	0.235 L	11-Sep-19 03:36	1
PFPeA	2706-90-3	ND	1.46	2.13	4.26		B9H0278	30-Aug-19	0.235 L	11-Sep-19 03:36	1
PFBS	375-73-5	ND	1.46	2.13	4.26		B9H0278	30-Aug-19	0.235 L	11-Sep-19 03:36	1
4:2 FTS	757124-72-4	ND	1.46	2.13	4.26		B9H0278	30-Aug-19	0.235 L	11-Sep-19 03:36	1
PFHxA	307-24-4	ND	1.46	2.13	4.26		B9H0278	30-Aug-19	0.235 L	11-Sep-19 03:36	1
PFPeS	2706-91-4	ND	1.46	2.13	4.26		B9H0278	30-Aug-19	0.235 L	11-Sep-19 03:36	1
PFHpA	375-85-9	ND	1.46	2.13	4.26		B9H0278	30-Aug-19	0.235 L	11-Sep-19 03:36	1
PFHxS	355-46-4	ND	1.46	2.13	4.26		B9H0278	30-Aug-19	0.235 L	11-Sep-19 03:36	1
6:2 FTS	27619-97-2	ND	1.46	2.13	4.26		B9H0278	30-Aug-19	0.235 L	11-Sep-19 03:36	1
PFOA	335-67-1	ND	1.46	2.13	4.26		B9H0278	30-Aug-19	0.235 L	11-Sep-19 03:36	1
PFHpS	375-92-8	ND	1.46	2.13	4.26		B9H0278	30-Aug-19	0.235 L	11-Sep-19 03:36	1
PFNA	375-95-1	ND	1.46	2.13	4.26		B9H0278	30-Aug-19	0.235 L	11-Sep-19 03:36	1
PFOSA	754-91-6	ND	1.46	2.13	4.26		B9H0278	30-Aug-19	0.235 L	11-Sep-19 03:36	1
PFOS	1763-23-1	ND	1.46	2.13	4.26		B9H0278	30-Aug-19	0.235 L	11-Sep-19 03:36	1
PFDA	335-76-2	ND	1.46	2.13	4.26		B9H0278	30-Aug-19	0.235 L	11-Sep-19 03:36	1
8:2 FTS	39108-34-4	ND	1.46	2.13	4.26		B9H0278	30-Aug-19	0.235 L	11-Sep-19 03:36	1
PFNS	68259-12-1	ND	2.06	2.13	4.26		B9H0278	30-Aug-19	0.235 L	11-Sep-19 03:36	1
MeFOSAA	2355-31-9	ND	1.46	2.13	4.26		B9H0278	30-Aug-19	0.235 L	11-Sep-19 03:36	1
EtFOSAA	2991-50-6	ND	1.46	2.13	4.26		B9H0278	30-Aug-19	0.235 L	11-Sep-19 03:36	1
PFUnA	2058-94-8	ND	1.46	2.13	4.26		B9H0278	30-Aug-19	0.235 L	11-Sep-19 03:36	1
PFDS	335-77-3	ND	1.46	2.13	4.26		B9H0278	30-Aug-19	0.235 L	11-Sep-19 03:36	1
PFDoA	307-55-1	ND	1.46	2.13	4.26		B9H0278	30-Aug-19	0.235 L	11-Sep-19 03:36	1
PFTTrDA	72629-94-8	ND	1.46	2.13	4.26		B9H0278	30-Aug-19	0.235 L	11-Sep-19 03:36	1
PFTeDA	376-06-7	ND	1.46	2.13	4.26		B9H0278	30-Aug-19	0.235 L	11-Sep-19 03:36	1

Labeled Standards	Type	% Recovery	Limits	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
13C3-PFBA	IS	86.9	60 - 130		B9H0278	30-Aug-19	0.235 L	11-Sep-19 03:36	1
13C3-PFPeA	IS	94.6	60 - 150		B9H0278	30-Aug-19	0.235 L	11-Sep-19 03:36	1
13C3-PFBS	IS	105	60 - 150		B9H0278	30-Aug-19	0.235 L	11-Sep-19 03:36	1
13C2-4:2 FTS	IS	106	20 - 150		B9H0278	30-Aug-19	0.235 L	11-Sep-19 03:36	1
13C2-PFHxA	IS	81.8	70 - 130		B9H0278	30-Aug-19	0.235 L	11-Sep-19 03:36	1
13C4-PFHpA	IS	104	60 - 150		B9H0278	30-Aug-19	0.235 L	11-Sep-19 03:36	1
13C3-PFHxS	IS	93.9	60 - 130		B9H0278	30-Aug-19	0.235 L	11-Sep-19 03:36	1
13C2-6:2 FTS	IS	90.3	40 - 150		B9H0278	30-Aug-19	0.235 L	11-Sep-19 03:36	1
13C5-PFNA	IS	98.3	50 - 130		B9H0278	30-Aug-19	0.235 L	11-Sep-19 03:36	1
13C8-PFOSA	IS	24.2	20 - 150		B9H0278	30-Aug-19	0.235 L	11-Sep-19 03:36	1
13C2-PFOA	IS	95.1	60 - 130		B9H0278	30-Aug-19	0.235 L	11-Sep-19 03:36	1
13C8-PFOS	IS	87.6	60 - 130		B9H0278	30-Aug-19	0.235 L	11-Sep-19 03:36	1
13C2-PFDA	IS	92.2	60 - 130		B9H0278	30-Aug-19	0.235 L	11-Sep-19 03:36	1

**Sample ID: EB03-190822** **PFAS Isotope Dilution Method**

<b>Client Data</b>				<b>Laboratory Data</b>			
Name:	Merit Laboratories, Inc.	Matrix:	Aqueous	Lab Sample:	1902819-02	Column:	BEH C18
Project:	Statewide WWTP Biosolids PFAS Evaluation	Date Collected:	22-Aug-19 14:30	Date Received:	23-Aug-19 09:59		
Location:	WIXO-Poly Tank Auger Rack						

Labeled Standards	Type	% Recovery	Limits	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
13C2-8:2 FTS	IS	86.2	40 - 150		B9H0278	30-Aug-19	0.235 L	11-Sep-19 03:36	1
d3-MeFOSAA	IS	79.7	50 - 150		B9H0278	30-Aug-19	0.235 L	11-Sep-19 03:36	1
13C2-PFUnA	IS	84.2	60 - 130		B9H0278	30-Aug-19	0.235 L	11-Sep-19 03:36	1
d5-EtFOSAA	IS	87.7	50 - 150		B9H0278	30-Aug-19	0.235 L	11-Sep-19 03:36	1
13C2-PFDoA	IS	70.5	30 - 130		B9H0278	30-Aug-19	0.235 L	11-Sep-19 03:36	1
13C2-PFTeDA	IS	59.7	20 - 150		B9H0278	30-Aug-19	0.235 L	11-Sep-19 03:36	1

DL - Detection Limit

LOD - Limit of Detection  
LOQ - Limit of quantitation

Results reported to the DL.

When reported, PFHxS, PFOA, PFOS, MeFOSAA and EtFOSAA include both linear and branched isomers. Only the linear isomer is reported for all other analytes.

**Sample ID: EB01-190822**

**PFAS Isotope Dilution Method**

Client Data				Laboratory Data			
Name:	Merit Laboratories, Inc.	Matrix:	Aqueous	Lab Sample:	1902819-03	Column:	BEH C18
Project:	Statewide WWTP Biosolids PFAS Evaluation	Date Collected:	22-Aug-19 14:35	Date Received:	23-Aug-19 09:59		
Location:	WIXO-Poly Tank-250 gal						

Analyte	CAS Number	Conc. (ng/L)	DL	LOD	LOQ	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
PFBA	375-22-4	ND	1.44	2.10	4.19		B9H0278	30-Aug-19	0.238 L	11-Sep-19 03:46	1
PFPeA	2706-90-3	ND	1.44	2.10	4.19		B9H0278	30-Aug-19	0.238 L	11-Sep-19 03:46	1
PFBS	375-73-5	ND	1.44	2.10	4.19		B9H0278	30-Aug-19	0.238 L	11-Sep-19 03:46	1
4:2 FTS	757124-72-4	ND	1.44	2.10	4.19		B9H0278	30-Aug-19	0.238 L	11-Sep-19 03:46	1
PFHxA	307-24-4	ND	1.44	2.10	4.19		B9H0278	30-Aug-19	0.238 L	11-Sep-19 03:46	1
PFPeS	2706-91-4	ND	1.44	2.10	4.19		B9H0278	30-Aug-19	0.238 L	11-Sep-19 03:46	1
PFHpA	375-85-9	ND	1.44	2.10	4.19		B9H0278	30-Aug-19	0.238 L	11-Sep-19 03:46	1
PFHxS	355-46-4	ND	1.44	2.10	4.19		B9H0278	30-Aug-19	0.238 L	11-Sep-19 03:46	1
6:2 FTS	27619-97-2	ND	1.44	2.10	4.19		B9H0278	30-Aug-19	0.238 L	11-Sep-19 03:46	1
PFOA	335-67-1	ND	1.44	2.10	4.19		B9H0278	30-Aug-19	0.238 L	11-Sep-19 03:46	1
PFHpS	375-92-8	ND	1.44	2.10	4.19		B9H0278	30-Aug-19	0.238 L	11-Sep-19 03:46	1
PFNA	375-95-1	ND	1.44	2.10	4.19		B9H0278	30-Aug-19	0.238 L	11-Sep-19 03:46	1
PFOSA	754-91-6	ND	1.44	2.10	4.19		B9H0278	30-Aug-19	0.238 L	11-Sep-19 03:46	1
PFOS	1763-23-1	ND	1.44	2.10	4.19		B9H0278	30-Aug-19	0.238 L	11-Sep-19 03:46	1
PFDA	335-76-2	ND	1.44	2.10	4.19		B9H0278	30-Aug-19	0.238 L	11-Sep-19 03:46	1
8:2 FTS	39108-34-4	ND	1.44	2.10	4.19		B9H0278	30-Aug-19	0.238 L	11-Sep-19 03:46	1
PFNS	68259-12-1	ND	2.03	2.10	4.19		B9H0278	30-Aug-19	0.238 L	11-Sep-19 03:46	1
MeFOSAA	2355-31-9	ND	1.44	2.10	4.19		B9H0278	30-Aug-19	0.238 L	11-Sep-19 03:46	1
EtFOSAA	2991-50-6	ND	1.44	2.10	4.19		B9H0278	30-Aug-19	0.238 L	11-Sep-19 03:46	1
PFUnA	2058-94-8	ND	1.44	2.10	4.19		B9H0278	30-Aug-19	0.238 L	11-Sep-19 03:46	1
PFDS	335-77-3	ND	1.44	2.10	4.19		B9H0278	30-Aug-19	0.238 L	11-Sep-19 03:46	1
PFDoA	307-55-1	ND	1.44	2.10	4.19		B9H0278	30-Aug-19	0.238 L	11-Sep-19 03:46	1
PFTTrDA	72629-94-8	ND	1.44	2.10	4.19		B9H0278	30-Aug-19	0.238 L	11-Sep-19 03:46	1
PFTeDA	376-06-7	ND	1.44	2.10	4.19		B9H0278	30-Aug-19	0.238 L	11-Sep-19 03:46	1

Labeled Standards	Type	% Recovery	Limits	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
13C3-PFBA	IS	99.0	60 - 130		B9H0278	30-Aug-19	0.238 L	11-Sep-19 03:46	1
13C3-PFPeA	IS	92.7	60 - 150		B9H0278	30-Aug-19	0.238 L	11-Sep-19 03:46	1
13C3-PFBS	IS	104	60 - 150		B9H0278	30-Aug-19	0.238 L	11-Sep-19 03:46	1
13C2-4:2 FTS	IS	112	20 - 150		B9H0278	30-Aug-19	0.238 L	11-Sep-19 03:46	1
13C2-PFHxA	IS	96.8	70 - 130		B9H0278	30-Aug-19	0.238 L	11-Sep-19 03:46	1
13C4-PFHpA	IS	87.7	60 - 150		B9H0278	30-Aug-19	0.238 L	11-Sep-19 03:46	1
13C3-PFHxS	IS	96.3	60 - 130		B9H0278	30-Aug-19	0.238 L	11-Sep-19 03:46	1
13C2-6:2 FTS	IS	96.9	40 - 150		B9H0278	30-Aug-19	0.238 L	11-Sep-19 03:46	1
13C5-PFNA	IS	95.3	50 - 130		B9H0278	30-Aug-19	0.238 L	11-Sep-19 03:46	1
13C8-PFOSA	IS	58.5	20 - 150		B9H0278	30-Aug-19	0.238 L	11-Sep-19 03:46	1
13C2-PFOA	IS	98.8	60 - 130		B9H0278	30-Aug-19	0.238 L	11-Sep-19 03:46	1
13C8-PFOS	IS	86.7	60 - 130		B9H0278	30-Aug-19	0.238 L	11-Sep-19 03:46	1
13C2-PFDA	IS	103	60 - 130		B9H0278	30-Aug-19	0.238 L	11-Sep-19 03:46	1

**Sample ID: EB01-190822** **PFAS Isotope Dilution Method**

Client Data				Laboratory Data			
Name:	Merit Laboratories, Inc.	Matrix:	Aqueous	Lab Sample:	1902819-03	Column:	BEH C18
Project:	Statewide WWTP Biosolids PFAS Evaluation	Date Collected:	22-Aug-19 14:35	Date Received:	23-Aug-19 09:59		
Location:	WIXO-Poly Tank-250 gal						

Labeled Standards	Type	% Recovery	Limits	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
13C2-8:2 FTS	IS	97.4	40 - 150		B9H0278	30-Aug-19	0.238 L	11-Sep-19 03:46	1
d3-MeFOSAA	IS	105	50 - 150		B9H0278	30-Aug-19	0.238 L	11-Sep-19 03:46	1
13C2-PFUnA	IS	89.7	60 - 130		B9H0278	30-Aug-19	0.238 L	11-Sep-19 03:46	1
d5-EtFOSAA	IS	94.6	50 - 150		B9H0278	30-Aug-19	0.238 L	11-Sep-19 03:46	1
13C2-PFDoA	IS	76.6	30 - 130		B9H0278	30-Aug-19	0.238 L	11-Sep-19 03:46	1
13C2-PFTeDA	IS	73.0	20 - 150		B9H0278	30-Aug-19	0.238 L	11-Sep-19 03:46	1

DL - Detection Limit

LOD - Limit of Detection  
LOQ - Limit of quantitation

Results reported to the DL.

When reported, PFHxS, PFOA, PFOS, MeFOSAA and EtFOSAA include both linear and branched isomers. Only the linear isomer is reported for all other analytes.

## DATA QUALIFIERS & ABBREVIATIONS

B	This compound was also detected in the method blank
Conc.	Concentration
D	Dilution
DL	Detection limit
E	The associated compound concentration exceeded the calibration range of the instrument
H	Recovery and/or RPD was outside laboratory acceptance limits
I	Chemical Interference
J	The amount detected is below the Reporting Limit/LOQ
LOD	Limits of Detection
LOQ	Limits of Quantitation
M	Estimated Maximum Possible Concentration (CA Region 2 projects only)
NA	Not applicable
ND	Not Detected
P	The reported concentration may include contribution from chlorinated diphenyl ether(s).
Q	The ion transition ratio is outside of the acceptance criteria.
TEQ	Toxic Equivalency
U	Not Detected (specific projects only)
*	See Cover Letter

Unless otherwise noted, solid sample results are reported in dry weight. Tissue samples are reported in wet weight.

### Vista Analytical Laboratory Certifications

Accrediting Authority	Certificate Number
Alaska Department of Environmental Conservation	17-013
Arkansas Department of Environmental Quality	19-013-0
California Department of Health – ELAP	2892
DoD ELAP - A2LA Accredited - ISO/IEC 17025:2005	3091.01
Florida Department of Health	E87777-23
Hawaii Department of Health	N/A
Louisiana Department of Environmental Quality	01977
Maine Department of Health	2018017
Massachusetts Department of Environmental Protection	N/A
Michigan Department of Environmental Quality	9932
Minnesota Department of Health	1521520
New Hampshire Environmental Accreditation Program	207718-B
New Jersey Department of Environmental Protection	190001
New York Department of Health	11411
Oregon Laboratory Accreditation Program	4042-010
Pennsylvania Department of Environmental Protection	016
Texas Commission on Environmental Quality	T104704189-19-10
Vermont Department of Health	VT-4042
Virginia Department of General Services	10272
Washington Department of Ecology	C584-19
Wisconsin Department of Natural Resources	998036160

*Current certificates and lists of licensed parameters are located in the Quality Assurance office and are available upon request.*

## NELAP Accredited Test Methods

MATRIX: Air	
Description of Test	Method
Determination of Polychlorinated p-Dioxins & Polychlorinated Dibenzofurans	EPA 23
Determination of Polychlorinated p-Dioxins & Polychlorinated Dibenzofurans	EPA TO-9A

MATRIX: Biological Tissue	
Description of Test	Method
Tetra- through Octa-Chlorinated Dioxins and Furans by Isotope Dilution GC/HRMS	EPA 1613B
Brominated Diphenyl Ethers by HRGC/HRMS	EPA 1614A
Chlorinated Biphenyl Congeners in Water, Soil, Sediment, and Tissue by GC/HRMS	EPA 1668A/C
Pesticides in Water, Soil, Sediment, Biosolids, and Tissue by HRGC/HRMS	EPA 1699
Perfluorinated Alkyl Acids in Drinking Water by SPE and LC/MS/MS	EPA 537
Polychlorinated Dibenzo-p-Dioxins and Polychlorinated Dibenzofurans by GC/HRMS	EPA 8280A/B
Polychlorinated Dibenzodioxins (PCDDs) and Polychlorinated Dibenzofurans (PCDFs) by GC/HRMS	EPA 8290/8290A

MATRIX: Drinking Water	
Description of Test	Method
2,3,7,8-Tetrachlorodibenzo- p-dioxin (2,3,7,8-TCDD) GC/HRMS	EPA 1613/1613B
1,4-Dioxane (1,4-Diethyleneoxide) analysis by GC/HRMS	EPA 522
Perfluorinated Alkyl Acids in Drinking Water by SPE and LC/MS/MS	EPA 537
Perfluorinated Alkyl Acids in Drinking Water by SPE and LC/MS/MS	ISO 25101 2009

MATRIX: Non-Potable Water	
Description of Test	Method
Tetra- through Octa-Chlorinated Dioxins and Furans by Isotope Dilution GC/HRMS	EPA 1613B
Brominated Diphenyl Ethers by HRGC/HRMS	EPA 1614A
Chlorinated Biphenyl Congeners in Water, Soil, Sediment, and Tissue by GC/HRMS	EPA 1668A/C
Pesticides in Water, Soil, Sediment, Biosolids, and Tissue by HRGC/HRMS	EPA 1699
Perfluorinated Alkyl Acids in Drinking Water by SPE and LC/MS/MS	EPA 537
Dioxin by GC/HRMS	EPA 613
Polychlorinated Dibenzo-p-Dioxins and Polychlorinated Dibenzofurans by GC/HRMS	EPA 8280A/B
Polychlorinated Dibenzodioxins (PCDDs) and Polychlorinated Dibenzofurans (PCDFs) by GC/HRMS	EPA 8290/8290A

MATRIX: Solids	
Description of Test	Method
Tetra-Octa Chlorinated Dioxins and Furans by Isotope Dilution GC/HRMS	EPA 1613
Tetra- through Octa-Chlorinated Dioxins and Furans by Isotope Dilution GC/HRMS	EPA 1613B
Brominated Diphenyl Ethers by HRGC/HRMS	EPA 1614A
Chlorinated Biphenyl Congeners in Water, Soil, Sediment, and Tissue by GC/HRMS	EPA 1668A/C
Pesticides in Water, Soil, Sediment, Biosolids, and Tissue by HRGC/HRMS	EPA 1699
Perfluorinated Alkyl Acids in Drinking Water by SPE and LC/MS/MS	EPA 537
Polychlorinated Dibenzo-p-Dioxins and Polychlorinated Dibenzofurans by GC/HRMS	EPA 8280A/B
Polychlorinated Dibenzodioxins (PCDDs) and Polychlorinated Dibenzofurans (PCDFs) by GC/HRMS	EPA 8290/8290A









# CHAIN OF CUSTODY

*\* see ~~re~~ revised coc was 08/24/19*

**For Laboratory Use Only**  
 Work Order #: 1902819 Temp: 0.9 °C  
 Storage ID: R-13; WR-2 Storage Secured: Yes  No

Project ID: Wixom Biosolid PO#: 60588767 Sampler: Stan Krenz  
 (name)

TAT Standard:  21 days  
 (check one): Rush (surcharge may apply)  
 14 days  7 days Specify: \_\_\_\_\_

Invoice to: Name Stephanie Kammer Company EGLE Address 525 W. Allegan St City Lansing State MI Ph# (517)-897-1997 Fax# (517)-241-3571

Relinquished by (printed name and signature) Stan Krenz Date 8-22-19 Time 1100 Received by (printed name and signature) Ashley Mason Date 08/23/19 Time 0959  
 Relinquished by (printed name and signature) \_\_\_\_\_ Date \_\_\_\_\_ Time \_\_\_\_\_ Received by (printed name and signature) \_\_\_\_\_ Date \_\_\_\_\_ Time \_\_\_\_\_

Sample ID	Date	Time	Location/Sample Description	Add Analysis(es) Requested										Comments				
				Quantity	Type	Matrix	PFOM/PFOS	UCMR3 PFAS List 6	537 List 14	Full List of 26	Other: Please List Below	PFOM/PFOS	UCMR3 PFAS List 6		PFAS List 14			
EB02-190822	8-22-19	1405	Aluminum Tank	2	P	AQ					X							
EB03-190822	8-22-19	1430	Poly Tank - Auger Pack	2	P	AQ					X							
EB01-190822	8-22-19	1435	Poly Tank - 250 gal	2	P	AQ					X							

Special Instructions/Comments: See email for list of recipients

**SEND DOCUMENTATION AND RESULTS TO:**

Name: Stephanie Kammer  
 Company: EGLE  
 Address: 525 W Allegan St  
 City: Lansing State: MI Zip: 48909  
 Phone: (517)-897-1997 Fax: (517)-241-3571  
 Email: Kammers@Michigan.gov

Container Types: P= HDPE, PJ= HDPE Jar      Bottle Preservation Type: T = Thiosulfate, TZ = Trizma: \_\_\_\_\_  
 Matrix Types: AQ = Aqueous, DW = Drinking Water, EF = Effluent, PP = Pulp/Paper, SD = Sediment, SL = Sludge, SO = Soil, WW = Wastewater, B = Blood/Serum, O = Other: \_\_\_\_\_

# Sample Log-In Checklist

Page # 1 of 1

Vista Work Order #: 1902819 TAT Std

Samples Arrival:	Date/Time <u>08/23/19 0959</u>	Initials: <u>ajm</u>	Location: <u>WR-2</u>
			Shelf/Rack: <u>N/A</u>
Logged In:	Date/Time <u>08/24/19 0721</u>	Initials: <u>JSB</u>	Location: <u>R-13   WR-2</u>
			Shelf/Rack: <u>A2   E6</u>
Delivered By:	<input checked="" type="checkbox"/> FedEx	<input type="checkbox"/> UPS	<input type="checkbox"/> On Trac
	<input type="checkbox"/> GSO	<input type="checkbox"/> DHL	<input type="checkbox"/> Hand Delivered
	<input type="checkbox"/> Other		
Preservation:	<input checked="" type="checkbox"/> Ice	<input type="checkbox"/> Blue Ice	<input type="checkbox"/> Dry Ice
	<input type="checkbox"/> None		
Temp °C: <u>0.9</u> (uncorrected)	Probe used: Y <input checked="" type="checkbox"/> N		Thermometer ID: <u>IR-3</u>
Temp °C: <u>0.9</u> (corrected)			

	YES	NO	NA
Adequate Sample Volume Received?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Holding Time Acceptable?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Shipping Container(s) Intact?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Shipping Custody Seals Intact?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Shipping Documentation Present?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Airbill <u>—</u> Trk # <u>7760 5435 3793</u>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Sample Container Intact?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Sample Custody Seals Intact?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
Chain of Custody / Sample Documentation Present?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
COC Anomaly/Sample Acceptance Form completed?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
If Chlorinated or Drinking Water Samples, Acceptable Preservation?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
Preservation Documented:	<input type="checkbox"/> Yes	<input type="checkbox"/> No	<input checked="" type="checkbox"/> NA
	<input type="checkbox"/> Na <sub>2</sub> S <sub>2</sub> O <sub>3</sub>	<input type="checkbox"/> Trizma	<input checked="" type="checkbox"/> None
	<input type="checkbox"/> Other		
Shipping Container	<input checked="" type="checkbox"/> Vista	<input type="checkbox"/> Client	<input checked="" type="checkbox"/> Retain
	<input type="checkbox"/> Return	<input type="checkbox"/> Dispose	

Comments:



September 26, 2019

**Vista Work Order No. 1903019**

Ms. Maya Murshak  
Merit Laboratories, Inc.  
2680 East Lansing Drive  
East Lansing, MI 48823

Dear Ms. Murshak,

Enclosed are the results for the sample set received at Vista Analytical Laboratory on September 05, 2019 under your Project Name 'Statewide WWTP Biosolids PFAS Evaluation'.

Vista Analytical Laboratory is committed to serving you effectively. If you require additional information, please contact me at 916-673-1520 or by email at [mmaier@vista-analytical.com](mailto:mmaier@vista-analytical.com).

Thank you for choosing Vista as part of your analytical support team.

Sincerely,

Martha Maier  
Laboratory Director



*Vista Analytical Laboratory certifies that the report herein meets all the requirements set forth by NELAP for those applicable test methods. Results relate only to the samples as received by the laboratory. This report should not be reproduced except in full without the written approval of Vista.*

## **Vista Work Order No. 1903019**

### **Case Narrative**

#### **Sample Condition on Receipt:**

Eight aqueous samples were received in good condition and within the method temperature requirements. The samples were received and stored securely in accordance with Vista standard operating procedures and EPA methodology. A revised COC was received by email Sept 5, 2019.

#### **Analytical Notes:**

##### **PFAS Isotope Dilution Method**

Samples "GW1909040925SK" and "FD1909040930SK" contained particulate and were centrifuged prior to extraction.

The samples were extracted and analyzed for a selected list of PFAS using the PFAS Isotope Dilution Method (Modified EPA Method 537). The results for PFHxS, PFOA, PFOS, MeFOSAA, and EtFOSAA include both linear and branched isomers. Results for all other analytes include the linear isomers only.

##### **Holding Times**

The samples were extracted and analyzed within the method hold times.

##### **Quality Control**

The Initial Calibration and Continuing Calibration Verifications met the method acceptance criteria.

A Method Blank and Ongoing Precision and Recovery (OPR) sample were extracted and analyzed with the preparation batch. No analytes were detected in the Method Blank above 1/2 the LOQ concentrations. The OPR recoveries were within the method acceptance criteria.

The labeled standard recoveries for all QC and field samples were within the acceptance criteria.

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# Sample Inventory Report

Vista Sample ID	Client Sample ID	Sampled	Received	Components/Containers
1903019-01	GW1909030955SK	03-Sep-19 09:55	05-Sep-19 09:01	HDPE Bottle, 250 mL HDPE Bottle, 250 mL
1903019-02	GW1909031115SK	03-Sep-19 11:15	05-Sep-19 09:01	HDPE Bottle, 250 mL HDPE Bottle, 250 mL
1903019-03	GW1909031245SK	03-Sep-19 12:45	05-Sep-19 09:01	HDPE Bottle, 250 mL HDPE Bottle, 250 mL
1903019-04	GW1909040925SK	04-Sep-19 09:25	05-Sep-19 09:01	HDPE Bottle, 250 mL HDPE Bottle, 250 mL
1903019-05	FD1909040930SK	04-Sep-19 09:30	05-Sep-19 09:01	HDPE Bottle, 250 mL HDPE Bottle, 250 mL
1903019-06	GW1909041130SK	04-Sep-19 11:30	05-Sep-19 09:01	HDPE Bottle, 250 mL HDPE Bottle, 250 mL
1903019-07	GW1909041220SK	04-Sep-19 12:20	05-Sep-19 09:01	HDPE Bottle, 250 mL HDPE Bottle, 250 mL
1903019-08	FB1909041255SK	04-Sep-19 12:55	05-Sep-19 09:01	HDPE Bottle, 250 mL HDPE Bottle, 250 mL



## **ANALYTICAL RESULTS**

**Sample ID: Method Blank**
**PFAS Isotope Dilution Method**

Client Data				Laboratory Data			
Name:	Merit Laboratories, Inc.	Matrix:	Aqueous	Lab Sample:	B9I0072-BLK1	Column:	BEH C18
Project:	Statewide WWTP Biosolids PFAS Evaluation						

Analyte	CAS Number	Conc. (ng/L)	DL	LOD	LOQ	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
PFBA	375-22-4	ND	1.37	2.00	4.00		B9I0072	11-Sep-19	0.250 L	25-Sep-19 07:14	1
PFPeA	2706-90-3	ND	1.37	2.00	4.00		B9I0072	11-Sep-19	0.250 L	25-Sep-19 07:14	1
PFBS	375-73-5	ND	1.37	2.00	4.00		B9I0072	11-Sep-19	0.250 L	25-Sep-19 07:14	1
4:2 FTS	757124-72-4	ND	1.37	2.00	4.00		B9I0072	11-Sep-19	0.250 L	25-Sep-19 07:14	1
PFHxA	307-24-4	ND	1.37	2.00	4.00		B9I0072	11-Sep-19	0.250 L	25-Sep-19 07:14	1
PFPeS	2706-91-4	ND	1.37	2.00	4.00		B9I0072	11-Sep-19	0.250 L	25-Sep-19 07:14	1
PFHpA	375-85-9	ND	1.37	2.00	4.00		B9I0072	11-Sep-19	0.250 L	25-Sep-19 07:14	1
PFHxS	355-46-4	ND	1.37	2.00	4.00		B9I0072	11-Sep-19	0.250 L	25-Sep-19 07:14	1
6:2 FTS	27619-97-2	ND	1.37	2.00	4.00		B9I0072	11-Sep-19	0.250 L	25-Sep-19 07:14	1
PFOA	335-67-1	ND	1.37	2.00	4.00		B9I0072	11-Sep-19	0.250 L	25-Sep-19 07:14	1
PFHpS	375-92-8	ND	1.37	2.00	4.00		B9I0072	11-Sep-19	0.250 L	25-Sep-19 07:14	1
PFNA	375-95-1	ND	1.37	2.00	4.00		B9I0072	11-Sep-19	0.250 L	25-Sep-19 07:14	1
PFOSA	754-91-6	ND	1.37	2.00	4.00		B9I0072	11-Sep-19	0.250 L	25-Sep-19 07:14	1
PFOS	1763-23-1	ND	1.37	2.00	4.00		B9I0072	11-Sep-19	0.250 L	25-Sep-19 07:14	1
PFDA	335-76-2	ND	1.37	2.00	4.00		B9I0072	11-Sep-19	0.250 L	25-Sep-19 07:14	1
8:2 FTS	39108-34-4	ND	1.37	2.00	4.00		B9I0072	11-Sep-19	0.250 L	25-Sep-19 07:14	1
PFNS	68259-12-1	ND	1.94	2.00	4.00		B9I0072	11-Sep-19	0.250 L	25-Sep-19 07:14	1
MeFOSAA	2355-31-9	ND	1.37	2.00	4.00		B9I0072	11-Sep-19	0.250 L	25-Sep-19 07:14	1
EtFOSAA	2991-50-6	ND	1.37	2.00	4.00		B9I0072	11-Sep-19	0.250 L	25-Sep-19 07:14	1
PFUnA	2058-94-8	ND	1.37	2.00	4.00		B9I0072	11-Sep-19	0.250 L	25-Sep-19 07:14	1
PFDS	335-77-3	ND	1.37	2.00	4.00		B9I0072	11-Sep-19	0.250 L	25-Sep-19 07:14	1
PFDoA	307-55-1	ND	1.37	2.00	4.00		B9I0072	11-Sep-19	0.250 L	25-Sep-19 07:14	1
PFTrDA	72629-94-8	ND	1.37	2.00	4.00		B9I0072	11-Sep-19	0.250 L	25-Sep-19 07:14	1
PFTeDA	376-06-7	ND	1.37	2.00	4.00		B9I0072	11-Sep-19	0.250 L	25-Sep-19 07:14	1

Labeled Standards	Type	% Recovery	Limits	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
13C3-PFBA	IS	96.5	60 - 130		B9I0072	11-Sep-19	0.250 L	25-Sep-19 07:14	1
13C3-PFPeA	IS	94.3	60 - 150		B9I0072	11-Sep-19	0.250 L	25-Sep-19 07:14	1
13C3-PFBS	IS	93.1	60 - 150		B9I0072	11-Sep-19	0.250 L	25-Sep-19 07:14	1
13C2-4:2 FTS	IS	102	20 - 150		B9I0072	11-Sep-19	0.250 L	25-Sep-19 07:14	1
13C2-PFHxA	IS	98.7	70 - 130		B9I0072	11-Sep-19	0.250 L	25-Sep-19 07:14	1
13C4-PFHpA	IS	96.7	60 - 150		B9I0072	11-Sep-19	0.250 L	25-Sep-19 07:14	1
13C3-PFHxS	IS	99.0	60 - 130		B9I0072	11-Sep-19	0.250 L	25-Sep-19 07:14	1
13C2-6:2 FTS	IS	106	40 - 150		B9I0072	11-Sep-19	0.250 L	25-Sep-19 07:14	1
13C5-PFNA	IS	93.7	50 - 130		B9I0072	11-Sep-19	0.250 L	25-Sep-19 07:14	1
13C8-PFOSA	IS	86.3	20 - 150		B9I0072	11-Sep-19	0.250 L	25-Sep-19 07:14	1
13C2-PFOA	IS	93.5	60 - 130		B9I0072	11-Sep-19	0.250 L	25-Sep-19 07:14	1
13C8-PFOS	IS	88.7	60 - 130		B9I0072	11-Sep-19	0.250 L	25-Sep-19 07:14	1
13C2-PFDA	IS	91.8	60 - 130		B9I0072	11-Sep-19	0.250 L	25-Sep-19 07:14	1

**Sample ID: Method Blank** **PFAS Isotope Dilution Method**

<b>Client Data</b>	<b>Laboratory Data</b>
Name: Merit Laboratories, Inc.      Matrix: Aqueous	Lab Sample: B9I0072-BLK1      Column: BEH C18
Project: Statewide WWTP Biosolids PFAS Evaluation	

Labeled Standards	Type	% Recovery	Limits	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
13C2-8:2 FTS	IS	89.3	40 - 150		B9I0072	11-Sep-19	0.250 L	25-Sep-19 07:14	1
d3-MeFOSAA	IS	76.1	50 - 150		B9I0072	11-Sep-19	0.250 L	25-Sep-19 07:14	1
13C2-PFUnA	IS	83.8	60 - 130		B9I0072	11-Sep-19	0.250 L	25-Sep-19 07:14	1
d5-EtFOSAA	IS	72.8	50 - 150		B9I0072	11-Sep-19	0.250 L	25-Sep-19 07:14	1
13C2-PFDoA	IS	81.3	30 - 130		B9I0072	11-Sep-19	0.250 L	25-Sep-19 07:14	1
13C2-PFTeDA	IS	75.9	20 - 150		B9I0072	11-Sep-19	0.250 L	25-Sep-19 07:14	1

DL - Detection Limit

LOD - Limit of Detection  
LOQ - Limit of quantitation

Results reported to the DL.

When reported, PFHxS, PFOA, PFOS, MeFOSAA and EtFOSAA include both linear and branched isomers. Only the linear isomer is reported for all other analytes.

**Sample ID: OPR**

**PFAS Isotope Dilution Method**

Client Data					Laboratory Data				
Name:	Merit Laboratories, Inc.		Matrix:	Aqueous	Lab Sample:	B9I0072-BS1	Column:	BEH C18	
Project:	Statewide WWTP Biosolids PFAS Evaluation								

Analyte	CAS Number	Amt Found (ng/L)	Spike Amt	% Rec	Limits	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
PFBA	375-22-4	35.1	40.0	87.6	70 - 130		B9I0072	11-Sep-19	0.250 L	25-Sep-19 07:04	1
PFPeA	2706-90-3	44.8	40.0	112	70 - 130		B9I0072	11-Sep-19	0.250 L	25-Sep-19 07:04	1
PFBS	375-73-5	38.5	40.0	96.3	70 - 130		B9I0072	11-Sep-19	0.250 L	25-Sep-19 07:04	1
4:2 FTS	757124-72-4	42.2	40.0	106	70 - 130		B9I0072	11-Sep-19	0.250 L	25-Sep-19 07:04	1
PFHxA	307-24-4	41.0	40.0	102	70 - 130		B9I0072	11-Sep-19	0.250 L	25-Sep-19 07:04	1
PFPeS	2706-91-4	39.0	40.0	97.4	70 - 130		B9I0072	11-Sep-19	0.250 L	25-Sep-19 07:04	1
PFHpA	375-85-9	35.4	40.0	88.5	70 - 130		B9I0072	11-Sep-19	0.250 L	25-Sep-19 07:04	1
PFHxS	355-46-4	34.1	40.0	85.2	70 - 130		B9I0072	11-Sep-19	0.250 L	25-Sep-19 07:04	1
6:2 FTS	27619-97-2	40.9	40.0	102	60 - 130		B9I0072	11-Sep-19	0.250 L	25-Sep-19 07:04	1
PFOA	335-67-1	39.8	40.0	99.5	70 - 130		B9I0072	11-Sep-19	0.250 L	25-Sep-19 07:04	1
PFHpS	375-92-8	47.1	40.0	118	60 - 130		B9I0072	11-Sep-19	0.250 L	25-Sep-19 07:04	1
PFNA	375-95-1	35.5	40.0	88.9	70 - 130		B9I0072	11-Sep-19	0.250 L	25-Sep-19 07:04	1
PFOSA	754-91-6	48.0	40.0	120	70 - 130		B9I0072	11-Sep-19	0.250 L	25-Sep-19 07:04	1
PFOS	1763-23-1	34.7	40.0	86.7	70 - 130		B9I0072	11-Sep-19	0.250 L	25-Sep-19 07:04	1
PFDA	335-76-2	44.5	40.0	111	70 - 130		B9I0072	11-Sep-19	0.250 L	25-Sep-19 07:04	1
8:2 FTS	39108-34-4	40.8	40.0	102	60 - 130		B9I0072	11-Sep-19	0.250 L	25-Sep-19 07:04	1
PFNS	68259-12-1	41.8	40.0	105	70 - 130		B9I0072	11-Sep-19	0.250 L	25-Sep-19 07:04	1
MeFOSAA	2355-31-9	45.7	40.0	114	70 - 130		B9I0072	11-Sep-19	0.250 L	25-Sep-19 07:04	1
EtFOSAA	2991-50-6	38.7	40.0	96.8	70 - 130		B9I0072	11-Sep-19	0.250 L	25-Sep-19 07:04	1
PFUnA	2058-94-8	39.0	40.0	97.6	70 - 130		B9I0072	11-Sep-19	0.250 L	25-Sep-19 07:04	1
PFDS	335-77-3	33.4	40.0	83.5	60 - 130		B9I0072	11-Sep-19	0.250 L	25-Sep-19 07:04	1
PFDoA	307-55-1	41.2	40.0	103	70 - 130		B9I0072	11-Sep-19	0.250 L	25-Sep-19 07:04	1
PFTTrDA	72629-94-8	35.2	40.0	87.9	60 - 130		B9I0072	11-Sep-19	0.250 L	25-Sep-19 07:04	1
PFTeDA	376-06-7	38.9	40.0	97.2	70 - 130		B9I0072	11-Sep-19	0.250 L	25-Sep-19 07:04	1

Labeled Standards	Type	% Rec	Limits	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
13C3-PFBA	IS	99.6	60- 130		B9I0072	11-Sep-19	0.250 L	25-Sep-19 07:04	1
13C3-PFPeA	IS	97.2	60- 150		B9I0072	11-Sep-19	0.250 L	25-Sep-19 07:04	1
13C3-PFBS	IS	108	60- 150		B9I0072	11-Sep-19	0.250 L	25-Sep-19 07:04	1
13C2-4:2 FTS	IS	109	20- 150		B9I0072	11-Sep-19	0.250 L	25-Sep-19 07:04	1
13C2-PFHxA	IS	98.6	70- 130		B9I0072	11-Sep-19	0.250 L	25-Sep-19 07:04	1
13C4-PFHpA	IS	94.5	60- 150		B9I0072	11-Sep-19	0.250 L	25-Sep-19 07:04	1
13C3-PFHxS	IS	113	60- 130		B9I0072	11-Sep-19	0.250 L	25-Sep-19 07:04	1
13C2-6:2 FTS	IS	100	40- 150		B9I0072	11-Sep-19	0.250 L	25-Sep-19 07:04	1
13C5-PFNA	IS	104	50- 130		B9I0072	11-Sep-19	0.250 L	25-Sep-19 07:04	1
13C8-PFOSA	IS	82.0	20- 150		B9I0072	11-Sep-19	0.250 L	25-Sep-19 07:04	1

**Sample ID: OPR**

**PFAS Isotope Dilution Method**

Client Data				Laboratory Data			
Name:	Merit Laboratories, Inc.	Matrix:	Aqueous	Lab Sample:	B9I0072-BS1	Column:	BEH C18
Project:	Statewide WWTP Biosolids PFAS Evaluation						

Labeled Standards	Type	% Rec	Limits	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
13C2-PFOA	IS	99.5	60- 130		B9I0072	11-Sep-19	0.250 L	25-Sep-19 07:04	1
13C8-PFOS	IS	90.3	60- 130		B9I0072	11-Sep-19	0.250 L	25-Sep-19 07:04	1
13C2-PFDA	IS	90.0	60- 130		B9I0072	11-Sep-19	0.250 L	25-Sep-19 07:04	1
13C2-8:2 FTS	IS	90.3	40- 150		B9I0072	11-Sep-19	0.250 L	25-Sep-19 07:04	1
d3-MeFOSAA	IS	75.6	50- 150		B9I0072	11-Sep-19	0.250 L	25-Sep-19 07:04	1
13C2-PFUnA	IS	84.3	60- 130		B9I0072	11-Sep-19	0.250 L	25-Sep-19 07:04	1
d5-EtFOSAA	IS	79.1	50- 150		B9I0072	11-Sep-19	0.250 L	25-Sep-19 07:04	1
13C2-PFDoA	IS	84.2	30- 130		B9I0072	11-Sep-19	0.250 L	25-Sep-19 07:04	1
13C2-PFTeDA	IS	76.2	20- 150		B9I0072	11-Sep-19	0.250 L	25-Sep-19 07:04	1

**Sample ID: GW1909030955SK**

**PFAS Isotope Dilution Method**

Client Data				Laboratory Data			
Name:	Merit Laboratories, Inc.	Matrix:	Aqueous	Lab Sample:	1903019-01	Column:	BEH C18
Project:	Statewide WWTP Biosolids PFAS Evaluation	Date Collected:	03-Sep-19 09:55	Date Received:	05-Sep-19 09:01		
Location:	WIXO-BC01-MW1D						

Analyte	CAS Number	Conc. (ng/L)	DL	LOD	LOQ	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
PFBA	375-22-4	ND	1.36	1.98	3.97		B9I0072	11-Sep-19	0.252 L	25-Sep-19 08:39	1
PFPeA	2706-90-3	ND	1.36	1.98	3.97		B9I0072	11-Sep-19	0.252 L	25-Sep-19 08:39	1
PFBS	375-73-5	ND	1.36	1.98	3.97		B9I0072	11-Sep-19	0.252 L	25-Sep-19 08:39	1
4:2 FTS	757124-72-4	ND	1.36	1.98	3.97		B9I0072	11-Sep-19	0.252 L	25-Sep-19 08:39	1
PFHxA	307-24-4	ND	1.36	1.98	3.97		B9I0072	11-Sep-19	0.252 L	25-Sep-19 08:39	1
PFPeS	2706-91-4	ND	1.36	1.98	3.97		B9I0072	11-Sep-19	0.252 L	25-Sep-19 08:39	1
PFHpA	375-85-9	ND	1.36	1.98	3.97		B9I0072	11-Sep-19	0.252 L	25-Sep-19 08:39	1
PFHxS	355-46-4	ND	1.36	1.98	3.97		B9I0072	11-Sep-19	0.252 L	25-Sep-19 08:39	1
6:2 FTS	27619-97-2	ND	1.36	1.98	3.97		B9I0072	11-Sep-19	0.252 L	25-Sep-19 08:39	1
PFOA	335-67-1	ND	1.36	1.98	3.97		B9I0072	11-Sep-19	0.252 L	25-Sep-19 08:39	1
PFHpS	375-92-8	ND	1.36	1.98	3.97		B9I0072	11-Sep-19	0.252 L	25-Sep-19 08:39	1
PFNA	375-95-1	ND	1.36	1.98	3.97		B9I0072	11-Sep-19	0.252 L	25-Sep-19 08:39	1
PFOSA	754-91-6	ND	1.36	1.98	3.97		B9I0072	11-Sep-19	0.252 L	25-Sep-19 08:39	1
PFOS	1763-23-1	ND	1.36	1.98	3.97		B9I0072	11-Sep-19	0.252 L	25-Sep-19 08:39	1
PFDA	335-76-2	ND	1.36	1.98	3.97		B9I0072	11-Sep-19	0.252 L	25-Sep-19 08:39	1
8:2 FTS	39108-34-4	ND	1.36	1.98	3.97		B9I0072	11-Sep-19	0.252 L	25-Sep-19 08:39	1
PFNS	68259-12-1	ND	1.92	1.98	3.97		B9I0072	11-Sep-19	0.252 L	25-Sep-19 08:39	1
MeFOSAA	2355-31-9	ND	1.36	1.98	3.97		B9I0072	11-Sep-19	0.252 L	25-Sep-19 08:39	1
EtFOSAA	2991-50-6	ND	1.36	1.98	3.97		B9I0072	11-Sep-19	0.252 L	25-Sep-19 08:39	1
PFUnA	2058-94-8	ND	1.36	1.98	3.97		B9I0072	11-Sep-19	0.252 L	25-Sep-19 08:39	1
PFDS	335-77-3	ND	1.36	1.98	3.97		B9I0072	11-Sep-19	0.252 L	25-Sep-19 08:39	1
PFDoA	307-55-1	ND	1.36	1.98	3.97		B9I0072	11-Sep-19	0.252 L	25-Sep-19 08:39	1
PFTTrDA	72629-94-8	ND	1.36	1.98	3.97		B9I0072	11-Sep-19	0.252 L	25-Sep-19 08:39	1
PFTeDA	376-06-7	ND	1.36	1.98	3.97		B9I0072	11-Sep-19	0.252 L	25-Sep-19 08:39	1

Labeled Standards	Type	% Recovery	Limits	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
13C3-PFBA	IS	103	60 - 130		B9I0072	11-Sep-19	0.252 L	25-Sep-19 08:39	1
13C3-PFPeA	IS	107	60 - 150		B9I0072	11-Sep-19	0.252 L	25-Sep-19 08:39	1
13C3-PFBS	IS	109	60 - 150		B9I0072	11-Sep-19	0.252 L	25-Sep-19 08:39	1
13C2-4:2 FTS	IS	110	20 - 150		B9I0072	11-Sep-19	0.252 L	25-Sep-19 08:39	1
13C2-PFHxA	IS	104	70 - 130		B9I0072	11-Sep-19	0.252 L	25-Sep-19 08:39	1
13C4-PFHpA	IS	101	60 - 150		B9I0072	11-Sep-19	0.252 L	25-Sep-19 08:39	1
13C3-PFHxS	IS	105	60 - 130		B9I0072	11-Sep-19	0.252 L	25-Sep-19 08:39	1
13C2-6:2 FTS	IS	117	40 - 150		B9I0072	11-Sep-19	0.252 L	25-Sep-19 08:39	1
13C5-PFNA	IS	101	50 - 130		B9I0072	11-Sep-19	0.252 L	25-Sep-19 08:39	1
13C8-PFOSA	IS	82.0	20 - 150		B9I0072	11-Sep-19	0.252 L	25-Sep-19 08:39	1
13C2-PFOA	IS	104	60 - 130		B9I0072	11-Sep-19	0.252 L	25-Sep-19 08:39	1
13C8-PFOS	IS	98.5	60 - 130		B9I0072	11-Sep-19	0.252 L	25-Sep-19 08:39	1
13C2-PFDA	IS	98.6	60 - 130		B9I0072	11-Sep-19	0.252 L	25-Sep-19 08:39	1

**Sample ID: GW1909030955SK** **PFAS Isotope Dilution Method**

Client Data				Laboratory Data			
Name:	Merit Laboratories, Inc.	Matrix:	Aqueous	Lab Sample:	1903019-01	Column:	BEH C18
Project:	Statewide WWTP Biosolids PFAS Evaluation	Date Collected:	03-Sep-19 09:55	Date Received:	05-Sep-19 09:01		
Location:	WIXO-BC01-MW1D						

Labeled Standards	Type	% Recovery	Limits	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
13C2-8:2 FTS	IS	102	40 - 150		B9I0072	11-Sep-19	0.252 L	25-Sep-19 08:39	1
d3-MeFOSAA	IS	82.6	50 - 150		B9I0072	11-Sep-19	0.252 L	25-Sep-19 08:39	1
13C2-PFUnA	IS	83.6	60 - 130		B9I0072	11-Sep-19	0.252 L	25-Sep-19 08:39	1
d5-EtFOSAA	IS	84.4	50 - 150		B9I0072	11-Sep-19	0.252 L	25-Sep-19 08:39	1
13C2-PFDoA	IS	78.9	30 - 130		B9I0072	11-Sep-19	0.252 L	25-Sep-19 08:39	1
13C2-PFTeDA	IS	73.9	20 - 150		B9I0072	11-Sep-19	0.252 L	25-Sep-19 08:39	1

DL - Detection Limit	LOD - Limit of Detection	Results reported to the DL.	When reported, PFHxS, PFOA, PFOS, MeFOSAA and EtFOSAA include both linear and branched isomers. Only the linear isomer is reported for all other analytes.
	LOQ - Limit of quantitation		

**Sample ID: GW1909031115SK**

**PFAS Isotope Dilution Method**

Client Data				Laboratory Data			
Name:	Merit Laboratories, Inc.	Matrix:	Aqueous	Lab Sample:	1903019-02	Column:	BEH C18
Project:	Statewide WWTP Biosolids PFAS Evaluation	Date Collected:	03-Sep-19 11:15	Date Received:	05-Sep-19 09:01		
Location:	WIXO-BC01-MW1S						

Analyte	CAS Number	Conc. (ng/L)	DL	LOD	LOQ	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
PFBA	375-22-4	ND	1.33	1.94	3.88		B9I0072	11-Sep-19	0.258 L	25-Sep-19 08:50	1
PFPeA	2706-90-3	ND	1.33	1.94	3.88		B9I0072	11-Sep-19	0.258 L	25-Sep-19 08:50	1
PFBS	375-73-5	ND	1.33	1.94	3.88		B9I0072	11-Sep-19	0.258 L	25-Sep-19 08:50	1
4:2 FTS	757124-72-4	ND	1.33	1.94	3.88		B9I0072	11-Sep-19	0.258 L	25-Sep-19 08:50	1
PFHxA	307-24-4	ND	1.33	1.94	3.88		B9I0072	11-Sep-19	0.258 L	25-Sep-19 08:50	1
PFPeS	2706-91-4	ND	1.33	1.94	3.88		B9I0072	11-Sep-19	0.258 L	25-Sep-19 08:50	1
PFHpA	375-85-9	ND	1.33	1.94	3.88		B9I0072	11-Sep-19	0.258 L	25-Sep-19 08:50	1
PFHxS	355-46-4	ND	1.33	1.94	3.88		B9I0072	11-Sep-19	0.258 L	25-Sep-19 08:50	1
6:2 FTS	27619-97-2	ND	1.33	1.94	3.88		B9I0072	11-Sep-19	0.258 L	25-Sep-19 08:50	1
PFOA	335-67-1	ND	1.33	1.94	3.88		B9I0072	11-Sep-19	0.258 L	25-Sep-19 08:50	1
PFHpS	375-92-8	ND	1.33	1.94	3.88		B9I0072	11-Sep-19	0.258 L	25-Sep-19 08:50	1
PFNA	375-95-1	ND	1.33	1.94	3.88		B9I0072	11-Sep-19	0.258 L	25-Sep-19 08:50	1
PFOSA	754-91-6	ND	1.33	1.94	3.88		B9I0072	11-Sep-19	0.258 L	25-Sep-19 08:50	1
PFOS	1763-23-1	ND	1.33	1.94	3.88		B9I0072	11-Sep-19	0.258 L	25-Sep-19 08:50	1
PFDA	335-76-2	ND	1.33	1.94	3.88		B9I0072	11-Sep-19	0.258 L	25-Sep-19 08:50	1
8:2 FTS	39108-34-4	ND	1.33	1.94	3.88		B9I0072	11-Sep-19	0.258 L	25-Sep-19 08:50	1
PFNS	68259-12-1	ND	1.88	1.94	3.88		B9I0072	11-Sep-19	0.258 L	25-Sep-19 08:50	1
MeFOSAA	2355-31-9	ND	1.33	1.94	3.88		B9I0072	11-Sep-19	0.258 L	25-Sep-19 08:50	1
EtFOSAA	2991-50-6	ND	1.33	1.94	3.88		B9I0072	11-Sep-19	0.258 L	25-Sep-19 08:50	1
PFUnA	2058-94-8	ND	1.33	1.94	3.88		B9I0072	11-Sep-19	0.258 L	25-Sep-19 08:50	1
PFDS	335-77-3	ND	1.33	1.94	3.88		B9I0072	11-Sep-19	0.258 L	25-Sep-19 08:50	1
PFDoA	307-55-1	ND	1.33	1.94	3.88		B9I0072	11-Sep-19	0.258 L	25-Sep-19 08:50	1
PFTTrDA	72629-94-8	ND	1.33	1.94	3.88		B9I0072	11-Sep-19	0.258 L	25-Sep-19 08:50	1
PFTeDA	376-06-7	ND	1.33	1.94	3.88		B9I0072	11-Sep-19	0.258 L	25-Sep-19 08:50	1

Labeled Standards	Type	% Recovery	Limits	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
13C3-PFBA	IS	93.0	60 - 130		B9I0072	11-Sep-19	0.258 L	25-Sep-19 08:50	1
13C3-PFPeA	IS	87.9	60 - 150		B9I0072	11-Sep-19	0.258 L	25-Sep-19 08:50	1
13C3-PFBS	IS	94.4	60 - 150		B9I0072	11-Sep-19	0.258 L	25-Sep-19 08:50	1
13C2-4:2 FTS	IS	98.9	20 - 150		B9I0072	11-Sep-19	0.258 L	25-Sep-19 08:50	1
13C2-PFHxA	IS	90.3	70 - 130		B9I0072	11-Sep-19	0.258 L	25-Sep-19 08:50	1
13C4-PFHpA	IS	88.9	60 - 150		B9I0072	11-Sep-19	0.258 L	25-Sep-19 08:50	1
13C3-PFHxS	IS	93.7	60 - 130		B9I0072	11-Sep-19	0.258 L	25-Sep-19 08:50	1
13C2-6:2 FTS	IS	104	40 - 150		B9I0072	11-Sep-19	0.258 L	25-Sep-19 08:50	1
13C5-PFNA	IS	92.6	50 - 130		B9I0072	11-Sep-19	0.258 L	25-Sep-19 08:50	1
13C8-PFOSA	IS	81.9	20 - 150		B9I0072	11-Sep-19	0.258 L	25-Sep-19 08:50	1
13C2-PFOA	IS	93.8	60 - 130		B9I0072	11-Sep-19	0.258 L	25-Sep-19 08:50	1
13C8-PFOS	IS	85.4	60 - 130		B9I0072	11-Sep-19	0.258 L	25-Sep-19 08:50	1
13C2-PFDA	IS	85.7	60 - 130		B9I0072	11-Sep-19	0.258 L	25-Sep-19 08:50	1



**Sample ID: GW1909031115SK** **PFAS Isotope Dilution Method**

Client Data				Laboratory Data			
Name:	Merit Laboratories, Inc.	Matrix:	Aqueous	Lab Sample:	1903019-02	Column:	BEH C18
Project:	Statewide WWTP Biosolids PFAS Evaluation	Date Collected:	03-Sep-19 11:15	Date Received:	05-Sep-19 09:01		
Location:	WIXO-BC01-MW1S						

Labeled Standards	Type	% Recovery	Limits	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
13C2-8:2 FTS	IS	85.4	40 - 150		B9I0072	11-Sep-19	0.258 L	25-Sep-19 08:50	1
d3-MeFOSAA	IS	74.3	50 - 150		B9I0072	11-Sep-19	0.258 L	25-Sep-19 08:50	1
13C2-PFUnA	IS	78.0	60 - 130		B9I0072	11-Sep-19	0.258 L	25-Sep-19 08:50	1
d5-EtFOSAA	IS	71.2	50 - 150		B9I0072	11-Sep-19	0.258 L	25-Sep-19 08:50	1
13C2-PFDoA	IS	70.2	30 - 130		B9I0072	11-Sep-19	0.258 L	25-Sep-19 08:50	1
13C2-PFTeDA	IS	79.2	20 - 150		B9I0072	11-Sep-19	0.258 L	25-Sep-19 08:50	1

DL - Detection Limit

LOD - Limit of Detection  
LOQ - Limit of quantitation

Results reported to the DL.

When reported, PFHxS, PFOA, PFOS, MeFOSAA and EtFOSAA include both linear and branched isomers. Only the linear isomer is reported for all other analytes.

**Sample ID: GW1909031245SK**

**PFAS Isotope Dilution Method**

Client Data				Laboratory Data			
Name:	Merit Laboratories, Inc.	Matrix:	Aqueous	Lab Sample:	1903019-03	Column:	BEH C18
Project:	Statewide WWTP Biosolids PFAS Evaluation	Date Collected:	03-Sep-19 12:45	Date Received:	05-Sep-19 09:01		
Location:	WIXO-BC02-MW1S						

Analyte	CAS Number	Conc. (ng/L)	DL	LOD	LOQ	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
PFBA	375-22-4	ND	1.45	2.11	4.22		B9I0072	11-Sep-19	0.237 L	25-Sep-19 09:00	1
PFPeA	2706-90-3	ND	1.45	2.11	4.22		B9I0072	11-Sep-19	0.237 L	25-Sep-19 09:00	1
PFBS	375-73-5	8.75	1.45	2.11	4.22		B9I0072	11-Sep-19	0.237 L	25-Sep-19 09:00	1
4:2 FTS	757124-72-4	ND	1.45	2.11	4.22		B9I0072	11-Sep-19	0.237 L	25-Sep-19 09:00	1
PFHxA	307-24-4	ND	1.45	2.11	4.22		B9I0072	11-Sep-19	0.237 L	25-Sep-19 09:00	1
PFPeS	2706-91-4	ND	1.45	2.11	4.22		B9I0072	11-Sep-19	0.237 L	25-Sep-19 09:00	1
PFHpA	375-85-9	ND	1.45	2.11	4.22		B9I0072	11-Sep-19	0.237 L	25-Sep-19 09:00	1
PFHxS	355-46-4	ND	1.45	2.11	4.22		B9I0072	11-Sep-19	0.237 L	25-Sep-19 09:00	1
6:2 FTS	27619-97-2	ND	1.45	2.11	4.22		B9I0072	11-Sep-19	0.237 L	25-Sep-19 09:00	1
PFOA	335-67-1	ND	1.45	2.11	4.22		B9I0072	11-Sep-19	0.237 L	25-Sep-19 09:00	1
PFHpS	375-92-8	ND	1.45	2.11	4.22		B9I0072	11-Sep-19	0.237 L	25-Sep-19 09:00	1
PFNA	375-95-1	ND	1.45	2.11	4.22		B9I0072	11-Sep-19	0.237 L	25-Sep-19 09:00	1
PFOSA	754-91-6	ND	1.45	2.11	4.22		B9I0072	11-Sep-19	0.237 L	25-Sep-19 09:00	1
PFOS	1763-23-1	ND	1.45	2.11	4.22		B9I0072	11-Sep-19	0.237 L	25-Sep-19 09:00	1
PFDA	335-76-2	ND	1.45	2.11	4.22		B9I0072	11-Sep-19	0.237 L	25-Sep-19 09:00	1
8:2 FTS	39108-34-4	ND	1.45	2.11	4.22		B9I0072	11-Sep-19	0.237 L	25-Sep-19 09:00	1
PFNS	68259-12-1	ND	2.04	2.11	4.22		B9I0072	11-Sep-19	0.237 L	25-Sep-19 09:00	1
MeFOSAA	2355-31-9	ND	1.45	2.11	4.22		B9I0072	11-Sep-19	0.237 L	25-Sep-19 09:00	1
EtFOSAA	2991-50-6	ND	1.45	2.11	4.22		B9I0072	11-Sep-19	0.237 L	25-Sep-19 09:00	1
PFOA	2058-94-8	ND	1.45	2.11	4.22		B9I0072	11-Sep-19	0.237 L	25-Sep-19 09:00	1
PFDS	335-77-3	ND	1.45	2.11	4.22		B9I0072	11-Sep-19	0.237 L	25-Sep-19 09:00	1
PFDoA	307-55-1	ND	1.45	2.11	4.22		B9I0072	11-Sep-19	0.237 L	25-Sep-19 09:00	1
PFTTrDA	72629-94-8	ND	1.45	2.11	4.22		B9I0072	11-Sep-19	0.237 L	25-Sep-19 09:00	1
PFTeDA	376-06-7	ND	1.45	2.11	4.22		B9I0072	11-Sep-19	0.237 L	25-Sep-19 09:00	1

Labeled Standards	Type	% Recovery	Limits	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
13C3-PFBA	IS	96.3	60 - 130		B9I0072	11-Sep-19	0.237 L	25-Sep-19 09:00	1
13C3-PFPeA	IS	99.4	60 - 150		B9I0072	11-Sep-19	0.237 L	25-Sep-19 09:00	1
13C3-PFBS	IS	104	60 - 150		B9I0072	11-Sep-19	0.237 L	25-Sep-19 09:00	1
13C2-4:2 FTS	IS	105	20 - 150		B9I0072	11-Sep-19	0.237 L	25-Sep-19 09:00	1
13C2-PFHxA	IS	100	70 - 130		B9I0072	11-Sep-19	0.237 L	25-Sep-19 09:00	1
13C4-PFHpA	IS	101	60 - 150		B9I0072	11-Sep-19	0.237 L	25-Sep-19 09:00	1
13C3-PFHxS	IS	103	60 - 130		B9I0072	11-Sep-19	0.237 L	25-Sep-19 09:00	1
13C2-6:2 FTS	IS	99.9	40 - 150		B9I0072	11-Sep-19	0.237 L	25-Sep-19 09:00	1
13C5-PFNA	IS	95.3	50 - 130		B9I0072	11-Sep-19	0.237 L	25-Sep-19 09:00	1
13C8-PFOSA	IS	87.0	20 - 150		B9I0072	11-Sep-19	0.237 L	25-Sep-19 09:00	1
13C2-PFOA	IS	92.3	60 - 130		B9I0072	11-Sep-19	0.237 L	25-Sep-19 09:00	1
13C8-PFOS	IS	92.6	60 - 130		B9I0072	11-Sep-19	0.237 L	25-Sep-19 09:00	1
13C2-PFDA	IS	87.0	60 - 130		B9I0072	11-Sep-19	0.237 L	25-Sep-19 09:00	1

**Sample ID: GW1909031245SK** **PFAS Isotope Dilution Method**

Client Data				Laboratory Data			
Name:	Merit Laboratories, Inc.	Matrix:	Aqueous	Lab Sample:	1903019-03	Column:	BEH C18
Project:	Statewide WWTP Biosolids PFAS Evaluation	Date Collected:	03-Sep-19 12:45	Date Received:	05-Sep-19 09:01		
Location:	WIXO-BC02-MW1S						

Labeled Standards	Type	% Recovery	Limits	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
13C2-8:2 FTS	IS	96.9	40 - 150		B9I0072	11-Sep-19	0.237 L	25-Sep-19 09:00	1
d3-MeFOSAA	IS	76.9	50 - 150		B9I0072	11-Sep-19	0.237 L	25-Sep-19 09:00	1
13C2-PFUnA	IS	80.7	60 - 130		B9I0072	11-Sep-19	0.237 L	25-Sep-19 09:00	1
d5-EtFOSAA	IS	72.2	50 - 150		B9I0072	11-Sep-19	0.237 L	25-Sep-19 09:00	1
13C2-PFDoA	IS	74.4	30 - 130		B9I0072	11-Sep-19	0.237 L	25-Sep-19 09:00	1
13C2-PFTeDA	IS	75.5	20 - 150		B9I0072	11-Sep-19	0.237 L	25-Sep-19 09:00	1

DL - Detection Limit

LOD - Limit of Detection  
LOQ - Limit of quantitation

Results reported to the DL.

When reported, PFHxS, PFOA, PFOS, MeFOSAA and EtFOSAA include both linear and branched isomers. Only the linear isomer is reported for all other analytes.

**Sample ID: GW1909040925SK**
**PFAS Isotope Dilution Method**

Client Data				Laboratory Data			
Name:	Merit Laboratories, Inc.	Matrix:	Aqueous	Lab Sample:	1903019-04	Column:	BEH C18
Project:	Statewide WWTP Biosolids PFAS Evaluation	Date Collected:	04-Sep-19 09:25	Date Received:	05-Sep-19 09:01		
Location:	WIXO-BC02-MW1D						

Analyte	CAS Number	Conc. (ng/L)	DL	LOD	LOQ	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
PFBA	375-22-4	ND	1.42	2.07	4.16		B9I0072	11-Sep-19	0.241 L	25-Sep-19 09:11	1
PFPeA	2706-90-3	ND	1.42	2.07	4.16		B9I0072	11-Sep-19	0.241 L	25-Sep-19 09:11	1
PFBS	375-73-5	ND	1.42	2.07	4.16		B9I0072	11-Sep-19	0.241 L	25-Sep-19 09:11	1
4:2 FTS	757124-72-4	ND	1.42	2.07	4.16		B9I0072	11-Sep-19	0.241 L	25-Sep-19 09:11	1
PFHxA	307-24-4	ND	1.42	2.07	4.16		B9I0072	11-Sep-19	0.241 L	25-Sep-19 09:11	1
PFPeS	2706-91-4	ND	1.42	2.07	4.16		B9I0072	11-Sep-19	0.241 L	25-Sep-19 09:11	1
PFHpA	375-85-9	ND	1.42	2.07	4.16		B9I0072	11-Sep-19	0.241 L	25-Sep-19 09:11	1
PFHxS	355-46-4	ND	1.42	2.07	4.16		B9I0072	11-Sep-19	0.241 L	25-Sep-19 09:11	1
6:2 FTS	27619-97-2	ND	1.42	2.07	4.16		B9I0072	11-Sep-19	0.241 L	25-Sep-19 09:11	1
PFOA	335-67-1	ND	1.42	2.07	4.16		B9I0072	11-Sep-19	0.241 L	25-Sep-19 09:11	1
PFHpS	375-92-8	ND	1.42	2.07	4.16		B9I0072	11-Sep-19	0.241 L	25-Sep-19 09:11	1
PFNA	375-95-1	ND	1.42	2.07	4.16		B9I0072	11-Sep-19	0.241 L	25-Sep-19 09:11	1
PFOSA	754-91-6	ND	1.42	2.07	4.16		B9I0072	11-Sep-19	0.241 L	25-Sep-19 09:11	1
PFOS	1763-23-1	ND	1.42	2.07	4.16		B9I0072	11-Sep-19	0.241 L	25-Sep-19 09:11	1
PFDA	335-76-2	ND	1.42	2.07	4.16		B9I0072	11-Sep-19	0.241 L	25-Sep-19 09:11	1
8:2 FTS	39108-34-4	ND	1.42	2.07	4.16		B9I0072	11-Sep-19	0.241 L	25-Sep-19 09:11	1
PFNS	68259-12-1	ND	2.01	2.07	4.16		B9I0072	11-Sep-19	0.241 L	25-Sep-19 09:11	1
MeFOSAA	2355-31-9	ND	1.42	2.07	4.16		B9I0072	11-Sep-19	0.241 L	25-Sep-19 09:11	1
EtFOSAA	2991-50-6	ND	1.42	2.07	4.16		B9I0072	11-Sep-19	0.241 L	25-Sep-19 09:11	1
PFOA	2058-94-8	ND	1.42	2.07	4.16		B9I0072	11-Sep-19	0.241 L	25-Sep-19 09:11	1
PFDS	335-77-3	ND	1.42	2.07	4.16		B9I0072	11-Sep-19	0.241 L	25-Sep-19 09:11	1
PFDoA	307-55-1	ND	1.42	2.07	4.16		B9I0072	11-Sep-19	0.241 L	25-Sep-19 09:11	1
PFTTrDA	72629-94-8	ND	1.42	2.07	4.16		B9I0072	11-Sep-19	0.241 L	25-Sep-19 09:11	1
PFTeDA	376-06-7	ND	1.42	2.07	4.16		B9I0072	11-Sep-19	0.241 L	25-Sep-19 09:11	1

Labeled Standards	Type	% Recovery	Limits	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
13C3-PFBA	IS	103	60 - 130		B9I0072	11-Sep-19	0.241 L	25-Sep-19 09:11	1
13C3-PFPeA	IS	112	60 - 150		B9I0072	11-Sep-19	0.241 L	25-Sep-19 09:11	1
13C3-PFBS	IS	99.5	60 - 150		B9I0072	11-Sep-19	0.241 L	25-Sep-19 09:11	1
13C2-4:2 FTS	IS	108	20 - 150		B9I0072	11-Sep-19	0.241 L	25-Sep-19 09:11	1
13C2-PFHxA	IS	103	70 - 130		B9I0072	11-Sep-19	0.241 L	25-Sep-19 09:11	1
13C4-PFHpA	IS	108	60 - 150		B9I0072	11-Sep-19	0.241 L	25-Sep-19 09:11	1
13C3-PFHxS	IS	104	60 - 130		B9I0072	11-Sep-19	0.241 L	25-Sep-19 09:11	1
13C2-6:2 FTS	IS	105	40 - 150		B9I0072	11-Sep-19	0.241 L	25-Sep-19 09:11	1
13C5-PFNA	IS	109	50 - 130		B9I0072	11-Sep-19	0.241 L	25-Sep-19 09:11	1
13C8-PFOSA	IS	96.3	20 - 150		B9I0072	11-Sep-19	0.241 L	25-Sep-19 09:11	1
13C2-PFOA	IS	100	60 - 130		B9I0072	11-Sep-19	0.241 L	25-Sep-19 09:11	1
13C8-PFOS	IS	93.7	60 - 130		B9I0072	11-Sep-19	0.241 L	25-Sep-19 09:11	1
13C2-PFDA	IS	95.6	60 - 130		B9I0072	11-Sep-19	0.241 L	25-Sep-19 09:11	1

**Sample ID: GW1909040925SK** **PFAS Isotope Dilution Method**

Client Data				Laboratory Data			
Name:	Merit Laboratories, Inc.	Matrix:	Aqueous	Lab Sample:	1903019-04	Column:	BEH C18
Project:	Statewide WWTP Biosolids PFAS Evaluation	Date Collected:	04-Sep-19 09:25	Date Received:	05-Sep-19 09:01		
Location:	WIXO-BC02-MW1D						

Labeled Standards	Type	% Recovery	Limits	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
13C2-8:2 FTS	IS	96.6	40 - 150		B9I0072	11-Sep-19	0.241 L	25-Sep-19 09:11	1
d3-MeFOSAA	IS	96.5	50 - 150		B9I0072	11-Sep-19	0.241 L	25-Sep-19 09:11	1
13C2-PFUnA	IS	94.6	60 - 130		B9I0072	11-Sep-19	0.241 L	25-Sep-19 09:11	1
d5-EtFOSAA	IS	90.4	50 - 150		B9I0072	11-Sep-19	0.241 L	25-Sep-19 09:11	1
13C2-PFDoA	IS	75.7	30 - 130		B9I0072	11-Sep-19	0.241 L	25-Sep-19 09:11	1
13C2-PFTeDA	IS	56.5	20 - 150		B9I0072	11-Sep-19	0.241 L	25-Sep-19 09:11	1

DL - Detection Limit

LOD - Limit of Detection  
LOQ - Limit of quantitation

Results reported to the DL.

When reported, PFHxS, PFOA, PFOS, MeFOSAA and EtFOSAA include both linear and branched isomers. Only the linear isomer is reported for all other analytes.

**Sample ID: FD1909040930SK**

**PFAS Isotope Dilution Method**

Client Data				Laboratory Data			
Name:	Merit Laboratories, Inc.	Matrix:	Aqueous	Lab Sample:	1903019-05	Column:	BEH C18
Project:	Statewide WWTP Biosolids PFAS Evaluation	Date Collected:	04-Sep-19 09:30	Date Received:	05-Sep-19 09:01		
Location:	Field Dup						

Analyte	CAS Number	Conc. (ng/L)	DL	LOD	LOQ	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
PFBA	375-22-4	ND	1.36	1.99	3.98		B9I0072	11-Sep-19	0.251 L	25-Sep-19 09:21	1
PFPeA	2706-90-3	ND	1.36	1.99	3.98		B9I0072	11-Sep-19	0.251 L	25-Sep-19 09:21	1
PFBS	375-73-5	ND	1.36	1.99	3.98		B9I0072	11-Sep-19	0.251 L	25-Sep-19 09:21	1
4:2 FTS	757124-72-4	ND	1.36	1.99	3.98		B9I0072	11-Sep-19	0.251 L	25-Sep-19 09:21	1
PFHxA	307-24-4	ND	1.36	1.99	3.98		B9I0072	11-Sep-19	0.251 L	25-Sep-19 09:21	1
PFPeS	2706-91-4	ND	1.36	1.99	3.98		B9I0072	11-Sep-19	0.251 L	25-Sep-19 09:21	1
PFHpA	375-85-9	ND	1.36	1.99	3.98		B9I0072	11-Sep-19	0.251 L	25-Sep-19 09:21	1
PFHxS	355-46-4	ND	1.36	1.99	3.98		B9I0072	11-Sep-19	0.251 L	25-Sep-19 09:21	1
6:2 FTS	27619-97-2	ND	1.36	1.99	3.98		B9I0072	11-Sep-19	0.251 L	25-Sep-19 09:21	1
PFOA	335-67-1	ND	1.36	1.99	3.98		B9I0072	11-Sep-19	0.251 L	25-Sep-19 09:21	1
PFHpS	375-92-8	ND	1.36	1.99	3.98		B9I0072	11-Sep-19	0.251 L	25-Sep-19 09:21	1
PFNA	375-95-1	ND	1.36	1.99	3.98		B9I0072	11-Sep-19	0.251 L	25-Sep-19 09:21	1
PFOSA	754-91-6	ND	1.36	1.99	3.98		B9I0072	11-Sep-19	0.251 L	25-Sep-19 09:21	1
PFOS	1763-23-1	ND	1.36	1.99	3.98		B9I0072	11-Sep-19	0.251 L	25-Sep-19 09:21	1
PFDA	335-76-2	ND	1.36	1.99	3.98		B9I0072	11-Sep-19	0.251 L	25-Sep-19 09:21	1
8:2 FTS	39108-34-4	ND	1.36	1.99	3.98		B9I0072	11-Sep-19	0.251 L	25-Sep-19 09:21	1
PFNS	68259-12-1	ND	1.92	1.99	3.98		B9I0072	11-Sep-19	0.251 L	25-Sep-19 09:21	1
MeFOSAA	2355-31-9	ND	1.36	1.99	3.98		B9I0072	11-Sep-19	0.251 L	25-Sep-19 09:21	1
EtFOSAA	2991-50-6	ND	1.36	1.99	3.98		B9I0072	11-Sep-19	0.251 L	25-Sep-19 09:21	1
PFUnA	2058-94-8	ND	1.36	1.99	3.98		B9I0072	11-Sep-19	0.251 L	25-Sep-19 09:21	1
PFDS	335-77-3	ND	1.36	1.99	3.98		B9I0072	11-Sep-19	0.251 L	25-Sep-19 09:21	1
PFDoA	307-55-1	ND	1.36	1.99	3.98		B9I0072	11-Sep-19	0.251 L	25-Sep-19 09:21	1
PFTTrDA	72629-94-8	ND	1.36	1.99	3.98		B9I0072	11-Sep-19	0.251 L	25-Sep-19 09:21	1
PFTeDA	376-06-7	ND	1.36	1.99	3.98		B9I0072	11-Sep-19	0.251 L	25-Sep-19 09:21	1

Labeled Standards	Type	% Recovery	Limits	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
13C3-PFBA	IS	101	60 - 130		B9I0072	11-Sep-19	0.251 L	25-Sep-19 09:21	1
13C3-PFPeA	IS	96.8	60 - 150		B9I0072	11-Sep-19	0.251 L	25-Sep-19 09:21	1
13C3-PFBS	IS	108	60 - 150		B9I0072	11-Sep-19	0.251 L	25-Sep-19 09:21	1
13C2-4:2 FTS	IS	110	20 - 150		B9I0072	11-Sep-19	0.251 L	25-Sep-19 09:21	1
13C2-PFHxA	IS	109	70 - 130		B9I0072	11-Sep-19	0.251 L	25-Sep-19 09:21	1
13C4-PFHpA	IS	101	60 - 150		B9I0072	11-Sep-19	0.251 L	25-Sep-19 09:21	1
13C3-PFHxS	IS	107	60 - 130		B9I0072	11-Sep-19	0.251 L	25-Sep-19 09:21	1
13C2-6:2 FTS	IS	106	40 - 150		B9I0072	11-Sep-19	0.251 L	25-Sep-19 09:21	1
13C5-PFNA	IS	98.1	50 - 130		B9I0072	11-Sep-19	0.251 L	25-Sep-19 09:21	1
13C8-PFOSA	IS	86.4	20 - 150		B9I0072	11-Sep-19	0.251 L	25-Sep-19 09:21	1
13C2-PFOA	IS	99.5	60 - 130		B9I0072	11-Sep-19	0.251 L	25-Sep-19 09:21	1
13C8-PFOS	IS	99.3	60 - 130		B9I0072	11-Sep-19	0.251 L	25-Sep-19 09:21	1
13C2-PFDA	IS	102	60 - 130		B9I0072	11-Sep-19	0.251 L	25-Sep-19 09:21	1

**Sample ID: FD1909040930SK** **PFAS Isotope Dilution Method**

Client Data	Laboratory Data
Name: Merit Laboratories, Inc.	Matrix: Aqueous
Project: Statewide WWTP Biosolids PFAS Evaluation	Date Collected: 04-Sep-19 09:30
Location: Field Dup	Lab Sample: 1903019-05
	Date Received: 05-Sep-19 09:01
	Column: BEH C18

Labeled Standards	Type	% Recovery	Limits	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
13C2-8:2 FTS	IS	94.2	40 - 150		B9I0072	11-Sep-19	0.251 L	25-Sep-19 09:21	1
d3-MeFOSAA	IS	76.6	50 - 150		B9I0072	11-Sep-19	0.251 L	25-Sep-19 09:21	1
13C2-PFUnA	IS	87.3	60 - 130		B9I0072	11-Sep-19	0.251 L	25-Sep-19 09:21	1
d5-EtFOSAA	IS	76.8	50 - 150		B9I0072	11-Sep-19	0.251 L	25-Sep-19 09:21	1
13C2-PFDoA	IS	80.4	30 - 130		B9I0072	11-Sep-19	0.251 L	25-Sep-19 09:21	1
13C2-PFTeDA	IS	63.5	20 - 150		B9I0072	11-Sep-19	0.251 L	25-Sep-19 09:21	1

DL - Detection Limit

LOD - Limit of Detection  
LOQ - Limit of quantitation

Results reported to the DL.

When reported, PFHxS, PFOA, PFOS, MeFOSAA and EtFOSAA include both linear and branched isomers. Only the linear isomer is reported for all other analytes.

**Sample ID: GW1909041130SK**

**PFAS Isotope Dilution Method**

Client Data				Laboratory Data			
Name:	Merit Laboratories, Inc.	Matrix:	Aqueous	Lab Sample:	1903019-06	Column:	BEH C18
Project:	Statewide WWTP Biosolids PFAS Evaluation	Date Collected:	04-Sep-19 11:30	Date Received:	05-Sep-19 09:01		
Location:	WIXO-BC01-MW2D						

Analyte	CAS Number	Conc. (ng/L)	DL	LOD	LOQ	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
PFBA	375-22-4	ND	1.31	1.92	3.83		B9I0072	11-Sep-19	0.261 L	25-Sep-19 09:53	1
PFPeA	2706-90-3	ND	1.31	1.92	3.83		B9I0072	11-Sep-19	0.261 L	25-Sep-19 09:53	1
PFBS	375-73-5	ND	1.31	1.92	3.83		B9I0072	11-Sep-19	0.261 L	25-Sep-19 09:53	1
4:2 FTS	757124-72-4	ND	1.31	1.92	3.83		B9I0072	11-Sep-19	0.261 L	25-Sep-19 09:53	1
PFHxA	307-24-4	ND	1.31	1.92	3.83		B9I0072	11-Sep-19	0.261 L	25-Sep-19 09:53	1
PFPeS	2706-91-4	ND	1.31	1.92	3.83		B9I0072	11-Sep-19	0.261 L	25-Sep-19 09:53	1
PFHpA	375-85-9	ND	1.31	1.92	3.83		B9I0072	11-Sep-19	0.261 L	25-Sep-19 09:53	1
PFHxS	355-46-4	ND	1.31	1.92	3.83		B9I0072	11-Sep-19	0.261 L	25-Sep-19 09:53	1
6:2 FTS	27619-97-2	ND	1.31	1.92	3.83		B9I0072	11-Sep-19	0.261 L	25-Sep-19 09:53	1
PFOA	335-67-1	ND	1.31	1.92	3.83		B9I0072	11-Sep-19	0.261 L	25-Sep-19 09:53	1
PFHpS	375-92-8	ND	1.31	1.92	3.83		B9I0072	11-Sep-19	0.261 L	25-Sep-19 09:53	1
PFNA	375-95-1	ND	1.31	1.92	3.83		B9I0072	11-Sep-19	0.261 L	25-Sep-19 09:53	1
PFOSA	754-91-6	ND	1.31	1.92	3.83		B9I0072	11-Sep-19	0.261 L	25-Sep-19 09:53	1
PFOS	1763-23-1	ND	1.31	1.92	3.83		B9I0072	11-Sep-19	0.261 L	25-Sep-19 09:53	1
PFDA	335-76-2	ND	1.31	1.92	3.83		B9I0072	11-Sep-19	0.261 L	25-Sep-19 09:53	1
8:2 FTS	39108-34-4	ND	1.31	1.92	3.83		B9I0072	11-Sep-19	0.261 L	25-Sep-19 09:53	1
PFNS	68259-12-1	ND	1.85	1.92	3.83		B9I0072	11-Sep-19	0.261 L	25-Sep-19 09:53	1
MeFOSAA	2355-31-9	ND	1.31	1.92	3.83		B9I0072	11-Sep-19	0.261 L	25-Sep-19 09:53	1
EtFOSAA	2991-50-6	ND	1.31	1.92	3.83		B9I0072	11-Sep-19	0.261 L	25-Sep-19 09:53	1
PFUnA	2058-94-8	ND	1.31	1.92	3.83		B9I0072	11-Sep-19	0.261 L	25-Sep-19 09:53	1
PFDS	335-77-3	ND	1.31	1.92	3.83		B9I0072	11-Sep-19	0.261 L	25-Sep-19 09:53	1
PFDoA	307-55-1	ND	1.31	1.92	3.83		B9I0072	11-Sep-19	0.261 L	25-Sep-19 09:53	1
PFTTrDA	72629-94-8	ND	1.31	1.92	3.83		B9I0072	11-Sep-19	0.261 L	25-Sep-19 09:53	1
PFTeDA	376-06-7	ND	1.31	1.92	3.83		B9I0072	11-Sep-19	0.261 L	25-Sep-19 09:53	1

Labeled Standards	Type	% Recovery	Limits	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
13C3-PFBA	IS	101	60 - 130		B9I0072	11-Sep-19	0.261 L	25-Sep-19 09:53	1
13C3-PFPeA	IS	97.7	60 - 150		B9I0072	11-Sep-19	0.261 L	25-Sep-19 09:53	1
13C3-PFBS	IS	111	60 - 150		B9I0072	11-Sep-19	0.261 L	25-Sep-19 09:53	1
13C2-4:2 FTS	IS	112	20 - 150		B9I0072	11-Sep-19	0.261 L	25-Sep-19 09:53	1
13C2-PFHxA	IS	103	70 - 130		B9I0072	11-Sep-19	0.261 L	25-Sep-19 09:53	1
13C4-PFHpA	IS	94.3	60 - 150		B9I0072	11-Sep-19	0.261 L	25-Sep-19 09:53	1
13C3-PFHxS	IS	110	60 - 130		B9I0072	11-Sep-19	0.261 L	25-Sep-19 09:53	1
13C2-6:2 FTS	IS	110	40 - 150		B9I0072	11-Sep-19	0.261 L	25-Sep-19 09:53	1
13C5-PFNA	IS	103	50 - 130		B9I0072	11-Sep-19	0.261 L	25-Sep-19 09:53	1
13C8-PFOSA	IS	102	20 - 150		B9I0072	11-Sep-19	0.261 L	25-Sep-19 09:53	1
13C2-PFOA	IS	98.9	60 - 130		B9I0072	11-Sep-19	0.261 L	25-Sep-19 09:53	1
13C8-PFOS	IS	95.2	60 - 130		B9I0072	11-Sep-19	0.261 L	25-Sep-19 09:53	1
13C2-PFDA	IS	99.1	60 - 130		B9I0072	11-Sep-19	0.261 L	25-Sep-19 09:53	1



**Sample ID: GW1909041130SK** **PFAS Isotope Dilution Method**

Client Data				Laboratory Data			
Name:	Merit Laboratories, Inc.	Matrix:	Aqueous	Lab Sample:	1903019-06	Column:	BEH C18
Project:	Statewide WWTP Biosolids PFAS Evaluation	Date Collected:	04-Sep-19 11:30	Date Received:	05-Sep-19 09:01		
Location:	WIXO-BC01-MW2D						

Labeled Standards	Type	% Recovery	Limits	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
13C2-8:2 FTS	IS	103	40 - 150		B9I0072	11-Sep-19	0.261 L	25-Sep-19 09:53	1
d3-MeFOSAA	IS	86.4	50 - 150		B9I0072	11-Sep-19	0.261 L	25-Sep-19 09:53	1
13C2-PFUnA	IS	89.9	60 - 130		B9I0072	11-Sep-19	0.261 L	25-Sep-19 09:53	1
d5-EtFOSAA	IS	86.3	50 - 150		B9I0072	11-Sep-19	0.261 L	25-Sep-19 09:53	1
13C2-PFDoA	IS	81.6	30 - 130		B9I0072	11-Sep-19	0.261 L	25-Sep-19 09:53	1
13C2-PFTeDA	IS	86.0	20 - 150		B9I0072	11-Sep-19	0.261 L	25-Sep-19 09:53	1

DL - Detection Limit

LOD - Limit of Detection  
LOQ - Limit of quantitation

Results reported to the DL.

When reported, PFHxS, PFOA, PFOS, MeFOSAA and EtFOSAA include both linear and branched isomers. Only the linear isomer is reported for all other analytes.

**Sample ID: GW1909041220SK**

**PFAS Isotope Dilution Method**

Client Data				Laboratory Data			
Name:	Merit Laboratories, Inc.	Matrix:	Aqueous	Lab Sample:	1903019-07	Column:	BEH C18
Project:	Statewide WWTP Biosolids PFAS Evaluation	Date Collected:	04-Sep-19 12:20	Date Received:	05-Sep-19 09:01		
Location:	WIXO-BC01-MW2S						

Analyte	CAS Number	Conc. (ng/L)	DL	LOD	LOQ	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
PFBA	375-22-4	14.4	1.35	1.96	3.93		B9I0072	11-Sep-19	0.255 L	25-Sep-19 10:04	1
PFPeA	2706-90-3	3.39	1.35	1.96	3.93	J	B9I0072	11-Sep-19	0.255 L	25-Sep-19 10:04	1
PFBS	375-73-5	156	1.35	1.96	3.93		B9I0072	11-Sep-19	0.255 L	25-Sep-19 10:04	1
4:2 FTS	757124-72-4	ND	1.35	1.96	3.93		B9I0072	11-Sep-19	0.255 L	25-Sep-19 10:04	1
PFHxA	307-24-4	10.9	1.35	1.96	3.93		B9I0072	11-Sep-19	0.255 L	25-Sep-19 10:04	1
PFPeS	2706-91-4	ND	1.35	1.96	3.93		B9I0072	11-Sep-19	0.255 L	25-Sep-19 10:04	1
PFHpA	375-85-9	ND	1.35	1.96	3.93		B9I0072	11-Sep-19	0.255 L	25-Sep-19 10:04	1
PFHxS	355-46-4	2.87	1.35	1.96	3.93	J	B9I0072	11-Sep-19	0.255 L	25-Sep-19 10:04	1
6:2 FTS	27619-97-2	ND	1.35	1.96	3.93		B9I0072	11-Sep-19	0.255 L	25-Sep-19 10:04	1
PFOA	335-67-1	ND	1.35	1.96	3.93		B9I0072	11-Sep-19	0.255 L	25-Sep-19 10:04	1
PFHpS	375-92-8	ND	1.35	1.96	3.93		B9I0072	11-Sep-19	0.255 L	25-Sep-19 10:04	1
PFNA	375-95-1	ND	1.35	1.96	3.93		B9I0072	11-Sep-19	0.255 L	25-Sep-19 10:04	1
PFOSA	754-91-6	ND	1.35	1.96	3.93		B9I0072	11-Sep-19	0.255 L	25-Sep-19 10:04	1
PFOS	1763-23-1	ND	1.35	1.96	3.93		B9I0072	11-Sep-19	0.255 L	25-Sep-19 10:04	1
PFDA	335-76-2	ND	1.35	1.96	3.93		B9I0072	11-Sep-19	0.255 L	25-Sep-19 10:04	1
8:2 FTS	39108-34-4	ND	1.35	1.96	3.93		B9I0072	11-Sep-19	0.255 L	25-Sep-19 10:04	1
PFNS	68259-12-1	ND	1.90	1.96	3.93		B9I0072	11-Sep-19	0.255 L	25-Sep-19 10:04	1
MeFOSAA	2355-31-9	ND	1.35	1.96	3.93		B9I0072	11-Sep-19	0.255 L	25-Sep-19 10:04	1
EtFOSAA	2991-50-6	ND	1.35	1.96	3.93		B9I0072	11-Sep-19	0.255 L	25-Sep-19 10:04	1
PFUnA	2058-94-8	ND	1.35	1.96	3.93		B9I0072	11-Sep-19	0.255 L	25-Sep-19 10:04	1
PFDS	335-77-3	ND	1.35	1.96	3.93		B9I0072	11-Sep-19	0.255 L	25-Sep-19 10:04	1
PFDoA	307-55-1	ND	1.35	1.96	3.93		B9I0072	11-Sep-19	0.255 L	25-Sep-19 10:04	1
PFTTrDA	72629-94-8	ND	1.35	1.96	3.93		B9I0072	11-Sep-19	0.255 L	25-Sep-19 10:04	1
PFTeDA	376-06-7	ND	1.35	1.96	3.93		B9I0072	11-Sep-19	0.255 L	25-Sep-19 10:04	1

Labeled Standards	Type	% Recovery	Limits	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
13C3-PFBA	IS	100	60 - 130		B9I0072	11-Sep-19	0.255 L	25-Sep-19 10:04	1
13C3-PFPeA	IS	104	60 - 150		B9I0072	11-Sep-19	0.255 L	25-Sep-19 10:04	1
13C3-PFBS	IS	98.9	60 - 150		B9I0072	11-Sep-19	0.255 L	25-Sep-19 10:04	1
13C2-4:2 FTS	IS	106	20 - 150		B9I0072	11-Sep-19	0.255 L	25-Sep-19 10:04	1
13C2-PFHxA	IS	106	70 - 130		B9I0072	11-Sep-19	0.255 L	25-Sep-19 10:04	1
13C4-PFHpA	IS	98.7	60 - 150		B9I0072	11-Sep-19	0.255 L	25-Sep-19 10:04	1
13C3-PFHxS	IS	103	60 - 130		B9I0072	11-Sep-19	0.255 L	25-Sep-19 10:04	1
13C2-6:2 FTS	IS	95.6	40 - 150		B9I0072	11-Sep-19	0.255 L	25-Sep-19 10:04	1
13C5-PFNA	IS	107	50 - 130		B9I0072	11-Sep-19	0.255 L	25-Sep-19 10:04	1
13C8-PFOSA	IS	89.5	20 - 150		B9I0072	11-Sep-19	0.255 L	25-Sep-19 10:04	1
13C2-PFOA	IS	99.4	60 - 130		B9I0072	11-Sep-19	0.255 L	25-Sep-19 10:04	1
13C8-PFOS	IS	89.1	60 - 130		B9I0072	11-Sep-19	0.255 L	25-Sep-19 10:04	1
13C2-PFDA	IS	98.4	60 - 130		B9I0072	11-Sep-19	0.255 L	25-Sep-19 10:04	1

**Sample ID: GW1909041220SK** **PFAS Isotope Dilution Method**

Client Data				Laboratory Data			
Name:	Merit Laboratories, Inc.	Matrix:	Aqueous	Lab Sample:	1903019-07	Column:	BEH C18
Project:	Statewide WWTP Biosolids PFAS Evaluation	Date Collected:	04-Sep-19 12:20	Date Received:	05-Sep-19 09:01		
Location:	WIXO-BC01-MW2S						

Labeled Standards	Type	% Recovery	Limits	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
13C2-8:2 FTS	IS	88.0	40 - 150		B9I0072	11-Sep-19	0.255 L	25-Sep-19 10:04	1
d3-MeFOSAA	IS	88.0	50 - 150		B9I0072	11-Sep-19	0.255 L	25-Sep-19 10:04	1
13C2-PFUnA	IS	86.4	60 - 130		B9I0072	11-Sep-19	0.255 L	25-Sep-19 10:04	1
d5-EtFOSAA	IS	85.4	50 - 150		B9I0072	11-Sep-19	0.255 L	25-Sep-19 10:04	1
13C2-PFDoA	IS	81.0	30 - 130		B9I0072	11-Sep-19	0.255 L	25-Sep-19 10:04	1
13C2-PFTeDA	IS	80.5	20 - 150		B9I0072	11-Sep-19	0.255 L	25-Sep-19 10:04	1

DL - Detection Limit      LOD - Limit of Detection      Results reported to the DL.      When reported, PFHxS, PFOA, PFOS, MeFOSAA and EtFOSAA include both linear and branched isomers. Only the linear isomer is reported for all other analytes.

LOQ - Limit of quantitation

**Sample ID: FB1909041255SK**

**PFAS Isotope Dilution Method**

Client Data				Laboratory Data			
Name:	Merit Laboratories, Inc.	Matrix:	Aqueous	Lab Sample:	1903019-08	Column:	BEH C18
Project:	Statewide WWTP Biosolids PFAS Evaluation	Date Collected:	04-Sep-19 12:55	Date Received:	05-Sep-19 09:01		
Location:	Field Blank						

Analyte	CAS Number	Conc. (ng/L)	DL	LOD	LOQ	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
PFBA	375-22-4	ND	1.41	2.06	4.11		B9I0072	11-Sep-19	0.243 L	25-Sep-19 10:14	1
PFPeA	2706-90-3	ND	1.41	2.06	4.11		B9I0072	11-Sep-19	0.243 L	25-Sep-19 10:14	1
PFBS	375-73-5	ND	1.41	2.06	4.11		B9I0072	11-Sep-19	0.243 L	25-Sep-19 10:14	1
4:2 FTS	757124-72-4	ND	1.41	2.06	4.11		B9I0072	11-Sep-19	0.243 L	25-Sep-19 10:14	1
PFHxA	307-24-4	ND	1.41	2.06	4.11		B9I0072	11-Sep-19	0.243 L	25-Sep-19 10:14	1
PFPeS	2706-91-4	ND	1.41	2.06	4.11		B9I0072	11-Sep-19	0.243 L	25-Sep-19 10:14	1
PFHpA	375-85-9	ND	1.41	2.06	4.11		B9I0072	11-Sep-19	0.243 L	25-Sep-19 10:14	1
PFHxS	355-46-4	ND	1.41	2.06	4.11		B9I0072	11-Sep-19	0.243 L	25-Sep-19 10:14	1
6:2 FTS	27619-97-2	ND	1.41	2.06	4.11		B9I0072	11-Sep-19	0.243 L	25-Sep-19 10:14	1
PFOA	335-67-1	ND	1.41	2.06	4.11		B9I0072	11-Sep-19	0.243 L	25-Sep-19 10:14	1
PFHpS	375-92-8	ND	1.41	2.06	4.11		B9I0072	11-Sep-19	0.243 L	25-Sep-19 10:14	1
PFNA	375-95-1	ND	1.41	2.06	4.11		B9I0072	11-Sep-19	0.243 L	25-Sep-19 10:14	1
PFOSA	754-91-6	ND	1.41	2.06	4.11		B9I0072	11-Sep-19	0.243 L	25-Sep-19 10:14	1
PFOS	1763-23-1	ND	1.41	2.06	4.11		B9I0072	11-Sep-19	0.243 L	25-Sep-19 10:14	1
PFDA	335-76-2	ND	1.41	2.06	4.11		B9I0072	11-Sep-19	0.243 L	25-Sep-19 10:14	1
8:2 FTS	39108-34-4	ND	1.41	2.06	4.11		B9I0072	11-Sep-19	0.243 L	25-Sep-19 10:14	1
PFNS	68259-12-1	ND	1.99	2.06	4.11		B9I0072	11-Sep-19	0.243 L	25-Sep-19 10:14	1
MeFOSAA	2355-31-9	ND	1.41	2.06	4.11		B9I0072	11-Sep-19	0.243 L	25-Sep-19 10:14	1
EtFOSAA	2991-50-6	ND	1.41	2.06	4.11		B9I0072	11-Sep-19	0.243 L	25-Sep-19 10:14	1
PFUnA	2058-94-8	ND	1.41	2.06	4.11		B9I0072	11-Sep-19	0.243 L	25-Sep-19 10:14	1
PFDS	335-77-3	ND	1.41	2.06	4.11		B9I0072	11-Sep-19	0.243 L	25-Sep-19 10:14	1
PFDoA	307-55-1	ND	1.41	2.06	4.11		B9I0072	11-Sep-19	0.243 L	25-Sep-19 10:14	1
PFTTrDA	72629-94-8	ND	1.41	2.06	4.11		B9I0072	11-Sep-19	0.243 L	25-Sep-19 10:14	1
PFTeDA	376-06-7	ND	1.41	2.06	4.11		B9I0072	11-Sep-19	0.243 L	25-Sep-19 10:14	1

Labeled Standards	Type	% Recovery	Limits	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
13C3-PFBA	IS	104	60 - 130		B9I0072	11-Sep-19	0.243 L	25-Sep-19 10:14	1
13C3-PFPeA	IS	104	60 - 150		B9I0072	11-Sep-19	0.243 L	25-Sep-19 10:14	1
13C3-PFBS	IS	95.4	60 - 150		B9I0072	11-Sep-19	0.243 L	25-Sep-19 10:14	1
13C2-4:2 FTS	IS	100	20 - 150		B9I0072	11-Sep-19	0.243 L	25-Sep-19 10:14	1
13C2-PFHxA	IS	103	70 - 130		B9I0072	11-Sep-19	0.243 L	25-Sep-19 10:14	1
13C4-PFHpA	IS	107	60 - 150		B9I0072	11-Sep-19	0.243 L	25-Sep-19 10:14	1
13C3-PFHxS	IS	97.1	60 - 130		B9I0072	11-Sep-19	0.243 L	25-Sep-19 10:14	1
13C2-6:2 FTS	IS	109	40 - 150		B9I0072	11-Sep-19	0.243 L	25-Sep-19 10:14	1
13C5-PFNA	IS	107	50 - 130		B9I0072	11-Sep-19	0.243 L	25-Sep-19 10:14	1
13C8-PFOSA	IS	57.6	20 - 150		B9I0072	11-Sep-19	0.243 L	25-Sep-19 10:14	1
13C2-PFOA	IS	101	60 - 130		B9I0072	11-Sep-19	0.243 L	25-Sep-19 10:14	1
13C8-PFOS	IS	98.5	60 - 130		B9I0072	11-Sep-19	0.243 L	25-Sep-19 10:14	1
13C2-PFDA	IS	101	60 - 130		B9I0072	11-Sep-19	0.243 L	25-Sep-19 10:14	1

**Sample ID: FB1909041255SK** **PFAS Isotope Dilution Method**

Client Data				Laboratory Data			
Name:	Merit Laboratories, Inc.	Matrix:	Aqueous	Lab Sample:	1903019-08	Column:	BEH C18
Project:	Statewide WWTP Biosolids PFAS Evaluation	Date Collected:	04-Sep-19 12:55	Date Received:	05-Sep-19 09:01		
Location:	Field Blank						

Labeled Standards	Type	% Recovery	Limits	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
13C2-8:2 FTS	IS	111	40 - 150		B9I0072	11-Sep-19	0.243 L	25-Sep-19 10:14	1
d3-MeFOSAA	IS	82.3	50 - 150		B9I0072	11-Sep-19	0.243 L	25-Sep-19 10:14	1
13C2-PFUnA	IS	90.0	60 - 130		B9I0072	11-Sep-19	0.243 L	25-Sep-19 10:14	1
d5-EtFOSAA	IS	76.7	50 - 150		B9I0072	11-Sep-19	0.243 L	25-Sep-19 10:14	1
13C2-PFDoA	IS	79.4	30 - 130		B9I0072	11-Sep-19	0.243 L	25-Sep-19 10:14	1
13C2-PFTeDA	IS	75.3	20 - 150		B9I0072	11-Sep-19	0.243 L	25-Sep-19 10:14	1

DL - Detection Limit

LOD - Limit of Detection  
LOQ - Limit of quantitation

Results reported to the DL.

When reported, PFHxS, PFOA, PFOS, MeFOSAA and EtFOSAA include both linear and branched isomers. Only the linear isomer is reported for all other analytes.

## DATA QUALIFIERS & ABBREVIATIONS

B	This compound was also detected in the method blank
Conc.	Concentration
D	Dilution
DL	Detection limit
E	The associated compound concentration exceeded the calibration range of the instrument
H	Recovery and/or RPD was outside laboratory acceptance limits
I	Chemical Interference
J	The amount detected is below the Reporting Limit/LOQ
LOD	Limits of Detection
LOQ	Limits of Quantitation
M	Estimated Maximum Possible Concentration (CA Region 2 projects only)
NA	Not applicable
ND	Not Detected
P	The reported concentration may include contribution from chlorinated diphenyl ether(s).
Q	The ion transition ratio is outside of the acceptance criteria.
TEQ	Toxic Equivalency
U	Not Detected (specific projects only)
*	See Cover Letter

Unless otherwise noted, solid sample results are reported in dry weight. Tissue samples are reported in wet weight.

### Vista Analytical Laboratory Certifications

Accrediting Authority	Certificate Number
Alaska Department of Environmental Conservation	17-013
Arkansas Department of Environmental Quality	19-013-0
California Department of Health – ELAP	2892
DoD ELAP - A2LA Accredited - ISO/IEC 17025:2005	3091.01
Florida Department of Health	E87777-23
Hawaii Department of Health	N/A
Louisiana Department of Environmental Quality	01977
Maine Department of Health	2018017
Massachusetts Department of Environmental Protection	N/A
Michigan Department of Environmental Quality	9932
Minnesota Department of Health	1521520
New Hampshire Environmental Accreditation Program	207718-B
New Jersey Department of Environmental Protection	190001
New York Department of Health	11411
Oregon Laboratory Accreditation Program	4042-010
Pennsylvania Department of Environmental Protection	016
Texas Commission on Environmental Quality	T104704189-19-10
Vermont Department of Health	VT-4042
Virginia Department of General Services	10272
Washington Department of Ecology	C584-19
Wisconsin Department of Natural Resources	998036160

*Current certificates and lists of licensed parameters are located in the Quality Assurance office and are available upon request.*

## NELAP Accredited Test Methods

MATRIX: Air	
Description of Test	Method
Determination of Polychlorinated p-Dioxins & Polychlorinated Dibenzofurans	EPA 23
Determination of Polychlorinated p-Dioxins & Polychlorinated Dibenzofurans	EPA TO-9A

MATRIX: Biological Tissue	
Description of Test	Method
Tetra- through Octa-Chlorinated Dioxins and Furans by Isotope Dilution GC/HRMS	EPA 1613B
Brominated Diphenyl Ethers by HRGC/HRMS	EPA 1614A
Chlorinated Biphenyl Congeners in Water, Soil, Sediment, and Tissue by GC/HRMS	EPA 1668A/C
Pesticides in Water, Soil, Sediment, Biosolids, and Tissue by HRGC/HRMS	EPA 1699
Perfluorinated Alkyl Acids in Drinking Water by SPE and LC/MS/MS	EPA 537
Polychlorinated Dibenzo-p-Dioxins and Polychlorinated Dibenzofurans by GC/HRMS	EPA 8280A/B
Polychlorinated Dibenzodioxins (PCDDs) and Polychlorinated Dibenzofurans (PCDFs) by GC/HRMS	EPA 8290/8290A

MATRIX: Drinking Water	
Description of Test	Method
2,3,7,8-Tetrachlorodibenzo- p-dioxin (2,3,7,8-TCDD) GC/HRMS	EPA 1613/1613B
1,4-Dioxane (1,4-Diethyleneoxide) analysis by GC/HRMS	EPA 522
Perfluorinated Alkyl Acids in Drinking Water by SPE and LC/MS/MS	EPA 537
Perfluorinated Alkyl Acids in Drinking Water by SPE and LC/MS/MS	ISO 25101 2009



MATRIX: Non-Potable Water	
Description of Test	Method
Tetra- through Octa-Chlorinated Dioxins and Furans by Isotope Dilution GC/HRMS	EPA 1613B
Brominated Diphenyl Ethers by HRGC/HRMS	EPA 1614A
Chlorinated Biphenyl Congeners in Water, Soil, Sediment, and Tissue by GC/HRMS	EPA 1668A/C
Pesticides in Water, Soil, Sediment, Biosolids, and Tissue by HRGC/HRMS	EPA 1699
Perfluorinated Alkyl Acids in Drinking Water by SPE and LC/MS/MS	EPA 537
Dioxin by GC/HRMS	EPA 613
Polychlorinated Dibenzo-p-Dioxins and Polychlorinated Dibenzofurans by GC/HRMS	EPA 8280A/B
Polychlorinated Dibenzodioxins (PCDDs) and Polychlorinated Dibenzofurans (PCDFs) by GC/HRMS	EPA 8290/8290A

MATRIX: Solids	
Description of Test	Method
Tetra-Octa Chlorinated Dioxins and Furans by Isotope Dilution GC/HRMS	EPA 1613
Tetra- through Octa-Chlorinated Dioxins and Furans by Isotope Dilution GC/HRMS	EPA 1613B
Brominated Diphenyl Ethers by HRGC/HRMS	EPA 1614A
Chlorinated Biphenyl Congeners in Water, Soil, Sediment, and Tissue by GC/HRMS	EPA 1668A/C
Pesticides in Water, Soil, Sediment, Biosolids, and Tissue by HRGC/HRMS	EPA 1699
Perfluorinated Alkyl Acids in Drinking Water by SPE and LC/MS/MS	EPA 537
Polychlorinated Dibenzo-p-Dioxins and Polychlorinated Dibenzofurans by GC/HRMS	EPA 8280A/B
Polychlorinated Dibenzodioxins (PCDDs) and Polychlorinated Dibenzofurans (PCDFs) by GC/HRMS	EPA 8290/8290A



Revised COC - rec'd via client email 09/05/19 0640  
 WWS 09/05/19

# CHAIN OF CUSTODY

**For Laboratory Use Only**  
 Work Order #: 1903019 Temp: 20.5 °C  
 Storage ID: R-13, WR-2 Storage Secured: Yes  No

Project ID: Statewide WWTP Biosolids PFAS Evaluation PO#: 60588767.01 Sampler: Stanley Krenz  
 (name)

TAT Standard:  21 days  
 (check one): Rush (surcharge may apply)  
 14 days  7 days Specify: \_\_\_\_\_

Invoice to: Name Stephanie Kammer Company MDEQ Address 525 W. Allegan Street City Lansing State MI Ph# 517-897-1597 Fax# 517-241-3571

Relinquished by (printed name and signature) Stanley Krenz Date \_\_\_\_\_ Time \_\_\_\_\_ Received by (printed name and signature) \_\_\_\_\_ Date \_\_\_\_\_ Time \_\_\_\_\_  
 Relinquished by (printed name and signature) \_\_\_\_\_ Date \_\_\_\_\_ Time \_\_\_\_\_ Received by (printed name and signature) \_\_\_\_\_ Date \_\_\_\_\_ Time \_\_\_\_\_

*see original COC*

SHIP TO: Vista Analytical Laboratory 1104 Windfield Way El Dorado Hills, CA 95762 Ph: (916) 673-1520; Fax: (916) 673-0106				Method of Shipment:		Add Analysis(es) Requested										Comments
ATTN: <u>Jennifer Miller</u>				Tracking No.:		Container(s)										
Sample ID	Date	Time	Location/Sample Description	Quantity	Type	Matrix	List of 21	List of 21 w/Isomers	List of 24	List of 24 w/Isomers	List of 28	Other: Please List Below	PFAS Isotope Dilution	USEPA Method 537		
GW1909030955SK	9/3/19	0955	WIXO-BC01-MW1D	2	P	AQ		X								
GW1909031115SK	9/3/19	1115	WIXO-BC01-MW1S	2	P	AQ		X								
GW1909031245SK	9/3/19	1245	WIXO-BC02-MW1S	2	P	AQ		X								
GW1909040925SK	9/4/19	0925	WIXO-BC02-MW1D	2	P	AQ		X								
FD1909040930SK	9/4/19	0930	Field Dup	2	P	AQ		X								
GW1909041130SK	9/4/19	1130	WIXO-BC01-MW2D	2	P	AQ		X								
GW1909041220SK	9/4/19	1220	WIXO-BC01-MW2S	2	P	AQ		X								
FB1909041255SK	9/4/19	1255	Field Blank	2	P	AQ		X								

Special Instructions/Comments: \_\_\_\_\_  
 Send Results and Acknowledgements to:  
Dorin.Bogdan@aecom.com  
Robert.Kennedy@aecom.com  
Michael.Wolf@aecom.com  
Lauren.Mcneely@aecom.com

**SEND DOCUMENTATION AND RESULTS TO:**

Name: Stephanie Kammer  
 Company: MDEQ  
 Address: 525 W. Allegan Street, Constitution Hall, 1st South West  
 City: Lansing State: MI Zip: 30242  
 Phone: 517-897-1597 Fax: 517-241-3571  
 Email: Kammers@michigan.gov

Container Types: P = HDPE, PJ = HDPE Jar  
 O = Other: \_\_\_\_\_  
 Bottle Preservation Type: T = Thiosulfate, TZ = Trizma: \_\_\_\_\_  
 Matrix Types: AQ = Aqueous, DW = Drinking Water, EF = Effluent, PP = Pulp/Paper, SD = Sediment, SL = Sludge, BS=Biosolids, SO = Soil, WW = Wastewater, B = Blood/Serum, O = Other: \_\_\_\_\_

# CHAIN OF CUSTODY

*Original COC - see revised COC*

**For Laboratory Use Only**  
 Work Order #: 1903019 Temp: 2.5 °C  
 Storage ID: R-13, MR-2 Storage Secured: Yes  No

Project ID: Wixom Biosolid PO#: 60588767 Sampler: Stanley Krenz (name)

TAT Standard:  21 days  
 (check one): Rush (surcharge may apply)  
 14 days  7 days Specify: \_\_\_\_\_

Invoice to: Name Stephanie Kammer Company EGLE Address 525 W. Allegan St City Lansing State MI Ph# 517-897-1597 Fax# 517-241-3571

Relinquished by (printed name and signature) Stanley Krenz Date 9-4-19 Time 1500 Received by (printed name and signature) Ashweeni Brakash Brakash Date 09/05/19 Time 0901

Sample ID	Date	Time	Location/Sample Description	Add Analysis(es) Requested										Comments											
				Quantity	Type	Matrix	PFOM/PFOS	UCMRs PFAS List 6	537 List: 14	PFAS List of 24	Other: Please List Below	Mod. EPA Method 537	PFAS List of 28 - Branch and Linear		PFOM/PFOS	UCMRs PFAS List 6	PFAS List: 14	EPA Method 537 (DW only)							
GW1909030955SK	9/3/19	0955	BC01-MW1D	2	P	AQ																			
GW1909031115SK	9/3/19	1115	BC01-MW1S	2	P	AQ																			
GW1909031245SK	9/3/19	1245	BC02-MW1S	2	P	AQ																			
GW1909040925SK	9/4/19	0925	BC02-MW1D	2	P	AQ																			
FD1909040930SK	9/4/19	0930	Field Dup	2	P	AQ																			
GW1909041130SK	9/4/19	1130	BC01-MW2D	2	P	AQ																			
GW1909041220SK	9/4/19	1220	BC01-MW2S	2	P	AQ																			
FB1909041255SK	9/4/19	1255	Field Blank	2	P	AQ																			

Special Instructions/Comments: **Send Results and Acknowledgements to:**  
Michael.Wolf@aecom.com  
Dorin.Bogdan@aecom.com  
Robert.Kennedy@aecom.com

**SEND DOCUMENTATION AND RESULTS TO:**

Name: Stephanie Kammer  
 Company: EGLE  
 Address: 525 W. Allegan St  
 City: Lansing MI 48909  
 Phone: 517-897-1597 517-241-3571  
 Email: \_\_\_\_\_

# Sample Log-In Checklist

Page # 1 of 1

Vista Work Order #: 1903019

TAT std

Samples Arrival:	Date/Time <u>09/05/19 0901</u>	Initials: <u>JP</u>	Location: <u>WF-2</u>
			Shelf/Rack: <u>NA</u>
Logged In:	Date/Time <u>09/05/19 1641</u>	Initials: <u>WWS</u>	Location: <u>R-13, WR-2</u> ↓ ↓ Shelf/Rack: <u>2-2, 2-4</u>
Delivered By:	<input checked="" type="radio"/> FedEx	<input type="radio"/> UPS	<input type="radio"/> On Trac
	<input type="radio"/> GSO	<input type="radio"/> DHL	<input type="radio"/> Hand Delivered
	<input type="radio"/> Other		
Preservation:	<input checked="" type="radio"/> Ice	<input type="radio"/> Blue Ice	<input type="radio"/> Dry Ice
	<input type="radio"/> None		
Temp °C: <u>2.5</u> (uncorrected)	Probe used: Y / <input checked="" type="radio"/> N		Thermometer ID: <u>IP-3</u>
Temp °C: <u>2.5</u> (corrected)			

	YES	NO	NA
Adequate Sample Volume Received?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Holding Time Acceptable?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Shipping Container(s) Intact?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Shipping Custody Seals Intact?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Shipping Documentation Present?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Airbill	Trk # <u>7761 3984 4874</u>		
Sample Container Intact?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Sample Custody Seals Intact?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
Chain of Custody / Sample Documentation Present?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
COC Anomaly/Sample Acceptance Form completed?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
If Chlorinated or Drinking Water Samples, Acceptable Preservation?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
Preservation Documented:	<input type="checkbox"/> Na <sub>2</sub> S <sub>2</sub> O <sub>3</sub>	<input type="checkbox"/> Trizma	<input type="checkbox"/> None
	<input type="checkbox"/> Other	<input type="checkbox"/> Yes	<input type="checkbox"/> No
	<input checked="" type="checkbox"/> NA		
Shipping Container	<input checked="" type="checkbox"/> Vista	<input type="checkbox"/> Client	<input checked="" type="checkbox"/> Retain
	<input type="checkbox"/> Return	<input type="checkbox"/> Dispose	

Comments:



December 05, 2019

**Vista Work Order No. 1903965**

Ms. Maya Murshak  
Merit Laboratories, Inc.  
2680 East Lansing Drive  
East Lansing, MI 48823

Dear Ms. Murshak,

Enclosed are the results for the sample set received at Vista Analytical Laboratory on November 08, 2019 under your Project Name 'Statewide Biosolids'.

Vista Analytical Laboratory is committed to serving you effectively. If you require additional information, please contact me at 916-673-1520 or by email at [mmaier@vista-analytical.com](mailto:mmaier@vista-analytical.com).

Thank you for choosing Vista as part of your analytical support team.

Sincerely,

Martha Maier  
Laboratory Director



*Vista Analytical Laboratory certifies that the report herein meets all the requirements set forth by NELAP for those applicable test methods. Results relate only to the samples as received by the laboratory. This report should not be reproduced except in full without the written approval of Vista.*

## **Vista Work Order No. 1903965**

### **Case Narrative**

#### **Sample Condition on Receipt:**

One drinking water sample was received in good condition and within the method temperature requirements. The sample was received and stored securely in accordance with Vista standard operating procedures and EPA methodology. A revised COC was received by email on November 15, 2019.

#### **Analytical Notes:**

##### **EPA Method 537, Rev. 1.1**

The sample was extracted and analyzed for a selected list of 14 PFAS using EPA Method 537, Rev. 1.1. The results have been reported following the conventions specified by the Michigan Department of Environmental Quality.

##### **Holding Times**

The sample was extracted and analyzed within the method hold times.

##### **Quality Control**

The Initial Calibration and Continuing Calibration Verifications met the method acceptance criteria.

A Laboratory Fortified Blank (LFB) and a Laboratory Reagent Blank (LRB) were extracted and analyzed with the preparation batch. No analytes were detected in the Laboratory Reagent Blank. The LFB recoveries were within the method acceptance criteria.

The surrogate recoveries for all QC and field samples were within the acceptance criteria.

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# Sample Inventory Report

<b>Vista Sample ID</b>	<b>Client Sample ID</b>	<b>Sampled</b>	<b>Received</b>	<b>Components/Containers</b>
1903965-01	WR1911060935LEM	06-Nov-19 09:35	08-Nov-19 08:53	HDPE Bottle, 250 mL HDPE Bottle, 250 mL
1903965-02	WT1911061000LEM	06-Nov-19 10:00	08-Nov-19 08:53	HDPE Bottle, 250 mL HDPE Bottle, 250 mL
1903965-03	WT1911071000LEM	07-Nov-19 10:00	08-Nov-19 08:53	HDPE Bottle, 250 mL HDPE Bottle, 250 mL
1903965-04	WT1911061255LEM	06-Nov-19 12:55	08-Nov-19 08:53	HDPE Bottle, 250 mL HDPE Bottle, 250 mL
1903965-05	WT1911071015LEM	07-Nov-19 10:15	08-Nov-19 08:53	HDPE Bottle, 250 mL HDPE Bottle, 250 mL



## **ANALYTICAL RESULTS**

**Sample ID: LRB**

**EPA Method 537**

<b>Client Data</b>				<b>Laboratory Data</b>					
Name:	Merit Laboratories, Inc.	Matrix:	Aqueous	Lab Sample:	B9K0101-BLK1	Column:	BEH C18		
Project:	Statewide Biosolids								

Analyte	CAS Number	Conc. (ng/L)	RL	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
PFBS	375-73-5	ND	2		B9K0101	19-Nov-19	0.25 L	25-Nov-19 15:35	1
PFHxA	307-24-4	ND	2		B9K0101	19-Nov-19	0.25 L	25-Nov-19 15:35	1
PFHpA	375-85-9	ND	2		B9K0101	19-Nov-19	0.25 L	25-Nov-19 15:35	1
PFHxS	355-46-4	ND	2		B9K0101	19-Nov-19	0.25 L	25-Nov-19 15:35	1
PFOA	335-67-1	ND	2		B9K0101	19-Nov-19	0.25 L	25-Nov-19 15:35	1
PFNA	375-95-1	ND	2		B9K0101	19-Nov-19	0.25 L	25-Nov-19 15:35	1
PFOS	1763-23-1	ND	2		B9K0101	19-Nov-19	0.25 L	25-Nov-19 15:35	1
PFDA	335-76-2	ND	2		B9K0101	19-Nov-19	0.25 L	25-Nov-19 15:35	1
MeFOSAA	2355-31-9	ND	4		B9K0101	19-Nov-19	0.25 L	25-Nov-19 15:35	1
EtFOSAA	2991-50-6	ND	4		B9K0101	19-Nov-19	0.25 L	25-Nov-19 15:35	1
PFUnA	2058-94-8	ND	4		B9K0101	19-Nov-19	0.25 L	25-Nov-19 15:35	1
PFDoA	307-55-1	ND	4		B9K0101	19-Nov-19	0.25 L	25-Nov-19 15:35	1
PFTeDA	72629-94-8	ND	4		B9K0101	19-Nov-19	0.25 L	25-Nov-19 15:35	1
PFTeDA	376-06-7	ND	4		B9K0101	19-Nov-19	0.25 L	25-Nov-19 15:35	1
Labeled Standards	Type	% Recovery	Limits	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
13C2-PFHxA	SURR	105	70 - 130		B9K0101	19-Nov-19	0.25 L	25-Nov-19 15:35	1
13C2-PFDA	SURR	116	70 - 130		B9K0101	19-Nov-19	0.25 L	25-Nov-19 15:35	1
d5-EtFOSAA	SURR	93	70 - 130		B9K0101	19-Nov-19	0.25 L	25-Nov-19 15:35	1

RL - Reporting limit

Results reported to RL.  
Reporting convention specified by MI DEQ.

When reported, PFHxS, PFOA, PFOS, MeFOSAA and EtFOSAA include both linear and branched isomers. Only the linear isomer is reported for all other analytes.

**Sample ID: LFB**

**EPA Method 537**

Client Data					Laboratory Data							
Name:	Merit Laboratories, Inc.	Matrix:	Aqueous		Lab Sample:	B9K0101-BS1	Column:	BEH C18				
Project:	Statewide Biosolids											

Analyte	CAS Number	Amt Found (ng/L)	Spike Amt	% Rec	Limits	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
PFBS	375-73-5	42	35	119	70 - 130		B9K0101	19-Nov-19	0.25 L	04-Dec-19 21:36	1
PFHxA	307-24-4	42	40	104	70 - 130		B9K0101	19-Nov-19	0.25 L	04-Dec-19 21:36	1
PFHpA	375-85-9	48	40	121	70 - 130		B9K0101	19-Nov-19	0.25 L	04-Dec-19 21:36	1
PFHxS	355-46-4	44	36	121	70 - 130		B9K0101	19-Nov-19	0.25 L	04-Dec-19 21:36	1
PFOA	335-67-1	45	40	113	70 - 130		B9K0101	19-Nov-19	0.25 L	04-Dec-19 21:36	1
PFNA	375-95-1	42	40	105	70 - 130		B9K0101	19-Nov-19	0.25 L	04-Dec-19 21:36	1
PFOS	1763-23-1	40	37	109	70 - 130		B9K0101	19-Nov-19	0.25 L	04-Dec-19 21:36	1
PFDA	335-76-2	41	40	103	70 - 130		B9K0101	19-Nov-19	0.25 L	04-Dec-19 21:36	1
MeFOSAA	2355-31-9	44	40	110	70 - 130		B9K0101	19-Nov-19	0.25 L	04-Dec-19 21:36	1
EtFOSAA	2991-50-6	41	40	102	70 - 130		B9K0101	19-Nov-19	0.25 L	04-Dec-19 21:36	1
PFOxA	2058-94-8	39	40	97	70 - 130		B9K0101	19-Nov-19	0.25 L	04-Dec-19 21:36	1
PFDoA	307-55-1	40	40	99	70 - 130		B9K0101	19-Nov-19	0.25 L	04-Dec-19 21:36	1
PFTTrDA	72629-94-8	39	40	98	70 - 130		B9K0101	19-Nov-19	0.25 L	04-Dec-19 21:36	1
PFTeDA	376-06-7	38	40	95	70 - 130		B9K0101	19-Nov-19	0.25 L	04-Dec-19 21:36	1
Labeled Standards		Type		% Rec	Limits	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
13C2-PFHxA		SURR		102	70- 130		B9K0101	19-Nov-19	0.25 L	04-Dec-19 21:36	1
13C2-PFDA		SURR		89	70- 130		B9K0101	19-Nov-19	0.25 L	04-Dec-19 21:36	1
d5-EtFOSAA		SURR		88	70- 130		B9K0101	19-Nov-19	0.25 L	04-Dec-19 21:36	1

Data Reported per Michigan DEQ instructions.

**Sample ID: WR1911060935LEM** **EPA Method 537**

Client Data				Laboratory Data			
Name:	Merit Laboratories, Inc.	Matrix:	Drinking Water	Lab Sample:	1903965-01	Column:	BEH C18
Project:	Statewide Biosolids	Date Collected:	06-Nov-19 09:35	Date Received:	08-Nov-19 08:53		
Location:	6875 MCCLEMENTS						

Analyte	CAS Number	Conc. (ng/L)	RL	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
PFBS	375-73-5	ND	2		B9K0101	19-Nov-19	0.24 L	25-Nov-19 16:19	1
PFHxA	307-24-4	ND	2		B9K0101	19-Nov-19	0.24 L	25-Nov-19 16:19	1
PFHpA	375-85-9	ND	2		B9K0101	19-Nov-19	0.24 L	25-Nov-19 16:19	1
PFHxS	355-46-4	ND	2		B9K0101	19-Nov-19	0.24 L	25-Nov-19 16:19	1
PFOA	335-67-1	ND	2		B9K0101	19-Nov-19	0.24 L	25-Nov-19 16:19	1
PFNA	375-95-1	ND	2		B9K0101	19-Nov-19	0.24 L	25-Nov-19 16:19	1
PFOS	1763-23-1	ND	2		B9K0101	19-Nov-19	0.24 L	25-Nov-19 16:19	1
PFDA	335-76-2	ND	2		B9K0101	19-Nov-19	0.24 L	25-Nov-19 16:19	1
MeFOSAA	2355-31-9	ND	4		B9K0101	19-Nov-19	0.24 L	25-Nov-19 16:19	1
EtFOSAA	2991-50-6	ND	4		B9K0101	19-Nov-19	0.24 L	25-Nov-19 16:19	1
PFUnA	2058-94-8	ND	4		B9K0101	19-Nov-19	0.24 L	25-Nov-19 16:19	1
PFDoA	307-55-1	ND	4		B9K0101	19-Nov-19	0.24 L	25-Nov-19 16:19	1
PFTrDA	72629-94-8	ND	4		B9K0101	19-Nov-19	0.24 L	25-Nov-19 16:19	1
PFTeDA	376-06-7	ND	4		B9K0101	19-Nov-19	0.24 L	25-Nov-19 16:19	1
Labeled Standards	Type	% Recovery	Limits	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
13C2-PFHxA	SURR	111	70 - 130		B9K0101	19-Nov-19	0.24 L	25-Nov-19 16:19	1
13C2-PFDA	SURR	114	70 - 130		B9K0101	19-Nov-19	0.24 L	25-Nov-19 16:19	1
d5-EtFOSAA	SURR	89	70 - 130		B9K0101	19-Nov-19	0.24 L	25-Nov-19 16:19	1

RL - Reporting limit

Results reported to RL.  
Reporting convention specified by MI DEQ..

When reported, PFHxS, PFOA, PFOS, MeFOSAA and EtFOSAA include both linear and branched isomers. Only the linear isomer is reported for all other analytes.

## DATA QUALIFIERS & ABBREVIATIONS

B	This compound was also detected in the method blank
Conc.	Concentration
CRS	Cleanup Recovery Standard
D	Dilution
DL	Detection limit
E	The associated compound concentration exceeded the calibration range of the instrument
H	Recovery and/or RPD was outside laboratory acceptance limits
I	Chemical Interference
IS	Internal Standard
J	The amount detected is below the Reporting Limit/LOQ
LOD	Limit of Detection
LOQ	Limit of Quantitation
M	Estimated Maximum Possible Concentration (CA Region 2 projects only)
NA	Not applicable
ND	Not Detected
OPR	Ongoing Precision and Recovery sample
P	The reported concentration may include contribution from chlorinated diphenyl ether(s).
Q	The ion transition ratio is outside of the acceptance criteria.
RL	Reporting Limit
TEQ	Toxic Equivalency
U	Not Detected (specific projects only)
*	See Cover Letter

Unless otherwise noted, solid sample results are reported in dry weight. Tissue samples are reported in wet weight.

### Vista Analytical Laboratory Certifications

Accrediting Authority	Certificate Number
Alaska Department of Environmental Conservation	17-013
Arkansas Department of Environmental Quality	19-013-0
California Department of Health – ELAP	2892
DoD ELAP - A2LA Accredited - ISO/IEC 17025:2005	3091.01
Florida Department of Health	E87777-23
Hawaii Department of Health	N/A
Louisiana Department of Environmental Quality	01977
Maine Department of Health	2018017
Massachusetts Department of Environmental Protection	N/A
Michigan Department of Environmental Quality	9932
Minnesota Department of Health	1521520
New Hampshire Environmental Accreditation Program	207718-B
New Jersey Department of Environmental Protection	190001
New York Department of Health	11411
Oregon Laboratory Accreditation Program	4042-010
Pennsylvania Department of Environmental Protection	016
Texas Commission on Environmental Quality	T104704189-19-10
Vermont Department of Health	VT-4042
Virginia Department of General Services	10272
Washington Department of Ecology	C584-19
Wisconsin Department of Natural Resources	998036160

*Current certificates and lists of licensed parameters are located in the Quality Assurance office and are available upon request.*

## NELAP Accredited Test Methods

MATRIX: Air	
Description of Test	Method
Determination of Polychlorinated p-Dioxins & Polychlorinated Dibenzofurans	EPA 23
Determination of Polychlorinated p-Dioxins & Polychlorinated Dibenzofurans	EPA TO-9A

MATRIX: Biological Tissue	
Description of Test	Method
Tetra- through Octa-Chlorinated Dioxins and Furans by Isotope Dilution GC/HRMS	EPA 1613B
Brominated Diphenyl Ethers by HRGC/HRMS	EPA 1614A
Chlorinated Biphenyl Congeners in Water, Soil, Sediment, and Tissue by GC/HRMS	EPA 1668A/C
Pesticides in Water, Soil, Sediment, Biosolids, and Tissue by HRGC/HRMS	EPA 1699
Perfluorinated Alkyl Acids in Drinking Water by SPE and LC/MS/MS	EPA 537
Polychlorinated Dibenzo-p-Dioxins and Polychlorinated Dibenzofurans by GC/HRMS	EPA 8280A/B
Polychlorinated Dibenzodioxins (PCDDs) and Polychlorinated Dibenzofurans (PCDFs) by GC/HRMS	EPA 8290/8290A

MATRIX: Drinking Water	
Description of Test	Method
2,3,7,8-Tetrachlorodibenzo- p-dioxin (2,3,7,8-TCDD) GC/HRMS	EPA 1613/1613B
1,4-Dioxane (1,4-Diethyleneoxide) analysis by GC/HRMS	EPA 522
Perfluorinated Alkyl Acids in Drinking Water by SPE and LC/MS/MS	EPA 537
Perfluorinated Alkyl Acids in Drinking Water by SPE and LC/MS/MS	ISO 25101 2009

MATRIX: Non-Potable Water	
Description of Test	Method
Tetra- through Octa-Chlorinated Dioxins and Furans by Isotope Dilution GC/HRMS	EPA 1613B
Brominated Diphenyl Ethers by HRGC/HRMS	EPA 1614A
Chlorinated Biphenyl Congeners in Water, Soil, Sediment, and Tissue by GC/HRMS	EPA 1668A/C
Pesticides in Water, Soil, Sediment, Biosolids, and Tissue by HRGC/HRMS	EPA 1699
Perfluorinated Alkyl Acids in Drinking Water by SPE and LC/MS/MS	EPA 537
Dioxin by GC/HRMS	EPA 613
Polychlorinated Dibenzo-p-Dioxins and Polychlorinated Dibenzofurans by GC/HRMS	EPA 8280A/B
Polychlorinated Dibenzodioxins (PCDDs) and Polychlorinated Dibenzofurans (PCDFs) by GC/HRMS	EPA 8290/8290A

MATRIX: Solids	
Description of Test	Method
Tetra-Octa Chlorinated Dioxins and Furans by Isotope Dilution GC/HRMS	EPA 1613
Tetra- through Octa-Chlorinated Dioxins and Furans by Isotope Dilution GC/HRMS	EPA 1613B
Brominated Diphenyl Ethers by HRGC/HRMS	EPA 1614A
Chlorinated Biphenyl Congeners in Water, Soil, Sediment, and Tissue by GC/HRMS	EPA 1668A/C
Pesticides in Water, Soil, Sediment, Biosolids, and Tissue by HRGC/HRMS	EPA 1699
Perfluorinated Alkyl Acids in Drinking Water by SPE and LC/MS/MS	EPA 537
Polychlorinated Dibenzo-p-Dioxins and Polychlorinated Dibenzofurans by GC/HRMS	EPA 8280A/B
Polychlorinated Dibenzodioxins (PCDDs) and Polychlorinated Dibenzofurans (PCDFs) by GC/HRMS	EPA 8290/8290A







# CHAIN OF CUSTODY

ID: LR - 537COC

1 of 3  
**1903965**

**For Laboratory Use Only**  
 Work Order #: **1903964** (KE) <sup>11-16-19</sup> Temp: **3.0** °C  
 Storage ID: **R-13, WR-2** Storage Secured: Yes  No

Project ID: Biosolids PO#: \_\_\_\_\_ Sampler: Lauren McNeely  
(name)

TAT Standard:  21 days  
 (check one): Rush (surcharge may apply)  
 14 days  7 days Specify: \_\_\_\_\_

Invoice to: Name Stephanie Kemmer Company EBLG Address \_\_\_\_\_ City \_\_\_\_\_ State \_\_\_\_\_ Ph# \_\_\_\_\_ Fax# \_\_\_\_\_

Relinquished by (printed name and signature) Lauren McNeely Date 11/7/19 Time 1815 Received by (printed name and signature) Hayden Gana Date 11/08/19 Time 08:53  
 Relinquished by (printed name and signature) \_\_\_\_\_ Date \_\_\_\_\_ Time \_\_\_\_\_ Received by (printed name and signature) \_\_\_\_\_ Date \_\_\_\_\_ Time \_\_\_\_\_  
 - SEE REVISED COCS KE 11/16/19 -

SHIP TO: Vista Analytical Laboratory  
1104 Windfield Way  
El Dorado Hills, CA 95762  
(916) 673-1520 \* Fax (916) 673-0106  
 Method of Shipment: \_\_\_\_\_  
 Tracking No.: \_\_\_\_\_  
 ATTN: \_\_\_\_\_

Sample ID	Date	Time	Location/Sample Description	Add Analysis(es) Requested										Comments		
				Quantity	Type	Matrix	PFOM PPOS	UCMR3 PFAS List 6	537 List 14	Full List of 28 2/18	Other: Please List Below	Mod. EPA Method 537	EPA Method 537(DW only)			
~ SB1911071210 LEM	11/7/19	1210	DV2-SOILB	1	PJ	SO					X					
~ SB1911071215 LEM	11/7/19	1215	DV2-SOILC	1	PJ	SO					X					Incremental Sampling Prep
~ SB1911071205 LEM	11/7/19	1205	DV2-SOILA	1	PJ	SO					X					
~ SB1911071355 LEM	11/7/19	1355	DV1-SOILC	1	PJ	SO					X					Incremental Sampling Prep
~ SB1911071350 LEM	11/7/19	1350	DV1-SOILB	1	PJ	SO					X					
~ SB1911071345 LEM	11/7/19	1345	DV1-SOILA	1	PJ	SO					X					
● SB1911071550 LEM	11/7/19	1550	SORG_SOIL2	1	PJ	SO					X					
● SB1911071515 LEM	11/7/19	1515	SORG_SOIL1	1	PJ	SO					X					
* WR1911060935 LEM	11/6/19	0935	6875 McClements	2	P	DW									X	
* WT1911061000 LEM	11/6/19	1000	LIVESTOCK WELL	2	P	DW									X	

Special Instructions/Comments:  
 ~ WO# = 1904043  
 Δ WO# = 1904042  
 \* WO# = 1903965  
 ● WO# = 1903964  
 @ WO# = 1903960

**SEND DOCUMENTATION AND RESULTS TO:**

Name: \_\_\_\_\_  
 Company: \_\_\_\_\_  
 Address: \_\_\_\_\_  
 City: \_\_\_\_\_ State: \_\_\_\_\_ Zip: \_\_\_\_\_  
 Phone: \_\_\_\_\_ Fax: \_\_\_\_\_  
 Email: \_\_\_\_\_

Container Types: P= HDPE, PJ= HDPE Jar      Bottle Preservation Type: T = Thiosulfate, TZ = Trizma: \_\_\_\_\_  
 Matrix Types: AQ = Aqueous, DW = Drinking Water, EF = Effluent, PP = Pulp/Paper, SD = Sediment, SL = Sludge, SO = Soil, WW = Wastewater, B = Blood/Serum, O = Other: \_\_\_\_\_



# CHAIN OF CUSTODY

ID: LR - 537COC

2 of 3  
1903965

**For Laboratory Use Only**  
 Work Order #: 1903964 Temp: 3.0 °C  
 Storage ID: R-13, WR-2 Storage Secured: Yes  No

Project ID: Biosolids PO#: \_\_\_\_\_ Sampler: Lauren McNeely (name)

TAT Standard:  21 days  
 (check one): Rush (surcharge may apply)  
 14 days  7 days Specify: \_\_\_\_\_

Invoice to: Name Stephanie Kammer EGLE Company \_\_\_\_\_ Address \_\_\_\_\_ City \_\_\_\_\_ State \_\_\_\_\_ Ph# \_\_\_\_\_ Fax# \_\_\_\_\_

Relinquished by (printed name and signature)	Date	Time	Received by (printed name and signature)	Date	Time
<u>Lauren McNeely</u>	<u>11/7/19</u>	<u>1815</u>	<u>Hagden Cranar</u>	<u>11/08/19</u>	<u>08:53</u>
<u>- SEE REVISED COCS - KE 11/6/19</u>					

SHIP TO: Vista Analytical Laboratory  
 1104 Windfield Way  
 El Dorado Hills, CA 95762  
 (916) 673-1520 \* Fax (916) 673-0106

Method of Shipment: \_\_\_\_\_  
 Tracking No.: \_\_\_\_\_

ATTN: \_\_\_\_\_

Sample ID	Date	Time	Location/Sample Description	Add Analysis(es) Requested										Comments				
				Quantity	Type	Matrix	PFOA/PFS	UCMR3 PFAS List 6	537 List: 14	Full List of 28 O <sub>2</sub>	Other: Please List Below	PFOA/PFS	UCMR3 PFAS List 6		537(DW only)			
* WT1911071000LEM	11/7/19	1000	6795 McClements	2	P	DW												
X WT1911061235LEM	11/6/19	1235	65 S. Kellogg	2	P	DW												
X WT1911071015LEM	11/7/19	1015	7342 Golf Club	2	P	DW												
Δ SW1911061100LEM	11/6/19	1100	POND 1	2	P	SW				X								
Δ SW1911061135LEM	11/6/19	1135	POND 2	2	P	SW				X								
Δ SW1911061155LEM	11/6/19	1155	POND 3	2	P	SW				X								
Δ SW1911061235LEM	11/6/19	1235	POND 4	2	P	SW				X								
Δ SW1911061245LEM	11/6/19	1245	POND 5	2	P	SW				X								
@ EB1911071430LEM	11/7/19	1430	SW Sampler	2	P	AQ				X								
@ EB1911071435LEM	11/7/19	1435	Soil Sampler	2	P	AQ				X								

Special Instructions/Comments:  
~ WO # = 1904043  
Δ WO # = 1904042  
\* WO # = 1903965  
● WO # = 1903964  
@ WO # = 1903960

**SEND DOCUMENTATION AND RESULTS TO:**

Name: \_\_\_\_\_  
 Company: \_\_\_\_\_  
 Address: \_\_\_\_\_  
 City: \_\_\_\_\_ State: \_\_\_\_\_ Zip: \_\_\_\_\_  
 Phone: \_\_\_\_\_ Fax: \_\_\_\_\_  
 Email: \_\_\_\_\_

Container Types: P= HDPE, PJ= HDPE Jar      Bottle Preservation Type: T = Thiosulfate, TZ = Trizma: \_\_\_\_\_  
 Matrix Types: AQ = Aqueous, DW = Drinking Water, EF = Effluent, PP = Pulp/Paper, SD = Sediment, SL = Sludge, SO = Soil, WW = Wastewater, B = Blood/Serum, O = Other: \_\_\_\_\_



# CHAIN OF CUSTODY

ID: LR - 537COC

3 of 3

1903965

**For Laboratory Use Only**

Work Order #: 1903964 Temp: 3.0 °C

Storage ID: 2-B, WR-2 Storage Secured: Yes  No

Project ID: Biosolids PO#: \_\_\_\_\_ Sampler: Lauren McNeely  
(name)

TAT Standard:  21 days  
(check one): Rush (surcharge may apply)  
 14 days  7 days Specify: \_\_\_\_\_

Invoice to: Name \_\_\_\_\_ Company \_\_\_\_\_ Address \_\_\_\_\_ City \_\_\_\_\_ State \_\_\_\_\_ Ph# \_\_\_\_\_ Fax# \_\_\_\_\_

Stephanie Kammer Eble

Relinquished by (printed name and signature) \_\_\_\_\_ Date \_\_\_\_\_ Time \_\_\_\_\_ Received by (printed name and signature) \_\_\_\_\_ Date \_\_\_\_\_ Time \_\_\_\_\_

Lauren McNeely 11/7/19 1815 Hayden Grant 11/08/19 08:53

Relinquished by (printed name and signature) \_\_\_\_\_ Date \_\_\_\_\_ Time \_\_\_\_\_ Received by (printed name and signature) \_\_\_\_\_ Date \_\_\_\_\_ Time \_\_\_\_\_

*- SEE REVISED COCS KE 11/16/19*

SHIP TO: Vista Analytical Laboratory  
1104 Windfield Way  
El Dorado Hills, CA 95762  
(916) 673-1520 \* Fax (916) 673-0106

Method of Shipment: \_\_\_\_\_

ATTN: \_\_\_\_\_ Tracking No.: \_\_\_\_\_

Quantity	Type	Matrix	Add Analysis(es) Requested					EPA Method 537(DW only)	Comments
			PFOM/ PFS	UCMR3 PFAS List 8	537 List: 14	Full List of 268	Other: Please List Below		
2	P	AQ				X			

Sample ID	Date	Time	Location/Sample Description
<u>EB911071555LEM</u>	<u>11/7/19</u>	<u>1555</u>	<u>Garden Shears</u>

Special Instructions/Comments:

~ WO # : 1904043

^ WO # : 1904042

\* WO # : 1903965

● WO # : 1903964

@ WO # : 1903960

**SEND DOCUMENTATION AND RESULTS TO:**

Name: \_\_\_\_\_

Company: \_\_\_\_\_

Address: \_\_\_\_\_

City: \_\_\_\_\_ State: \_\_\_\_\_ Zip: \_\_\_\_\_

Phone: \_\_\_\_\_ Fax: \_\_\_\_\_

Email: \_\_\_\_\_

Container Types: P= HDPE, PJ= HDPE Jar      Bottle Preservation Type: T = Thiosulfate, TZ = Trizma: \_\_\_\_\_

O = Other: \_\_\_\_\_      Matrix Types: AQ = Aqueous, DW = Drinking Water, EF = Effluent, PP = Pulp/Paper, SD = Sediment, SL = Sludge, SO = Soil, WW = Wastewater, B = Blood/Serum, O = Other: \_\_\_\_\_

# Sample Log-In Checklist

Page # 1 of 1

Vista Work Order #: 1903965 TAT std

Samples Arrival:	Date/Time		Initials:		Location: <u>WR-2</u>		
	<u>11/08/19 08:55</u>		<u>HOG</u>		Shelf/Rack: <u>NA</u>		
Delivered By:	<input checked="" type="radio"/> FedEx	<input type="radio"/> UPS	<input type="radio"/> On Trac	<input type="radio"/> GSO	<input type="radio"/> DHL	<input type="radio"/> Hand Delivered	<input type="radio"/> Other
Preservation:	<input checked="" type="radio"/> Ice		<input type="radio"/> Blue Ice		<input type="radio"/> Dry Ice		<input type="radio"/> None
Temp °C: <u>3.0</u> (uncorrected)	Probe used: <u>Y</u> <input checked="" type="radio"/> <u>N</u>			Thermometer ID: <u>IR-3</u>			
Temp °C: <u>3.0</u> (corrected)							

	YES	NO	NA		
Shipping Container(s) Intact?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		
Shipping Custody Seals Intact?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>		
Airbill <u>                    </u> Trk # <u>7808 1634 0970</u>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		
Shipping Documentation Present?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		
Shipping Container	<input type="checkbox"/> Vista	<input checked="" type="checkbox"/> <u>Client</u>	<input type="checkbox"/> Retain	<input checked="" type="checkbox"/> <u>Return</u>	<input type="checkbox"/> Dispose
Chain of Custody / Sample Documentation Present?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		
Chain of Custody / Sample Documentation Complete?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		
Holding Time Acceptable?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		

Logged In:	Date/Time		Initials:		Location: <u>R-13</u>   <u>WR-2</u>		
	<u>11/09/19 1631</u>		<u>KG</u>		Shelf/Rack: <u>A4</u>   <u>F5</u> <u>SD</u> <u>A5</u>		
COC Anomaly/Sample Acceptance Form completed?					<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>

Comments:

# CoC/Label Reconciliation Report WO# 1903965

LabNumber	CoC Sample ID		SampleAlias	Sample Date/Time	Container	BaseMatrix	Sample Comments
1903965-01	A WR1911060935LEM	<input checked="" type="checkbox"/>	6875 MCCLEMENTS ✓	06-Nov-19 09:35 <input checked="" type="checkbox"/>	HDPE Bottle, 250 mL ✓	Aqueous ✓	
1903965-01	B WR1911060935LEM	<input checked="" type="checkbox"/>	6875 MCCLEMENTS ✓	06-Nov-19 09:35 <input checked="" type="checkbox"/>	HDPE Bottle, 250 mL ✓	Aqueous ✓	
1903965-02	A WT1911061000LEM	<input checked="" type="checkbox"/>	LIVESTOCK WELL ✓	06-Nov-19 10:00 <input checked="" type="checkbox"/>	HDPE Bottle, 250 mL ✓	Aqueous ✓	
1903965-02	B WT1911061000LEM	<input checked="" type="checkbox"/>	LIVESTOCK WELL ✓	06-Nov-19 10:00 <input checked="" type="checkbox"/>	HDPE Bottle, 250 mL ✓	Aqueous ✓	
1903965-03	A WT1911071000LEM	<input checked="" type="checkbox"/>	6795 MCCLEMENTS	07-Nov-19 10:00 <input checked="" type="checkbox"/>	HDPE Bottle, 250 mL ✓	Aqueous ✓	
1903965-03	B WT1911071000LEM	<input checked="" type="checkbox"/>	6795 MCCLEMENTS	07-Nov-19 10:00 <input checked="" type="checkbox"/>	HDPE Bottle, 250 mL ✓	Aqueous ✓	
1903965-04	A WT1911061255LEM	<input checked="" type="checkbox"/>	65 S. KELLOGG ✓	06-Nov-19 12:55 <input checked="" type="checkbox"/>	HDPE Bottle, 250 mL ✓	Aqueous ✓	
1903965-04	B WT1911061255LEM	<input checked="" type="checkbox"/>	65 S. KELLOGG ✓	06-Nov-19 12:55 <input checked="" type="checkbox"/>	HDPE Bottle, 250 mL ✓	Aqueous ✓	
1903965-05	A WT1911071015LEM	<input checked="" type="checkbox"/>	7342 GOLF CLUB ✓	07-Nov-19 10:15 <input checked="" type="checkbox"/>	HDPE Bottle, 250 mL ✓	Aqueous ✓	
1903965-05	B WT1911071015LEM	<input checked="" type="checkbox"/>	7342 GOLF CLUB ✓	07-Nov-19 10:15 <input checked="" type="checkbox"/>	HDPE Bottle, 250 mL ✓	Aqueous ✓	

Checkmarks indicate that information on the COC reconciled with the sample label.  
Any discrepancies are noted in the following columns.

	Yes	No	NA	Comments:
Sample Container Intact?	✓			
Sample Custody Seals Intact?			✓	
Adequate Sample Volume?	✓			
Container Type Appropriate for Analysis(es)	✓			
Preservation Documented: Na2S2O3 <u>Trizma</u> None Other	✓			
If Chlorinated or Drinking Water Samples, Acceptable Preservation?	✓			

Verified by/Date: kg 11/10/19



December 05, 2019

**Vista Work Order No. 1903965**

Ms. Maya Murshak  
Merit Laboratories, Inc.  
2680 East Lansing Drive  
East Lansing, MI 48823

Dear Ms. Murshak,

Enclosed are the results for the sample set received at Vista Analytical Laboratory on November 08, 2019 under your Project Name 'Statewide Biosolids'.

Vista Analytical Laboratory is committed to serving you effectively. If you require additional information, please contact me at 916-673-1520 or by email at [mmaier@vista-analytical.com](mailto:mmaier@vista-analytical.com).

Thank you for choosing Vista as part of your analytical support team.

Sincerely,

Martha Maier  
Laboratory Director



*Vista Analytical Laboratory certifies that the report herein meets all the requirements set forth by NELAP for those applicable test methods. Results relate only to the samples as received by the laboratory. This report should not be reproduced except in full without the written approval of Vista.*

Vista Analytical Laboratory 1104 Windfield Way El Dorado Hills, CA 95762 ph: 916-673-1520 fx: 916-673-0106 [www.vista-analytical.com](http://www.vista-analytical.com)

## **Vista Work Order No. 1903965**

### **Case Narrative**

#### **Sample Condition on Receipt:**

One drinking water sample was received in good condition and within the method temperature requirements. The sample was received and stored securely in accordance with Vista standard operating procedures and EPA methodology. A revised COC was received by email on November 15, 2019.

#### **Analytical Notes:**

##### **EPA Method 537, Rev. 1.1**

The sample was extracted and analyzed for a selected list of 14 PFAS using EPA Method 537, Rev. 1.1. The results have been reported following the conventions specified by the Michigan Department of Environmental Quality.

##### **Holding Times**

The sample was extracted and analyzed within the method hold times.

##### **Quality Control**

The Initial Calibration and Continuing Calibration Verifications met the method acceptance criteria.

A Laboratory Fortified Blank (LFB) and a Laboratory Reagent Blank (LRB) were extracted and analyzed with the preparation batch. No analytes were detected in the Laboratory Reagent Blank. The LFB recoveries were within the method acceptance criteria.

The surrogate recoveries for all QC and field samples were within the acceptance criteria.



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# Sample Inventory Report

<b>Vista Sample ID</b>	<b>Client Sample ID</b>	<b>Sampled</b>	<b>Received</b>	<b>Components/Containers</b>
1903965-01	WR1911060935LEM	06-Nov-19 09:35	08-Nov-19 08:53	HDPE Bottle, 250 mL HDPE Bottle, 250 mL
1903965-02	WT1911061000LEM	06-Nov-19 10:00	08-Nov-19 08:53	HDPE Bottle, 250 mL HDPE Bottle, 250 mL
1903965-03	WT1911071000LEM	07-Nov-19 10:00	08-Nov-19 08:53	HDPE Bottle, 250 mL HDPE Bottle, 250 mL
1903965-04	WT1911061255LEM	06-Nov-19 12:55	08-Nov-19 08:53	HDPE Bottle, 250 mL HDPE Bottle, 250 mL
1903965-05	WT1911071015LEM	07-Nov-19 10:15	08-Nov-19 08:53	HDPE Bottle, 250 mL HDPE Bottle, 250 mL

## **ANALYTICAL RESULTS**

**Sample ID: LRB**

**EPA Method 537**

<b>Client Data</b>				<b>Laboratory Data</b>					
Name:	Merit Laboratories, Inc.	Matrix:	Aqueous	Lab Sample:	B9K0101-BLK1	Column:	BEH C18		
Project:	Statewide Biosolids								

Analyte	CAS Number	Conc. (ng/L)	RL	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
PFBS	375-73-5	ND	2		B9K0101	19-Nov-19	0.25 L	25-Nov-19 15:35	1
PFHxA	307-24-4	ND	2		B9K0101	19-Nov-19	0.25 L	25-Nov-19 15:35	1
PFHpA	375-85-9	ND	2		B9K0101	19-Nov-19	0.25 L	25-Nov-19 15:35	1
PFHxS	355-46-4	ND	2		B9K0101	19-Nov-19	0.25 L	25-Nov-19 15:35	1
PFOA	335-67-1	ND	2		B9K0101	19-Nov-19	0.25 L	25-Nov-19 15:35	1
PFNA	375-95-1	ND	2		B9K0101	19-Nov-19	0.25 L	25-Nov-19 15:35	1
PFOS	1763-23-1	ND	2		B9K0101	19-Nov-19	0.25 L	25-Nov-19 15:35	1
PFDA	335-76-2	ND	2		B9K0101	19-Nov-19	0.25 L	25-Nov-19 15:35	1
MeFOSAA	2355-31-9	ND	4		B9K0101	19-Nov-19	0.25 L	25-Nov-19 15:35	1
EtFOSAA	2991-50-6	ND	4		B9K0101	19-Nov-19	0.25 L	25-Nov-19 15:35	1
PFUnA	2058-94-8	ND	4		B9K0101	19-Nov-19	0.25 L	25-Nov-19 15:35	1
PFDoA	307-55-1	ND	4		B9K0101	19-Nov-19	0.25 L	25-Nov-19 15:35	1
PFTeDA	72629-94-8	ND	4		B9K0101	19-Nov-19	0.25 L	25-Nov-19 15:35	1
PFTeDA	376-06-7	ND	4		B9K0101	19-Nov-19	0.25 L	25-Nov-19 15:35	1

Labeled Standards	Type	% Recovery	Limits	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
13C2-PFHxA	SURR	105	70 - 130		B9K0101	19-Nov-19	0.25 L	25-Nov-19 15:35	1
13C2-PFDA	SURR	116	70 - 130		B9K0101	19-Nov-19	0.25 L	25-Nov-19 15:35	1
d5-EtFOSAA	SURR	93	70 - 130		B9K0101	19-Nov-19	0.25 L	25-Nov-19 15:35	1

RL - Reporting limit

Results reported to RL.  
Reporting convention specified by MI DEQ.

When reported, PFHxS, PFOA, PFOS, MeFOSAA and EtFOSAA include both linear and branched isomers. Only the linear isomer is reported for all other analytes.

**Sample ID: LFB**

**EPA Method 537**

Client Data					Laboratory Data							
Name:	Merit Laboratories, Inc.	Matrix:	Aqueous		Lab Sample:	B9K0101-BS1	Column:	BEH C18				
Project:	Statewide Biosolids											

Analyte	CAS Number	Amt Found (ng/L)	Spike Amt	% Rec	Limits	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
PFBS	375-73-5	42	35	119	70 - 130		B9K0101	19-Nov-19	0.25 L	04-Dec-19 21:36	1
PFHxA	307-24-4	42	40	104	70 - 130		B9K0101	19-Nov-19	0.25 L	04-Dec-19 21:36	1
PFHpA	375-85-9	48	40	121	70 - 130		B9K0101	19-Nov-19	0.25 L	04-Dec-19 21:36	1
PFHxS	355-46-4	44	36	121	70 - 130		B9K0101	19-Nov-19	0.25 L	04-Dec-19 21:36	1
PFOA	335-67-1	45	40	113	70 - 130		B9K0101	19-Nov-19	0.25 L	04-Dec-19 21:36	1
PFNA	375-95-1	42	40	105	70 - 130		B9K0101	19-Nov-19	0.25 L	04-Dec-19 21:36	1
PFOS	1763-23-1	40	37	109	70 - 130		B9K0101	19-Nov-19	0.25 L	04-Dec-19 21:36	1
PFDA	335-76-2	41	40	103	70 - 130		B9K0101	19-Nov-19	0.25 L	04-Dec-19 21:36	1
MeFOSAA	2355-31-9	44	40	110	70 - 130		B9K0101	19-Nov-19	0.25 L	04-Dec-19 21:36	1
EtFOSAA	2991-50-6	41	40	102	70 - 130		B9K0101	19-Nov-19	0.25 L	04-Dec-19 21:36	1
PFOxA	2058-94-8	39	40	97	70 - 130		B9K0101	19-Nov-19	0.25 L	04-Dec-19 21:36	1
PFDoA	307-55-1	40	40	99	70 - 130		B9K0101	19-Nov-19	0.25 L	04-Dec-19 21:36	1
PFTTrDA	72629-94-8	39	40	98	70 - 130		B9K0101	19-Nov-19	0.25 L	04-Dec-19 21:36	1
PFTeDA	376-06-7	38	40	95	70 - 130		B9K0101	19-Nov-19	0.25 L	04-Dec-19 21:36	1
Labeled Standards		Type		% Rec	Limits	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
13C2-PFHxA		SURR		102	70- 130		B9K0101	19-Nov-19	0.25 L	04-Dec-19 21:36	1
13C2-PFDA		SURR		89	70- 130		B9K0101	19-Nov-19	0.25 L	04-Dec-19 21:36	1
d5-EtFOSAA		SURR		88	70- 130		B9K0101	19-Nov-19	0.25 L	04-Dec-19 21:36	1

Data Reported per Michigan DEQ instructions.

**Sample ID: WT1911061000LEM** **EPA Method 537**

<b>Client Data</b>				<b>Laboratory Data</b>			
Name:	Merit Laboratories, Inc.	Matrix:	Drinking Water	Lab Sample:	1903965-02	Column:	BEH C18
Project:	Statewide Biosolids	Date Collected:	06-Nov-19 10:00	Date Received:	08-Nov-19 08:53		
Location:	WIXO-AG01-LW1						

Analyte	CAS Number	Conc. (ng/L)	RL	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
PFBS	375-73-5	ND	2		B9K0101	19-Nov-19	0.24 L	25-Nov-19 16:30	1
PFHxA	307-24-4	ND	2		B9K0101	19-Nov-19	0.24 L	25-Nov-19 16:30	1
PFHpA	375-85-9	ND	2		B9K0101	19-Nov-19	0.24 L	25-Nov-19 16:30	1
PFHxS	355-46-4	ND	2		B9K0101	19-Nov-19	0.24 L	25-Nov-19 16:30	1
PFOA	335-67-1	ND	2		B9K0101	19-Nov-19	0.24 L	25-Nov-19 16:30	1
PFNA	375-95-1	ND	2		B9K0101	19-Nov-19	0.24 L	25-Nov-19 16:30	1
PFOS	1763-23-1	ND	2		B9K0101	19-Nov-19	0.24 L	25-Nov-19 16:30	1
PFDA	335-76-2	ND	2		B9K0101	19-Nov-19	0.24 L	25-Nov-19 16:30	1
MeFOSAA	2355-31-9	ND	4		B9K0101	19-Nov-19	0.24 L	25-Nov-19 16:30	1
EtFOSAA	2991-50-6	ND	4		B9K0101	19-Nov-19	0.24 L	25-Nov-19 16:30	1
PFUnA	2058-94-8	ND	4		B9K0101	19-Nov-19	0.24 L	25-Nov-19 16:30	1
PFDoA	307-55-1	ND	4		B9K0101	19-Nov-19	0.24 L	25-Nov-19 16:30	1
PFTeDA	72629-94-8	ND	4		B9K0101	19-Nov-19	0.24 L	25-Nov-19 16:30	1
PFTeDA	376-06-7	ND	4		B9K0101	19-Nov-19	0.24 L	25-Nov-19 16:30	1
Labeled Standards	Type	% Recovery	Limits	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
13C2-PFHxA	SURR	114	70 - 130		B9K0101	19-Nov-19	0.24 L	25-Nov-19 16:30	1
13C2-PFDA	SURR	111	70 - 130		B9K0101	19-Nov-19	0.24 L	25-Nov-19 16:30	1
d5-EtFOSAA	SURR	78	70 - 130		B9K0101	19-Nov-19	0.24 L	25-Nov-19 16:30	1

RL - Reporting limit      Results reported to RL.  
 Reporting convention specified by MI DEQ..      When reported, PFHxS, PFOA, PFOS, MeFOSAA and EtFOSAA include both linear and branched isomers. Only the linear isomer is reported for all other analytes.

## DATA QUALIFIERS & ABBREVIATIONS

B	This compound was also detected in the method blank
Conc.	Concentration
CRS	Cleanup Recovery Standard
D	Dilution
DL	Detection limit
E	The associated compound concentration exceeded the calibration range of the instrument
H	Recovery and/or RPD was outside laboratory acceptance limits
I	Chemical Interference
IS	Internal Standard
J	The amount detected is below the Reporting Limit/LOQ
LOD	Limit of Detection
LOQ	Limit of Quantitation
M	Estimated Maximum Possible Concentration (CA Region 2 projects only)
NA	Not applicable
ND	Not Detected
OPR	Ongoing Precision and Recovery sample
P	The reported concentration may include contribution from chlorinated diphenyl ether(s).
Q	The ion transition ratio is outside of the acceptance criteria.
RL	Reporting Limit
TEQ	Toxic Equivalency
U	Not Detected (specific projects only)
*	See Cover Letter

Unless otherwise noted, solid sample results are reported in dry weight. Tissue samples are reported in wet weight.

### Vista Analytical Laboratory Certifications

Accrediting Authority	Certificate Number
Alaska Department of Environmental Conservation	17-013
Arkansas Department of Environmental Quality	19-013-0
California Department of Health – ELAP	2892
DoD ELAP - A2LA Accredited - ISO/IEC 17025:2005	3091.01
Florida Department of Health	E87777-23
Hawaii Department of Health	N/A
Louisiana Department of Environmental Quality	01977
Maine Department of Health	2018017
Massachusetts Department of Environmental Protection	N/A
Michigan Department of Environmental Quality	9932
Minnesota Department of Health	1521520
New Hampshire Environmental Accreditation Program	207718-B
New Jersey Department of Environmental Protection	190001
New York Department of Health	11411
Oregon Laboratory Accreditation Program	4042-010
Pennsylvania Department of Environmental Protection	016
Texas Commission on Environmental Quality	T104704189-19-10
Vermont Department of Health	VT-4042
Virginia Department of General Services	10272
Washington Department of Ecology	C584-19
Wisconsin Department of Natural Resources	998036160

*Current certificates and lists of licensed parameters are located in the Quality Assurance office and are available upon request.*



## NELAP Accredited Test Methods

MATRIX: Air	
Description of Test	Method
Determination of Polychlorinated p-Dioxins & Polychlorinated Dibenzofurans	EPA 23
Determination of Polychlorinated p-Dioxins & Polychlorinated Dibenzofurans	EPA TO-9A

MATRIX: Biological Tissue	
Description of Test	Method
Tetra- through Octa-Chlorinated Dioxins and Furans by Isotope Dilution GC/HRMS	EPA 1613B
Brominated Diphenyl Ethers by HRGC/HRMS	EPA 1614A
Chlorinated Biphenyl Congeners in Water, Soil, Sediment, and Tissue by GC/HRMS	EPA 1668A/C
Pesticides in Water, Soil, Sediment, Biosolids, and Tissue by HRGC/HRMS	EPA 1699
Perfluorinated Alkyl Acids in Drinking Water by SPE and LC/MS/MS	EPA 537
Polychlorinated Dibenzo-p-Dioxins and Polychlorinated Dibenzofurans by GC/HRMS	EPA 8280A/B
Polychlorinated Dibenzodioxins (PCDDs) and Polychlorinated Dibenzofurans (PCDFs) by GC/HRMS	EPA 8290/8290A

MATRIX: Drinking Water	
Description of Test	Method
2,3,7,8-Tetrachlorodibenzo- p-dioxin (2,3,7,8-TCDD) GC/HRMS	EPA 1613/1613B
1,4-Dioxane (1,4-Diethyleneoxide) analysis by GC/HRMS	EPA 522
Perfluorinated Alkyl Acids in Drinking Water by SPE and LC/MS/MS	EPA 537
Perfluorinated Alkyl Acids in Drinking Water by SPE and LC/MS/MS	ISO 25101 2009

MATRIX: Non-Potable Water	
Description of Test	Method
Tetra- through Octa-Chlorinated Dioxins and Furans by Isotope Dilution GC/HRMS	EPA 1613B
Brominated Diphenyl Ethers by HRGC/HRMS	EPA 1614A
Chlorinated Biphenyl Congeners in Water, Soil, Sediment, and Tissue by GC/HRMS	EPA 1668A/C
Pesticides in Water, Soil, Sediment, Biosolids, and Tissue by HRGC/HRMS	EPA 1699
Perfluorinated Alkyl Acids in Drinking Water by SPE and LC/MS/MS	EPA 537
Dioxin by GC/HRMS	EPA 613
Polychlorinated Dibenzo-p-Dioxins and Polychlorinated Dibenzofurans by GC/HRMS	EPA 8280A/B
Polychlorinated Dibenzodioxins (PCDDs) and Polychlorinated Dibenzofurans (PCDFs) by GC/HRMS	EPA 8290/8290A

MATRIX: Solids	
Description of Test	Method
Tetra-Octa Chlorinated Dioxins and Furans by Isotope Dilution GC/HRMS	EPA 1613
Tetra- through Octa-Chlorinated Dioxins and Furans by Isotope Dilution GC/HRMS	EPA 1613B
Brominated Diphenyl Ethers by HRGC/HRMS	EPA 1614A
Chlorinated Biphenyl Congeners in Water, Soil, Sediment, and Tissue by GC/HRMS	EPA 1668A/C
Pesticides in Water, Soil, Sediment, Biosolids, and Tissue by HRGC/HRMS	EPA 1699
Perfluorinated Alkyl Acids in Drinking Water by SPE and LC/MS/MS	EPA 537
Polychlorinated Dibenzo-p-Dioxins and Polychlorinated Dibenzofurans by GC/HRMS	EPA 8280A/B
Polychlorinated Dibenzodioxins (PCDDs) and Polychlorinated Dibenzofurans (PCDFs) by GC/HRMS	EPA 8290/8290A



# CHAIN OF CUSTODY

**For Laboratory Use Only**  
 Work Order #: 1903965 B Temp: 30 °C  
 Storage ID: R-13# WR-2 Storage Secured: Yes  No

Project ID: Statewide Biosolids PO#: 60588767.01 Sampler: Lauren McNeely  
 (name)

TAT Standard:  21 days  
 (check one): Rush (surcharge may apply)  
 14 days  7 days Specify: \_\_\_\_\_

Invoice to: Name Stephanie Kammer Company EGLE Address 525 W. Allegan Street City Lansing State MI Ph# 517-897-1597 Fax# 517-241-3571

Relinquished by (printed name and signature) Lauren McNeely Date 11/7/2019 Time 1815 Received by (printed name and signature) \* RECEIVED REVISED COC EMAIL 11-15-19 1447 Date 11-15-19 Time 1447

Relinquished by (printed name and signature) \_\_\_\_\_ Date \_\_\_\_\_ Time \_\_\_\_\_ Received by (printed name and signature) - SEE ORIGINAL COC FOR SIGNATURE - KE 11-16-19 Date \_\_\_\_\_ Time \_\_\_\_\_

SHIP TO: Vista Analytical Laboratory 1104 Windfield Way El Dorado Hills, CA 95762 Ph: (916) 673-1520; Fax: (916) 673-0106			Method of Shipment:		Add Analysis(es) Requested							PFAS Isotope Dilution		USEPA Method 537		Comments	
ATTN: Jennifer Miller			Tracking No.:		Quantity	Type	Matrix	List of 21	List of 21 w/Isomers	List of 24	List of 24 w/Isomers	List of 28	Other: Please List Below	PFOM PPOS	UCMR3 PFAS List: 6		PFAS List: 14
Sample ID	Date	Time	Location/Sample Description														
WT1911061000LEM	11/6/19	1000	WIXO-AG01-LW1	2	P	DW										X	Located at 02n05e02-AG01 -Livestock Well

Special Instructions/Comments: Send Results and Acknowledgements to the list provided

**SEND DOCUMENTATION AND RESULTS TO:**

Name: Stephanie Kammer  
 Company: EGLE  
 Address: 525 W. Allegan Street, Constitution Hall, 1st South West  
 City: Lansing State: MI Zip: 30242  
 Phone: 517-897-1597 Fax: 517-241-3571  
 Email: dorin.bogdan@aecom.com

Container Types: P= HDPE, PJ= HDPE Jar      Bottle Preservation Type: T = Thiosulfate,      Matrix Types: AQ = Aqueous, DW = Drinking Water, EF = Effluent, PP = Pulp/Paper, SD = Sediment, O = Other: \_\_\_\_\_      TZ = Trizma: \_\_\_\_\_      SL = Sludge, BS=Biosolids, SO = Soil, WW = Wastewater, B = Blood/Serum, O = Other: \_\_\_\_\_



# CHAIN OF CUSTODY

ID: LR - 537COC

1 of 3  
**1903965**

**For Laboratory Use Only**  
 Work Order #: **1903964** (KE) <sup>11-16-19</sup> Temp: **3.0** °C  
 Storage ID: **R-13, WR-2** Storage Secured: Yes  No

Project ID: Biosolids PO#: \_\_\_\_\_ Sampler: Lauren McNeely  
(name)

TAT Standard:  21 days  
 (check one): Rush (surcharge may apply)  
 14 days  7 days Specify: \_\_\_\_\_

Invoice to: Name Stephanie Kemmer Company EBLG Address \_\_\_\_\_ City \_\_\_\_\_ State \_\_\_\_\_ Ph# \_\_\_\_\_ Fax# \_\_\_\_\_

Relinquished by (printed name and signature) Lauren McNeely Date 11/7/19 Time 1815 Received by (printed name and signature) Hayden Gana Date 11/08/19 Time 08:53  
 Relinquished by (printed name and signature) \_\_\_\_\_ Date \_\_\_\_\_ Time \_\_\_\_\_ Received by (printed name and signature) \_\_\_\_\_ Date \_\_\_\_\_ Time \_\_\_\_\_  
- SEE REVISED COC'S KE 11/16/19 -

SHIP TO: Vista Analytical Laboratory  
 1104 Windfield Way  
 El Dorado Hills, CA 95762  
 (916) 673-1520 \* Fax (916) 673-0106  
 Method of Shipment: \_\_\_\_\_  
 Tracking No.: \_\_\_\_\_  
 ATTN: \_\_\_\_\_

Sample ID	Date	Time	Location/Sample Description	Add Analysis(es) Requested										Comments			
				Quantity	Type	Matrix	PFOM PPOS	UCMR3 PFAS List 6	537 List 14	Full List of 28 2/18	Other: Please List Below	Mod. EPA Method 537	EPA Method 537(DW only)				
~ SB1911071210 LEM	11/7/19	1210	DV2-SOILB	1	PJ	SO											
~ SB1911071215 LEM	11/7/19	1215	DV2-SOILC	1	PJ	SO											Incremental Sampling Prep
~ SB1911071205 LEM	11/7/19	1205	DV2-SOILA	1	PJ	SO											
~ SB1911071355 LEM	11/7/19	1355	DV1-SOILC	1	PJ	SO											Incremental Sampling Prep
~ SB1911071350 LEM	11/7/19	1350	DV1-SOILB	1	PJ	SO											
~ SB1911071345 LEM	11/7/19	1345	DV1-SOILA	1	PJ	SO											
● SB1911071550 LEM	11/7/19	1550	SORG_SOIL2	1	PJ	SO											
● SB1911071515 LEM	11/7/19	1515	SORG_SOIL1	1	PJ	SO											
* WR1911060935 LEM	11/6/19	0935	6875 McClements	2	P	DW											
* WT1911061000 LEM	11/6/19	1000	LIVESTOCK WELL	2	P	DW											

Special Instructions/Comments:  
 ~ WO # = 1904043  
 Δ WO # = 1904042  
 \* WO # = 1903965  
 ● WO # = 1903964  
 @ WO # = 1903960

**SEND DOCUMENTATION AND RESULTS TO:**

Name: \_\_\_\_\_  
 Company: \_\_\_\_\_  
 Address: \_\_\_\_\_  
 City: \_\_\_\_\_ State: \_\_\_\_\_ Zip: \_\_\_\_\_  
 Phone: \_\_\_\_\_ Fax: \_\_\_\_\_  
 Email: \_\_\_\_\_

Container Types: P= HDPE, PJ= HDPE Jar      Bottle Preservation Type: T = Thiosulfate, TZ = Trizma: \_\_\_\_\_  
 Matrix Types: AQ = Aqueous, DW = Drinking Water, EF = Effluent, PP = Pulp/Paper, SD = Sediment, SL = Sludge, SO = Soil, WW = Wastewater, B = Blood/Serum, O = Other: \_\_\_\_\_



# CHAIN OF CUSTODY

ID: LR - 537COC

2 of 3  
1903965

**For Laboratory Use Only**  
 Work Order #: 1903964 Temp: 3.0 °C  
 Storage ID: R-13, WR-2 Storage Secured: Yes  No

Project ID: Biosolids PO#: \_\_\_\_\_ Sampler: Lauren McNeely  
(name)

TAT Standard:  21 days  
 (check one): Rush (surcharge may apply)  
 14 days  7 days Specify: \_\_\_\_\_

Invoice to: Name Stephanie Kammer EGLE Company \_\_\_\_\_ Address \_\_\_\_\_ City \_\_\_\_\_ State \_\_\_\_\_ Ph# \_\_\_\_\_ Fax# \_\_\_\_\_

Relinquished by (printed name and signature)	Date	Time	Received by (printed name and signature)	Date	Time
<u>Lauren McNeely</u>	<u>11/7/19</u>	<u>1815</u>	<u>Hagden Cranar</u>	<u>11/08/19</u>	<u>08:53</u>
<u>- SEE REVISED COCS - KE 11/6/19</u>					

SHIP TO: Vista Analytical Laboratory  
 1104 Windfield Way  
 El Dorado Hills, CA 95762  
 (916) 673-1520 \* Fax (916) 673-0106

Method of Shipment: \_\_\_\_\_  
 Tracking No.: \_\_\_\_\_

ATTN: \_\_\_\_\_

Sample ID	Date	Time	Location/Sample Description	Add Analysis(es) Requested										Comments							
				Quantity	Type	Matrix	PFOA/PFS	UCMR3 PFAS List 6	537 List: 14	Full List of 28 O <sub>2</sub>	Other: Please List Below	PFOA/PFS	UCMR3 PFAS List 6		537(DW only)						
* WT1911071000LEM	11/7/19	1000	6795 McClements	2	P	DW															
X WT1911061235LEM	11/6/19	1235	65 S. Kellogg	2	P	DW															
X WT1911071015LEM	11/7/19	1015	7342 Golf Club	2	P	DW															
Δ SW1911061100LEM	11/6/19	1100	POND 1	2	P	SW					X										
Δ SW1911061135LEM	11/6/19	1135	POND 2	2	P	SW					X										
Δ SW1911061155LEM	11/6/19	1155	POND 3	2	P	SW					X										
Δ SW1911061235LEM	11/6/19	1235	POND 4	2	P	SW					X										
Δ SW1911061245LEM	11/6/19	1245	POND 5	2	P	SW					X										
@ EB1911071430LEM	11/7/19	1430	SW Sampler	2	P	AQ					X										
@ EB1911071435LEM	11/7/19	1435	Soil Sampler	2	P	AQ					X										

Special Instructions/Comments:  
~ WO # = 1904043  
Δ WO # = 1904042  
\* WO # = 1903965  
● WO # = 1903964  
@ WO # = 1903960

**SEND DOCUMENTATION AND RESULTS TO:**

Name: \_\_\_\_\_  
 Company: \_\_\_\_\_  
 Address: \_\_\_\_\_  
 City: \_\_\_\_\_ State: \_\_\_\_\_ Zip: \_\_\_\_\_  
 Phone: \_\_\_\_\_ Fax: \_\_\_\_\_  
 Email: \_\_\_\_\_

Container Types: P= HDPE, PJ= HDPE Jar      Bottle Preservation Type: T = Thiosulfate, TZ = Trizma: \_\_\_\_\_  
 Matrix Types: AQ = Aqueous, DW = Drinking Water, EF = Effluent, PP = Pulp/Paper, SD = Sediment, SL = Sludge, SO = Soil, WW = Wastewater, B = Blood/Serum, O = Other: \_\_\_\_\_



# CHAIN OF CUSTODY

ID: LR - 537COC

3 of 3  
1903965

**For Laboratory Use Only**

Work Order #: 1903964 Temp: 3.0 °C

Storage ID: 2-B, WR-2 Storage Secured: Yes  No

Project ID: Biosolids PO#: \_\_\_\_\_ Sampler: Lauren McNeely  
(name)

TAT (check one):  21 days  
 14 days  7 days Specify: \_\_\_\_\_

Standard: \_\_\_\_\_  
Rush (surcharge may apply): \_\_\_\_\_

Invoice to: Name \_\_\_\_\_ Company \_\_\_\_\_ Address \_\_\_\_\_ City \_\_\_\_\_ State \_\_\_\_\_ Ph# \_\_\_\_\_ Fax# \_\_\_\_\_

Stephanie Kammer EBLE

Relinquished by (printed name and signature) \_\_\_\_\_ Date \_\_\_\_\_ Time \_\_\_\_\_ Received by (printed name and signature) \_\_\_\_\_ Date \_\_\_\_\_ Time \_\_\_\_\_

Lauren McNeely [Signature] 11/7/19 1815 Hayden Grant [Signature] 11/08/19 08:53

Relinquished by (printed name and signature) \_\_\_\_\_ Date \_\_\_\_\_ Time \_\_\_\_\_ Received by (printed name and signature) \_\_\_\_\_ Date \_\_\_\_\_ Time \_\_\_\_\_

*- SEE REVISED COCS KE 11/16/19*

SHIP TO: Vista Analytical Laboratory  
1104 Windfield Way  
El Dorado Hills, CA 95762  
(916) 673-1520 \* Fax (916) 673-0106

Method of Shipment: \_\_\_\_\_  
Tracking No.: \_\_\_\_\_

ATTN: \_\_\_\_\_

Sample ID	Date	Time	Location/Sample Description	Add Analysis(es) Requested							Comments							
				Quantity	Type	Matrix	PFOM/ PFS	UCMR3 PFAS List 8	537 List: 14	Full List of 268		Other: Please List Below	PFOM/ PFS	UCMR3 PFAS List 8	PFAS List: 14			
EB911071555LEM	11/7/19	1555	Garden Shears	2	P	AQ				X								

Special Instructions/Comments:

~ WO # : 1904043

^ WO # : 1904042

\* WO # : 1903965

● WO # : 1903964

@ WO # : 1903960

**SEND DOCUMENTATION AND RESULTS TO:**

Name: \_\_\_\_\_  
Company: \_\_\_\_\_  
Address: \_\_\_\_\_  
City: \_\_\_\_\_ State: \_\_\_\_\_ Zip: \_\_\_\_\_  
Phone: \_\_\_\_\_ Fax: \_\_\_\_\_  
Email: \_\_\_\_\_

Container Types: P= HDPE, PJ= HDPE Jar      Bottle Preservation Type: T = Thiosulfate, TZ = Trizma: \_\_\_\_\_  
Matrix Types: AQ = Aqueous, DW = Drinking Water, EF = Effluent, PP = Pulp/Paper, SD = Sediment, SL = Sludge, SO = Soil, WW = Wastewater, B = Blood/Serum, O = Other: \_\_\_\_\_

# Sample Log-In Checklist

Page # 1 of 1

Vista Work Order #: 1903965 TAT std

Samples Arrival:	Date/Time		Initials:		Location: <u>WR-2</u>		
	<u>11/08/19 08:55</u>		<u>HOG</u>		Shelf/Rack: <u>NA</u>		
Delivered By:	<input checked="" type="radio"/> FedEx	<input type="radio"/> UPS	<input type="radio"/> On Trac	<input type="radio"/> GSO	<input type="radio"/> DHL	<input type="radio"/> Hand Delivered	<input type="radio"/> Other
Preservation:	<input checked="" type="radio"/> Ice		<input type="radio"/> Blue Ice		<input type="radio"/> Dry Ice		<input type="radio"/> None
Temp °C: <u>3.0</u>	<u>(uncorrected)</u>		Probe used: <u>Y</u> <input checked="" type="radio"/> <u>N</u>		Thermometer ID: <u>IR-3</u>		
Temp °C: <u>3.0</u>	<u>(corrected)</u>						

	YES	NO	NA		
Shipping Container(s) Intact?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		
Shipping Custody Seals Intact?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>		
Airbill <u>                    </u> Trk # <u>7808 1634 0970</u>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		
Shipping Documentation Present?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		
Shipping Container	<input type="checkbox"/> Vista	<input checked="" type="checkbox"/> <u>Client</u>	<input type="checkbox"/> Retain	<input checked="" type="checkbox"/> <u>Return</u>	<input type="checkbox"/> Dispose
Chain of Custody / Sample Documentation Present?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		
Chain of Custody / Sample Documentation Complete?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		
Holding Time Acceptable?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		

Logged In:	Date/Time		Initials:		Location: <u>R-13</u>   <u>WR-2</u>		
	<u>11/09/19 1631</u>		<u>KG</u>		Shelf/Rack: <u>A4</u>   <u>F5</u> <u>SD</u> <u>A5</u>		
COC Anomaly/Sample Acceptance Form completed?					<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>

Comments:

# CoC/Label Reconciliation Report WO# 1903965

LabNumber	CoC Sample ID		SampleAlias	Sample Date/Time	Container	BaseMatrix	Sample Comments
1903965-01	A WR1911060935LEM	<input checked="" type="checkbox"/>	6875 MCCLEMENTS ✓	06-Nov-19 09:35 <input checked="" type="checkbox"/>	HDPE Bottle, 250 mL ✓	Aqueous ✓	
1903965-01	B WR1911060935LEM	<input checked="" type="checkbox"/>	6875 MCCLEMENTS ✓	06-Nov-19 09:35 <input checked="" type="checkbox"/>	HDPE Bottle, 250 mL ✓	Aqueous ✓	
1903965-02	A WT1911061000LEM	<input checked="" type="checkbox"/>	LIVESTOCK WELL ✓	06-Nov-19 10:00 <input checked="" type="checkbox"/>	HDPE Bottle, 250 mL ✓	Aqueous ✓	
1903965-02	B WT1911061000LEM	<input checked="" type="checkbox"/>	LIVESTOCK WELL ✓	06-Nov-19 10:00 <input checked="" type="checkbox"/>	HDPE Bottle, 250 mL ✓	Aqueous ✓	
1903965-03	A WT1911071000LEM	<input checked="" type="checkbox"/>	6795 MCCLEMENTS	07-Nov-19 10:00 <input checked="" type="checkbox"/>	HDPE Bottle, 250 mL ✓	Aqueous ✓	
1903965-03	B WT1911071000LEM	<input checked="" type="checkbox"/>	6795 MCCLEMENTS	07-Nov-19 10:00 <input checked="" type="checkbox"/>	HDPE Bottle, 250 mL ✓	Aqueous ✓	
1903965-04	A WT1911061255LEM	<input checked="" type="checkbox"/>	65 S. KELLOGG ✓	06-Nov-19 12:55 <input checked="" type="checkbox"/>	HDPE Bottle, 250 mL ✓	Aqueous ✓	
1903965-04	B WT1911061255LEM	<input checked="" type="checkbox"/>	65 S. KELLOGG ✓	06-Nov-19 12:55 <input checked="" type="checkbox"/>	HDPE Bottle, 250 mL ✓	Aqueous ✓	
1903965-05	A WT1911071015LEM	<input checked="" type="checkbox"/>	7342 GOLF CLUB ✓	07-Nov-19 10:15 <input checked="" type="checkbox"/>	HDPE Bottle, 250 mL ✓	Aqueous ✓	
1903965-05	B WT1911071015LEM	<input checked="" type="checkbox"/>	7342 GOLF CLUB ✓	07-Nov-19 10:15 <input checked="" type="checkbox"/>	HDPE Bottle, 250 mL ✓	Aqueous ✓	

Checkmarks indicate that information on the COC reconciled with the sample label.  
Any discrepancies are noted in the following columns.

	Yes	No	NA	Comments:
Sample Container Intact?	✓			
Sample Custody Seals Intact?			✓	
Adequate Sample Volume?	✓			
Container Type Appropriate for Analysis(es)	✓			
Preservation Documented: Na2S2O3 <u>Trizma</u> None Other	✓			
If Chlorinated or Drinking Water Samples, Acceptable Preservation?	✓			

Verified by/Date: kg 11/10/19





December 05, 2019

**Vista Work Order No. 1903965**

Ms. Maya Murshak  
Merit Laboratories, Inc.  
2680 East Lansing Drive  
East Lansing, MI 48823

Dear Ms. Murshak,

Enclosed are the results for the sample set received at Vista Analytical Laboratory on November 08, 2019 under your Project Name 'Statewide Biosolids'.

Vista Analytical Laboratory is committed to serving you effectively. If you require additional information, please contact me at 916-673-1520 or by email at [mmaier@vista-analytical.com](mailto:mmaier@vista-analytical.com).

Thank you for choosing Vista as part of your analytical support team.

Sincerely,

Martha Maier  
Laboratory Director



*Vista Analytical Laboratory certifies that the report herein meets all the requirements set forth by NELAP for those applicable test methods. Results relate only to the samples as received by the laboratory. This report should not be reproduced except in full without the written approval of Vista.*

Vista Analytical Laboratory 1104 Windfield Way El Dorado Hills, CA 95762 ph: 916-673-1520 fx: 916-673-0106 [www.vista-analytical.com](http://www.vista-analytical.com)

## **Vista Work Order No. 1903965**

### **Case Narrative**

#### **Sample Condition on Receipt:**

One drinking water sample was received in good condition and within the method temperature requirements. The sample was received and stored securely in accordance with Vista standard operating procedures and EPA methodology. A revised COC was received by email on November 15, 2019.

#### **Analytical Notes:**

##### **EPA Method 537, Rev. 1.1**

The sample was extracted and analyzed for a selected list of 14 PFAS using EPA Method 537, Rev. 1.1. The results have been reported following the conventions specified by the Michigan Department of Environmental Quality.

##### **Holding Times**

The sample was extracted and analyzed within the method hold times.

##### **Quality Control**

The Initial Calibration and Continuing Calibration Verifications met the method acceptance criteria.

A Laboratory Fortified Blank (LFB) and a Laboratory Reagent Blank (LRB) were extracted and analyzed with the preparation batch. No analytes were detected in the Laboratory Reagent Blank. The LFB recoveries were within the method acceptance criteria.

The surrogate recoveries for all QC and field samples were within the acceptance criteria.

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# Sample Inventory Report

<b>Vista Sample ID</b>	<b>Client Sample ID</b>	<b>Sampled</b>	<b>Received</b>	<b>Components/Containers</b>
1903965-01	WR1911060935LEM	06-Nov-19 09:35	08-Nov-19 08:53	HDPE Bottle, 250 mL HDPE Bottle, 250 mL
1903965-02	WT1911061000LEM	06-Nov-19 10:00	08-Nov-19 08:53	HDPE Bottle, 250 mL HDPE Bottle, 250 mL
1903965-03	WT1911071000LEM	07-Nov-19 10:00	08-Nov-19 08:53	HDPE Bottle, 250 mL HDPE Bottle, 250 mL
1903965-04	WT1911061255LEM	06-Nov-19 12:55	08-Nov-19 08:53	HDPE Bottle, 250 mL HDPE Bottle, 250 mL
1903965-05	WT1911071015LEM	07-Nov-19 10:15	08-Nov-19 08:53	HDPE Bottle, 250 mL HDPE Bottle, 250 mL

## **ANALYTICAL RESULTS**

**Sample ID: LRB**

**EPA Method 537**

<b>Client Data</b>				<b>Laboratory Data</b>					
Name:	Merit Laboratories, Inc.	Matrix:	Aqueous	Lab Sample:	B9K0101-BLK1	Column:	BEH C18		
Project:	Statewide Biosolids								

Analyte	CAS Number	Conc. (ng/L)	RL	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
PFBS	375-73-5	ND	2		B9K0101	19-Nov-19	0.25 L	25-Nov-19 15:35	1
PFHxA	307-24-4	ND	2		B9K0101	19-Nov-19	0.25 L	25-Nov-19 15:35	1
PFHpA	375-85-9	ND	2		B9K0101	19-Nov-19	0.25 L	25-Nov-19 15:35	1
PFHxS	355-46-4	ND	2		B9K0101	19-Nov-19	0.25 L	25-Nov-19 15:35	1
PFOA	335-67-1	ND	2		B9K0101	19-Nov-19	0.25 L	25-Nov-19 15:35	1
PFNA	375-95-1	ND	2		B9K0101	19-Nov-19	0.25 L	25-Nov-19 15:35	1
PFOS	1763-23-1	ND	2		B9K0101	19-Nov-19	0.25 L	25-Nov-19 15:35	1
PFDA	335-76-2	ND	2		B9K0101	19-Nov-19	0.25 L	25-Nov-19 15:35	1
MeFOSAA	2355-31-9	ND	4		B9K0101	19-Nov-19	0.25 L	25-Nov-19 15:35	1
EtFOSAA	2991-50-6	ND	4		B9K0101	19-Nov-19	0.25 L	25-Nov-19 15:35	1
PFUnA	2058-94-8	ND	4		B9K0101	19-Nov-19	0.25 L	25-Nov-19 15:35	1
PFDoA	307-55-1	ND	4		B9K0101	19-Nov-19	0.25 L	25-Nov-19 15:35	1
PFTeDA	72629-94-8	ND	4		B9K0101	19-Nov-19	0.25 L	25-Nov-19 15:35	1
PFTeDA	376-06-7	ND	4		B9K0101	19-Nov-19	0.25 L	25-Nov-19 15:35	1
Labeled Standards	Type	% Recovery	Limits	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
13C2-PFHxA	SURR	105	70 - 130		B9K0101	19-Nov-19	0.25 L	25-Nov-19 15:35	1
13C2-PFDA	SURR	116	70 - 130		B9K0101	19-Nov-19	0.25 L	25-Nov-19 15:35	1
d5-EtFOSAA	SURR	93	70 - 130		B9K0101	19-Nov-19	0.25 L	25-Nov-19 15:35	1

RL - Reporting limit

Results reported to RL.  
Reporting convention specified by MI DEQ.

When reported, PFHxS, PFOA, PFOS, MeFOSAA and EtFOSAA include both linear and branched isomers. Only the linear isomer is reported for all other analytes.

**Sample ID: LFB**

**EPA Method 537**

Client Data					Laboratory Data							
Name:	Merit Laboratories, Inc.	Matrix:	Aqueous		Lab Sample:	B9K0101-BS1	Column:	BEH C18				
Project:	Statewide Biosolids											

Analyte	CAS Number	Amt Found (ng/L)	Spike Amt	% Rec	Limits	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
PFBS	375-73-5	42	35	119	70 - 130		B9K0101	19-Nov-19	0.25 L	04-Dec-19 21:36	1
PFHxA	307-24-4	42	40	104	70 - 130		B9K0101	19-Nov-19	0.25 L	04-Dec-19 21:36	1
PFHpA	375-85-9	48	40	121	70 - 130		B9K0101	19-Nov-19	0.25 L	04-Dec-19 21:36	1
PFHxS	355-46-4	44	36	121	70 - 130		B9K0101	19-Nov-19	0.25 L	04-Dec-19 21:36	1
PFOA	335-67-1	45	40	113	70 - 130		B9K0101	19-Nov-19	0.25 L	04-Dec-19 21:36	1
PFNA	375-95-1	42	40	105	70 - 130		B9K0101	19-Nov-19	0.25 L	04-Dec-19 21:36	1
PFOS	1763-23-1	40	37	109	70 - 130		B9K0101	19-Nov-19	0.25 L	04-Dec-19 21:36	1
PFDA	335-76-2	41	40	103	70 - 130		B9K0101	19-Nov-19	0.25 L	04-Dec-19 21:36	1
MeFOSAA	2355-31-9	44	40	110	70 - 130		B9K0101	19-Nov-19	0.25 L	04-Dec-19 21:36	1
EtFOSAA	2991-50-6	41	40	102	70 - 130		B9K0101	19-Nov-19	0.25 L	04-Dec-19 21:36	1
PFOxA	2058-94-8	39	40	97	70 - 130		B9K0101	19-Nov-19	0.25 L	04-Dec-19 21:36	1
PFDoA	307-55-1	40	40	99	70 - 130		B9K0101	19-Nov-19	0.25 L	04-Dec-19 21:36	1
PFTTrDA	72629-94-8	39	40	98	70 - 130		B9K0101	19-Nov-19	0.25 L	04-Dec-19 21:36	1
PFTeDA	376-06-7	38	40	95	70 - 130		B9K0101	19-Nov-19	0.25 L	04-Dec-19 21:36	1
Labeled Standards		Type		% Rec	Limits	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
13C2-PFHxA		SURR		102	70- 130		B9K0101	19-Nov-19	0.25 L	04-Dec-19 21:36	1
13C2-PFDA		SURR		89	70- 130		B9K0101	19-Nov-19	0.25 L	04-Dec-19 21:36	1
d5-EtFOSAA		SURR		88	70- 130		B9K0101	19-Nov-19	0.25 L	04-Dec-19 21:36	1

Data Reported per Michigan DEQ instructions.

**Sample ID: WT1911071000LEM** **EPA Method 537**

Client Data				Laboratory Data			
Name:	Merit Laboratories, Inc.	Matrix:	Drinking Water	Lab Sample:	1903965-03	Column:	BEH C18
Project:	Statewide Biosolids	Date Collected:	07-Nov-19 10:00	Date Received:	08-Nov-19 08:53		
Location:	6795 MCCLEMENTS						

Analyte	CAS Number	Conc. (ng/L)	RL	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
PFBS	375-73-5	ND	2		B9K0101	19-Nov-19	0.23 L	25-Nov-19 16:41	1
PFHxA	307-24-4	ND	2		B9K0101	19-Nov-19	0.23 L	25-Nov-19 16:41	1
PFHpA	375-85-9	ND	2		B9K0101	19-Nov-19	0.23 L	25-Nov-19 16:41	1
PFHxS	355-46-4	ND	2		B9K0101	19-Nov-19	0.23 L	25-Nov-19 16:41	1
PFOA	335-67-1	ND	2		B9K0101	19-Nov-19	0.23 L	25-Nov-19 16:41	1
PFNA	375-95-1	ND	2		B9K0101	19-Nov-19	0.23 L	25-Nov-19 16:41	1
PFOS	1763-23-1	ND	2		B9K0101	19-Nov-19	0.23 L	25-Nov-19 16:41	1
PFDA	335-76-2	ND	2		B9K0101	19-Nov-19	0.23 L	25-Nov-19 16:41	1
MeFOSAA	2355-31-9	ND	4		B9K0101	19-Nov-19	0.23 L	25-Nov-19 16:41	1
EtFOSAA	2991-50-6	ND	4		B9K0101	19-Nov-19	0.23 L	25-Nov-19 16:41	1
PFUnA	2058-94-8	ND	4		B9K0101	19-Nov-19	0.23 L	25-Nov-19 16:41	1
PFDoA	307-55-1	ND	4		B9K0101	19-Nov-19	0.23 L	25-Nov-19 16:41	1
PFTrDA	72629-94-8	ND	4		B9K0101	19-Nov-19	0.23 L	25-Nov-19 16:41	1
PFTeDA	376-06-7	ND	4		B9K0101	19-Nov-19	0.23 L	25-Nov-19 16:41	1
Labeled Standards	Type	% Recovery	Limits	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
13C2-PFHxA	SURR	112	70 - 130		B9K0101	19-Nov-19	0.23 L	25-Nov-19 16:41	1
13C2-PFDA	SURR	115	70 - 130		B9K0101	19-Nov-19	0.23 L	25-Nov-19 16:41	1
d5-EtFOSAA	SURR	89	70 - 130		B9K0101	19-Nov-19	0.23 L	25-Nov-19 16:41	1

RL - Reporting limit

Results reported to RL.  
Reporting convention specified by MI DEQ..

When reported, PFHxS, PFOA, PFOS, MeFOSAA and EtFOSAA include both linear and branched isomers. Only the linear isomer is reported for all other analytes.



## DATA QUALIFIERS & ABBREVIATIONS

B	This compound was also detected in the method blank
Conc.	Concentration
CRS	Cleanup Recovery Standard
D	Dilution
DL	Detection limit
E	The associated compound concentration exceeded the calibration range of the instrument
H	Recovery and/or RPD was outside laboratory acceptance limits
I	Chemical Interference
IS	Internal Standard
J	The amount detected is below the Reporting Limit/LOQ
LOD	Limit of Detection
LOQ	Limit of Quantitation
M	Estimated Maximum Possible Concentration (CA Region 2 projects only)
NA	Not applicable
ND	Not Detected
OPR	Ongoing Precision and Recovery sample
P	The reported concentration may include contribution from chlorinated diphenyl ether(s).
Q	The ion transition ratio is outside of the acceptance criteria.
RL	Reporting Limit
TEQ	Toxic Equivalency
U	Not Detected (specific projects only)
*	See Cover Letter

Unless otherwise noted, solid sample results are reported in dry weight. Tissue samples are reported in wet weight.

### Vista Analytical Laboratory Certifications

Accrediting Authority	Certificate Number
Alaska Department of Environmental Conservation	17-013
Arkansas Department of Environmental Quality	19-013-0
California Department of Health – ELAP	2892
DoD ELAP - A2LA Accredited - ISO/IEC 17025:2005	3091.01
Florida Department of Health	E87777-23
Hawaii Department of Health	N/A
Louisiana Department of Environmental Quality	01977
Maine Department of Health	2018017
Massachusetts Department of Environmental Protection	N/A
Michigan Department of Environmental Quality	9932
Minnesota Department of Health	1521520
New Hampshire Environmental Accreditation Program	207718-B
New Jersey Department of Environmental Protection	190001
New York Department of Health	11411
Oregon Laboratory Accreditation Program	4042-010
Pennsylvania Department of Environmental Protection	016
Texas Commission on Environmental Quality	T104704189-19-10
Vermont Department of Health	VT-4042
Virginia Department of General Services	10272
Washington Department of Ecology	C584-19
Wisconsin Department of Natural Resources	998036160

*Current certificates and lists of licensed parameters are located in the Quality Assurance office and are available upon request.*

## NELAP Accredited Test Methods

MATRIX: Air	
Description of Test	Method
Determination of Polychlorinated p-Dioxins & Polychlorinated Dibenzofurans	EPA 23
Determination of Polychlorinated p-Dioxins & Polychlorinated Dibenzofurans	EPA TO-9A

MATRIX: Biological Tissue	
Description of Test	Method
Tetra- through Octa-Chlorinated Dioxins and Furans by Isotope Dilution GC/HRMS	EPA 1613B
Brominated Diphenyl Ethers by HRGC/HRMS	EPA 1614A
Chlorinated Biphenyl Congeners in Water, Soil, Sediment, and Tissue by GC/HRMS	EPA 1668A/C
Pesticides in Water, Soil, Sediment, Biosolids, and Tissue by HRGC/HRMS	EPA 1699
Perfluorinated Alkyl Acids in Drinking Water by SPE and LC/MS/MS	EPA 537
Polychlorinated Dibenzo-p-Dioxins and Polychlorinated Dibenzofurans by GC/HRMS	EPA 8280A/B
Polychlorinated Dibenzodioxins (PCDDs) and Polychlorinated Dibenzofurans (PCDFs) by GC/HRMS	EPA 8290/8290A

MATRIX: Drinking Water	
Description of Test	Method
2,3,7,8-Tetrachlorodibenzo- p-dioxin (2,3,7,8-TCDD) GC/HRMS	EPA 1613/1613B
1,4-Dioxane (1,4-Diethyleneoxide) analysis by GC/HRMS	EPA 522
Perfluorinated Alkyl Acids in Drinking Water by SPE and LC/MS/MS	EPA 537
Perfluorinated Alkyl Acids in Drinking Water by SPE and LC/MS/MS	ISO 25101 2009

MATRIX: Non-Potable Water	
Description of Test	Method
Tetra- through Octa-Chlorinated Dioxins and Furans by Isotope Dilution GC/HRMS	EPA 1613B
Brominated Diphenyl Ethers by HRGC/HRMS	EPA 1614A
Chlorinated Biphenyl Congeners in Water, Soil, Sediment, and Tissue by GC/HRMS	EPA 1668A/C
Pesticides in Water, Soil, Sediment, Biosolids, and Tissue by HRGC/HRMS	EPA 1699
Perfluorinated Alkyl Acids in Drinking Water by SPE and LC/MS/MS	EPA 537
Dioxin by GC/HRMS	EPA 613
Polychlorinated Dibenzo-p-Dioxins and Polychlorinated Dibenzofurans by GC/HRMS	EPA 8280A/B
Polychlorinated Dibenzodioxins (PCDDs) and Polychlorinated Dibenzofurans (PCDFs) by GC/HRMS	EPA 8290/8290A

MATRIX: Solids	
Description of Test	Method
Tetra-Octa Chlorinated Dioxins and Furans by Isotope Dilution GC/HRMS	EPA 1613
Tetra- through Octa-Chlorinated Dioxins and Furans by Isotope Dilution GC/HRMS	EPA 1613B
Brominated Diphenyl Ethers by HRGC/HRMS	EPA 1614A
Chlorinated Biphenyl Congeners in Water, Soil, Sediment, and Tissue by GC/HRMS	EPA 1668A/C
Pesticides in Water, Soil, Sediment, Biosolids, and Tissue by HRGC/HRMS	EPA 1699
Perfluorinated Alkyl Acids in Drinking Water by SPE and LC/MS/MS	EPA 537
Polychlorinated Dibenzo-p-Dioxins and Polychlorinated Dibenzofurans by GC/HRMS	EPA 8280A/B
Polychlorinated Dibenzodioxins (PCDDs) and Polychlorinated Dibenzofurans (PCDFs) by GC/HRMS	EPA 8290/8290A



# CHAIN OF CUSTODY

**For Laboratory Use Only**  
 Work Order #: 1903965C Temp: 3.0 °C  
 Storage ID: R13, WR 2 Storage Secured: Yes  No

Project ID: Statewide Biosolids PO#: 60588767.01 Sampler: Lauren McNeely  
 (name)

TAT Standard:  21 days  
 (check one): Rush (surcharge may apply)  
 14 days  7 days Specify:

Invoice to: Name Stephanie Kammer Company EGLE Address 525 W. Allegan Street City Lansing State MI Ph# 517-897-1597 Fax# 517-241-3571

Relinquished by (printed name and signature) Lauren McNeely Date 11/7/2019 Time 1815 Received by (printed name and signature) \* RECEIVED REVISED COC EMAIL 11-15-19 1441 Date 11-15-19 Time 1441

Relinquished by (printed name and signature) \_\_\_\_\_ Date \_\_\_\_\_ Time \_\_\_\_\_ Received by (printed name and signature) -SEE ORIGINAL COC FOR SIGNATURE- KE 11-16-19 Date \_\_\_\_\_ Time \_\_\_\_\_

SHIP TO: Vista Analytical Laboratory 1104 Windfield Way El Dorado Hills, CA 95762 Ph: (916) 673-1520; Fax: (916) 673-0106				Method of Shipment:		Add Analysis(es) Requested								USEPA Method 537			Comments
ATTN: Jennifer Miller				Tracking No.:		Container(s)								PFAS Isotope Dilution			
Sample ID	Date	Time	Location/Sample Description	Quantity	Type	Matrix	List of 21	List of 21 w/Isomers	List of 24	List of 24 w/Isomers	List of 28	Other: Please List Below	PFOM/ PFOS	UCMR3 PFAS List-6	PFAS List: 14		
WT1911071000LEM	11/7/19	1000	6795 McClements	2	P	DW									X	Well ID: 47000030469	

Special Instructions/Comments: Send Results and Acknowledgements to the list provided

SEND DOCUMENTATION AND RESULTS TO:

Name: Stephanie Kammer  
 Company: EGLE  
 Address: 525 W. Allegan Street, Constitution Hall, 1st South West  
 City: Lansing State: MI Zip: 30242  
 Phone: 517-897-1597 Fax: 517-241-3571  
 Email: dorin.bogdan@aecom.com

Container Types: P= HDPE, PJ= HDPE Jar  
 O = Other: \_\_\_\_\_

Bottle Preservation Type: T = Thiosulfate,  
 TZ = Trizma: \_\_\_\_\_

Matrix Types: AQ = Aqueous, DW = Drinking Water, EF = Effluent, PP = Pulp/Paper, SD = Sediment,  
 SL = Sludge, BS=Biosolids, SO = Soil, WW = Wastewater, B = Blood/Serum, O = Other: \_\_\_\_\_





# CHAIN OF CUSTODY

ID: LR - 537COC

2 of 3  
1903965

**For Laboratory Use Only**  
 Work Order #: 1903964 Temp: 3.0 °C  
 Storage ID: R-13, WR-2 Storage Secured: Yes  No

Project ID: Biosolids PO#: \_\_\_\_\_ Sampler: Lauren McNeely  
(name)

TAT Standard:  21 days  
 (check one): Rush (surcharge may apply)  
 14 days  7 days Specify: \_\_\_\_\_

Invoice to: Name Stephanie Kammer EGLE Company \_\_\_\_\_ Address \_\_\_\_\_ City \_\_\_\_\_ State \_\_\_\_\_ Ph# \_\_\_\_\_ Fax# \_\_\_\_\_

Relinquished by (printed name and signature)	Date	Time	Received by (printed name and signature)	Date	Time
<u>Lauren McNeely</u>	<u>11/7/19</u>	<u>1815</u>	<u>Hagden Cranar</u>	<u>11/08/19</u>	<u>08:53</u>
<u>- SEE REVISED COCS - KE 11/6/19</u>					

SHIP TO: Vista Analytical Laboratory  
 1104 Windfield Way  
 El Dorado Hills, CA 95762  
 (916) 673-1520 \* Fax (916) 673-0106

Method of Shipment: \_\_\_\_\_  
 Tracking No.: \_\_\_\_\_

ATTN: \_\_\_\_\_

Sample ID	Date	Time	Location/Sample Description	Add Analysis(es) Requested										Comments						
				Quantity	Type	Matrix	PFOA/PFS	UCMR3 PFAS List 6	537 List: 14	Full List of 280 O <sub>2</sub>	Other: Please List Below	PFOA/PFS	UCMR3 PFAS List 6		537(DW only)					
* WT1911071000LEM	11/7/19	1000	6795 McClements	2	P	DW														
X WT1911061235LEM	11/6/19	1235	65 S. Kellogg	2	P	DW														
X WT1911071015LEM	11/7/19	1015	7342 Golf Club	2	P	DW														
Δ SW1911061100LEM	11/6/19	1100	POND 1	2	P	SW				X										
Δ SW1911061135LEM	11/6/19	1135	POND 2	2	P	SW				X										
Δ SW1911061155LEM	11/6/19	1155	POND 3	2	P	SW				X										
Δ SW1911061235LEM	11/6/19	1235	POND 4	2	P	SW				X										
Δ SW1911061245LEM	11/6/19	1245	POND 5	2	P	SW				X										
@ EB1911071430LEM	11/7/19	1430	SW Sampler	2	P	AQ				X										
@ EB1911071435LEM	11/7/19	1435	Soil Sampler	2	P	AQ				X										

Special Instructions/Comments:  
~ WO # = 1904043  
Δ WO # = 1904042  
\* WO # = 1903965  
● WO # = 1903964  
@ WO # = 1903960

**SEND DOCUMENTATION AND RESULTS TO:**

Name: \_\_\_\_\_  
 Company: \_\_\_\_\_  
 Address: \_\_\_\_\_  
 City: \_\_\_\_\_ State: \_\_\_\_\_ Zip: \_\_\_\_\_  
 Phone: \_\_\_\_\_ Fax: \_\_\_\_\_  
 Email: \_\_\_\_\_

Container Types: P= HDPE, PJ= HDPE Jar      Bottle Preservation Type: T = Thiosulfate, TZ = Trizma: \_\_\_\_\_  
 Matrix Types: AQ = Aqueous, DW = Drinking Water, EF = Effluent, PP = Pulp/Paper, SD = Sediment, SL = Sludge, SO = Soil, WW = Wastewater, B = Blood/Serum, O = Other: \_\_\_\_\_





# Sample Log-In Checklist

Page # 1 of 1

Vista Work Order #: 1903965

TAT std

Samples Arrival:	Date/Time		Initials:		Location: <u>WR-2</u>		
	<u>11/08/19 08:55</u>		<u>HOG</u>		Shelf/Rack: <u>NA</u>		
Delivered By:	<input checked="" type="radio"/> FedEx	<input type="radio"/> UPS	<input type="radio"/> On Trac	<input type="radio"/> GSO	<input type="radio"/> DHL	<input type="radio"/> Hand Delivered	<input type="radio"/> Other
Preservation:	<input checked="" type="radio"/> Ice		<input type="radio"/> Blue Ice		<input type="radio"/> Dry Ice		<input type="radio"/> None
Temp °C: <u>3.0</u> (uncorrected)	Probe used: <u>Y</u> <input checked="" type="radio"/> <u>N</u>			Thermometer ID: <u>IR-3</u>			
Temp °C: <u>3.0</u> (corrected)							

	YES	NO	NA		
Shipping Container(s) Intact?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		
Shipping Custody Seals Intact?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>		
Airbill <u>      </u> Trk # <u>7808 1634 0970</u>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		
Shipping Documentation Present?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		
Shipping Container	<input type="checkbox"/> Vista	<input checked="" type="checkbox"/> <u>Client</u>	<input type="checkbox"/> Retain	<input checked="" type="checkbox"/> <u>Return</u>	<input type="checkbox"/> Dispose
Chain of Custody / Sample Documentation Present?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		
Chain of Custody / Sample Documentation Complete?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		
Holding Time Acceptable?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		

Logged In:	Date/Time		Initials:		Location: <u>R-13</u>   <u>WR-2</u>		
	<u>11/09/19 1631</u>		<u>KG</u>		Shelf/Rack: <u>A4</u>   <u>F5</u> <u>SD</u> <u>A5</u>		
COC Anomaly/Sample Acceptance Form completed?					<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>

Comments:

# CoC/Label Reconciliation Report WO# 1903965

LabNumber	CoC Sample ID		SampleAlias	Sample Date/Time	Container	BaseMatrix	Sample Comments
1903965-01	A WR1911060935LEM	<input checked="" type="checkbox"/>	6875 MCCLEMENTS ✓	06-Nov-19 09:35 <input checked="" type="checkbox"/>	HDPE Bottle, 250 mL ✓	Aqueous ✓	
1903965-01	B WR1911060935LEM	<input checked="" type="checkbox"/>	6875 MCCLEMENTS ✓	06-Nov-19 09:35 <input checked="" type="checkbox"/>	HDPE Bottle, 250 mL ✓	Aqueous ✓	
1903965-02	A WT1911061000LEM	<input checked="" type="checkbox"/>	LIVESTOCK WELL ✓	06-Nov-19 10:00 <input checked="" type="checkbox"/>	HDPE Bottle, 250 mL ✓	Aqueous ✓	
1903965-02	B WT1911061000LEM	<input checked="" type="checkbox"/>	LIVESTOCK WELL ✓	06-Nov-19 10:00 <input checked="" type="checkbox"/>	HDPE Bottle, 250 mL ✓	Aqueous ✓	
1903965-03	A WT1911071000LEM	<input checked="" type="checkbox"/>	6795 MCCLEMENTS	07-Nov-19 10:00 <input checked="" type="checkbox"/>	HDPE Bottle, 250 mL ✓	Aqueous ✓	
1903965-03	B WT1911071000LEM	<input checked="" type="checkbox"/>	6795 MCCLEMENTS	07-Nov-19 10:00 <input checked="" type="checkbox"/>	HDPE Bottle, 250 mL ✓	Aqueous ✓	
1903965-04	A WT1911061255LEM	<input checked="" type="checkbox"/>	65 S. KELLOGG ✓	06-Nov-19 12:55 <input checked="" type="checkbox"/>	HDPE Bottle, 250 mL ✓	Aqueous ✓	
1903965-04	B WT1911061255LEM	<input checked="" type="checkbox"/>	65 S. KELLOGG ✓	06-Nov-19 12:55 <input checked="" type="checkbox"/>	HDPE Bottle, 250 mL ✓	Aqueous ✓	
1903965-05	A WT1911071015LEM	<input checked="" type="checkbox"/>	7342 GOLF CLUB ✓	07-Nov-19 10:15 <input checked="" type="checkbox"/>	HDPE Bottle, 250 mL ✓	Aqueous ✓	
1903965-05	B WT1911071015LEM	<input checked="" type="checkbox"/>	7342 GOLF CLUB ✓	07-Nov-19 10:15 <input checked="" type="checkbox"/>	HDPE Bottle, 250 mL ✓	Aqueous ✓	

Checkmarks indicate that information on the COC reconciled with the sample label.  
Any discrepancies are noted in the following columns.

	Yes	No	NA	Comments:
Sample Container Intact?	✓			
Sample Custody Seals Intact?			✓	
Adequate Sample Volume?	✓			
Container Type Appropriate for Analysis(es)	✓			
Preservation Documented: Na2S2O3 <u>Trizma</u> None Other	✓			
If Chlorinated or Drinking Water Samples, Acceptable Preservation?	✓			

Verified by/Date: kg 11/10/19



December 05, 2019

**Vista Work Order No. 1903965**

Ms. Maya Murshak  
Merit Laboratories, Inc.  
2680 East Lansing Drive  
East Lansing, MI 48823

Dear Ms. Murshak,

Enclosed are the results for the sample set received at Vista Analytical Laboratory on November 08, 2019 under your Project Name 'Statewide Biosolids'.

Vista Analytical Laboratory is committed to serving you effectively. If you require additional information, please contact me at 916-673-1520 or by email at [mmaier@vista-analytical.com](mailto:mmaier@vista-analytical.com).

Thank you for choosing Vista as part of your analytical support team.

Sincerely,

Martha Maier  
Laboratory Director



*Vista Analytical Laboratory certifies that the report herein meets all the requirements set forth by NELAP for those applicable test methods. Results relate only to the samples as received by the laboratory. This report should not be reproduced except in full without the written approval of Vista.*

## **Vista Work Order No. 1903965**

### **Case Narrative**

#### **Sample Condition on Receipt:**

One drinking water sample was received in good condition and within the method temperature requirements. The sample was received and stored securely in accordance with Vista standard operating procedures and EPA methodology. A revised COC was received by email on November 15, 2019.

#### **Analytical Notes:**

##### **EPA Method 537, Rev. 1.1**

The sample was extracted and analyzed for a selected list of 14 PFAS using EPA Method 537, Rev. 1.1. The results have been reported following the conventions specified by the Michigan Department of Environmental Quality.

##### **Holding Times**

The sample was extracted and analyzed within the method hold times.

##### **Quality Control**

The Initial Calibration and Continuing Calibration Verifications met the method acceptance criteria.

A Laboratory Fortified Blank (LFB) and a Laboratory Reagent Blank (LRB) were extracted and analyzed with the preparation batch. No analytes were detected in the Laboratory Reagent Blank. The LFB recoveries were within the method acceptance criteria.

The surrogate recoveries for all QC and field samples were within the acceptance criteria.

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# Sample Inventory Report

<b>Vista Sample ID</b>	<b>Client Sample ID</b>	<b>Sampled</b>	<b>Received</b>	<b>Components/Containers</b>
1903965-01	WR1911060935LEM	06-Nov-19 09:35	08-Nov-19 08:53	HDPE Bottle, 250 mL HDPE Bottle, 250 mL
1903965-02	WT1911061000LEM	06-Nov-19 10:00	08-Nov-19 08:53	HDPE Bottle, 250 mL HDPE Bottle, 250 mL
1903965-03	WT1911071000LEM	07-Nov-19 10:00	08-Nov-19 08:53	HDPE Bottle, 250 mL HDPE Bottle, 250 mL
1903965-04	WT1911061255LEM	06-Nov-19 12:55	08-Nov-19 08:53	HDPE Bottle, 250 mL HDPE Bottle, 250 mL
1903965-05	WT1911071015LEM	07-Nov-19 10:15	08-Nov-19 08:53	HDPE Bottle, 250 mL HDPE Bottle, 250 mL

## **ANALYTICAL RESULTS**

**Sample ID: LRB** **EPA Method 537**

<b>Client Data</b>				<b>Laboratory Data</b>			
Name:	Merit Laboratories, Inc.	Matrix:	Aqueous	Lab Sample:	B9K0101-BLK1	Column:	BEH C18
Project:	Statewide Biosolids						

Analyte	CAS Number	Conc. (ng/L)	RL	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
PFBS	375-73-5	ND	2		B9K0101	19-Nov-19	0.25 L	25-Nov-19 15:35	1
PFHxA	307-24-4	ND	2		B9K0101	19-Nov-19	0.25 L	25-Nov-19 15:35	1
PFHpA	375-85-9	ND	2		B9K0101	19-Nov-19	0.25 L	25-Nov-19 15:35	1
PFHxS	355-46-4	ND	2		B9K0101	19-Nov-19	0.25 L	25-Nov-19 15:35	1
PFOA	335-67-1	ND	2		B9K0101	19-Nov-19	0.25 L	25-Nov-19 15:35	1
PFNA	375-95-1	ND	2		B9K0101	19-Nov-19	0.25 L	25-Nov-19 15:35	1
PFOS	1763-23-1	ND	2		B9K0101	19-Nov-19	0.25 L	25-Nov-19 15:35	1
PFDA	335-76-2	ND	2		B9K0101	19-Nov-19	0.25 L	25-Nov-19 15:35	1
MeFOSAA	2355-31-9	ND	4		B9K0101	19-Nov-19	0.25 L	25-Nov-19 15:35	1
EtFOSAA	2991-50-6	ND	4		B9K0101	19-Nov-19	0.25 L	25-Nov-19 15:35	1
PFUnA	2058-94-8	ND	4		B9K0101	19-Nov-19	0.25 L	25-Nov-19 15:35	1
PFDoA	307-55-1	ND	4		B9K0101	19-Nov-19	0.25 L	25-Nov-19 15:35	1
PFTeDA	72629-94-8	ND	4		B9K0101	19-Nov-19	0.25 L	25-Nov-19 15:35	1
PFTeDA	376-06-7	ND	4		B9K0101	19-Nov-19	0.25 L	25-Nov-19 15:35	1
Labeled Standards	Type	% Recovery	Limits	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
13C2-PFHxA	SURR	105	70 - 130		B9K0101	19-Nov-19	0.25 L	25-Nov-19 15:35	1
13C2-PFDA	SURR	116	70 - 130		B9K0101	19-Nov-19	0.25 L	25-Nov-19 15:35	1
d5-EtFOSAA	SURR	93	70 - 130		B9K0101	19-Nov-19	0.25 L	25-Nov-19 15:35	1

RL - Reporting limit

Results reported to RL.  
Reporting convention specified by MI DEQ.

When reported, PFHxS, PFOA, PFOS, MeFOSAA and EtFOSAA include both linear and branched isomers. Only the linear isomer is reported for all other analytes.



**Sample ID: LFB**

**EPA Method 537**

Client Data					Laboratory Data						
Name:	Merit Laboratories, Inc.	Matrix:	Aqueous	Lab Sample:	B9K0101-BS1	Column:	BEH C18				
Project:	Statewide Biosolids										

Analyte	CAS Number	Amt Found (ng/L)	Spike Amt	% Rec	Limits	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
PFBS	375-73-5	42	35	119	70 - 130		B9K0101	19-Nov-19	0.25 L	04-Dec-19 21:36	1
PFHxA	307-24-4	42	40	104	70 - 130		B9K0101	19-Nov-19	0.25 L	04-Dec-19 21:36	1
PFHpA	375-85-9	48	40	121	70 - 130		B9K0101	19-Nov-19	0.25 L	04-Dec-19 21:36	1
PFHxS	355-46-4	44	36	121	70 - 130		B9K0101	19-Nov-19	0.25 L	04-Dec-19 21:36	1
PFOA	335-67-1	45	40	113	70 - 130		B9K0101	19-Nov-19	0.25 L	04-Dec-19 21:36	1
PFNA	375-95-1	42	40	105	70 - 130		B9K0101	19-Nov-19	0.25 L	04-Dec-19 21:36	1
PFOS	1763-23-1	40	37	109	70 - 130		B9K0101	19-Nov-19	0.25 L	04-Dec-19 21:36	1
PFDA	335-76-2	41	40	103	70 - 130		B9K0101	19-Nov-19	0.25 L	04-Dec-19 21:36	1
MeFOSAA	2355-31-9	44	40	110	70 - 130		B9K0101	19-Nov-19	0.25 L	04-Dec-19 21:36	1
EtFOSAA	2991-50-6	41	40	102	70 - 130		B9K0101	19-Nov-19	0.25 L	04-Dec-19 21:36	1
PFOxA	2058-94-8	39	40	97	70 - 130		B9K0101	19-Nov-19	0.25 L	04-Dec-19 21:36	1
PFDoA	307-55-1	40	40	99	70 - 130		B9K0101	19-Nov-19	0.25 L	04-Dec-19 21:36	1
PFTTrDA	72629-94-8	39	40	98	70 - 130		B9K0101	19-Nov-19	0.25 L	04-Dec-19 21:36	1
PFTeDA	376-06-7	38	40	95	70 - 130		B9K0101	19-Nov-19	0.25 L	04-Dec-19 21:36	1
Labeled Standards	Type			% Rec	Limits	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
13C2-PFHxA	SURR			102	70- 130		B9K0101	19-Nov-19	0.25 L	04-Dec-19 21:36	1
13C2-PFDA	SURR			89	70- 130		B9K0101	19-Nov-19	0.25 L	04-Dec-19 21:36	1
d5-EtFOSAA	SURR			88	70- 130		B9K0101	19-Nov-19	0.25 L	04-Dec-19 21:36	1

Data Reported per Michigan DEQ instructions.

**Sample ID: WT1911061255LEM** **EPA Method 537**

Client Data				Laboratory Data			
Name:	Merit Laboratories, Inc.	Matrix:	Drinking Water	Lab Sample:	1903965-04	Column:	BEH C18
Project:	Statewide Biosolids	Date Collected:	06-Nov-19 12:55	Date Received:	08-Nov-19 08:53		
Location:	65 S. KELLOGG						

Analyte	CAS Number	Conc. (ng/L)	RL	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
PFBS	375-73-5	ND	2		B9K0101	19-Nov-19	0.23 L	25-Nov-19 16:52	1
PFHxA	307-24-4	ND	2		B9K0101	19-Nov-19	0.23 L	25-Nov-19 16:52	1
PFHpA	375-85-9	ND	2		B9K0101	19-Nov-19	0.23 L	25-Nov-19 16:52	1
PFHxS	355-46-4	ND	2		B9K0101	19-Nov-19	0.23 L	25-Nov-19 16:52	1
PFOA	335-67-1	ND	2		B9K0101	19-Nov-19	0.23 L	25-Nov-19 16:52	1
PFNA	375-95-1	ND	2		B9K0101	19-Nov-19	0.23 L	25-Nov-19 16:52	1
PFOS	1763-23-1	ND	2		B9K0101	19-Nov-19	0.23 L	25-Nov-19 16:52	1
PFDA	335-76-2	ND	2		B9K0101	19-Nov-19	0.23 L	25-Nov-19 16:52	1
MeFOSAA	2355-31-9	ND	4		B9K0101	19-Nov-19	0.23 L	25-Nov-19 16:52	1
EtFOSAA	2991-50-6	ND	4		B9K0101	19-Nov-19	0.23 L	25-Nov-19 16:52	1
PFUnA	2058-94-8	ND	4		B9K0101	19-Nov-19	0.23 L	25-Nov-19 16:52	1
PFDoA	307-55-1	ND	4		B9K0101	19-Nov-19	0.23 L	25-Nov-19 16:52	1
PFTrDA	72629-94-8	ND	4		B9K0101	19-Nov-19	0.23 L	25-Nov-19 16:52	1
PFTeDA	376-06-7	ND	4		B9K0101	19-Nov-19	0.23 L	25-Nov-19 16:52	1
Labeled Standards	Type	% Recovery	Limits	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
13C2-PFHxA	SURR	114	70 - 130		B9K0101	19-Nov-19	0.23 L	25-Nov-19 16:52	1
13C2-PFDA	SURR	124	70 - 130		B9K0101	19-Nov-19	0.23 L	25-Nov-19 16:52	1
d5-EtFOSAA	SURR	95	70 - 130		B9K0101	19-Nov-19	0.23 L	25-Nov-19 16:52	1

RL - Reporting limit      Results reported to RL.      When reported, PFHxS, PFOA, PFOS, MeFOSAA and EtFOSAA include both linear and branched isomers. Only the linear isomer is reported for all other analytes.

Reporting convention specified by MI DEQ..

## DATA QUALIFIERS & ABBREVIATIONS

B	This compound was also detected in the method blank
Conc.	Concentration
CRS	Cleanup Recovery Standard
D	Dilution
DL	Detection limit
E	The associated compound concentration exceeded the calibration range of the instrument
H	Recovery and/or RPD was outside laboratory acceptance limits
I	Chemical Interference
IS	Internal Standard
J	The amount detected is below the Reporting Limit/LOQ
LOD	Limit of Detection
LOQ	Limit of Quantitation
M	Estimated Maximum Possible Concentration (CA Region 2 projects only)
NA	Not applicable
ND	Not Detected
OPR	Ongoing Precision and Recovery sample
P	The reported concentration may include contribution from chlorinated diphenyl ether(s).
Q	The ion transition ratio is outside of the acceptance criteria.
RL	Reporting Limit
TEQ	Toxic Equivalency
U	Not Detected (specific projects only)
*	See Cover Letter

Unless otherwise noted, solid sample results are reported in dry weight. Tissue samples are reported in wet weight.

### Vista Analytical Laboratory Certifications

Accrediting Authority	Certificate Number
Alaska Department of Environmental Conservation	17-013
Arkansas Department of Environmental Quality	19-013-0
California Department of Health – ELAP	2892
DoD ELAP - A2LA Accredited - ISO/IEC 17025:2005	3091.01
Florida Department of Health	E87777-23
Hawaii Department of Health	N/A
Louisiana Department of Environmental Quality	01977
Maine Department of Health	2018017
Massachusetts Department of Environmental Protection	N/A
Michigan Department of Environmental Quality	9932
Minnesota Department of Health	1521520
New Hampshire Environmental Accreditation Program	207718-B
New Jersey Department of Environmental Protection	190001
New York Department of Health	11411
Oregon Laboratory Accreditation Program	4042-010
Pennsylvania Department of Environmental Protection	016
Texas Commission on Environmental Quality	T104704189-19-10
Vermont Department of Health	VT-4042
Virginia Department of General Services	10272
Washington Department of Ecology	C584-19
Wisconsin Department of Natural Resources	998036160

*Current certificates and lists of licensed parameters are located in the Quality Assurance office and are available upon request.*

## NELAP Accredited Test Methods

MATRIX: Air	
Description of Test	Method
Determination of Polychlorinated p-Dioxins & Polychlorinated Dibenzofurans	EPA 23
Determination of Polychlorinated p-Dioxins & Polychlorinated Dibenzofurans	EPA TO-9A

MATRIX: Biological Tissue	
Description of Test	Method
Tetra- through Octa-Chlorinated Dioxins and Furans by Isotope Dilution GC/HRMS	EPA 1613B
Brominated Diphenyl Ethers by HRGC/HRMS	EPA 1614A
Chlorinated Biphenyl Congeners in Water, Soil, Sediment, and Tissue by GC/HRMS	EPA 1668A/C
Pesticides in Water, Soil, Sediment, Biosolids, and Tissue by HRGC/HRMS	EPA 1699
Perfluorinated Alkyl Acids in Drinking Water by SPE and LC/MS/MS	EPA 537
Polychlorinated Dibenzo-p-Dioxins and Polychlorinated Dibenzofurans by GC/HRMS	EPA 8280A/B
Polychlorinated Dibenzodioxins (PCDDs) and Polychlorinated Dibenzofurans (PCDFs) by GC/HRMS	EPA 8290/8290A

MATRIX: Drinking Water	
Description of Test	Method
2,3,7,8-Tetrachlorodibenzo- p-dioxin (2,3,7,8-TCDD) GC/HRMS	EPA 1613/1613B
1,4-Dioxane (1,4-Diethyleneoxide) analysis by GC/HRMS	EPA 522
Perfluorinated Alkyl Acids in Drinking Water by SPE and LC/MS/MS	EPA 537
Perfluorinated Alkyl Acids in Drinking Water by SPE and LC/MS/MS	ISO 25101 2009

MATRIX: Non-Potable Water	
Description of Test	Method
Tetra- through Octa-Chlorinated Dioxins and Furans by Isotope Dilution GC/HRMS	EPA 1613B
Brominated Diphenyl Ethers by HRGC/HRMS	EPA 1614A
Chlorinated Biphenyl Congeners in Water, Soil, Sediment, and Tissue by GC/HRMS	EPA 1668A/C
Pesticides in Water, Soil, Sediment, Biosolids, and Tissue by HRGC/HRMS	EPA 1699
Perfluorinated Alkyl Acids in Drinking Water by SPE and LC/MS/MS	EPA 537
Dioxin by GC/HRMS	EPA 613
Polychlorinated Dibenzo-p-Dioxins and Polychlorinated Dibenzofurans by GC/HRMS	EPA 8280A/B
Polychlorinated Dibenzodioxins (PCDDs) and Polychlorinated Dibenzofurans (PCDFs) by GC/HRMS	EPA 8290/8290A

MATRIX: Solids	
Description of Test	Method
Tetra-Octa Chlorinated Dioxins and Furans by Isotope Dilution GC/HRMS	EPA 1613
Tetra- through Octa-Chlorinated Dioxins and Furans by Isotope Dilution GC/HRMS	EPA 1613B
Brominated Diphenyl Ethers by HRGC/HRMS	EPA 1614A
Chlorinated Biphenyl Congeners in Water, Soil, Sediment, and Tissue by GC/HRMS	EPA 1668A/C
Pesticides in Water, Soil, Sediment, Biosolids, and Tissue by HRGC/HRMS	EPA 1699
Perfluorinated Alkyl Acids in Drinking Water by SPE and LC/MS/MS	EPA 537
Polychlorinated Dibenzo-p-Dioxins and Polychlorinated Dibenzofurans by GC/HRMS	EPA 8280A/B
Polychlorinated Dibenzodioxins (PCDDs) and Polychlorinated Dibenzofurans (PCDFs) by GC/HRMS	EPA 8290/8290A



# CHAIN OF CUSTODY

**For Laboratory Use Only**  
 Work Order #: 1903965 D Temp: 3.0 °C  
 Storage ID: R-13 & WK-2 Storage Secured: Yes  No

Project ID: Statewide Biosolids PO#: 60588767.01 Sampler: Lauren McNeely  
 (name)

TAT Standard:  21 days  
 (check one): Rush (surcharge may apply)  
 14 days  7 days Specify: \_\_\_\_\_

Invoice to: Name Stephanie Kammer Company EGLE Address 525 W. Allegan Street City Lansing State MI Ph# 517-897-1597 Fax# 517-241-3571

Relinquished by (printed name and signature) Lauren McNeely Date 11/7/2019 Time 1815 Received by (printed name and signature) \* RECEIVED REVISED COC EMAIL 11-15-19 1441 Date \_\_\_\_\_ Time \_\_\_\_\_

Relinquished by (printed name and signature) \_\_\_\_\_ Date \_\_\_\_\_ Time \_\_\_\_\_ Received by (printed name and signature) \_\_\_\_\_ Date \_\_\_\_\_ Time \_\_\_\_\_  
- SEE ORIGINAL COC FOR SIGNATURE KE 11-16-19

SHIP TO: Vista Analytical Laboratory 1104 Windfield Way El Dorado Hills, CA 95762 Ph: (916) 673-1520; Fax: (916) 673-0106				Method of Shipment:		Add Analysis(es) Requested							PFAS Isotope Dilution			USEPA Method 537		Comments
ATTN: Jennifer Miller				Tracking No.:		Container(s)							PFOM/PFOs			UCMR3 PFAS List 6		
Sample ID	Date	Time	Location/Sample Description	Quantity	Type	Matrix	List of 21	List of 21 w/Isomers	List of 24	List of 24 w/Isomers	List of 28	Other: Please List Below	PFAS List: 14	PFAS List: 14	PFAS List: 14			
WT1911061255LEM	11/6/19	1255	65 S. Kellogg	2	P	DW									X	Well ID: 47000026485		

Special Instructions/Comments: Send Results and Acknowledgements to the list provided

SEND DOCUMENTATION AND RESULTS TO:

Name: Stephanie Kammer  
 Company: EGLE  
 Address: 525 W. Allegan Street, Constitution Hall, 1st South West  
 City: Lansing State: MI Zip: 30242  
 Phone: 517-897-1597 Fax: 517-241-3571  
 Email: dorin.bogdan@aecom.com

Container Types: P= HDPE, PJ= HDPE Jar      Bottle Preservation Type: T = Thiosulfate,      Matrix Types: AQ = Aqueous, DW = Drinking Water, EF = Effluent, PP = Pulp/Paper, SD = Sediment,  
 O = Other: \_\_\_\_\_      TZ = Trizma: \_\_\_\_\_      SL = Sludge, BS=Biosolids, SO = Soil, WW = Wastewater, B = Blood/Serum, O = Other: \_\_\_\_\_



# CHAIN OF CUSTODY

ID: LR - 537COC

1 of 3  
1903965

**For Laboratory Use Only**  
 Work Order #: 1903964 <sup>11-16-19</sup> <sub>KE</sub> Temp: 3.0 °C  
 Storage ID: R-13, WR-2 Storage Secured: Yes  No

Project ID: Biosolids PO#: \_\_\_\_\_ Sampler: Lauren McNeely  
(name)

TAT Standard:  21 days  
 (check one): Rush (surcharge may apply)  
 14 days  7 days Specify: \_\_\_\_\_

Invoice to: Name Stephanie Kemmer Company EBLG Address \_\_\_\_\_ City \_\_\_\_\_ State \_\_\_\_\_ Ph# \_\_\_\_\_ Fax# \_\_\_\_\_

Relinquished by (printed name and signature) Lauren McNeely Date 11/7/19 Time 1815 Received by (printed name and signature) Hayden Gana Date 11/08/19 Time 08:53  
 Relinquished by (printed name and signature) \_\_\_\_\_ Date \_\_\_\_\_ Time \_\_\_\_\_ Received by (printed name and signature) \_\_\_\_\_ Date \_\_\_\_\_ Time \_\_\_\_\_  
- SEE REVISED COCS KE 11/16/19 -

SHIP TO: Vista Analytical Laboratory  
 1104 Windfield Way  
 El Dorado Hills, CA 95762  
 (916) 673-1520 \* Fax (916) 673-0106  
 Method of Shipment: \_\_\_\_\_  
 Tracking No.: \_\_\_\_\_  
 ATTN: \_\_\_\_\_

Sample ID	Date	Time	Location/Sample Description	Add Analysis(es) Requested										Comments				
				Quantity	Type	Matrix	PFOM PPOS	UCMR3 PFAS List 6	537 List 14	Full List of 28 2/18	Other: Please List Below	Mod. EPA Method 537	EPA Method 537(DW only)					
~ SB1911071210 LEM	11/7/19	1210	DV2-SOILB	1	PJ	SO												
~ SB1911071215 LEM	11/7/19	1215	DV2-SOILC	1	PJ	SO												Incremental Sampling Prep
~ SB1911071205 LEM	11/7/19	1205	DV2-SOILA	1	PJ	SO												
~ SB1911071355 LEM	11/7/19	1355	DV1-SOILC	1	PJ	SO												Incremental Sampling Prep
~ SB1911071350 LEM	11/7/19	1350	DV1-SOILB	1	PJ	SO												
~ SB1911071345 LEM	11/7/19	1345	DV1-SOILA	1	PJ	SO												
● SB1911071550 LEM	11/7/19	1550	SORG_SOIL2	1	PJ	SO												
● SB1911071515 LEM	11/7/19	1515	SORG_SOIL1	1	PJ	SO												
* WR1911060935 LEM	11/6/19	0935	6875 McClements	2	P	DW												
* WT1911061000 LEM	11/6/19	1000	LIVESTOCK WELL	2	P	DW												

Special Instructions/Comments:  
 ~ WO # = 1904043  
 Δ WO # = 1904042  
 \* WO # = 1903965  
 ● WO # = 1903964  
 @ WO # = 1903960

**SEND DOCUMENTATION AND RESULTS TO:**

Name: \_\_\_\_\_  
 Company: \_\_\_\_\_  
 Address: \_\_\_\_\_  
 City: \_\_\_\_\_ State: \_\_\_\_\_ Zip: \_\_\_\_\_  
 Phone: \_\_\_\_\_ Fax: \_\_\_\_\_  
 Email: \_\_\_\_\_

Container Types: P= HDPE, PJ= HDPE Jar      Bottle Preservation Type: T = Thiosulfate, TZ = Trizma: \_\_\_\_\_  
 Matrix Types: AQ = Aqueous, DW = Drinking Water, EF = Effluent, PP = Pulp/Paper, SD = Sediment, SL = Sludge, SO = Soil, WW = Wastewater, B = Blood/Serum, O = Other: \_\_\_\_\_





# CHAIN OF CUSTODY

ID: LR - 537COC

2 of 3  
1903965

**For Laboratory Use Only**  
 Work Order #: 1903964 Temp: 3.0 °C  
 Storage ID: R-13, WR-2 Storage Secured: Yes  No

Project ID: Biosolids PO#: \_\_\_\_\_ Sampler: Lauren McNeely (name)

TAT Standard:  21 days  
 (check one): Rush (surcharge may apply)  
 14 days  7 days Specify: \_\_\_\_\_

Invoice to: Name Stephanie Kammer EGLE Company \_\_\_\_\_ Address \_\_\_\_\_ City \_\_\_\_\_ State \_\_\_\_\_ Ph# \_\_\_\_\_ Fax# \_\_\_\_\_

Relinquished by (printed name and signature)	Date	Time	Received by (printed name and signature)	Date	Time
<u>Lauren McNeely</u>	<u>11/7/19</u>	<u>1815</u>	<u>Hagden Cranar</u>	<u>11/08/19</u>	<u>08:53</u>
<u>- SEE REVISED COCS - KE 11/6/19</u>					

SHIP TO: Vista Analytical Laboratory  
 1104 Windfield Way  
 El Dorado Hills, CA 95762  
 (916) 673-1520 \* Fax (916) 673-0106

Method of Shipment: \_\_\_\_\_  
 Tracking No.: \_\_\_\_\_

ATTN: \_\_\_\_\_

Sample ID	Date	Time	Location/Sample Description	Add Analysis(es) Requested										Comments							
				Quantity	Type	Matrix	PFOA/PFS	UCMR3 PFAS List 6	537 List: 14	Full List of 28 O <sub>2</sub>	Other: Please List Below	PFOA/PFS	UCMR3 PFAS List 6		PFAS List: 14						
* WT1911071000LEM	11/7/19	1000	6795 McClements	2	P	DW															
X WT1911061235LEM	11/6/19	1235	65 S. Kellogg	2	P	DW															
X WT1911071015LEM	11/7/19	1015	7342 Golf Club	2	P	DW															
Δ SW1911061100LEM	11/6/19	1100	POND 1	2	P	SW					X										
Δ SW1911061135LEM	11/6/19	1135	POND 2	2	P	SW					X										
Δ SW1911061155LEM	11/6/19	1155	POND 3	2	P	SW					X										
Δ SW1911061235LEM	11/6/19	1235	POND 4	2	P	SW					X										
Δ SW1911061245LEM	11/6/19	1245	POND 5	2	P	SW					X										
@ EB1911071430LEM	11/7/19	1430	SW Sampler	2	P	AQ					X										
@ EB1911071435LEM	11/7/19	1435	Soil Sampler	2	P	AQ					X										

Special Instructions/Comments:  
~ WO # = 1904043  
Δ WO # = 1904042  
\* WO # = 1903965  
● WO # = 1903964  
@ WO # = 1903960

**SEND DOCUMENTATION AND RESULTS TO:**

Name: \_\_\_\_\_  
 Company: \_\_\_\_\_  
 Address: \_\_\_\_\_  
 City: \_\_\_\_\_ State: \_\_\_\_\_ Zip: \_\_\_\_\_  
 Phone: \_\_\_\_\_ Fax: \_\_\_\_\_  
 Email: \_\_\_\_\_

Container Types: P= HDPE, PJ= HDPE Jar      Bottle Preservation Type: T = Thiosulfate, TZ = Trizma: \_\_\_\_\_  
 Matrix Types: AQ = Aqueous, DW = Drinking Water, EF = Effluent, PP = Pulp/Paper, SD = Sediment, SL = Sludge, SO = Soil, WW = Wastewater, B = Blood/Serum, O = Other: \_\_\_\_\_



# CHAIN OF CUSTODY

ID: LR - 537COC

3 of 3

1903965

**For Laboratory Use Only**

Work Order #: 1903964 Temp: 3.0 °C

Storage ID: 2-B, WR-2 Storage Secured: Yes  No

Project ID: Biosolids PO#: \_\_\_\_\_ Sampler: Lauren McNeely (name)

TAT (check one):  21 days  
 14 days  7 days Specify: \_\_\_\_\_

Invoice to: Name Stephanie Kammer Company Eble Address \_\_\_\_\_ City \_\_\_\_\_ State \_\_\_\_\_ Ph# \_\_\_\_\_ Fax# \_\_\_\_\_

Relinquished by (printed name and signature) Lauren McNeely Date 11/7/19 Time 1815 Received by (printed name and signature) Hayden Grant Date 11/08/19 Time 08:53

*- SEE REVISED COCS KE 11/16/19*

SHIP TO: Vista Analytical Laboratory  
1104 Windfield Way  
El Dorado Hills, CA 95762  
(916) 673-1520 \* Fax (916) 673-0106

Method of Shipment: \_\_\_\_\_  
Tracking No.: \_\_\_\_\_

ATTN: \_\_\_\_\_

Quantity	Type	Matrix	Add Analysis(es) Requested				Full List of 268 Other: Please List Below	EPA Method 537(DW only)			Comments
			PFOM PFS	UCMR3 PFAS List 8	537 List: 14	Mod. EPA Method 537		PFOM PFS	UCMR3 PFAS List 8	PFAS List: 14	

Sample ID	Date	Time	Location/Sample Description	Quantity	Type	Matrix	PFOM PFS	UCMR3 PFAS List 8	537 List: 14	Full List of 268 Other: Please List Below	PFOM PFS	UCMR3 PFAS List 8	PFAS List: 14	Comments
<u>EB911071555LEM</u>	<u>11/7/19</u>	<u>1555</u>	<u>Garden Shears</u>	<u>2</u>	<u>P</u>	<u>AQ</u>				<u>X</u>				

Special Instructions/Comments:  
~ WO # : 1904043  
^ WO # : 1904042  
\* WO # : 1903965  
● WO # : 1903964  
@ WO # : 1903960

**SEND DOCUMENTATION AND RESULTS TO:**

Name: \_\_\_\_\_  
 Company: \_\_\_\_\_  
 Address: \_\_\_\_\_  
 City: \_\_\_\_\_ State: \_\_\_\_\_ Zip: \_\_\_\_\_  
 Phone: \_\_\_\_\_ Fax: \_\_\_\_\_  
 Email: \_\_\_\_\_

Container Types: P= HDPE, PJ= HDPE Jar      Bottle Preservation Type: T = Thiosulfate, TZ = Trizma: \_\_\_\_\_  
 Matrix Types: AQ = Aqueous, DW = Drinking Water, EF = Effluent, PP = Pulp/Paper, SD = Sediment, SL = Sludge, SO = Soil, WW = Wastewater, B = Blood/Serum, O = Other: \_\_\_\_\_

# Sample Log-In Checklist

Page # 1 of 1

Vista Work Order #: 1903965 TAT std

Samples Arrival:	Date/Time		Initials:		Location: <u>WR-2</u>		
	<u>11/08/19 08:55</u>		<u>HOG</u>		Shelf/Rack: <u>NA</u>		
Delivered By:	<input checked="" type="radio"/> FedEx	<input type="radio"/> UPS	<input type="radio"/> On Trac	<input type="radio"/> GSO	<input type="radio"/> DHL	<input type="radio"/> Hand Delivered	<input type="radio"/> Other
Preservation:	<input checked="" type="radio"/> Ice		<input type="radio"/> Blue Ice		<input type="radio"/> Dry Ice		<input type="radio"/> None
Temp °C: <u>3.0</u>	<u>(uncorrected)</u>		Probe used: <u>Y</u> <input checked="" type="radio"/> <u>N</u>			Thermometer ID: <u>IR-3</u>	
Temp °C: <u>3.0</u>	<u>(corrected)</u>						

	YES	NO	NA		
Shipping Container(s) Intact?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		
Shipping Custody Seals Intact?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>		
Airbill <u>      </u> Trk # <u>7808 1634 0970</u>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		
Shipping Documentation Present?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		
Shipping Container	<input type="checkbox"/> Vista	<input checked="" type="checkbox"/> <u>Client</u>	<input type="checkbox"/> Retain	<input checked="" type="checkbox"/> <u>Return</u>	<input type="checkbox"/> Dispose
Chain of Custody / Sample Documentation Present?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		
Chain of Custody / Sample Documentation Complete?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		
Holding Time Acceptable?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		

Logged In:	Date/Time		Initials:		Location: <u>R-13</u>   <u>WR-2</u>		
	<u>11/09/19 1631</u>		<u>KG</u>		Shelf/Rack: <u>A4</u>   <u>F5</u> <u>SD</u> <u>A5</u>		
COC Anomaly/Sample Acceptance Form completed?					<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>

Comments:

# CoC/Label Reconciliation Report WO# 1903965

LabNumber	CoC Sample ID		SampleAlias	Sample Date/Time	Container	BaseMatrix	Sample Comments
1903965-01	A WR1911060935LEM	<input checked="" type="checkbox"/>	6875 MCCLEMENTS ✓	06-Nov-19 09:35 <input checked="" type="checkbox"/>	HDPE Bottle, 250 mL ✓	Aqueous ✓	
1903965-01	B WR1911060935LEM	<input checked="" type="checkbox"/>	6875 MCCLEMENTS ✓	06-Nov-19 09:35 <input checked="" type="checkbox"/>	HDPE Bottle, 250 mL ✓	Aqueous ✓	
1903965-02	A WT1911061000LEM	<input checked="" type="checkbox"/>	LIVESTOCK WELL ✓	06-Nov-19 10:00 <input checked="" type="checkbox"/>	HDPE Bottle, 250 mL ✓	Aqueous ✓	
1903965-02	B WT1911061000LEM	<input checked="" type="checkbox"/>	LIVESTOCK WELL ✓	06-Nov-19 10:00 <input checked="" type="checkbox"/>	HDPE Bottle, 250 mL ✓	Aqueous ✓	
1903965-03	A WT1911071000LEM	<input checked="" type="checkbox"/>	6795 MCCLEMENTS	07-Nov-19 10:00 <input checked="" type="checkbox"/>	HDPE Bottle, 250 mL ✓	Aqueous ✓	
1903965-03	B WT1911071000LEM	<input checked="" type="checkbox"/>	6795 MCCLEMENTS	07-Nov-19 10:00 <input checked="" type="checkbox"/>	HDPE Bottle, 250 mL ✓	Aqueous ✓	
1903965-04	A WT1911061255LEM	<input checked="" type="checkbox"/>	65 S. KELLOGG ✓	06-Nov-19 12:55 <input checked="" type="checkbox"/>	HDPE Bottle, 250 mL ✓	Aqueous ✓	
1903965-04	B WT1911061255LEM	<input checked="" type="checkbox"/>	65 S. KELLOGG ✓	06-Nov-19 12:55 <input checked="" type="checkbox"/>	HDPE Bottle, 250 mL ✓	Aqueous ✓	
1903965-05	A WT1911071015LEM	<input checked="" type="checkbox"/>	7342 GOLF CLUB ✓	07-Nov-19 10:15 <input checked="" type="checkbox"/>	HDPE Bottle, 250 mL ✓	Aqueous ✓	
1903965-05	B WT1911071015LEM	<input checked="" type="checkbox"/>	7342 GOLF CLUB ✓	07-Nov-19 10:15 <input checked="" type="checkbox"/>	HDPE Bottle, 250 mL ✓	Aqueous ✓	

Checkmarks indicate that information on the COC reconciled with the sample label.  
Any discrepancies are noted in the following columns.

	Yes	No	NA	Comments:
Sample Container Intact?	✓			
Sample Custody Seals Intact?			✓	
Adequate Sample Volume?	✓			
Container Type Appropriate for Analysis(es)	✓			
Preservation Documented: Na2S2O3 <u>Trizma</u> None Other	✓			
If Chlorinated or Drinking Water Samples, Acceptable Preservation?	✓			

Verified by/Date: kg 11/10/19



December 05, 2019

**Vista Work Order No. 1903965**

Ms. Maya Murshak  
Merit Laboratories, Inc.  
2680 East Lansing Drive  
East Lansing, MI 48823

Dear Ms. Murshak,

Enclosed are the results for the sample set received at Vista Analytical Laboratory on November 08, 2019 under your Project Name 'Statewide Biosolids'.

Vista Analytical Laboratory is committed to serving you effectively. If you require additional information, please contact me at 916-673-1520 or by email at [mmaier@vista-analytical.com](mailto:mmaier@vista-analytical.com).

Thank you for choosing Vista as part of your analytical support team.

Sincerely,

Martha Maier  
Laboratory Director



*Vista Analytical Laboratory certifies that the report herein meets all the requirements set forth by NELAP for those applicable test methods. Results relate only to the samples as received by the laboratory. This report should not be reproduced except in full without the written approval of Vista.*

Vista Analytical Laboratory 1104 Windfield Way El Dorado Hills, CA 95762 ph: 916-673-1520 fx: 916-673-0106 [www.vista-analytical.com](http://www.vista-analytical.com)

## **Vista Work Order No. 1903965**

### **Case Narrative**

#### **Sample Condition on Receipt:**

One drinking water sample was received in good condition and within the method temperature requirements. The sample was received and stored securely in accordance with Vista standard operating procedures and EPA methodology. A revised COC was received by email on November 15, 2019.

#### **Analytical Notes:**

##### **EPA Method 537, Rev. 1.1**

The sample was extracted and analyzed for a selected list of 14 PFAS using EPA Method 537, Rev. 1.1. The results have been reported following the conventions specified by the Michigan Department of Environmental Quality.

##### **Holding Times**

The sample was extracted and analyzed within the method hold times.

##### **Quality Control**

The Initial Calibration and Continuing Calibration Verifications met the method acceptance criteria.

A Laboratory Fortified Blank (LFB) and a Laboratory Reagent Blank (LRB) were extracted and analyzed with the preparation batch. No analytes were detected in the Laboratory Reagent Blank. The LFB recoveries were within the method acceptance criteria.

The surrogate recoveries for all QC and field samples were within the acceptance criteria.

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# Sample Inventory Report

<b>Vista Sample ID</b>	<b>Client Sample ID</b>	<b>Sampled</b>	<b>Received</b>	<b>Components/Containers</b>
1903965-01	WR1911060935LEM	06-Nov-19 09:35	08-Nov-19 08:53	HDPE Bottle, 250 mL HDPE Bottle, 250 mL
1903965-02	WT1911061000LEM	06-Nov-19 10:00	08-Nov-19 08:53	HDPE Bottle, 250 mL HDPE Bottle, 250 mL
1903965-03	WT1911071000LEM	07-Nov-19 10:00	08-Nov-19 08:53	HDPE Bottle, 250 mL HDPE Bottle, 250 mL
1903965-04	WT1911061255LEM	06-Nov-19 12:55	08-Nov-19 08:53	HDPE Bottle, 250 mL HDPE Bottle, 250 mL
1903965-05	WT1911071015LEM	07-Nov-19 10:15	08-Nov-19 08:53	HDPE Bottle, 250 mL HDPE Bottle, 250 mL



## **ANALYTICAL RESULTS**

**Sample ID: LRB**

**EPA Method 537**

<b>Client Data</b>				<b>Laboratory Data</b>					
Name:	Merit Laboratories, Inc.	Matrix:	Aqueous	Lab Sample:	B9K0101-BLK1	Column:	BEH C18		
Project:	Statewide Biosolids								

Analyte	CAS Number	Conc. (ng/L)	RL	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
PFBS	375-73-5	ND	2		B9K0101	19-Nov-19	0.25 L	25-Nov-19 15:35	1
PFHxA	307-24-4	ND	2		B9K0101	19-Nov-19	0.25 L	25-Nov-19 15:35	1
PFHpA	375-85-9	ND	2		B9K0101	19-Nov-19	0.25 L	25-Nov-19 15:35	1
PFHxS	355-46-4	ND	2		B9K0101	19-Nov-19	0.25 L	25-Nov-19 15:35	1
PFOA	335-67-1	ND	2		B9K0101	19-Nov-19	0.25 L	25-Nov-19 15:35	1
PFNA	375-95-1	ND	2		B9K0101	19-Nov-19	0.25 L	25-Nov-19 15:35	1
PFOS	1763-23-1	ND	2		B9K0101	19-Nov-19	0.25 L	25-Nov-19 15:35	1
PFDA	335-76-2	ND	2		B9K0101	19-Nov-19	0.25 L	25-Nov-19 15:35	1
MeFOSAA	2355-31-9	ND	4		B9K0101	19-Nov-19	0.25 L	25-Nov-19 15:35	1
EtFOSAA	2991-50-6	ND	4		B9K0101	19-Nov-19	0.25 L	25-Nov-19 15:35	1
PFUnA	2058-94-8	ND	4		B9K0101	19-Nov-19	0.25 L	25-Nov-19 15:35	1
PFDoA	307-55-1	ND	4		B9K0101	19-Nov-19	0.25 L	25-Nov-19 15:35	1
PFTeDA	72629-94-8	ND	4		B9K0101	19-Nov-19	0.25 L	25-Nov-19 15:35	1
PFTeDA	376-06-7	ND	4		B9K0101	19-Nov-19	0.25 L	25-Nov-19 15:35	1

Labeled Standards	Type	% Recovery	Limits	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
13C2-PFHxA	SURR	105	70 - 130		B9K0101	19-Nov-19	0.25 L	25-Nov-19 15:35	1
13C2-PFDA	SURR	116	70 - 130		B9K0101	19-Nov-19	0.25 L	25-Nov-19 15:35	1
d5-EtFOSAA	SURR	93	70 - 130		B9K0101	19-Nov-19	0.25 L	25-Nov-19 15:35	1

RL - Reporting limit

Results reported to RL.  
Reporting convention specified by MI DEQ.

When reported, PFHxS, PFOA, PFOS, MeFOSAA and EtFOSAA include both linear and branched isomers. Only the linear isomer is reported for all other analytes.

**Sample ID: LFB**

**EPA Method 537**

Client Data					Laboratory Data							
Name:	Merit Laboratories, Inc.	Matrix:	Aqueous		Lab Sample:	B9K0101-BS1	Column:	BEH C18				
Project:	Statewide Biosolids											

Analyte	CAS Number	Amt Found (ng/L)	Spike Amt	% Rec	Limits	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
PFBS	375-73-5	42	35	119	70 - 130		B9K0101	19-Nov-19	0.25 L	04-Dec-19 21:36	1
PFHxA	307-24-4	42	40	104	70 - 130		B9K0101	19-Nov-19	0.25 L	04-Dec-19 21:36	1
PFHpA	375-85-9	48	40	121	70 - 130		B9K0101	19-Nov-19	0.25 L	04-Dec-19 21:36	1
PFHxS	355-46-4	44	36	121	70 - 130		B9K0101	19-Nov-19	0.25 L	04-Dec-19 21:36	1
PFOA	335-67-1	45	40	113	70 - 130		B9K0101	19-Nov-19	0.25 L	04-Dec-19 21:36	1
PFNA	375-95-1	42	40	105	70 - 130		B9K0101	19-Nov-19	0.25 L	04-Dec-19 21:36	1
PFOS	1763-23-1	40	37	109	70 - 130		B9K0101	19-Nov-19	0.25 L	04-Dec-19 21:36	1
PFDA	335-76-2	41	40	103	70 - 130		B9K0101	19-Nov-19	0.25 L	04-Dec-19 21:36	1
MeFOSAA	2355-31-9	44	40	110	70 - 130		B9K0101	19-Nov-19	0.25 L	04-Dec-19 21:36	1
EtFOSAA	2991-50-6	41	40	102	70 - 130		B9K0101	19-Nov-19	0.25 L	04-Dec-19 21:36	1
PFOxA	2058-94-8	39	40	97	70 - 130		B9K0101	19-Nov-19	0.25 L	04-Dec-19 21:36	1
PFDoA	307-55-1	40	40	99	70 - 130		B9K0101	19-Nov-19	0.25 L	04-Dec-19 21:36	1
PFTTrDA	72629-94-8	39	40	98	70 - 130		B9K0101	19-Nov-19	0.25 L	04-Dec-19 21:36	1
PFTeDA	376-06-7	38	40	95	70 - 130		B9K0101	19-Nov-19	0.25 L	04-Dec-19 21:36	1
Labeled Standards		Type		% Rec	Limits	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
13C2-PFHxA		SURR		102	70- 130		B9K0101	19-Nov-19	0.25 L	04-Dec-19 21:36	1
13C2-PFDA		SURR		89	70- 130		B9K0101	19-Nov-19	0.25 L	04-Dec-19 21:36	1
d5-EtFOSAA		SURR		88	70- 130		B9K0101	19-Nov-19	0.25 L	04-Dec-19 21:36	1

Data Reported per Michigan DEQ instructions.

**Sample ID: WT1911071015LEM** **EPA Method 537**

Client Data				Laboratory Data			
Name:	Merit Laboratories, Inc.	Matrix:	Drinking Water	Lab Sample:	1903965-05	Column:	BEH C18
Project:	Statewide Biosolids	Date Collected:	07-Nov-19 10:15	Date Received:	08-Nov-19 08:53		
Location:	7342 GOLF CLUB						

Analyte	CAS Number	Conc. (ng/L)	RL	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
PFBS	375-73-5	ND	2		B9K0101	19-Nov-19	0.24 L	25-Nov-19 17:03	1
PFHxA	307-24-4	ND	2		B9K0101	19-Nov-19	0.24 L	25-Nov-19 17:03	1
PFHpA	375-85-9	ND	2		B9K0101	19-Nov-19	0.24 L	25-Nov-19 17:03	1
PFHxS	355-46-4	ND	2		B9K0101	19-Nov-19	0.24 L	25-Nov-19 17:03	1
PFOA	335-67-1	ND	2		B9K0101	19-Nov-19	0.24 L	25-Nov-19 17:03	1
PFNA	375-95-1	ND	2		B9K0101	19-Nov-19	0.24 L	25-Nov-19 17:03	1
PFOS	1763-23-1	ND	2		B9K0101	19-Nov-19	0.24 L	25-Nov-19 17:03	1
PFDA	335-76-2	ND	2		B9K0101	19-Nov-19	0.24 L	25-Nov-19 17:03	1
MeFOSAA	2355-31-9	ND	4		B9K0101	19-Nov-19	0.24 L	25-Nov-19 17:03	1
EtFOSAA	2991-50-6	ND	4		B9K0101	19-Nov-19	0.24 L	25-Nov-19 17:03	1
PFOA	2058-94-8	ND	4		B9K0101	19-Nov-19	0.24 L	25-Nov-19 17:03	1
PFDoA	307-55-1	ND	4		B9K0101	19-Nov-19	0.24 L	25-Nov-19 17:03	1
PFTeDA	72629-94-8	ND	4		B9K0101	19-Nov-19	0.24 L	25-Nov-19 17:03	1
PFTeDA	376-06-7	ND	4		B9K0101	19-Nov-19	0.24 L	25-Nov-19 17:03	1
Labeled Standards	Type	% Recovery	Limits	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
13C2-PFHxA	SURR	110	70 - 130		B9K0101	19-Nov-19	0.24 L	25-Nov-19 17:03	1
13C2-PFDA	SURR	116	70 - 130		B9K0101	19-Nov-19	0.24 L	25-Nov-19 17:03	1
d5-EtFOSAA	SURR	87	70 - 130		B9K0101	19-Nov-19	0.24 L	25-Nov-19 17:03	1

RL - Reporting limit      Results reported to RL.  
 Reporting convention specified by MI DEQ..      When reported, PFHxS, PFOA, PFOS, MeFOSAA and EtFOSAA include both linear and branched isomers. Only the linear isomer is reported for all other analytes.

## DATA QUALIFIERS & ABBREVIATIONS

B	This compound was also detected in the method blank
Conc.	Concentration
CRS	Cleanup Recovery Standard
D	Dilution
DL	Detection limit
E	The associated compound concentration exceeded the calibration range of the instrument
H	Recovery and/or RPD was outside laboratory acceptance limits
I	Chemical Interference
IS	Internal Standard
J	The amount detected is below the Reporting Limit/LOQ
LOD	Limit of Detection
LOQ	Limit of Quantitation
M	Estimated Maximum Possible Concentration (CA Region 2 projects only)
NA	Not applicable
ND	Not Detected
OPR	Ongoing Precision and Recovery sample
P	The reported concentration may include contribution from chlorinated diphenyl ether(s).
Q	The ion transition ratio is outside of the acceptance criteria.
RL	Reporting Limit
TEQ	Toxic Equivalency
U	Not Detected (specific projects only)
*	See Cover Letter

Unless otherwise noted, solid sample results are reported in dry weight. Tissue samples are reported in wet weight.

### Vista Analytical Laboratory Certifications

Accrediting Authority	Certificate Number
Alaska Department of Environmental Conservation	17-013
Arkansas Department of Environmental Quality	19-013-0
California Department of Health – ELAP	2892
DoD ELAP - A2LA Accredited - ISO/IEC 17025:2005	3091.01
Florida Department of Health	E87777-23
Hawaii Department of Health	N/A
Louisiana Department of Environmental Quality	01977
Maine Department of Health	2018017
Massachusetts Department of Environmental Protection	N/A
Michigan Department of Environmental Quality	9932
Minnesota Department of Health	1521520
New Hampshire Environmental Accreditation Program	207718-B
New Jersey Department of Environmental Protection	190001
New York Department of Health	11411
Oregon Laboratory Accreditation Program	4042-010
Pennsylvania Department of Environmental Protection	016
Texas Commission on Environmental Quality	T104704189-19-10
Vermont Department of Health	VT-4042
Virginia Department of General Services	10272
Washington Department of Ecology	C584-19
Wisconsin Department of Natural Resources	998036160

*Current certificates and lists of licensed parameters are located in the Quality Assurance office and are available upon request.*

## NELAP Accredited Test Methods

MATRIX: Air	
Description of Test	Method
Determination of Polychlorinated p-Dioxins & Polychlorinated Dibenzofurans	EPA 23
Determination of Polychlorinated p-Dioxins & Polychlorinated Dibenzofurans	EPA TO-9A

MATRIX: Biological Tissue	
Description of Test	Method
Tetra- through Octa-Chlorinated Dioxins and Furans by Isotope Dilution GC/HRMS	EPA 1613B
Brominated Diphenyl Ethers by HRGC/HRMS	EPA 1614A
Chlorinated Biphenyl Congeners in Water, Soil, Sediment, and Tissue by GC/HRMS	EPA 1668A/C
Pesticides in Water, Soil, Sediment, Biosolids, and Tissue by HRGC/HRMS	EPA 1699
Perfluorinated Alkyl Acids in Drinking Water by SPE and LC/MS/MS	EPA 537
Polychlorinated Dibenzo-p-Dioxins and Polychlorinated Dibenzofurans by GC/HRMS	EPA 8280A/B
Polychlorinated Dibenzodioxins (PCDDs) and Polychlorinated Dibenzofurans (PCDFs) by GC/HRMS	EPA 8290/8290A

MATRIX: Drinking Water	
Description of Test	Method
2,3,7,8-Tetrachlorodibenzo- p-dioxin (2,3,7,8-TCDD) GC/HRMS	EPA 1613/1613B
1,4-Dioxane (1,4-Diethyleneoxide) analysis by GC/HRMS	EPA 522
Perfluorinated Alkyl Acids in Drinking Water by SPE and LC/MS/MS	EPA 537
Perfluorinated Alkyl Acids in Drinking Water by SPE and LC/MS/MS	ISO 25101 2009

MATRIX: Non-Potable Water	
Description of Test	Method
Tetra- through Octa-Chlorinated Dioxins and Furans by Isotope Dilution GC/HRMS	EPA 1613B
Brominated Diphenyl Ethers by HRGC/HRMS	EPA 1614A
Chlorinated Biphenyl Congeners in Water, Soil, Sediment, and Tissue by GC/HRMS	EPA 1668A/C
Pesticides in Water, Soil, Sediment, Biosolids, and Tissue by HRGC/HRMS	EPA 1699
Perfluorinated Alkyl Acids in Drinking Water by SPE and LC/MS/MS	EPA 537
Dioxin by GC/HRMS	EPA 613
Polychlorinated Dibenzo-p-Dioxins and Polychlorinated Dibenzofurans by GC/HRMS	EPA 8280A/B
Polychlorinated Dibenzodioxins (PCDDs) and Polychlorinated Dibenzofurans (PCDFs) by GC/HRMS	EPA 8290/8290A

MATRIX: Solids	
Description of Test	Method
Tetra-Octa Chlorinated Dioxins and Furans by Isotope Dilution GC/HRMS	EPA 1613
Tetra- through Octa-Chlorinated Dioxins and Furans by Isotope Dilution GC/HRMS	EPA 1613B
Brominated Diphenyl Ethers by HRGC/HRMS	EPA 1614A
Chlorinated Biphenyl Congeners in Water, Soil, Sediment, and Tissue by GC/HRMS	EPA 1668A/C
Pesticides in Water, Soil, Sediment, Biosolids, and Tissue by HRGC/HRMS	EPA 1699
Perfluorinated Alkyl Acids in Drinking Water by SPE and LC/MS/MS	EPA 537
Polychlorinated Dibenzo-p-Dioxins and Polychlorinated Dibenzofurans by GC/HRMS	EPA 8280A/B
Polychlorinated Dibenzodioxins (PCDDs) and Polychlorinated Dibenzofurans (PCDFs) by GC/HRMS	EPA 8290/8290A





# CHAIN OF CUSTODY

**For Laboratory Use Only**  
 Work Order #: 1903965E Temp: 3.0 °C  
 Storage ID: P-13, W-2 Storage Secured: Yes  No

Project ID: Statewide Biosolids PO#: 60588767.01 Sampler: Lauren McNeely  
 (name)

TAT Standard:  21 days  
 (check one): Rush (surcharge may apply)  
 14 days  7 days Specify: \_\_\_\_\_

Invoice to: Name Stephanie Kammer Company EGLE Address 525 W. Allegan Street City Lansing State MI Ph# 517-897-1597 Fax# 517-241-3571

Relinquished by (printed name and signature) Lauren McNeely Date 11/7/2019 Time 1815 Received by (printed name and signature) \*RECEIVED REVISED COC EMAIL 11-15-19 1441 Date \_\_\_\_\_ Time \_\_\_\_\_

Relinquished by (printed name and signature) \_\_\_\_\_ Date \_\_\_\_\_ Time \_\_\_\_\_ Received by (printed name and signature) \_\_\_\_\_ Date \_\_\_\_\_ Time \_\_\_\_\_  
-SEE ORIGINAL COC FOR SIGNATURE - PE 11-16-19

SHIP TO: Vista Analytical Laboratory 1104 Windfield Way El Dorado Hills, CA 95762 Ph: (916) 673-1520; Fax: (916) 673-0106				Method of Shipment:		Add Analysis(es) Requested										Comments	
ATTN: Jennifer Miller				Tracking No.:		Container(s)										USEPA Method 537	
Sample ID	Date	Time	Location/Sample Description	Quantity	Type	Matrix	List of 21	List of 21 w/Isomers	List of 24	List of 24 w/Isomers	List of 28	Other: Please List Below	PFOA/ PFOS	UCMR3 PFAS List 6	PFAS List: 14		
WT1911071015LEM	11/7/19	1015	7342 Golf Club	2	P	DW										X	Well ID: 47000026487

Special Instructions/Comments: Send Results and Acknowledgements to the list provided

**SEND DOCUMENTATION AND RESULTS TO:**

Name: Stephanie Kammer  
 Company: EGLE  
 Address: 525 W. Allegan Street, Constitution Hall, 1st South West  
 City: Lansing State: MI Zip: 30242  
 Phone: 517-897-1597 Fax: 517-241-3571  
 Email: dorin.bogdan@aecom.com

Container Types: P= HDPE, PJ= HDPE Jar      Bottle Preservation Type: T = Thiosulfate,      Matrix Types: AQ = Aqueous, DW = Drinking Water, EF = Effluent, PP = Pulp/Paper, SD = Sediment,  
 O = Other: \_\_\_\_\_      TZ = Trizma: \_\_\_\_\_      SL = Sludge, BS=Biosolids, SO = Soil, WW = Wastewater, B = Blood/Serum, O = Other: \_\_\_\_\_



# CHAIN OF CUSTODY

ID: LR - 537COC

1 of 3  
1903965

**For Laboratory Use Only**  
 Work Order #: 1903964 <sup>11-16-19</sup> <sub>KE</sub> Temp: 3.0 °C  
 Storage ID: R-13, WR-2 Storage Secured: Yes  No

Project ID: Biosolids PO#: \_\_\_\_\_ Sampler: Lauren McNeely  
(name)

TAT Standard:  21 days  
 (check one): Rush (surcharge may apply)  
 14 days  7 days Specify: \_\_\_\_\_

Invoice to: Name Stephanie Kemmer Company EBLG Address \_\_\_\_\_ City \_\_\_\_\_ State \_\_\_\_\_ Ph# \_\_\_\_\_ Fax# \_\_\_\_\_

Relinquished by (printed name and signature) Lauren McNeely Date 11/7/19 Time 1815 Received by (printed name and signature) Hayden Gana Date 11/08/19 Time 08:53  
 Relinquished by (printed name and signature) \_\_\_\_\_ Date \_\_\_\_\_ Time \_\_\_\_\_ Received by (printed name and signature) \_\_\_\_\_ Date \_\_\_\_\_ Time \_\_\_\_\_  
- SEE REVISED COCS KE 11/16/19 -

SHIP TO: Vista Analytical Laboratory  
 1104 Windfield Way  
 El Dorado Hills, CA 95762  
 (916) 673-1520 \* Fax (916) 673-0106  
 Method of Shipment: \_\_\_\_\_  
 Tracking No.: \_\_\_\_\_  
 ATTN: \_\_\_\_\_

Sample ID	Date	Time	Location/Sample Description	Add Analysis(es) Requested										Comments		
				Quantity	Type	Matrix	PFOM PPOS	UCMR3 PFAS List 6	537 List 14	Full List of 28 2/18	Other: Please List Below	Mod. EPA Method 537	EPA Method 537(DW only)			
~ SB1911071210 LEM	11/7/19	1210	DV2-SOILB	1	PJ	SO					X					
~ SB1911071215 LEM	11/7/19	1215	DV2-SOILC	1	PJ	SO					X					Incremental Sampling Prep
~ SB1911071205 LEM	11/7/19	1205	DV2-SOILA	1	PJ	SO					X					
~ SB1911071355 LEM	11/7/19	1355	DV1-SOILC	1	PJ	SO					X					Incremental Sampling Prep
~ SB1911071350 LEM	11/7/19	1350	DV1-SOILB	1	PJ	SO					X					
~ SB1911071345 LEM	11/7/19	1345	DV1-SOILA	1	PJ	SO					X					
● SB1911071550 LEM	11/7/19	1550	SORG_SOIL2	1	PJ	SO					X					
● SB1911071515 LEM	11/7/19	1515	SORG_SOIL1	1	PJ	SO					X					
* WR1911060935 LEM	11/6/19	0935	6875 McClements	2	P	DW									X	
* WT1911061000 LEM	11/6/19	1000	LIVESTOCK WELL	2	P	DW									X	

Special Instructions/Comments:  
 ~ WO# = 1904043  
 Δ WO# = 1904042  
 \* WO# = 1903965  
 ● WO# = 1903964  
 @ WO# = 1903960

**SEND DOCUMENTATION AND RESULTS TO:**

Name: \_\_\_\_\_  
 Company: \_\_\_\_\_  
 Address: \_\_\_\_\_  
 City: \_\_\_\_\_ State: \_\_\_\_\_ Zip: \_\_\_\_\_  
 Phone: \_\_\_\_\_ Fax: \_\_\_\_\_  
 Email: \_\_\_\_\_

Container Types: P= HDPE, PJ= HDPE Jar      Bottle Preservation Type: T = Thiosulfate, TZ = Trizma: \_\_\_\_\_  
 Matrix Types: AQ = Aqueous, DW = Drinking Water, EF = Effluent, PP = Pulp/Paper, SD = Sediment, SL = Sludge, SO = Soil, WW = Wastewater, B = Blood/Serum, O = Other: \_\_\_\_\_



# CHAIN OF CUSTODY

ID: LR - 537COC

2 of 3  
1903965

**For Laboratory Use Only**  
 Work Order #: 1903964 Temp: 3.0 °C  
 Storage ID: R-13, WR-2 Storage Secured: Yes  No

Project ID: Biosolids PO#: \_\_\_\_\_ Sampler: Lauren McNeely (name)

TAT Standard:  21 days  
 (check one): Rush (surcharge may apply)  
 14 days  7 days Specify: \_\_\_\_\_

Invoice to: Name Stephanie Kammer EGLB Company \_\_\_\_\_ Address \_\_\_\_\_ City \_\_\_\_\_ State \_\_\_\_\_ Ph# \_\_\_\_\_ Fax# \_\_\_\_\_

Relinquished by (printed name and signature)	Date	Time	Received by (printed name and signature)	Date	Time
<u>Lauren McNeely</u>	<u>11/7/19</u>	<u>1815</u>	<u>Hagden Cranar</u>	<u>11/08/19</u>	<u>08:53</u>
<u>- SEE REVISED COCS - KE 11/6/19</u>					

SHIP TO: Vista Analytical Laboratory  
 1104 Windfield Way  
 El Dorado Hills, CA 95762  
 (916) 673-1520 \* Fax (916) 673-0106

Method of Shipment: \_\_\_\_\_  
 Tracking No.: \_\_\_\_\_

ATTN: \_\_\_\_\_

Sample ID	Date	Time	Location/Sample Description	Add Analysis(es) Requested										Comments										
				Quantity	Type	Matrix	PFOA/PFS	UCMR3 PFAS List 6	537 List: 14	Full List of 280 O <sub>2</sub>	Other: Please List Below	PFOA/PFS	UCMR3 PFAS List 6		537(DW only)									
* WT1911071000LEM	11/7/19	1000	6795 McClements	2	P	DW																		
X WT1911061235LEM	11/6/19	1235	65 S. Kellogg	2	P	DW																		
X WT1911071015LEM	11/7/19	1015	7342 Golf Club	2	P	DW																		
Δ SW1911061100LEM	11/6/19	1100	POND 1	2	P	SW					X													
Δ SW1911061135LEM	11/6/19	1135	POND 2	2	P	SW					X													
Δ SW1911061155LEM	11/6/19	1155	POND 3	2	P	SW					X													
Δ SW1911061235LEM	11/6/19	1235	POND 4	2	P	SW					X													
Δ SW1911061245LEM	11/6/19	1245	POND 5	2	P	SW					X													
@ EB1911071430LEM	11/7/19	1430	SW Sampler	2	P	AQ					X													
@ EB1911071435LEM	11/7/19	1435	Soil Sampler	2	P	AQ					X													

Special Instructions/Comments:  
~ WO # = 1904043  
Δ WO # = 1904042  
\* WO # = 1903965  
● WO # = 1903964  
@ WO # = 1903960

**SEND DOCUMENTATION AND RESULTS TO:**

Name: \_\_\_\_\_  
 Company: \_\_\_\_\_  
 Address: \_\_\_\_\_  
 City: \_\_\_\_\_ State: \_\_\_\_\_ Zip: \_\_\_\_\_  
 Phone: \_\_\_\_\_ Fax: \_\_\_\_\_  
 Email: \_\_\_\_\_

Container Types: P= HDPE, PJ= HDPE Jar      Bottle Preservation Type: T = Thiosulfate, TZ = Trizma: \_\_\_\_\_  
 Matrix Types: AQ = Aqueous, DW = Drinking Water, EF = Effluent, PP = Pulp/Paper, SD = Sediment, SL = Sludge, SO = Soil, WW = Wastewater, B = Blood/Serum, O = Other: \_\_\_\_\_



# Sample Log-In Checklist

Page # 1 of 1

Vista Work Order #: 1903965

TAT std

Samples Arrival:	Date/Time		Initials:		Location: <u>WR-2</u>		
	<u>11/08/19 08:55</u>		<u>HOG</u>		Shelf/Rack: <u>NA</u>		
Delivered By:	<input checked="" type="radio"/> FedEx	<input type="radio"/> UPS	<input type="radio"/> On Trac	<input type="radio"/> GSO	<input type="radio"/> DHL	<input type="radio"/> Hand Delivered	<input type="radio"/> Other
Preservation:	<input checked="" type="radio"/> Ice		<input type="radio"/> Blue Ice		<input type="radio"/> Dry Ice		<input type="radio"/> None
Temp °C: <u>3.0</u> (uncorrected)	Probe used: Y <input checked="" type="radio"/> N			Thermometer ID: <u>IR-3</u>			
Temp °C: <u>3.0</u> (corrected)							

	YES	NO	NA
Shipping Container(s) Intact?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Shipping Custody Seals Intact?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
Airbill <u>      </u> Trk # <u>7808 1634 0970</u>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Shipping Documentation Present?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Shipping Container	<input type="checkbox"/> Vista	<input checked="" type="checkbox"/> Client	<input type="checkbox"/> Retain
	<input type="checkbox"/>	<input checked="" type="checkbox"/> Return	<input type="checkbox"/> Dispose
Chain of Custody / Sample Documentation Present?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Chain of Custody / Sample Documentation Complete?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Holding Time Acceptable?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Logged In:	Date/Time		Initials:		Location: <u>R-13</u> / <u>WR-2</u>	
	<u>11/09/19 1631</u>		<u>KG</u>		Shelf/Rack: <u>A4</u> / <u>F5</u> <u>SD</u> <u>A5</u>	
COC Anomaly/Sample Acceptance Form completed?					<input type="checkbox"/>	<input checked="" type="checkbox"/>

Comments:

# CoC/Label Reconciliation Report WO# 1903965

LabNumber	CoC Sample ID		SampleAlias	Sample Date/Time	Container	BaseMatrix	Sample Comments
1903965-01	A WR1911060935LEM	<input checked="" type="checkbox"/>	6875 MCCLEMENTS ✓	06-Nov-19 09:35 <input checked="" type="checkbox"/>	HDPE Bottle, 250 mL ✓	Aqueous ✓	
1903965-01	B WR1911060935LEM	<input checked="" type="checkbox"/>	6875 MCCLEMENTS ✓	06-Nov-19 09:35 <input checked="" type="checkbox"/>	HDPE Bottle, 250 mL ✓	Aqueous ✓	
1903965-02	A WT1911061000LEM	<input checked="" type="checkbox"/>	LIVESTOCK WELL ✓	06-Nov-19 10:00 <input checked="" type="checkbox"/>	HDPE Bottle, 250 mL ✓	Aqueous ✓	
1903965-02	B WT1911061000LEM	<input checked="" type="checkbox"/>	LIVESTOCK WELL ✓	06-Nov-19 10:00 <input checked="" type="checkbox"/>	HDPE Bottle, 250 mL ✓	Aqueous ✓	
1903965-03	A WT1911071000LEM	<input checked="" type="checkbox"/>	6795 MCCLEMENTS	07-Nov-19 10:00 <input checked="" type="checkbox"/>	HDPE Bottle, 250 mL ✓	Aqueous ✓	
1903965-03	B WT1911071000LEM	<input checked="" type="checkbox"/>	6795 MCCLEMENTS	07-Nov-19 10:00 <input checked="" type="checkbox"/>	HDPE Bottle, 250 mL ✓	Aqueous ✓	
1903965-04	A WT1911061255LEM	<input checked="" type="checkbox"/>	65 S. KELLOGG ✓	06-Nov-19 12:55 <input checked="" type="checkbox"/>	HDPE Bottle, 250 mL ✓	Aqueous ✓	
1903965-04	B WT1911061255LEM	<input checked="" type="checkbox"/>	65 S. KELLOGG ✓	06-Nov-19 12:55 <input checked="" type="checkbox"/>	HDPE Bottle, 250 mL ✓	Aqueous ✓	
1903965-05	A WT1911071015LEM	<input checked="" type="checkbox"/>	7342 GOLF CLUB ✓	07-Nov-19 10:15 <input checked="" type="checkbox"/>	HDPE Bottle, 250 mL ✓	Aqueous ✓	
1903965-05	B WT1911071015LEM	<input checked="" type="checkbox"/>	7342 GOLF CLUB ✓	07-Nov-19 10:15 <input checked="" type="checkbox"/>	HDPE Bottle, 250 mL ✓	Aqueous ✓	

Checkmarks indicate that information on the COC reconciled with the sample label.  
Any discrepancies are noted in the following columns.

	Yes	No	NA	Comments:
Sample Container Intact?	✓			
Sample Custody Seals Intact?			✓	
Adequate Sample Volume?	✓			
Container Type Appropriate for Analysis(es)	✓			
Preservation Documented: Na2S2O3 <u>Trizma</u> None Other	✓			
If Chlorinated or Drinking Water Samples, Acceptable Preservation?	✓			

Verified by/Date: kg 11/10/19



November 26, 2019

**Vista Work Order No. 1904042**

Ms. Maya Murshak  
Merit Laboratories, Inc.  
2680 East Lansing Drive  
East Lansing, MI 48823

Dear Ms. Murshak,

Enclosed are the results for the sample set received at Vista Analytical Laboratory on November 08, 2019 under your Project Name 'Statewide Biosolids'.

Vista Analytical Laboratory is committed to serving you effectively. If you require additional information, please contact me at 916-673-1520 or by email at [mmaier@vista-analytical.com](mailto:mmaier@vista-analytical.com).

Thank you for choosing Vista as part of your analytical support team.

Sincerely,

Martha Maier  
Laboratory Director



*Vista Analytical Laboratory certifies that the report herein meets all the requirements set forth by NELAP for those applicable test methods. Results relate only to the samples as received by the laboratory. This report should not be reproduced except in full without the written approval of Vista.*

## Vista Work Order No. 1904042

### Case Narrative

#### Sample Condition on Receipt:

Five surface water samples were received in good condition and within the method temperature requirements. The samples were received and stored securely in accordance with Vista standard operating procedures and EPA methodology.

#### Analytical Notes:

##### PFAS Isotope Dilution Method

Samples "SW1911061100LEM", "SW1911061135LEM" and "SW1911061245LEM" contained particulate and were centrifuged prior to extraction.

The samples were extracted and analyzed for a selected list of PFAS using the PFAS Isotope Dilution Method (Modified EPA Method 537). The results for PFHxS, PFOA, PFOS, MeFOSAA and EtFOSAA include both linear and branched isomers. Results for all other analytes include the linear isomers only.

##### Holding Times

The samples were extracted and analyzed within the method hold times.

##### Quality Control

The Initial Calibration and Continuing Calibration Verifications met the method acceptance criteria.

A Method Blank and Ongoing Precision and Recovery (OPR) sample were extracted and analyzed with the preparation batch. No analytes were detected in the Method Blank above 1/2 the LOQ. The OPR recoveries were within the method acceptance criteria.

The labeled standard recoveries outside the acceptance criteria are listed in the table below.

#### QC Anomalies

LabNumber	SampleName	Analysis	Analyte	Flag	%Rec
1904042-01	SW1911061100LEM	PFAS Isotope Dilution Method	13C3-PFBA	H	57.9
1904042-05	SW1911061245LEM	PFAS Isotope Dilution Method	13C2-PFTeDA	H	15.9

H = Recovery was outside laboratory acceptance criteria.



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# Sample Inventory Report

<b>Vista Sample ID</b>	<b>Client Sample ID</b>	<b>Sampled</b>	<b>Received</b>	<b>Components/Containers</b>
1904042-01	SW1911061100LEM	06-Nov-19 11:00	08-Nov-19 08:53	HDPE Bottle, 250 mL HDPE Bottle, 250 mL
1904042-02	SW1911061135LEM	06-Nov-19 11:35	08-Nov-19 08:53	HDPE Bottle, 250 mL HDPE Bottle, 250 mL
1904042-03	SW1911061155LEM	06-Nov-19 11:55	08-Nov-19 08:53	HDPE Bottle, 250 mL HDPE Bottle, 250 mL
1904042-04	SW1911061235LEM	06-Nov-19 12:35	08-Nov-19 08:53	HDPE Bottle, 250 mL HDPE Bottle, 250 mL
1904042-05	SW1911061245LEM	06-Nov-19 12:45	08-Nov-19 08:53	HDPE Bottle, 250 mL HDPE Bottle, 250 mL

## **ANALYTICAL RESULTS**

**Sample ID: Method Blank**
**PFAS Isotope Dilution Method**

Client Data				Laboratory Data							
Name:	Merit Laboratories, Inc.	Matrix:	Aqueous	Lab Sample:	B9K0160-BLK1	Column:	BEH C18				
Project:	Statewide Biosolids										

Analyte	CAS Number	Conc. (ng/L)	DL	LOD	LOQ	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
PFBA	375-22-4	ND	1.37	2.00	4.00		B9K0160	19-Nov-19	0.250 L	23-Nov-19 19:08	1
PFPeA	2706-90-3	ND	1.37	2.00	4.00		B9K0160	19-Nov-19	0.250 L	23-Nov-19 19:08	1
PFBS	375-73-5	ND	1.37	2.00	4.00		B9K0160	19-Nov-19	0.250 L	23-Nov-19 19:08	1
4:2 FTS	757124-72-4	ND	1.37	2.00	4.00		B9K0160	19-Nov-19	0.250 L	23-Nov-19 19:08	1
PFHxA	307-24-4	ND	1.37	2.00	4.00		B9K0160	19-Nov-19	0.250 L	23-Nov-19 19:08	1
PFPeS	2706-91-4	ND	1.37	2.00	4.00		B9K0160	19-Nov-19	0.250 L	23-Nov-19 19:08	1
PFHpA	375-85-9	ND	1.37	2.00	4.00		B9K0160	19-Nov-19	0.250 L	23-Nov-19 19:08	1
PFHxS	355-46-4	ND	1.37	2.00	4.00		B9K0160	19-Nov-19	0.250 L	23-Nov-19 19:08	1
6:2 FTS	27619-97-2	ND	1.37	2.00	4.00		B9K0160	19-Nov-19	0.250 L	23-Nov-19 19:08	1
PFOA	335-67-1	ND	1.37	2.00	4.00		B9K0160	19-Nov-19	0.250 L	23-Nov-19 19:08	1
PFHpS	375-92-8	ND	1.37	2.00	4.00		B9K0160	19-Nov-19	0.250 L	23-Nov-19 19:08	1
PFNA	375-95-1	ND	1.37	2.00	4.00		B9K0160	19-Nov-19	0.250 L	23-Nov-19 19:08	1
PFOSA	754-91-6	ND	1.37	2.00	4.00		B9K0160	19-Nov-19	0.250 L	23-Nov-19 19:08	1
PFOS	1763-23-1	ND	1.37	2.00	4.00		B9K0160	19-Nov-19	0.250 L	23-Nov-19 19:08	1
PFDA	335-76-2	ND	1.37	2.00	4.00		B9K0160	19-Nov-19	0.250 L	23-Nov-19 19:08	1
8:2 FTS	39108-34-4	ND	1.37	2.00	4.00		B9K0160	19-Nov-19	0.250 L	23-Nov-19 19:08	1
PFNS	68259-12-1	ND	1.94	2.00	4.00		B9K0160	19-Nov-19	0.250 L	23-Nov-19 19:08	1
MeFOSAA	2355-31-9	ND	1.37	2.00	4.00		B9K0160	19-Nov-19	0.250 L	23-Nov-19 19:08	1
EtFOSAA	2991-50-6	ND	1.37	2.00	4.00		B9K0160	19-Nov-19	0.250 L	23-Nov-19 19:08	1
PFUnA	2058-94-8	ND	1.37	2.00	4.00		B9K0160	19-Nov-19	0.250 L	23-Nov-19 19:08	1
PFDS	335-77-3	ND	1.37	2.00	4.00		B9K0160	19-Nov-19	0.250 L	23-Nov-19 19:08	1
PFDoA	307-55-1	ND	1.37	2.00	4.00		B9K0160	19-Nov-19	0.250 L	23-Nov-19 19:08	1
PFTTrDA	72629-94-8	ND	1.37	2.00	4.00		B9K0160	19-Nov-19	0.250 L	23-Nov-19 19:08	1
PFTeDA	376-06-7	ND	1.37	2.00	4.00		B9K0160	19-Nov-19	0.250 L	23-Nov-19 19:08	1

Labeled Standards	Type	% Recovery	Limits	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
13C3-PFBA	IS	88.4	60 - 130		B9K0160	19-Nov-19	0.250 L	23-Nov-19 19:08	1
13C3-PFPeA	IS	100	60 - 150		B9K0160	19-Nov-19	0.250 L	23-Nov-19 19:08	1
13C3-PFBS	IS	97.1	60 - 150		B9K0160	19-Nov-19	0.250 L	23-Nov-19 19:08	1
13C2-4:2 FTS	IS	102	20 - 150		B9K0160	19-Nov-19	0.250 L	23-Nov-19 19:08	1
13C2-PFHxA	IS	99.1	70 - 130		B9K0160	19-Nov-19	0.250 L	23-Nov-19 19:08	1
13C4-PFHpA	IS	97.0	60 - 150		B9K0160	19-Nov-19	0.250 L	23-Nov-19 19:08	1
13C3-PFHxS	IS	92.3	60 - 130		B9K0160	19-Nov-19	0.250 L	23-Nov-19 19:08	1
13C2-6:2 FTS	IS	89.3	40 - 150		B9K0160	19-Nov-19	0.250 L	23-Nov-19 19:08	1
13C5-PFNA	IS	97.0	50 - 130		B9K0160	19-Nov-19	0.250 L	23-Nov-19 19:08	1
13C8-PFOSA	IS	68.0	20 - 150		B9K0160	19-Nov-19	0.250 L	23-Nov-19 19:08	1
13C2-PFOA	IS	95.5	60 - 130		B9K0160	19-Nov-19	0.250 L	23-Nov-19 19:08	1
13C8-PFOS	IS	110	60 - 130		B9K0160	19-Nov-19	0.250 L	23-Nov-19 19:08	1
13C2-PFDA	IS	96.4	60 - 130		B9K0160	19-Nov-19	0.250 L	23-Nov-19 19:08	1

**Sample ID: Method Blank** **PFAS Isotope Dilution Method**

<b>Client Data</b>				<b>Laboratory Data</b>			
Name:	Merit Laboratories, Inc.	Matrix:	Aqueous	Lab Sample:	B9K0160-BLK1	Column:	BEH C18
Project:	Statewide Biosolids						

Labeled Standards	Type	% Recovery	Limits	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
13C2-8:2 FTS	IS	91.0	40 - 150		B9K0160	19-Nov-19	0.250 L	23-Nov-19 19:08	1
d3-MeFOSAA	IS	99.4	50 - 150		B9K0160	19-Nov-19	0.250 L	23-Nov-19 19:08	1
13C2-PFUnA	IS	83.7	60 - 130		B9K0160	19-Nov-19	0.250 L	23-Nov-19 19:08	1
d5-EtFOSAA	IS	72.8	50 - 150		B9K0160	19-Nov-19	0.250 L	23-Nov-19 19:08	1
13C2-PFDoA	IS	81.6	30 - 130		B9K0160	19-Nov-19	0.250 L	23-Nov-19 19:08	1
13C2-PFTeDA	IS	74.5	20 - 150		B9K0160	19-Nov-19	0.250 L	23-Nov-19 19:08	1

DL - Detection Limit

LOD - Limit of Detection  
LOQ - Limit of quantitation

Results reported to the DL.

When reported, PFHxS, PFOA, PFOS, MeFOSAA and EtFOSAA include both linear and branched isomers. Only the linear isomer is reported for all other analytes.

**Sample ID: OPR**

**PFAS Isotope Dilution Method**

Client Data					Laboratory Data						
Name:	Merit Laboratories, Inc.		Matrix:	Aqueous	Lab Sample:	B9K0160-BS1	Column:	BEH C18			
Project:	Statewide Biosolids										

Analyte	CAS Number	Amt Found (ng/L)	Spike Amt	% Rec	Limits	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
PFBA	375-22-4	41.1	40.0	103	70 - 130		B9K0160	19-Nov-19	0.250 L	23-Nov-19 19:19	1
PFPeA	2706-90-3	43.8	40.0	110	70 - 130		B9K0160	19-Nov-19	0.250 L	23-Nov-19 19:19	1
PFBS	375-73-5	39.8	40.0	99.5	70 - 130		B9K0160	19-Nov-19	0.250 L	23-Nov-19 19:19	1
4:2 FTS	757124-72-4	39.4	40.0	98.5	70 - 130		B9K0160	19-Nov-19	0.250 L	23-Nov-19 19:19	1
PFHxA	307-24-4	43.6	40.0	109	70 - 130		B9K0160	19-Nov-19	0.250 L	23-Nov-19 19:19	1
PFPeS	2706-91-4	37.8	40.0	94.4	70 - 130		B9K0160	19-Nov-19	0.250 L	23-Nov-19 19:19	1
PFHpA	375-85-9	40.7	40.0	102	70 - 130		B9K0160	19-Nov-19	0.250 L	23-Nov-19 19:19	1
PFHxS	355-46-4	36.9	40.0	92.1	70 - 130		B9K0160	19-Nov-19	0.250 L	23-Nov-19 19:19	1
6:2 FTS	27619-97-2	35.2	40.0	88.0	60 - 130		B9K0160	19-Nov-19	0.250 L	23-Nov-19 19:19	1
PFOA	335-67-1	42.2	40.0	106	70 - 130		B9K0160	19-Nov-19	0.250 L	23-Nov-19 19:19	1
PFHpS	375-92-8	42.3	40.0	106	60 - 130		B9K0160	19-Nov-19	0.250 L	23-Nov-19 19:19	1
PFNA	375-95-1	38.4	40.0	96.1	70 - 130		B9K0160	19-Nov-19	0.250 L	23-Nov-19 19:19	1
PFOSA	754-91-6	48.3	40.0	121	70 - 130		B9K0160	19-Nov-19	0.250 L	23-Nov-19 19:19	1
PFOS	1763-23-1	34.6	40.1	86.3	70 - 130	Q	B9K0160	19-Nov-19	0.250 L	23-Nov-19 19:19	1
PFDA	335-76-2	41.7	40.0	104	70 - 130		B9K0160	19-Nov-19	0.250 L	23-Nov-19 19:19	1
8:2 FTS	39108-34-4	37.4	40.0	93.6	60 - 130		B9K0160	19-Nov-19	0.250 L	23-Nov-19 19:19	1
PFNS	68259-12-1	40.1	40.0	100	70 - 130		B9K0160	19-Nov-19	0.250 L	23-Nov-19 19:19	1
MeFOSAA	2355-31-9	49.4	40.0	123	70 - 130		B9K0160	19-Nov-19	0.250 L	23-Nov-19 19:19	1
EtFOSAA	2991-50-6	42.2	40.0	105	70 - 130		B9K0160	19-Nov-19	0.250 L	23-Nov-19 19:19	1
PFUnA	2058-94-8	44.6	40.0	111	70 - 130		B9K0160	19-Nov-19	0.250 L	23-Nov-19 19:19	1
PFDS	335-77-3	31.6	40.1	78.9	60 - 130		B9K0160	19-Nov-19	0.250 L	23-Nov-19 19:19	1
PFDoA	307-55-1	44.4	40.0	111	70 - 130		B9K0160	19-Nov-19	0.250 L	23-Nov-19 19:19	1
PFTTrDA	72629-94-8	42.4	40.0	106	60 - 130		B9K0160	19-Nov-19	0.250 L	23-Nov-19 19:19	1
PFTeDA	376-06-7	41.8	40.0	105	70 - 130		B9K0160	19-Nov-19	0.250 L	23-Nov-19 19:19	1

Labeled Standards	Type	% Rec	Limits	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
13C3-PFBA	IS	86.6	60- 130		B9K0160	19-Nov-19	0.250 L	23-Nov-19 19:19	1
13C3-PFPeA	IS	96.6	60- 150		B9K0160	19-Nov-19	0.250 L	23-Nov-19 19:19	1
13C3-PFBS	IS	99.7	60- 150		B9K0160	19-Nov-19	0.250 L	23-Nov-19 19:19	1
13C2-4:2 FTS	IS	106	20- 150		B9K0160	19-Nov-19	0.250 L	23-Nov-19 19:19	1
13C2-PFHxA	IS	95.2	70- 130		B9K0160	19-Nov-19	0.250 L	23-Nov-19 19:19	1
13C4-PFHpA	IS	98.0	60- 150		B9K0160	19-Nov-19	0.250 L	23-Nov-19 19:19	1
13C3-PFHxS	IS	106	60- 130		B9K0160	19-Nov-19	0.250 L	23-Nov-19 19:19	1
13C2-6:2 FTS	IS	119	40- 150		B9K0160	19-Nov-19	0.250 L	23-Nov-19 19:19	1
13C5-PFNA	IS	101	50- 130		B9K0160	19-Nov-19	0.250 L	23-Nov-19 19:19	1
13C8-PFOSA	IS	60.1	20- 150		B9K0160	19-Nov-19	0.250 L	23-Nov-19 19:19	1

**Sample ID: OPR**

**PFAS Isotope Dilution Method**

**Client Data**

Name: Merit Laboratories, Inc.  
Project: Statewide Biosolids

Matrix: Aqueous

**Laboratory Data**

Lab Sample: B9K0160-BS1      Column: BEH C18

Labeled Standards	Type	% Rec	Limits	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
13C2-PFOA	IS	96.5	60- 130		B9K0160	19-Nov-19	0.250 L	23-Nov-19 19:19	1
13C8-PFOS	IS	111	60- 130		B9K0160	19-Nov-19	0.250 L	23-Nov-19 19:19	1
13C2-PFDA	IS	92.5	60- 130		B9K0160	19-Nov-19	0.250 L	23-Nov-19 19:19	1
13C2-8:2 FTS	IS	104	40- 150		B9K0160	19-Nov-19	0.250 L	23-Nov-19 19:19	1
d3-MeFOSAA	IS	80.6	50- 150		B9K0160	19-Nov-19	0.250 L	23-Nov-19 19:19	1
13C2-PFUnA	IS	88.7	60- 130		B9K0160	19-Nov-19	0.250 L	23-Nov-19 19:19	1
d5-EtFOSAA	IS	87.2	50- 150		B9K0160	19-Nov-19	0.250 L	23-Nov-19 19:19	1
13C2-PFDoA	IS	74.1	30- 130		B9K0160	19-Nov-19	0.250 L	23-Nov-19 19:19	1
13C2-PFTeDA	IS	68.6	20- 150		B9K0160	19-Nov-19	0.250 L	23-Nov-19 19:19	1

**Sample ID: SW1911061100LEM**
**PFAS Isotope Dilution Method**

Client Data				Laboratory Data			
Name:	Merit Laboratories, Inc.	Matrix:	Surface Water	Lab Sample:	1904042-01	Column:	BEH C18
Project:	Statewide Biosolids	Date Collected:	06-Nov-19 11:00	Date Received:	08-Nov-19 08:53		
Location:	WIXO-02n05e02-AG01						

Analyte	CAS Number	Conc. (ng/L)	DL	LOD	LOQ	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
PFBA	375-22-4	14.5	1.44	2.11	4.21		B9K0160	19-Nov-19	0.237 L	23-Nov-19 20:01	1
PFPeA	2706-90-3	39.7	1.44	2.11	4.21		B9K0160	19-Nov-19	0.237 L	23-Nov-19 20:01	1
PFBS	375-73-5	73.3	1.44	2.11	4.21		B9K0160	19-Nov-19	0.237 L	23-Nov-19 20:01	1
4:2 FTS	757124-72-4	ND	1.44	2.11	4.21		B9K0160	19-Nov-19	0.237 L	23-Nov-19 20:01	1
PFHxA	307-24-4	38.9	1.44	2.11	4.21		B9K0160	19-Nov-19	0.237 L	23-Nov-19 20:01	1
PFPeS	2706-91-4	ND	1.44	2.11	4.21		B9K0160	19-Nov-19	0.237 L	23-Nov-19 20:01	1
PFHpA	375-85-9	17.7	1.44	2.11	4.21		B9K0160	19-Nov-19	0.237 L	23-Nov-19 20:01	1
PFHxS	355-46-4	7.73	1.44	2.11	4.21		B9K0160	19-Nov-19	0.237 L	23-Nov-19 20:01	1
6:2 FTS	27619-97-2	ND	1.44	2.11	4.21		B9K0160	19-Nov-19	0.237 L	23-Nov-19 20:01	1
PFOA	335-67-1	57.3	1.44	2.11	4.21		B9K0160	19-Nov-19	0.237 L	23-Nov-19 20:01	1
PFHpS	375-92-8	1.49	1.44	2.11	4.21	J, Q	B9K0160	19-Nov-19	0.237 L	23-Nov-19 20:01	1
PFNA	375-95-1	6.43	1.44	2.11	4.21	Q	B9K0160	19-Nov-19	0.237 L	23-Nov-19 20:01	1
PFOSA	754-91-6	ND	1.44	2.11	4.21		B9K0160	19-Nov-19	0.237 L	23-Nov-19 20:01	1
PFOS	1763-23-1	159	1.44	2.11	4.21		B9K0160	19-Nov-19	0.237 L	23-Nov-19 20:01	1
PFDA	335-76-2	5.95	1.44	2.11	4.21		B9K0160	19-Nov-19	0.237 L	23-Nov-19 20:01	1
8:2 FTS	39108-34-4	ND	1.44	2.11	4.21		B9K0160	19-Nov-19	0.237 L	23-Nov-19 20:01	1
PFNS	68259-12-1	ND	2.04	2.11	4.21		B9K0160	19-Nov-19	0.237 L	23-Nov-19 20:01	1
MeFOSAA	2355-31-9	ND	1.44	2.11	4.21		B9K0160	19-Nov-19	0.237 L	23-Nov-19 20:01	1
EtFOSAA	2991-50-6	ND	1.44	2.11	4.21		B9K0160	19-Nov-19	0.237 L	23-Nov-19 20:01	1
PFUnA	2058-94-8	ND	1.44	2.11	4.21		B9K0160	19-Nov-19	0.237 L	23-Nov-19 20:01	1
PFDS	335-77-3	ND	1.44	2.11	4.21		B9K0160	19-Nov-19	0.237 L	23-Nov-19 20:01	1
PFDoA	307-55-1	ND	1.44	2.11	4.21		B9K0160	19-Nov-19	0.237 L	23-Nov-19 20:01	1
PFTTrDA	72629-94-8	ND	1.44	2.11	4.21		B9K0160	19-Nov-19	0.237 L	23-Nov-19 20:01	1
PFTeDA	376-06-7	ND	1.44	2.11	4.21		B9K0160	19-Nov-19	0.237 L	23-Nov-19 20:01	1

Labeled Standards	Type	% Recovery	Limits	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
13C3-PFBA	IS	57.9	60 - 130	H	B9K0160	19-Nov-19	0.237 L	23-Nov-19 20:01	1
13C3-PFPeA	IS	94.7	60 - 150		B9K0160	19-Nov-19	0.237 L	23-Nov-19 20:01	1
13C3-PFBS	IS	104	60 - 150		B9K0160	19-Nov-19	0.237 L	23-Nov-19 20:01	1
13C2-4:2 FTS	IS	101	20 - 150		B9K0160	19-Nov-19	0.237 L	23-Nov-19 20:01	1
13C2-PFHxA	IS	94.1	70 - 130		B9K0160	19-Nov-19	0.237 L	23-Nov-19 20:01	1
13C4-PFHpA	IS	98.5	60 - 150		B9K0160	19-Nov-19	0.237 L	23-Nov-19 20:01	1
13C3-PFHxS	IS	100	60 - 130		B9K0160	19-Nov-19	0.237 L	23-Nov-19 20:01	1
13C2-6:2 FTS	IS	84.2	40 - 150		B9K0160	19-Nov-19	0.237 L	23-Nov-19 20:01	1
13C5-PFNA	IS	99.2	50 - 130		B9K0160	19-Nov-19	0.237 L	23-Nov-19 20:01	1
13C8-PFOSA	IS	37.5	20 - 150		B9K0160	19-Nov-19	0.237 L	23-Nov-19 20:01	1
13C2-PFOA	IS	94.7	60 - 130		B9K0160	19-Nov-19	0.237 L	23-Nov-19 20:01	1
13C8-PFOS	IS	100	60 - 130		B9K0160	19-Nov-19	0.237 L	23-Nov-19 20:01	1
13C2-PFDA	IS	96.4	60 - 130		B9K0160	19-Nov-19	0.237 L	23-Nov-19 20:01	1



**Sample ID: SW1911061100LEM** **PFAS Isotope Dilution Method**

Client Data				Laboratory Data			
Name:	Merit Laboratories, Inc.	Matrix:	Surface Water	Lab Sample:	1904042-01	Column:	BEH C18
Project:	Statewide Biosolids	Date Collected:	06-Nov-19 11:00	Date Received:	08-Nov-19 08:53		
Location:	WIXO-02n05e02-AG01						

Labeled Standards	Type	% Recovery	Limits	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
13C2-8:2 FTS	IS	112	40 - 150		B9K0160	19-Nov-19	0.237 L	23-Nov-19 20:01	1
d3-MeFOSAA	IS	93.7	50 - 150		B9K0160	19-Nov-19	0.237 L	23-Nov-19 20:01	1
13C2-PFUnA	IS	90.1	60 - 130		B9K0160	19-Nov-19	0.237 L	23-Nov-19 20:01	1
d5-EtFOSAA	IS	82.4	50 - 150		B9K0160	19-Nov-19	0.237 L	23-Nov-19 20:01	1
13C2-PFDoA	IS	75.5	30 - 130		B9K0160	19-Nov-19	0.237 L	23-Nov-19 20:01	1
13C2-PFTeDA	IS	33.9	20 - 150		B9K0160	19-Nov-19	0.237 L	23-Nov-19 20:01	1

DL - Detection Limit

LOD - Limit of Detection  
LOQ - Limit of quantitation

Results reported to the DL.

When reported, PFHxS, PFOA, PFOS, MeFOSAA and EtFOSAA include both linear and branched isomers. Only the linear isomer is reported for all other analytes.

**Sample ID: SW1911061135LEM**
**PFAS Isotope Dilution Method**

Client Data				Laboratory Data			
Name:	Merit Laboratories, Inc.	Matrix:	Surface Water	Lab Sample:	1904042-02	Column:	BEH C18
Project:	Statewide Biosolids	Date Collected:	06-Nov-19 11:35	Date Received:	08-Nov-19 08:53		
Location:	WIXO-02n05e02-AG01						

Analyte	CAS Number	Conc. (ng/L)	DL	LOD	LOQ	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
PFBA	375-22-4	27.3	1.47	2.15	4.29		B9K0160	19-Nov-19	0.233 L	23-Nov-19 20:11	1
PFPeA	2706-90-3	76.4	1.47	2.15	4.29		B9K0160	19-Nov-19	0.233 L	23-Nov-19 20:11	1
PFBS	375-73-5	154	1.47	2.15	4.29		B9K0160	19-Nov-19	0.233 L	23-Nov-19 20:11	1
4:2 FTS	757124-72-4	ND	1.47	2.15	4.29		B9K0160	19-Nov-19	0.233 L	23-Nov-19 20:11	1
PFHxA	307-24-4	68.3	1.47	2.15	4.29		B9K0160	19-Nov-19	0.233 L	23-Nov-19 20:11	1
PFPeS	2706-91-4	ND	1.47	2.15	4.29		B9K0160	19-Nov-19	0.233 L	23-Nov-19 20:11	1
PFHpA	375-85-9	21.9	1.47	2.15	4.29		B9K0160	19-Nov-19	0.233 L	23-Nov-19 20:11	1
PFHxS	355-46-4	7.76	1.47	2.15	4.29		B9K0160	19-Nov-19	0.233 L	23-Nov-19 20:11	1
6:2 FTS	27619-97-2	ND	1.47	2.15	4.29		B9K0160	19-Nov-19	0.233 L	23-Nov-19 20:11	1
PFOA	335-67-1	64.4	1.47	2.15	4.29		B9K0160	19-Nov-19	0.233 L	23-Nov-19 20:11	1
PFHpS	375-92-8	ND	1.47	2.15	4.29		B9K0160	19-Nov-19	0.233 L	23-Nov-19 20:11	1
PFNA	375-95-1	7.17	1.47	2.15	4.29	Q	B9K0160	19-Nov-19	0.233 L	23-Nov-19 20:11	1
PFOSA	754-91-6	ND	1.47	2.15	4.29		B9K0160	19-Nov-19	0.233 L	23-Nov-19 20:11	1
PFOS	1763-23-1	120	1.47	2.15	4.29		B9K0160	19-Nov-19	0.233 L	23-Nov-19 20:11	1
PFDA	335-76-2	3.75	1.47	2.15	4.29	J	B9K0160	19-Nov-19	0.233 L	23-Nov-19 20:11	1
8:2 FTS	39108-34-4	ND	1.47	2.15	4.29		B9K0160	19-Nov-19	0.233 L	23-Nov-19 20:11	1
PFNS	68259-12-1	ND	2.07	2.15	4.29		B9K0160	19-Nov-19	0.233 L	23-Nov-19 20:11	1
MeFOSAA	2355-31-9	ND	1.47	2.15	4.29		B9K0160	19-Nov-19	0.233 L	23-Nov-19 20:11	1
EtFOSAA	2991-50-6	ND	1.47	2.15	4.29		B9K0160	19-Nov-19	0.233 L	23-Nov-19 20:11	1
PFUnA	2058-94-8	ND	1.47	2.15	4.29		B9K0160	19-Nov-19	0.233 L	23-Nov-19 20:11	1
PFDS	335-77-3	ND	1.47	2.15	4.29		B9K0160	19-Nov-19	0.233 L	23-Nov-19 20:11	1
PFDoA	307-55-1	ND	1.47	2.15	4.29		B9K0160	19-Nov-19	0.233 L	23-Nov-19 20:11	1
PFTTrDA	72629-94-8	ND	1.47	2.15	4.29		B9K0160	19-Nov-19	0.233 L	23-Nov-19 20:11	1
PFTeDA	376-06-7	ND	1.47	2.15	4.29		B9K0160	19-Nov-19	0.233 L	23-Nov-19 20:11	1

Labeled Standards	Type	% Recovery	Limits	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
13C3-PFBA	IS	65.1	60 - 130		B9K0160	19-Nov-19	0.233 L	23-Nov-19 20:11	1
13C3-PFPeA	IS	97.7	60 - 150		B9K0160	19-Nov-19	0.233 L	23-Nov-19 20:11	1
13C3-PFBS	IS	99.3	60 - 150		B9K0160	19-Nov-19	0.233 L	23-Nov-19 20:11	1
13C2-4:2 FTS	IS	93.0	20 - 150		B9K0160	19-Nov-19	0.233 L	23-Nov-19 20:11	1
13C2-PFHxA	IS	98.0	70 - 130		B9K0160	19-Nov-19	0.233 L	23-Nov-19 20:11	1
13C4-PFHpA	IS	107	60 - 150		B9K0160	19-Nov-19	0.233 L	23-Nov-19 20:11	1
13C3-PFHxS	IS	96.3	60 - 130		B9K0160	19-Nov-19	0.233 L	23-Nov-19 20:11	1
13C2-6:2 FTS	IS	112	40 - 150		B9K0160	19-Nov-19	0.233 L	23-Nov-19 20:11	1
13C5-PFNA	IS	93.6	50 - 130		B9K0160	19-Nov-19	0.233 L	23-Nov-19 20:11	1
13C8-PFOSA	IS	35.1	20 - 150		B9K0160	19-Nov-19	0.233 L	23-Nov-19 20:11	1
13C2-PFOA	IS	102	60 - 130		B9K0160	19-Nov-19	0.233 L	23-Nov-19 20:11	1
13C8-PFOS	IS	118	60 - 130		B9K0160	19-Nov-19	0.233 L	23-Nov-19 20:11	1
13C2-PFDA	IS	103	60 - 130		B9K0160	19-Nov-19	0.233 L	23-Nov-19 20:11	1

**Sample ID: SW1911061135LEM** **PFAS Isotope Dilution Method**

<b>Client Data</b>				<b>Laboratory Data</b>			
Name:	Merit Laboratories, Inc.	Matrix:	Surface Water	Lab Sample:	1904042-02	Column:	BEH C18
Project:	Statewide Biosolids	Date Collected:	06-Nov-19 11:35	Date Received:	08-Nov-19 08:53		
Location:	WIXO-02n05e02-AG01						

Labeled Standards	Type	% Recovery	Limits	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
13C2-8:2 FTS	IS	117	40 - 150		B9K0160	19-Nov-19	0.233 L	23-Nov-19 20:11	1
d3-MeFOSAA	IS	92.1	50 - 150		B9K0160	19-Nov-19	0.233 L	23-Nov-19 20:11	1
13C2-PFUnA	IS	87.5	60 - 130		B9K0160	19-Nov-19	0.233 L	23-Nov-19 20:11	1
d5-EtFOSAA	IS	80.2	50 - 150		B9K0160	19-Nov-19	0.233 L	23-Nov-19 20:11	1
13C2-PFDoA	IS	93.9	30 - 130		B9K0160	19-Nov-19	0.233 L	23-Nov-19 20:11	1
13C2-PFTeDA	IS	29.6	20 - 150		B9K0160	19-Nov-19	0.233 L	23-Nov-19 20:11	1

DL - Detection Limit

LOD - Limit of Detection  
LOQ - Limit of quantitation

Results reported to the DL.

When reported, PFHxS, PFOA, PFOS, MeFOSAA and EtFOSAA include both linear and branched isomers. Only the linear isomer is reported for all other analytes.

**Sample ID: SW1911061155LEM**
**PFAS Isotope Dilution Method**

Client Data				Laboratory Data			
Name:	Merit Laboratories, Inc.	Matrix:	Surface Water	Lab Sample:	1904042-03	Column:	BEH C18
Project:	Statewide Biosolids	Date Collected:	06-Nov-19 11:55	Date Received:	08-Nov-19 08:53		
Location:	WIXO-02n05e02-AG01						

Analyte	CAS Number	Conc. (ng/L)	DL	LOD	LOQ	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
PFBA	375-22-4	5.40	1.44	2.11	4.21		B9K0160	19-Nov-19	0.237 L	23-Nov-19 20:22	1
PFPeA	2706-90-3	1.62	1.44	2.11	4.21	J	B9K0160	19-Nov-19	0.237 L	23-Nov-19 20:22	1
PFBS	375-73-5	2.00	1.44	2.11	4.21	J	B9K0160	19-Nov-19	0.237 L	23-Nov-19 20:22	1
4:2 FTS	757124-72-4	ND	1.44	2.11	4.21		B9K0160	19-Nov-19	0.237 L	23-Nov-19 20:22	1
PFHxA	307-24-4	1.45	1.44	2.11	4.21	J, Q	B9K0160	19-Nov-19	0.237 L	23-Nov-19 20:22	1
PFPeS	2706-91-4	ND	1.44	2.11	4.21		B9K0160	19-Nov-19	0.237 L	23-Nov-19 20:22	1
PFHpA	375-85-9	ND	1.44	2.11	4.21		B9K0160	19-Nov-19	0.237 L	23-Nov-19 20:22	1
PFHxS	355-46-4	ND	1.44	2.11	4.21		B9K0160	19-Nov-19	0.237 L	23-Nov-19 20:22	1
6:2 FTS	27619-97-2	ND	1.44	2.11	4.21		B9K0160	19-Nov-19	0.237 L	23-Nov-19 20:22	1
PFOA	335-67-1	ND	1.44	2.11	4.21		B9K0160	19-Nov-19	0.237 L	23-Nov-19 20:22	1
PFHpS	375-92-8	ND	1.44	2.11	4.21		B9K0160	19-Nov-19	0.237 L	23-Nov-19 20:22	1
PFNA	375-95-1	ND	1.44	2.11	4.21		B9K0160	19-Nov-19	0.237 L	23-Nov-19 20:22	1
PFOSA	754-91-6	ND	1.44	2.11	4.21		B9K0160	19-Nov-19	0.237 L	23-Nov-19 20:22	1
PFOS	1763-23-1	1.56	1.44	2.11	4.21	J, Q	B9K0160	19-Nov-19	0.237 L	23-Nov-19 20:22	1
PFDA	335-76-2	ND	1.44	2.11	4.21		B9K0160	19-Nov-19	0.237 L	23-Nov-19 20:22	1
8:2 FTS	39108-34-4	ND	1.44	2.11	4.21		B9K0160	19-Nov-19	0.237 L	23-Nov-19 20:22	1
PFNS	68259-12-1	ND	2.04	2.11	4.21		B9K0160	19-Nov-19	0.237 L	23-Nov-19 20:22	1
MeFOSAA	2355-31-9	ND	1.44	2.11	4.21		B9K0160	19-Nov-19	0.237 L	23-Nov-19 20:22	1
EtFOSAA	2991-50-6	ND	1.44	2.11	4.21		B9K0160	19-Nov-19	0.237 L	23-Nov-19 20:22	1
PFUnA	2058-94-8	ND	1.44	2.11	4.21		B9K0160	19-Nov-19	0.237 L	23-Nov-19 20:22	1
PFDS	335-77-3	ND	1.44	2.11	4.21		B9K0160	19-Nov-19	0.237 L	23-Nov-19 20:22	1
PFDoA	307-55-1	ND	1.44	2.11	4.21		B9K0160	19-Nov-19	0.237 L	23-Nov-19 20:22	1
PFTTrDA	72629-94-8	ND	1.44	2.11	4.21		B9K0160	19-Nov-19	0.237 L	23-Nov-19 20:22	1
PFTeDA	376-06-7	ND	1.44	2.11	4.21		B9K0160	19-Nov-19	0.237 L	23-Nov-19 20:22	1

Labeled Standards	Type	% Recovery	Limits	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
13C3-PFBA	IS	71.0	60 - 130		B9K0160	19-Nov-19	0.237 L	23-Nov-19 20:22	1
13C3-PFPeA	IS	94.9	60 - 150		B9K0160	19-Nov-19	0.237 L	23-Nov-19 20:22	1
13C3-PFBS	IS	101	60 - 150		B9K0160	19-Nov-19	0.237 L	23-Nov-19 20:22	1
13C2-4:2 FTS	IS	94.3	20 - 150		B9K0160	19-Nov-19	0.237 L	23-Nov-19 20:22	1
13C2-PFHxA	IS	95.0	70 - 130		B9K0160	19-Nov-19	0.237 L	23-Nov-19 20:22	1
13C4-PFHpA	IS	96.9	60 - 150		B9K0160	19-Nov-19	0.237 L	23-Nov-19 20:22	1
13C3-PFHxS	IS	100	60 - 130		B9K0160	19-Nov-19	0.237 L	23-Nov-19 20:22	1
13C2-6:2 FTS	IS	115	40 - 150		B9K0160	19-Nov-19	0.237 L	23-Nov-19 20:22	1
13C5-PFNA	IS	98.8	50 - 130		B9K0160	19-Nov-19	0.237 L	23-Nov-19 20:22	1
13C8-PFOSA	IS	40.5	20 - 150		B9K0160	19-Nov-19	0.237 L	23-Nov-19 20:22	1
13C2-PFOA	IS	93.6	60 - 130		B9K0160	19-Nov-19	0.237 L	23-Nov-19 20:22	1
13C8-PFOS	IS	101	60 - 130		B9K0160	19-Nov-19	0.237 L	23-Nov-19 20:22	1
13C2-PFDA	IS	87.1	60 - 130		B9K0160	19-Nov-19	0.237 L	23-Nov-19 20:22	1

**Sample ID: SW1911061155LEM** **PFAS Isotope Dilution Method**

Client Data				Laboratory Data			
Name:	Merit Laboratories, Inc.	Matrix:	Surface Water	Lab Sample:	1904042-03	Column:	BEH C18
Project:	Statewide Biosolids	Date Collected:	06-Nov-19 11:55	Date Received:	08-Nov-19 08:53		
Location:	WIXO-02n05e02-AG01						

Labeled Standards	Type	% Recovery	Limits	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
13C2-8:2 FTS	IS	84.3	40 - 150		B9K0160	19-Nov-19	0.237 L	23-Nov-19 20:22	1
d3-MeFOSAA	IS	91.7	50 - 150		B9K0160	19-Nov-19	0.237 L	23-Nov-19 20:22	1
13C2-PFUnA	IS	86.9	60 - 130		B9K0160	19-Nov-19	0.237 L	23-Nov-19 20:22	1
d5-EtFOSAA	IS	89.9	50 - 150		B9K0160	19-Nov-19	0.237 L	23-Nov-19 20:22	1
13C2-PFDoA	IS	73.1	30 - 130		B9K0160	19-Nov-19	0.237 L	23-Nov-19 20:22	1
13C2-PFTeDA	IS	55.9	20 - 150		B9K0160	19-Nov-19	0.237 L	23-Nov-19 20:22	1

DL - Detection Limit

LOD - Limit of Detection  
LOQ - Limit of quantitation

Results reported to the DL.

When reported, PFHxS, PFOA, PFOS, MeFOSAA and EtFOSAA include both linear and branched isomers. Only the linear isomer is reported for all other analytes.

**Sample ID: SW1911061235LEM**
**PFAS Isotope Dilution Method**

Client Data				Laboratory Data			
Name:	Merit Laboratories, Inc.	Matrix:	Surface Water	Lab Sample:	1904042-04	Column:	BEH C18
Project:	Statewide Biosolids	Date Collected:	06-Nov-19 12:35	Date Received:	08-Nov-19 08:53		
Location:	WIXO-02n05e02-BC01						

Analyte	CAS Number	Conc. (ng/L)	DL	LOD	LOQ	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
PFBA	375-22-4	13.0	1.47	2.16	4.31		B9K0160	19-Nov-19	0.232 L	23-Nov-19 20:32	1
PFPeA	2706-90-3	18.2	1.47	2.16	4.31		B9K0160	19-Nov-19	0.232 L	23-Nov-19 20:32	1
PFBS	375-73-5	99.1	1.47	2.16	4.31		B9K0160	19-Nov-19	0.232 L	23-Nov-19 20:32	1
4:2 FTS	757124-72-4	ND	1.47	2.16	4.31		B9K0160	19-Nov-19	0.232 L	23-Nov-19 20:32	1
PFHxA	307-24-4	13.8	1.47	2.16	4.31		B9K0160	19-Nov-19	0.232 L	23-Nov-19 20:32	1
PFPeS	2706-91-4	ND	1.47	2.16	4.31		B9K0160	19-Nov-19	0.232 L	23-Nov-19 20:32	1
PFHpA	375-85-9	6.10	1.47	2.16	4.31		B9K0160	19-Nov-19	0.232 L	23-Nov-19 20:32	1
PFHxS	355-46-4	1.70	1.47	2.16	4.31	J	B9K0160	19-Nov-19	0.232 L	23-Nov-19 20:32	1
6:2 FTS	27619-97-2	ND	1.47	2.16	4.31		B9K0160	19-Nov-19	0.232 L	23-Nov-19 20:32	1
PFOA	335-67-1	13.9	1.47	2.16	4.31		B9K0160	19-Nov-19	0.232 L	23-Nov-19 20:32	1
PFHpS	375-92-8	ND	1.47	2.16	4.31		B9K0160	19-Nov-19	0.232 L	23-Nov-19 20:32	1
PFNA	375-95-1	ND	1.47	2.16	4.31		B9K0160	19-Nov-19	0.232 L	23-Nov-19 20:32	1
PFOSA	754-91-6	ND	1.47	2.16	4.31		B9K0160	19-Nov-19	0.232 L	23-Nov-19 20:32	1
PFOS	1763-23-1	60.4	1.47	2.16	4.31	Q	B9K0160	19-Nov-19	0.232 L	23-Nov-19 20:32	1
PFDA	335-76-2	ND	1.47	2.16	4.31		B9K0160	19-Nov-19	0.232 L	23-Nov-19 20:32	1
8:2 FTS	39108-34-4	ND	1.47	2.16	4.31		B9K0160	19-Nov-19	0.232 L	23-Nov-19 20:32	1
PFNS	68259-12-1	ND	2.08	2.16	4.31		B9K0160	19-Nov-19	0.232 L	23-Nov-19 20:32	1
MeFOSAA	2355-31-9	ND	1.47	2.16	4.31		B9K0160	19-Nov-19	0.232 L	23-Nov-19 20:32	1
EtFOSAA	2991-50-6	ND	1.47	2.16	4.31		B9K0160	19-Nov-19	0.232 L	23-Nov-19 20:32	1
PFUnA	2058-94-8	ND	1.47	2.16	4.31		B9K0160	19-Nov-19	0.232 L	23-Nov-19 20:32	1
PFDS	335-77-3	ND	1.47	2.16	4.31		B9K0160	19-Nov-19	0.232 L	23-Nov-19 20:32	1
PFDoA	307-55-1	ND	1.47	2.16	4.31		B9K0160	19-Nov-19	0.232 L	23-Nov-19 20:32	1
PFTTrDA	72629-94-8	ND	1.47	2.16	4.31		B9K0160	19-Nov-19	0.232 L	23-Nov-19 20:32	1
PFTeDA	376-06-7	ND	1.47	2.16	4.31		B9K0160	19-Nov-19	0.232 L	23-Nov-19 20:32	1

Labeled Standards	Type	% Recovery	Limits	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
13C3-PFBA	IS	72.9	60 - 130		B9K0160	19-Nov-19	0.232 L	23-Nov-19 20:32	1
13C3-PFPeA	IS	101	60 - 150		B9K0160	19-Nov-19	0.232 L	23-Nov-19 20:32	1
13C3-PFBS	IS	93.2	60 - 150		B9K0160	19-Nov-19	0.232 L	23-Nov-19 20:32	1
13C2-4:2 FTS	IS	82.9	20 - 150		B9K0160	19-Nov-19	0.232 L	23-Nov-19 20:32	1
13C2-PFHxA	IS	96.6	70 - 130		B9K0160	19-Nov-19	0.232 L	23-Nov-19 20:32	1
13C4-PFHpA	IS	98.0	60 - 150		B9K0160	19-Nov-19	0.232 L	23-Nov-19 20:32	1
13C3-PFHxS	IS	91.8	60 - 130		B9K0160	19-Nov-19	0.232 L	23-Nov-19 20:32	1
13C2-6:2 FTS	IS	121	40 - 150		B9K0160	19-Nov-19	0.232 L	23-Nov-19 20:32	1
13C5-PFNA	IS	93.9	50 - 130		B9K0160	19-Nov-19	0.232 L	23-Nov-19 20:32	1
13C8-PFOSA	IS	61.0	20 - 150		B9K0160	19-Nov-19	0.232 L	23-Nov-19 20:32	1
13C2-PFOA	IS	96.8	60 - 130		B9K0160	19-Nov-19	0.232 L	23-Nov-19 20:32	1
13C8-PFOS	IS	121	60 - 130		B9K0160	19-Nov-19	0.232 L	23-Nov-19 20:32	1
13C2-PFDA	IS	85.5	60 - 130		B9K0160	19-Nov-19	0.232 L	23-Nov-19 20:32	1

**Sample ID: SW1911061235LEM** **PFAS Isotope Dilution Method**

<b>Client Data</b>				<b>Laboratory Data</b>			
Name:	Merit Laboratories, Inc.	Matrix:	Surface Water	Lab Sample:	1904042-04	Column:	BEH C18
Project:	Statewide Biosolids	Date Collected:	06-Nov-19 12:35	Date Received:	08-Nov-19 08:53		
Location:	WIXO-02n05e02-BC01						

Labeled Standards	Type	% Recovery	Limits	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
13C2-8:2 FTS	IS	83.4	40 - 150		B9K0160	19-Nov-19	0.232 L	23-Nov-19 20:32	1
d3-MeFOSAA	IS	92.0	50 - 150		B9K0160	19-Nov-19	0.232 L	23-Nov-19 20:32	1
13C2-PFUnA	IS	85.6	60 - 130		B9K0160	19-Nov-19	0.232 L	23-Nov-19 20:32	1
d5-EtFOSAA	IS	87.1	50 - 150		B9K0160	19-Nov-19	0.232 L	23-Nov-19 20:32	1
13C2-PFDoA	IS	65.0	30 - 130		B9K0160	19-Nov-19	0.232 L	23-Nov-19 20:32	1
13C2-PFTeDA	IS	31.3	20 - 150		B9K0160	19-Nov-19	0.232 L	23-Nov-19 20:32	1

DL - Detection Limit

LOD - Limit of Detection  
LOQ - Limit of quantitation

Results reported to the DL.

When reported, PFHxS, PFOA, PFOS, MeFOSAA and EtFOSAA include both linear and branched isomers. Only the linear isomer is reported for all other analytes.

**Sample ID: SW1911061245LEM**
**PFAS Isotope Dilution Method**

Client Data				Laboratory Data			
Name:	Merit Laboratories, Inc.	Matrix:	Surface Water	Lab Sample:	1904042-05	Column:	BEH C18
Project:	Statewide Biosolids	Date Collected:	06-Nov-19 12:45	Date Received:	08-Nov-19 08:53		
Location:	WIXO-02n05e02-BC01						

Analyte	CAS Number	Conc. (ng/L)	DL	LOD	LOQ	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
PFBA	375-22-4	8.62	1.48	2.16	4.33		B9K0160	19-Nov-19	0.231 L	23-Nov-19 20:43	1
PFPeA	2706-90-3	11.7	1.48	2.16	4.33		B9K0160	19-Nov-19	0.231 L	23-Nov-19 20:43	1
PFBS	375-73-5	50.1	1.48	2.16	4.33		B9K0160	19-Nov-19	0.231 L	23-Nov-19 20:43	1
4:2 FTS	757124-72-4	ND	1.48	2.16	4.33		B9K0160	19-Nov-19	0.231 L	23-Nov-19 20:43	1
PFHxA	307-24-4	10.6	1.48	2.16	4.33		B9K0160	19-Nov-19	0.231 L	23-Nov-19 20:43	1
PFPeS	2706-91-4	ND	1.48	2.16	4.33		B9K0160	19-Nov-19	0.231 L	23-Nov-19 20:43	1
PFHpA	375-85-9	4.56	1.48	2.16	4.33		B9K0160	19-Nov-19	0.231 L	23-Nov-19 20:43	1
PFHxS	355-46-4	1.91	1.48	2.16	4.33	J, Q	B9K0160	19-Nov-19	0.231 L	23-Nov-19 20:43	1
6:2 FTS	27619-97-2	ND	1.48	2.16	4.33		B9K0160	19-Nov-19	0.231 L	23-Nov-19 20:43	1
PFOA	335-67-1	13.9	1.48	2.16	4.33		B9K0160	19-Nov-19	0.231 L	23-Nov-19 20:43	1
PFHpS	375-92-8	ND	1.48	2.16	4.33		B9K0160	19-Nov-19	0.231 L	23-Nov-19 20:43	1
PFNA	375-95-1	2.03	1.48	2.16	4.33	J, Q	B9K0160	19-Nov-19	0.231 L	23-Nov-19 20:43	1
PFOSA	754-91-6	ND	1.48	2.16	4.33		B9K0160	19-Nov-19	0.231 L	23-Nov-19 20:43	1
PFOS	1763-23-1	191	1.48	2.16	4.33		B9K0160	19-Nov-19	0.231 L	23-Nov-19 20:43	1
PFDA	335-76-2	2.25	1.48	2.16	4.33	J, Q	B9K0160	19-Nov-19	0.231 L	23-Nov-19 20:43	1
8:2 FTS	39108-34-4	ND	1.48	2.16	4.33		B9K0160	19-Nov-19	0.231 L	23-Nov-19 20:43	1
PFNS	68259-12-1	ND	2.10	2.16	4.33		B9K0160	19-Nov-19	0.231 L	23-Nov-19 20:43	1
MeFOSAA	2355-31-9	ND	1.48	2.16	4.33		B9K0160	19-Nov-19	0.231 L	23-Nov-19 20:43	1
EtFOSAA	2991-50-6	ND	1.48	2.16	4.33		B9K0160	19-Nov-19	0.231 L	23-Nov-19 20:43	1
PFUnA	2058-94-8	ND	1.48	2.16	4.33		B9K0160	19-Nov-19	0.231 L	23-Nov-19 20:43	1
PFDS	335-77-3	ND	1.48	2.16	4.33		B9K0160	19-Nov-19	0.231 L	23-Nov-19 20:43	1
PFDoA	307-55-1	ND	1.48	2.16	4.33		B9K0160	19-Nov-19	0.231 L	23-Nov-19 20:43	1
PFTTrDA	72629-94-8	ND	1.48	2.16	4.33		B9K0160	19-Nov-19	0.231 L	23-Nov-19 20:43	1
PFTeDA	376-06-7	ND	1.48	2.16	4.33		B9K0160	19-Nov-19	0.231 L	23-Nov-19 20:43	1

Labeled Standards	Type	% Recovery	Limits	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
13C3-PFBA	IS	69.0	60 - 130		B9K0160	19-Nov-19	0.231 L	23-Nov-19 20:43	1
13C3-PFPeA	IS	93.5	60 - 150		B9K0160	19-Nov-19	0.231 L	23-Nov-19 20:43	1
13C3-PFBS	IS	107	60 - 150		B9K0160	19-Nov-19	0.231 L	23-Nov-19 20:43	1
13C2-4:2 FTS	IS	94.7	20 - 150		B9K0160	19-Nov-19	0.231 L	23-Nov-19 20:43	1
13C2-PFHxA	IS	95.1	70 - 130		B9K0160	19-Nov-19	0.231 L	23-Nov-19 20:43	1
13C4-PFHpA	IS	96.9	60 - 150		B9K0160	19-Nov-19	0.231 L	23-Nov-19 20:43	1
13C3-PFHxS	IS	100	60 - 130		B9K0160	19-Nov-19	0.231 L	23-Nov-19 20:43	1
13C2-6:2 FTS	IS	106	40 - 150		B9K0160	19-Nov-19	0.231 L	23-Nov-19 20:43	1
13C5-PFNA	IS	86.7	50 - 130		B9K0160	19-Nov-19	0.231 L	23-Nov-19 20:43	1
13C8-PFOSA	IS	32.8	20 - 150		B9K0160	19-Nov-19	0.231 L	23-Nov-19 20:43	1
13C2-PFOA	IS	88.6	60 - 130		B9K0160	19-Nov-19	0.231 L	23-Nov-19 20:43	1
13C8-PFOS	IS	98.8	60 - 130		B9K0160	19-Nov-19	0.231 L	23-Nov-19 20:43	1
13C2-PFDA	IS	74.5	60 - 130		B9K0160	19-Nov-19	0.231 L	23-Nov-19 20:43	1



**Sample ID: SW1911061245LEM** **PFAS Isotope Dilution Method**

Client Data				Laboratory Data			
Name:	Merit Laboratories, Inc.	Matrix:	Surface Water	Lab Sample:	1904042-05	Column:	BEH C18
Project:	Statewide Biosolids	Date Collected:	06-Nov-19 12:45	Date Received:	08-Nov-19 08:53		
Location:	WIXO-02n05e02-BC01						

Labeled Standards	Type	% Recovery	Limits	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
13C2-8:2 FTS	IS	99.7	40 - 150		B9K0160	19-Nov-19	0.231 L	23-Nov-19 20:43	1
d3-MeFOSAA	IS	60.8	50 - 150		B9K0160	19-Nov-19	0.231 L	23-Nov-19 20:43	1
13C2-PFUnA	IS	61.8	60 - 130		B9K0160	19-Nov-19	0.231 L	23-Nov-19 20:43	1
d5-EtFOSAA	IS	60.4	50 - 150		B9K0160	19-Nov-19	0.231 L	23-Nov-19 20:43	1
13C2-PFDoA	IS	36.0	30 - 130		B9K0160	19-Nov-19	0.231 L	23-Nov-19 20:43	1
13C2-PFTeDA	IS	15.9	20 - 150	H	B9K0160	19-Nov-19	0.231 L	23-Nov-19 20:43	1

DL - Detection Limit

LOD - Limit of Detection  
LOQ - Limit of quantitation

Results reported to the DL.

When reported, PFHxS, PFOA, PFOS, MeFOSAA and EtFOSAA include both linear and branched isomers. Only the linear isomer is reported for all other analytes.

## DATA QUALIFIERS & ABBREVIATIONS

B	This compound was also detected in the method blank
Conc.	Concentration
CRS	Cleanup Recovery Standard
D	Dilution
DL	Detection limit
E	The associated compound concentration exceeded the calibration range of the instrument
H	Recovery and/or RPD was outside laboratory acceptance limits
I	Chemical Interference
IS	Internal Standard
J	The amount detected is below the Reporting Limit/LOQ
LOD	Limit of Detection
LOQ	Limit of Quantitation
M	Estimated Maximum Possible Concentration (CA Region 2 projects only)
NA	Not applicable
ND	Not Detected
OPR	Ongoing Precision and Recovery sample
P	The reported concentration may include contribution from chlorinated diphenyl ether(s).
Q	The ion transition ratio is outside of the acceptance criteria.
RL	Reporting Limit
TEQ	Toxic Equivalency
U	Not Detected (specific projects only)
*	See Cover Letter

Unless otherwise noted, solid sample results are reported in dry weight. Tissue samples are reported in wet weight.

### Vista Analytical Laboratory Certifications

Accrediting Authority	Certificate Number
Alaska Department of Environmental Conservation	17-013
Arkansas Department of Environmental Quality	19-013-0
California Department of Health – ELAP	2892
DoD ELAP - A2LA Accredited - ISO/IEC 17025:2005	3091.01
Florida Department of Health	E87777-23
Hawaii Department of Health	N/A
Louisiana Department of Environmental Quality	01977
Maine Department of Health	2018017
Massachusetts Department of Environmental Protection	N/A
Michigan Department of Environmental Quality	9932
Minnesota Department of Health	1521520
New Hampshire Environmental Accreditation Program	207718-B
New Jersey Department of Environmental Protection	190001
New York Department of Health	11411
Oregon Laboratory Accreditation Program	4042-010
Pennsylvania Department of Environmental Protection	016
Texas Commission on Environmental Quality	T104704189-19-10
Vermont Department of Health	VT-4042
Virginia Department of General Services	10272
Washington Department of Ecology	C584-19
Wisconsin Department of Natural Resources	998036160

*Current certificates and lists of licensed parameters are located in the Quality Assurance office and are available upon request.*

## NELAP Accredited Test Methods

MATRIX: Air	
Description of Test	Method
Determination of Polychlorinated p-Dioxins & Polychlorinated Dibenzofurans	EPA 23
Determination of Polychlorinated p-Dioxins & Polychlorinated Dibenzofurans	EPA TO-9A

MATRIX: Biological Tissue	
Description of Test	Method
Tetra- through Octa-Chlorinated Dioxins and Furans by Isotope Dilution GC/HRMS	EPA 1613B
Brominated Diphenyl Ethers by HRGC/HRMS	EPA 1614A
Chlorinated Biphenyl Congeners in Water, Soil, Sediment, and Tissue by GC/HRMS	EPA 1668A/C
Pesticides in Water, Soil, Sediment, Biosolids, and Tissue by HRGC/HRMS	EPA 1699
Perfluorinated Alkyl Acids in Drinking Water by SPE and LC/MS/MS	EPA 537
Polychlorinated Dibenzo-p-Dioxins and Polychlorinated Dibenzofurans by GC/HRMS	EPA 8280A/B
Polychlorinated Dibenzodioxins (PCDDs) and Polychlorinated Dibenzofurans (PCDFs) by GC/HRMS	EPA 8290/8290A

MATRIX: Drinking Water	
Description of Test	Method
2,3,7,8-Tetrachlorodibenzo- p-dioxin (2,3,7,8-TCDD) GC/HRMS	EPA 1613/1613B
1,4-Dioxane (1,4-Diethyleneoxide) analysis by GC/HRMS	EPA 522
Perfluorinated Alkyl Acids in Drinking Water by SPE and LC/MS/MS	EPA 537
Perfluorinated Alkyl Acids in Drinking Water by SPE and LC/MS/MS	ISO 25101 2009

MATRIX: Non-Potable Water	
Description of Test	Method
Tetra- through Octa-Chlorinated Dioxins and Furans by Isotope Dilution GC/HRMS	EPA 1613B
Brominated Diphenyl Ethers by HRGC/HRMS	EPA 1614A
Chlorinated Biphenyl Congeners in Water, Soil, Sediment, and Tissue by GC/HRMS	EPA 1668A/C
Pesticides in Water, Soil, Sediment, Biosolids, and Tissue by HRGC/HRMS	EPA 1699
Perfluorinated Alkyl Acids in Drinking Water by SPE and LC/MS/MS	EPA 537
Dioxin by GC/HRMS	EPA 613
Polychlorinated Dibenzo-p-Dioxins and Polychlorinated Dibenzofurans by GC/HRMS	EPA 8280A/B
Polychlorinated Dibenzodioxins (PCDDs) and Polychlorinated Dibenzofurans (PCDFs) by GC/HRMS	EPA 8290/8290A

MATRIX: Solids	
Description of Test	Method
Tetra-Octa Chlorinated Dioxins and Furans by Isotope Dilution GC/HRMS	EPA 1613
Tetra- through Octa-Chlorinated Dioxins and Furans by Isotope Dilution GC/HRMS	EPA 1613B
Brominated Diphenyl Ethers by HRGC/HRMS	EPA 1614A
Chlorinated Biphenyl Congeners in Water, Soil, Sediment, and Tissue by GC/HRMS	EPA 1668A/C
Pesticides in Water, Soil, Sediment, Biosolids, and Tissue by HRGC/HRMS	EPA 1699
Perfluorinated Alkyl Acids in Drinking Water by SPE and LC/MS/MS	EPA 537
Polychlorinated Dibenzo-p-Dioxins and Polychlorinated Dibenzofurans by GC/HRMS	EPA 8280A/B
Polychlorinated Dibenzodioxins (PCDDs) and Polychlorinated Dibenzofurans (PCDFs) by GC/HRMS	EPA 8290/8290A



# CHAIN OF CUSTODY

**For Laboratory Use Only**  
 Work Order #: 1904042 Temp: 3.0 °C  
 Storage ID: R-13, WR-2 Storage Secured: Yes  No

Project ID: Statewide Biosolids PO#: 60588767.01 Sampler: Lauren McNeely  
 (name)

TAT Standard:  21 days  
 (check one): Rush (surcharge may apply)  
 14 days  7 days Specify: \_\_\_\_\_

Invoice to: Name Stephanie Kammer Company EGLE Address 525 W. Allegan Street City Lansing State MI Ph# 517-897-1597 Fax# 517-241-3571

Relinquished by (printed name and signature) Lauren McNeely Date 11/7/2019 Time 1815 Received by (printed name and signature) \* RECEIVED REVISED COC EMAIL 11-15-19 KKH Date \_\_\_\_\_ Time \_\_\_\_\_

Relinquished by (printed name and signature) \_\_\_\_\_ Date \_\_\_\_\_ Time \_\_\_\_\_ Received by (printed name and signature) \_\_\_\_\_ Date \_\_\_\_\_ Time \_\_\_\_\_  
- SEE ORIGINAL COC FOR SIGNATURE - 11-16-19

Sample ID	Date	Time	Location/Sample Description	Container(s)			Add Analysis(es) Requested				PFAS Isotope Dilution	USEPA Method 837	Comments	
				Quantity	Type	Matrix	List of 21	List of 21 w/Isomers	List of 24	List of 24 w/Isomers				List of 28
SW1911061100LEM	11/6/19	1100	WIXO-02n05e02-AG01	2	P	SW			X					Pond 1 in Cattle Pasture
SW1911061135LEM	11/6/19	1135	WIXO-02n05e02-AG01	2	P	SW			X					Pond 2 in Sorghum field east of cattle pasture
SW1911061155LEM	11/6/19	1155	WIXO-02n05e02-AG01	2	P	SW			X					Large Pond at AG01 - Pond 3
SW1911061235LEM	11/6/19	1235	WIXO-02n05e02-BC01	2	P	SW			X					Larger Pond at 02n05e02-BC01
SW1911061245LEM	11/6/19	1245	WIXO-02n05e02-BC01	2	P	SW			X					Perch water smaller pond at 02n05e02-BC01

Special Instructions/Comments: Send Results and Acknowledgements to the list provided

**SEND DOCUMENTATION AND RESULTS TO:**

Name: Stephanie Kammer  
 Company: EGLE  
 Address: 525 W. Allegan Street, Constitution Hall, 1st South West  
 City: Lansing State: MI Zip: 30242  
 Phone: 517-897-1597 Fax: 517-241-3571  
 Email: dorin.bogdan@aecom.com

Container Types: P= HDPE, PJ= HDPE Jar      Bottle Preservation Type: T = Thiosulfate,      Matrix Types: AQ = Aqueous, DW = Drinking Water, EF = Effluent, PP = Pulp/Paper, SD = Sediment,  
 O = Other: \_\_\_\_\_      TZ = Trizma: \_\_\_\_\_      SL = Sludge, BS=Biosolids, SO = Soil, WW = Wastewater, B = Blood/Serum, O = Other: \_\_\_\_\_



# CHAIN OF CUSTODY

ID: LR - 537COC

1 of 3  
**1904042**

**For Laboratory Use Only**  
Work Order #: **1903964** 11-16-19 Temp: **3.0** °C  
Storage ID: **P-13, WR-2** Storage Secured: Yes  No

Project ID: Biosolids PO#: \_\_\_\_\_ Sampler: Lauren McNeely  
(name)

TAT (check one): Standard:  21 days  
Rush (surcharge may apply):  14 days  7 days Specify: \_\_\_\_\_  
State \_\_\_\_\_ Ph# \_\_\_\_\_ Fax# \_\_\_\_\_

Invoice to: Name Stephanie Kammer Company EG&G Address \_\_\_\_\_ City \_\_\_\_\_ State \_\_\_\_\_ Ph# \_\_\_\_\_ Fax# \_\_\_\_\_

Relinquished by (printed name and signature) Lauren McNeely Date 11/7/19 Time 1815 Received by (printed name and signature) Hayden Canai Date 11/08/19 Time 08:53  
Relinquished by (printed name and signature) \_\_\_\_\_ Date \_\_\_\_\_ Time \_\_\_\_\_ Received by (printed name and signature) \_\_\_\_\_ Date \_\_\_\_\_ Time \_\_\_\_\_  
*- SEE REVISED COCS - FE 11-16-19*

SHIP TO: Vista Analytical Laboratory  
1104 Windfield Way  
El Dorado Hills, CA 95762  
(916) 673-1520 \* Fax (916) 673-0106

Method of Shipment: \_\_\_\_\_

Add Analysis(es) Requested

ATTN: \_\_\_\_\_

Tracking No.: \_\_\_\_\_

Container(s)

Quantity	Type	Matrix	Add Analysis(es) Requested				Full List or Other: Please List Below	Mod. EPA Method 537			Comments
			PFOA/PFOs	LCMR3 PFAS List 6	537 List: 14	EPA Method 537 (DW only)		PFOA/PFOs	LCMR3 PFAS List 6	PFAS List: 14	

Sample ID	Date	Time	Location/Sample Description	Quantity	Type	Matrix	PFOA/PFOs	LCMR3 PFAS List 6	537 List: 14	Full List or Other: Please List Below	PFOA/PFOs	LCMR3 PFAS List 6	PFAS List: 14	Comments
✓ SB1911071210 LEM	11/7/19	1210	DV2-SOILB	1	PJ	SO				X				
✓ SB1911071215 LEM	11/7/19	1215	DV2-SOILC	1	PJ	SO				X				Incremental Sampling Prep
✓ SB1911071205 LEM	11/7/19	1205	DV2-SOILA	1	PJ	SO				X				
✓ SB1911071355 LEM	11/7/19	1355	DV1-SOILC	1	PJ	SO				X				Incremental Sampling Prep
✓ SB1911071350 LEM	11/7/19	1350	DV1-SOILB	1	PJ	SO				X				
✓ SB1911071345 LEM	11/7/19	1345	DV1-SOILA	1	PJ	SO				X				
● SB1911071550 LEM	11/7/19	1550	SORG_SOIL2	1	PJ	SO				X				
● SB1911071515 LEM	11/7/19	1515	SORG_SOIL1	1	PJ	SO				X				
* WR1911060935 LEM	11/6/19	0935	6875 McClements	2	P	DW							X	
* WT1911061000 LEM	11/6/19	1000	LIVESTOCK WELL	2	P	DW							X	

Special Instructions/Comments:

~ WO # = 1904043  
**Δ WO # = 1904042**  
 \* WO # = 1903965  
 ● WO # = 1903964  
 @ WO # = 1903960

SEND DOCUMENTATION AND RESULTS TO:

Name: \_\_\_\_\_  
 Company: \_\_\_\_\_  
 Address: \_\_\_\_\_  
 City: \_\_\_\_\_ State: \_\_\_\_\_ Zip: \_\_\_\_\_  
 Phone: \_\_\_\_\_ Fax: \_\_\_\_\_  
 Email: \_\_\_\_\_

Container Types: P = HDPE, PJ = HDPE Jar  
 O = Other: \_\_\_\_\_

Bottle Preservation Type: T = Thiosulfate,  
 TZ = Trizma: \_\_\_\_\_

Matrix Types: AQ = Aqueous, DW = Drinking Water, EF = Effluent, PP = Pulp/Paper, SD = Sediment,  
 SL = Sludge, SO = Soil, WW = Wastewater, B = Blood/Serum, O = Other: \_\_\_\_\_



# CHAIN OF CUSTODY

ID: LR - 537COC

2 of 3  
1904042

**For Laboratory Use Only**  
 Work Order #: 1903964 11-16-19 Temp: 3.0 °C  
 Storage ID: R-13, WR-2 Storage Secured: Yes  No

Project ID: Biosolids PO#: \_\_\_\_\_ Sampler: Lauren McNeely (name)

TAT (check one):  21 days  
 14 days  7 days Specify: \_\_\_\_\_  
 Standard: \_\_\_\_\_  
 Rush (surcharge may apply)  
 State \_\_\_\_\_ Ph# \_\_\_\_\_ Fax# \_\_\_\_\_

Invoice to: Name Stephanie Kammer Company EGLE Address \_\_\_\_\_ City \_\_\_\_\_

Relinquished by (printed name and signature) Lauren McNeely Date 11/7/19 Time 1815  
 Received by (printed name and signature) Hagden Granas Date 11/08/19 Time 08:53  
 Relinquished by (printed name and signature) \_\_\_\_\_ Date \_\_\_\_\_ Time \_\_\_\_\_  
 Received by (printed name and signature) \_\_\_\_\_ Date \_\_\_\_\_ Time \_\_\_\_\_  
- SEE REVISED COC'S - KEE 11-16-19

SHIP TO: Vista Analytical Laboratory  
 1104 Windfield Way  
 El Dorado Hills, CA 95762  
 (916) 673-1520 \* Fax (916) 673-0106

Method of Shipment: \_\_\_\_\_  
 Tracking No.: \_\_\_\_\_

ATTN: \_\_\_\_\_

Add Analysis(es) Requested: \_\_\_\_\_  
 Container(s): \_\_\_\_\_  
 Mod. EPA Method 537  
 EPA Method 537(DW only)

Sample ID	Date	Time	Location/Sample Description	Quantity	Type	Matrix	PFDA/PFS	UCMR3 PFAS List 6	337 List 14	Full List of 260-227 Other, Please List Below	PFDA/PFS	UCMR3 PFAS List 6	PFAS List 14	Comments
* WT1911071000LEM	11/7/19	1000	6795 McClements	2	P	DW								
* WT1911061255LEM	11/6/19	1255	65 S. Kellogg	2	P	DW								
* WT1911071015LEM	11/7/19	1015	7342 Golf Club	2	P	DW								
Δ SW1911061100LEM	11/6/19	1100	POND 1	2	P	SW			X					
Δ SW1911061135LEM	11/6/19	1135	POND 2	2	P	SW			X					
Δ SW1911061155LEM	11/6/19	1155	POND 3	2	P	SW			X					
Δ SW1911061235LEM	11/6/19	1235	POND 4	2	P	SW			X					
Δ SW1911061245LEM	11/6/19	1245	POND 5	2	P	SW			X					
@ EB1911071430LEM	11/7/19	1430	SW Sampler	2	P	AQ			X					
@ EB1911071435LEM	11/7/19	1435	Soil Sampler	2	P	AQ			X					

Special Instructions/Comments:  
 ~ WO # = 1904043  
 Δ WO # = 1904042  
 \* WO # = 1903965  
 ● WO # = 1903964  
 @ WO # = 1903960

**SEND DOCUMENTATION AND RESULTS TO:**

Name: \_\_\_\_\_  
 Company: \_\_\_\_\_  
 Address: \_\_\_\_\_  
 City: \_\_\_\_\_ State: \_\_\_\_\_ Zip: \_\_\_\_\_  
 Phone: \_\_\_\_\_ Fax: \_\_\_\_\_  
 Email: \_\_\_\_\_

Container Types: P= HDPE, PJ= HDPE Jar  
 Bottle Preservation Type: T = Thiosulfate, TZ = Trizma:  
 Matrix Types: AQ = Aqueous, DW = Drinking Water, EF = Effluent, PP = Pulp/Paper, SD = Sediment, SL = Sludge, SO = Soil, WW = Wastewater, B = Blood/Serum, O = Other:





# CHAIN OF CUSTODY

ID: LR - 537COC

3 of 3  
1904042

**For Laboratory Use Only**

Work Order #: 1903964 <sup>11-16-19</sup> Temp: 30 °C

Storage ID: 2-B, WR-2 Storage Secured: Yes  No

Project ID: Biosolids PO#: \_\_\_\_\_ Sampler: Lauren McNeely  
(name)

TAT Standard:  21 days  
(check one): Rush (surcharge may apply)  
 14 days  7 days Specify: \_\_\_\_\_

Invoice to: Name \_\_\_\_\_ Company \_\_\_\_\_ Address \_\_\_\_\_ City \_\_\_\_\_ State \_\_\_\_\_ Ph# \_\_\_\_\_ Fax# \_\_\_\_\_

Stephanie Kammer EGL

Relinquished by (printed name and signature) \_\_\_\_\_ Date \_\_\_\_\_ Time \_\_\_\_\_ Received by (printed name and signature) \_\_\_\_\_ Date \_\_\_\_\_ Time \_\_\_\_\_

Lauren McNeely [Signature] 11/7/19 1815 Hayden Grant [Signature] 11/08/19 08:53

- SEE REVISED COCS - 11-16-19

SHIP TO: Vista Analytical Laboratory  
1104 Windfield Way  
El Dorado Hills, CA 95762  
(916) 673-1520 \* Fax (916) 673-0106

Method of Shipment: \_\_\_\_\_

ATTN: \_\_\_\_\_ Tracking No.: \_\_\_\_\_

Sample ID	Date	Time	Location/Sample Description	Add Analysis(es) Requested										Comments									
				Quantity	Type	Matrix	PFOM/PFOA	UCMR3 PFAS List 6	537 List 14	Full List of 268 PFAS Other: Please List Below	Mod. EPA Method 537	PFOM/PFOA	UCMR3 PFAS List 6		PFAS List 14	EPA Method 537 (DW only)							
<u>EB911071555LEM</u>	<u>11/7/19</u>	<u>1555</u>	<u>Garden Shears</u>	<u>2</u>	<u>P</u>	<u>AQ</u>						<u>X</u>											

Special Instructions/Comments:

~ WO # : 1904043

Δ WO # : 1904042

\* WO # : 1903965

● WO # : 1903964

@ WO # : 1903960

**SEND DOCUMENTATION AND RESULTS TO:**

Name: \_\_\_\_\_  
Company: \_\_\_\_\_  
Address: \_\_\_\_\_  
City: \_\_\_\_\_ State: \_\_\_\_\_ Zip: \_\_\_\_\_  
Phone: \_\_\_\_\_ Fax: \_\_\_\_\_  
Email: \_\_\_\_\_

Container Types: P= HDPE, PJ= HDPE Jar      Bottle Preservation Type: T = Thiosulfate, TZ = Trizma: \_\_\_\_\_  
O = Other: \_\_\_\_\_      Matrix Types: AQ = Aqueous, DW = Drinking Water, EF = Effluent, PP = Pulp/Paper, SD = Sediment, SL = Sludge, SO = Soil, WW = Wastewater, B = Blood/Serum, O = Other: \_\_\_\_\_



# Sample Log-In Checklist

1904042  
~~1903965~~

Page # 1 of 1

Vista Work Order #: KE 11-16-19 TAT Std

Samples Arrival:	Date/Time		Initials:		Location: <u>WR-2</u>		
	<u>11/08/19 08:53</u>		<u>HOG</u>		Shelf/Rack: <u>NA</u>		
Delivered By:	<input checked="" type="radio"/> FedEx	<input type="radio"/> UPS	<input type="radio"/> On Trac	<input type="radio"/> GSO	<input type="radio"/> DHL	<input type="radio"/> Hand Delivered	<input type="radio"/> Other
Preservation:	<input checked="" type="radio"/> Ice		<input type="radio"/> Blue Ice		<input type="radio"/> Dry Ice		<input type="radio"/> None
Temp °C: <u>3.0</u>	<u>(uncorrected)</u>		Probe used: Y <input checked="" type="radio"/> N			Thermometer ID: <u>IR-3</u>	
Temp °C: <u>3.0</u>	<u>(corrected)</u>						

	YES	NO	NA
Shipping Container(s) Intact?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Shipping Custody Seals Intact?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
Airbill <u>      </u> Trk # <u>7808 1634 0970</u>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Shipping Documentation Present?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Shipping Container	<input type="checkbox"/> Vista	<input checked="" type="checkbox"/> Client	<input type="checkbox"/> Retain
	<input type="checkbox"/>	<input checked="" type="checkbox"/> Return	<input type="checkbox"/> Dispose
Chain of Custody / Sample Documentation Present?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Chain of Custody / Sample Documentation Complete?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Holding Time Acceptable?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Logged In:	Date/Time <u>11/16/19 1737</u>	Initials: <u>KE</u>	Location: <u>R-13</u>	<u>WR-2</u>
	<u>11/09/19 1631</u> <u>KE 11-16-19</u>		Shelf/Rack: <u>A4</u>	<u>A4</u> <u>F5</u> <u>SD</u> <u>A5</u>
COC Anomaly/Sample Acceptance Form completed?			<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>

Comments: \* REVISED 11-16-19 KE PER EMAIL REQUEST

# CoC/Label Reconciliation Report WO# 1904042

LabNumber	CoC Sample ID		SampleAlias	Sample Date/Time		Container	BaseMatrix	Sample Comments
1904042-01	A SW1911061100LEM	<input checked="" type="checkbox"/>	WIXO-02n05e02-AG01	06-Nov-19 11:00	<input checked="" type="checkbox"/>	HDPE Bottle, 250 mL	Aqueous	
1904042-01	B SW1911061100LEM	<input checked="" type="checkbox"/>	WIXO-02n05e02-AG01	06-Nov-19 11:00	<input checked="" type="checkbox"/>	HDPE Bottle, 250 mL	Aqueous	
1904042-02	A SW1911061135LEM	<input checked="" type="checkbox"/>	WIXO-02n05e02-AG01	06-Nov-19 11:35	<input checked="" type="checkbox"/>	HDPE Bottle, 250 mL	Aqueous	
1904042-02	B SW1911061135LEM	<input checked="" type="checkbox"/>	WIXO-02n05e02-AG01	06-Nov-19 11:35	<input checked="" type="checkbox"/>	HDPE Bottle, 250 mL	Aqueous	
1904042-03	A SW1911061155LEM	<input checked="" type="checkbox"/>	WIXO-02n05e02-AG01	06-Nov-19 11:55	<input checked="" type="checkbox"/>	HDPE Bottle, 250 mL	Aqueous	
1904042-03	B SW1911061155LEM	<input checked="" type="checkbox"/>	WIXO-02n05e02-AG01	06-Nov-19 11:55	<input checked="" type="checkbox"/>	HDPE Bottle, 250 mL	Aqueous	
1904042-04	A SW1911061235LEM	<input checked="" type="checkbox"/>	WIXO-02n05e02-BC01	06-Nov-19 12:35	<input checked="" type="checkbox"/>	HDPE Bottle, 250 mL	Aqueous	
1904042-04	B SW1911061235LEM	<input checked="" type="checkbox"/>	WIXO-02n05e02-BC01	06-Nov-19 12:35	<input checked="" type="checkbox"/>	HDPE Bottle, 250 mL	Aqueous	
1904042-05	A SW1911061245LEM	<input checked="" type="checkbox"/>	WIXO-02n05e02-BC01	06-Nov-19 12:45	<input checked="" type="checkbox"/>	HDPE Bottle, 250 mL	Aqueous	
1904042-05	B SW1911061245LEM	<input checked="" type="checkbox"/>	WIXO-02n05e02-BC01	06-Nov-19 12:45	<input checked="" type="checkbox"/>	HDPE Bottle, 250 mL	Aqueous	

Checkmarks indicate that information on the COC reconciled with the sample label.  
Any discrepancies are noted in the following columns.

	Yes	No	NA
Sample Container Intact?	<input checked="" type="checkbox"/>		
Sample Custody Seals Intact?			<input checked="" type="checkbox"/>
Adequate Sample Volume?	<input checked="" type="checkbox"/>		
Container Type Appropriate for Analysis(es)	<input checked="" type="checkbox"/>		
Preservation Documented: Na2S2O3 Trizma None Other			<input checked="" type="checkbox"/>
If Chlorinated or Drinking Water Samples, Acceptable Preservation?			<input checked="" type="checkbox"/>

Comments:

Verified by/Date: KG 11/17/19



December 31, 2018

**Vista Work Order No. 1803709**

Ms. Maya Murshak  
Merit Laboratories, Inc.  
2680 East Lansing Drive  
East Lansing, MI 48823

Dear Ms. Murshak,

Enclosed are the results for the sample set received at Vista Analytical Laboratory on November 21, 2018 under your Project Name 'Statewide WWTP Biosolids PFAS Evaluation'.

Vista Analytical Laboratory is committed to serving you effectively. If you require additional information, please contact me at 916-673-1520 or by email at [mmaier@vista-analytical.com](mailto:mmaier@vista-analytical.com).

Thank you for choosing Vista as part of your analytical support team.

Sincerely,

Martha Maier  
Laboratory Director



*Vista Analytical Laboratory certifies that the report herein meets all the requirements set forth by NELAP for those applicable test methods. Results relate only to the samples as received by the laboratory. This report should not be reproduced except in full without the written approval of Vista.*

## Vista Work Order No. 1803709

### Case Narrative

#### Sample Condition on Receipt:

One biosolid sample, four wastewater samples and three sludge samples were received in good condition and within the method temperature requirements. The samples were received and stored securely in accordance with Vista standard operating procedures and EPA methodology. A revised CoC was received by email on November 29, 2018.

As requested, after determining the percent solids, samples "BS1811140830GSC", "SL1811140905GSC" and "SL1811140945GSC" were centrifuged and the aqueous and solid phases were extracted and analyzed separately. The sample IDs of the aqueous phases were appended with an "A"; the IDs of the solid phases have been appended with an "S".

#### Analytical Notes:

#### PFAS Isotope Dilution Method

The aqueous samples, as well as "BS1811140830GSC-A", "SL1811140905GSC-A" and "SL1811140945GSC-A", were extracted and analyzed for a selected list of PFAS using Vista's PFAS Isotope Dilution Method. This method is listed on Vista's NELAP certificate as Modified EPA Method 537. The results for PFHxS, PFOA, PFOS, MeFOSAA and EtFOSAA include both linear and branched isomers. Results for all other analytes include the linear isomers only.

The following samples contained particulate and were centrifuged prior to extraction:

<u>Laboratory ID</u>	<u>Sample Name</u>
1803709-07	WW1811140950GSC
1803709-08	WW1811141000GSC
1803709-10	SL1811140905GSC-A
1803709-11	SL1811140945GSC-A

#### Holding Times

The samples were extracted and analyzed within the method hold times.

#### Quality Control

The Initial Calibration and Continuing Calibration Verifications met the method acceptance criteria.

A Method Blank and Ongoing Precision and Recovery (OPR) sample were extracted and analyzed with each preparation batch. No analytes were detected in the Method Blanks above 1/2 the LOQ. The OPR recoveries were within the method acceptance criteria.

The labeled standard recoveries outside the acceptance criteria are listed in the table below.

## VAL-PFAS

Sample "SL1811140930GSC", "BS1811140830GSC-S", "SL1811140905GSC-S" and "SL1811140945GSC-S" were extracted and analyzed for a selected list of PFAS using VAL Method PFAS. The results for PFHxS, PFOA, PFOS, MeFOSAA and EtFOSAA include both linear and branched isomers. Results for all other analytes include the linear isomers only.

## Holding Times

The samples were extracted and analyzed within the hold times.

## Quality Control

The Initial Calibration and Continuing Calibration Verifications met the method acceptance criteria.

A Method Blank and Ongoing Precision and Recovery (OPR) sample were extracted and analyzed with each preparation batch. No analytes were detected in the Method Blanks above 1/2 the LOQ. The OPR recoveries were within the method acceptance criteria.

The labeled standard recoveries outside the acceptance criteria are listed in the table below.

### QC Anomalies

LabNumber	SampleName	Analysis	Analyte	Flag	%Rec
1803709-01	BS1811140830GSC-S	VAL - PFAS	13C2-6:2 FTS	H	215
1803709-01	BS1811140830GSC-S	VAL - PFAS	13C2-8:2 FTS	H	188
1803709-03	SL1811140905GS-S	VAL - PFAS	d5-EtFOSAA	H	45.8
1803709-03	SL1811140905GS-S	VAL - PFAS	13C2-PFTeDA	H	16.9
1803709-05	SL1811140930GSC	VAL - PFAS	13C2-4:2 FTS	H	35.9
1803709-06	SL1811140945GSC-S	VAL - PFAS	13C8-PFOS	H	57.6
1803709-06	SL1811140945GSC-S	VAL - PFAS	13C2-PFTeDA	H	12.2
1803709-07	WW1811140950GSC	PFAS Isotope Dilution Method	13C8-PFOA	H	12.4
1803709-07	WW1811140950GSC	PFAS Isotope Dilution Method	13C8-PFOS	H	28.2
1803709-07	WW1811140950GSC	PFAS Isotope Dilution Method	13C2-PFDA	H	34.0
1803709-07	WW1811140950GSC	PFAS Isotope Dilution Method	d3-MeFOSAA	H	21.1
1803709-07	WW1811140950GSC	PFAS Isotope Dilution Method	d5-EtFOSAA	H	18.9
1803709-07	WW1811140950GSC	PFAS Isotope Dilution Method	13C2-PFUnA	H	25.2
1803709-07	WW1811140950GSC	PFAS Isotope Dilution Method	13C2-PFDoA	H	21.1
1803709-07	WW1811140950GSC	PFAS Isotope Dilution Method	13C2-PFTeDA	H	17.5
1803709-08	WW1811141000GSC	PFAS Isotope Dilution Method	13C2-PFUnA	H	58.1
B8L0059-BLK1	B8L0059-BLK1	VAL - PFAS	13C8-PFOA	H	10.7
B8L0059-BS1	B8L0059-BS1	VAL - PFAS	13C8-PFOA	H	17.3
B8L0060-BLK1	B8L0060-BLK1	PFAS Isotope Dilution Method	13C8-PFOA	H	11.7
B8L0060-BS1	B8L0060-BS1	PFAS Isotope Dilution Method	13C8-PFOA	H	9.40

H = Recovery was outside laboratory acceptance criteria.

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# Sample Inventory Report

Vista Sample ID	Client Sample ID	Sampled	Received	Components/Containers
1803709-01	BS1811140830GSC-S	14-Nov-18 08:30	21-Nov-18 09:45	HDPE Bottle, 250 mL HDPE Bottle, 250 mL
1803709-02	WW1811140845GSC	14-Nov-18 08:45	21-Nov-18 09:45	HDPE Bottle, 250 mL HDPE Bottle, 250 mL
1803709-03	SL1811140905GS-S	14-Nov-18 09:05	21-Nov-18 09:45	HDPE Bottle, 250 mL HDPE Bottle, 250 mL
1803709-04	WW1811140915GSC	14-Nov-18 09:15	21-Nov-18 09:45	HDPE Bottle, 250 mL HDPE Bottle, 250 mL
1803709-05	SL1811140930GSC	14-Nov-18 09:30	21-Nov-18 09:45	HDPE Jar, 6 oz
1803709-06	SL1811140945GSC-S	14-Nov-18 09:45	21-Nov-18 09:45	HDPE Bottle, 250 mL HDPE Bottle, 250 mL
1803709-07	WW1811140950GSC	14-Nov-18 09:50	21-Nov-18 09:45	HDPE Bottle, 250 mL HDPE Bottle, 250 mL
1803709-08	WW1811141000GSC	14-Nov-18 10:00	21-Nov-18 09:45	HDPE Bottle, 250 mL HDPE Bottle, 250 mL
1803709-09	BS1811140830GSC-A	14-Nov-18 08:30	21-Nov-18 09:45	HDPE Bottle, 250 mL HDPE Bottle, 250 mL
1803709-10	SL1811140905GSC-A	14-Nov-18 09:05	21-Nov-18 09:45	HDPE Bottle, 250 mL HDPE Bottle, 250 mL
1803709-11	SL1811140945GSC-A	14-Nov-18 09:45	21-Nov-18 09:45	HDPE Bottle, 250 mL HDPE Bottle, 250 mL



## **ANALYTICAL RESULTS**

**Sample ID: Method Blank**
**VAL - PFAS**

Client Data				Laboratory Data			
Name:	Merit Laboratories, Inc.	Matrix:	Solid	Lab Sample:	B8K0221-BLK1	Column:	BEH C18
Project:	Statewide WWTP Biosolids PFAS Evaluation						

Analyte	CAS Number	Conc. (ng/g)	DL	LOD	LOQ	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
PFBA	375-22-4	ND	0.845	1.00	2.00		B8K0221	02-Dec-18	1.00 g	04-Dec-18 21:34	1
PFPeA	2706-90-3	ND	0.845	1.00	2.00		B8K0221	02-Dec-18	1.00 g	04-Dec-18 21:34	1
PFBS	375-73-5	ND	0.845	1.00	2.00		B8K0221	02-Dec-18	1.00 g	04-Dec-18 21:34	1
4:2 FTS	757124-72-4	ND	0.845	1.00	2.00		B8K0221	02-Dec-18	1.00 g	04-Dec-18 21:34	1
PFHxA	307-24-4	ND	0.845	1.00	2.00		B8K0221	02-Dec-18	1.00 g	04-Dec-18 21:34	1
PFPeS	2706-91-4	ND	0.845	1.00	2.00		B8K0221	02-Dec-18	1.00 g	04-Dec-18 21:34	1
PFHpA	375-85-9	ND	0.845	1.00	2.00		B8K0221	02-Dec-18	1.00 g	04-Dec-18 21:34	1
PFHxS	355-46-4	ND	0.845	1.00	2.00		B8K0221	02-Dec-18	1.00 g	04-Dec-18 21:34	1
6:2 FTS	27619-97-2	ND	0.845	1.00	2.00		B8K0221	02-Dec-18	1.00 g	04-Dec-18 21:34	1
PFOA	335-67-1	ND	0.845	1.00	2.00		B8K0221	02-Dec-18	1.00 g	04-Dec-18 21:34	1
PFHpS	375-92-8	ND	0.845	1.00	2.00		B8K0221	02-Dec-18	1.00 g	04-Dec-18 21:34	1
PFNA	375-95-1	ND	0.845	1.00	2.00		B8K0221	02-Dec-18	1.00 g	04-Dec-18 21:34	1
PFOSA	754-91-6	ND	0.845	1.00	2.00		B8K0221	02-Dec-18	1.00 g	04-Dec-18 21:34	1
PFOS	1763-23-1	ND	0.845	1.00	2.00		B8K0221	02-Dec-18	1.00 g	04-Dec-18 21:34	1
PFDA	335-76-2	ND	0.845	1.00	2.00		B8K0221	02-Dec-18	1.00 g	04-Dec-18 21:34	1
8:2 FTS	39108-34-4	ND	0.845	1.00	2.00		B8K0221	02-Dec-18	1.00 g	04-Dec-18 21:34	1
PFNS	68259-12-1	ND	1.43	1.50	2.00		B8K0221	02-Dec-18	1.00 g	04-Dec-18 21:34	1
MeFOSAA	2355-31-9	ND	0.845	1.00	2.00		B8K0221	02-Dec-18	1.00 g	04-Dec-18 21:34	1
EtFOSAA	2991-50-6	ND	0.845	1.00	2.00		B8K0221	02-Dec-18	1.00 g	04-Dec-18 21:34	1
PFOA	2058-94-8	ND	0.845	1.00	2.00		B8K0221	02-Dec-18	1.00 g	04-Dec-18 21:34	1
PFDS	335-77-3	ND	0.845	1.00	2.00		B8K0221	02-Dec-18	1.00 g	04-Dec-18 21:34	1
PFDoA	307-55-1	ND	0.845	1.00	2.00		B8K0221	02-Dec-18	1.00 g	04-Dec-18 21:34	1
PFTTrDA	72629-94-8	ND	0.845	1.00	2.00		B8K0221	02-Dec-18	1.00 g	04-Dec-18 21:34	1
PFTeDA	376-06-7	ND	0.845	1.00	2.00		B8K0221	02-Dec-18	1.00 g	04-Dec-18 21:34	1

Labeled Standards	Type	% Recovery	Limits	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
13C3-PFBA	IS	104	60 - 130		B8K0221	02-Dec-18	1.00 g	04-Dec-18 21:34	1
13C3-PFPeA	IS	97.4	60 - 150		B8K0221	02-Dec-18	1.00 g	04-Dec-18 21:34	1
13C3-PFBS	IS	91.4	60 - 150		B8K0221	02-Dec-18	1.00 g	04-Dec-18 21:34	1
13C2-4:2 FTS	IS	79.0	40 - 150		B8K0221	02-Dec-18	1.00 g	04-Dec-18 21:34	1
13C2-PFHxA	IS	96.9	70 - 130		B8K0221	02-Dec-18	1.00 g	04-Dec-18 21:34	1
13C4-PFHpA	IS	99.3	60 - 150		B8K0221	02-Dec-18	1.00 g	04-Dec-18 21:34	1
18O2-PFHxS	IS	87.6	60 - 130		B8K0221	02-Dec-18	1.00 g	04-Dec-18 21:34	1
13C2-6:2 FTS	IS	84.5	40 - 150		B8K0221	02-Dec-18	1.00 g	04-Dec-18 21:34	1
13C2-PFOA	IS	83.5	60 - 130		B8K0221	02-Dec-18	1.00 g	04-Dec-18 21:34	1
13C5-PFNA	IS	70.6	50 - 130		B8K0221	02-Dec-18	1.00 g	04-Dec-18 21:34	1
13C8-PFOSA	IS	38.1	20 - 150		B8K0221	02-Dec-18	1.00 g	04-Dec-18 21:34	1
13C8-PFOS	IS	95.2	60 - 130		B8K0221	02-Dec-18	1.00 g	04-Dec-18 21:34	1
13C2-PFDA	IS	74.3	60 - 130		B8K0221	02-Dec-18	1.00 g	04-Dec-18 21:34	1



**Sample ID: OPR**

**VAL - PFAS**

Client Data					Laboratory Data						
Name:	Merit Laboratories, Inc.		Matrix:	Solid	Lab Sample:	B8K0221-BS1	Column:	BEH C18			
Project:	Statewide WWTP Biosolids PFAS Evaluation										

Analyte	CAS Number	Amt Found (ng/g)	Spike Amt	% Rec	Limits	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
PFBA	375-22-4	11.3	10.0	113	70 - 130		B8K0221	02-Dec-18	1.00 g	04-Dec-18 21:24	1
PFPeA	2706-90-3	10.9	10.0	109	70 - 130		B8K0221	02-Dec-18	1.00 g	04-Dec-18 21:24	1
PFBS	375-73-5	10.9	10.0	109	70 - 130		B8K0221	02-Dec-18	1.00 g	04-Dec-18 21:24	1
4:2 FTS	757124-72-4	11.3	10.0	113	60 - 130		B8K0221	02-Dec-18	1.00 g	04-Dec-18 21:24	1
PFHxA	307-24-4	11.0	10.0	110	70 - 130		B8K0221	02-Dec-18	1.00 g	04-Dec-18 21:24	1
PFPeS	2706-91-4	10.7	10.0	107	70 - 130		B8K0221	02-Dec-18	1.00 g	04-Dec-18 21:24	1
PFHpA	375-85-9	11.3	10.0	113	70 - 130		B8K0221	02-Dec-18	1.00 g	04-Dec-18 21:24	1
PFHxS	355-46-4	9.86	10.0	98.6	70 - 130		B8K0221	02-Dec-18	1.00 g	04-Dec-18 21:24	1
6:2 FTS	27619-97-2	10.9	10.0	109	60 - 130		B8K0221	02-Dec-18	1.00 g	04-Dec-18 21:24	1
PFOA	335-67-1	11.3	10.0	113	70 - 130		B8K0221	02-Dec-18	1.00 g	04-Dec-18 21:24	1
PFHpS	375-92-8	11.3	10.0	113	60 - 130		B8K0221	02-Dec-18	1.00 g	04-Dec-18 21:24	1
PFNA	375-95-1	10.8	10.0	108	70 - 130		B8K0221	02-Dec-18	1.00 g	04-Dec-18 21:24	1
PFOSA	754-91-6	10.1	10.0	101	70 - 130		B8K0221	02-Dec-18	1.00 g	04-Dec-18 21:24	1
PFOS	1763-23-1	11.7	10.0	117	70 - 130		B8K0221	02-Dec-18	1.00 g	04-Dec-18 21:24	1
PFDA	335-76-2	10.4	10.0	104	70 - 130		B8K0221	02-Dec-18	1.00 g	04-Dec-18 21:24	1
8:2 FTS	39108-34-4	12.0	10.0	120	60 - 130		B8K0221	02-Dec-18	1.00 g	04-Dec-18 21:24	1
PFNS	68259-12-1	11.1	10.0	111	70 - 130		B8K0221	02-Dec-18	1.00 g	04-Dec-18 21:24	1
MeFOSAA	2355-31-9	10.2	10.0	102	70 - 130		B8K0221	02-Dec-18	1.00 g	04-Dec-18 21:24	1
EtFOSAA	2991-50-6	10.1	10.0	101	70 - 130		B8K0221	02-Dec-18	1.00 g	04-Dec-18 21:24	1
PFUnA	2058-94-8	10.7	10.0	107	70 - 130		B8K0221	02-Dec-18	1.00 g	04-Dec-18 21:24	1
PFDS	335-77-3	9.97	10.0	99.7	60 - 130		B8K0221	02-Dec-18	1.00 g	04-Dec-18 21:24	1
PFDoA	307-55-1	11.5	10.0	115	70 - 130		B8K0221	02-Dec-18	1.00 g	04-Dec-18 21:24	1
PFTTrDA	72629-94-8	11.8	10.0	118	60 - 130		B8K0221	02-Dec-18	1.00 g	04-Dec-18 21:24	1
PFTeDA	376-06-7	11.6	10.0	116	70 - 130		B8K0221	02-Dec-18	1.00 g	04-Dec-18 21:24	1

Labeled Standards	Type	% Rec	Limits	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
13C3-PFBA	IS	90.8	60- 130		B8K0221	02-Dec-18	1.00 g	04-Dec-18 21:24	1
13C3-PFPeA	IS	89.0	60- 150		B8K0221	02-Dec-18	1.00 g	04-Dec-18 21:24	1
13C3-PFBS	IS	91.4	60- 150		B8K0221	02-Dec-18	1.00 g	04-Dec-18 21:24	1
13C2-4:2 FTS	IS	75.2	40- 150		B8K0221	02-Dec-18	1.00 g	04-Dec-18 21:24	1
13C2-PFHxA	IS	93.9	70- 130		B8K0221	02-Dec-18	1.00 g	04-Dec-18 21:24	1
13C4-PFHpA	IS	96.4	60- 150		B8K0221	02-Dec-18	1.00 g	04-Dec-18 21:24	1
18O2-PFHxS	IS	96.6	60- 130		B8K0221	02-Dec-18	1.00 g	04-Dec-18 21:24	1
13C2-6:2 FTS	IS	79.5	40- 150		B8K0221	02-Dec-18	1.00 g	04-Dec-18 21:24	1
13C2-PFOA	IS	83.6	60- 130		B8K0221	02-Dec-18	1.00 g	04-Dec-18 21:24	1
13C5-PFNA	IS	75.1	50- 130		B8K0221	02-Dec-18	1.00 g	04-Dec-18 21:24	1

**Sample ID: OPR**

**VAL - PFAS**

**Client Data**

Name: Merit Laboratories, Inc.  
 Project: Statewide WWTP Biosolids PFAS Evaluation

Matrix: Solid

**Laboratory Data**

Lab Sample: B8K0221-BS1      Column: BEH C18

Labeled Standards	Type	% Rec	Limits	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
13C8-PFOA	IS	41.3	20- 150		B8K0221	02-Dec-18	1.00 g	04-Dec-18 21:24	1
13C8-PFOS	IS	82.2	60- 130		B8K0221	02-Dec-18	1.00 g	04-Dec-18 21:24	1
13C2-PFDA	IS	72.0	60- 130		B8K0221	02-Dec-18	1.00 g	04-Dec-18 21:24	1
13C2-8:2 FTS	IS	70.3	40- 150		B8K0221	02-Dec-18	1.00 g	04-Dec-18 21:24	1
d3-MeFOSAA	IS	64.2	50- 150		B8K0221	02-Dec-18	1.00 g	04-Dec-18 21:24	1
d5-EtFOSAA	IS	63.3	50- 150		B8K0221	02-Dec-18	1.00 g	04-Dec-18 21:24	1
13C2-PFUnA	IS	60.1	60- 130		B8K0221	02-Dec-18	1.00 g	04-Dec-18 21:24	1
13C2-PFDoA	IS	62.4	30- 130		B8K0221	02-Dec-18	1.00 g	04-Dec-18 21:24	1
13C2-PFTeDA	IS	63.2	20- 150		B8K0221	02-Dec-18	1.00 g	04-Dec-18 21:24	1

**Sample ID: Method Blank**
**VAL - PFAS**

Client Data				Laboratory Data			
Name:	Merit Laboratories, Inc.	Matrix:	Solid	Lab Sample:	B8L0059-BLK1	Column:	BEH C18
Project:	Statewide WWTP Biosolids PFAS Evaluation						

Analyte	CAS Number	Conc. (ng/g)	DL	LOD	LOQ	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
PFBA	375-22-4	ND	0.845	1.00	2.00		B8L0059	11-Dec-18	1.00 g	13-Dec-18 19:35	1
PFPeA	2706-90-3	ND	0.845	1.00	2.00		B8L0059	11-Dec-18	1.00 g	13-Dec-18 19:35	1
PFBS	375-73-5	ND	0.845	1.00	2.00		B8L0059	11-Dec-18	1.00 g	13-Dec-18 19:35	1
4:2 FTS	757124-72-4	ND	0.845	1.00	2.00		B8L0059	11-Dec-18	1.00 g	13-Dec-18 19:35	1
PFHxA	307-24-4	ND	0.845	1.00	2.00		B8L0059	11-Dec-18	1.00 g	13-Dec-18 19:35	1
PFPeS	2706-91-4	ND	0.845	1.00	2.00		B8L0059	11-Dec-18	1.00 g	13-Dec-18 19:35	1
PFHpA	375-85-9	ND	0.845	1.00	2.00		B8L0059	11-Dec-18	1.00 g	13-Dec-18 19:35	1
PFHxS	355-46-4	ND	0.845	1.00	2.00		B8L0059	11-Dec-18	1.00 g	13-Dec-18 19:35	1
6:2 FTS	27619-97-2	ND	0.845	1.00	2.00		B8L0059	11-Dec-18	1.00 g	13-Dec-18 19:35	1
PFOA	335-67-1	ND	0.845	1.00	2.00		B8L0059	11-Dec-18	1.00 g	13-Dec-18 19:35	1
PFHpS	375-92-8	ND	0.845	1.00	2.00		B8L0059	11-Dec-18	1.00 g	13-Dec-18 19:35	1
PFNA	375-95-1	ND	0.845	1.00	2.00		B8L0059	11-Dec-18	1.00 g	13-Dec-18 19:35	1
PFOSA	754-91-6	ND	0.845	1.00	2.00		B8L0059	11-Dec-18	1.00 g	13-Dec-18 19:35	1
PFOS	1763-23-1	ND	0.845	1.00	2.00		B8L0059	11-Dec-18	1.00 g	13-Dec-18 19:35	1
PFDA	335-76-2	ND	0.845	1.00	2.00		B8L0059	11-Dec-18	1.00 g	13-Dec-18 19:35	1
8:2 FTS	39108-34-4	ND	0.845	1.00	2.00		B8L0059	11-Dec-18	1.00 g	13-Dec-18 19:35	1
PFNS	68259-12-1	ND	1.43	1.50	2.00		B8L0059	11-Dec-18	1.00 g	13-Dec-18 19:35	1
MeFOSAA	2355-31-9	ND	0.845	1.00	2.00		B8L0059	11-Dec-18	1.00 g	13-Dec-18 19:35	1
EtFOSAA	2991-50-6	ND	0.845	1.00	2.00		B8L0059	11-Dec-18	1.00 g	13-Dec-18 19:35	1
PFOA	2058-94-8	ND	0.845	1.00	2.00		B8L0059	11-Dec-18	1.00 g	13-Dec-18 19:35	1
PFDS	335-77-3	ND	0.845	1.00	2.00		B8L0059	11-Dec-18	1.00 g	13-Dec-18 19:35	1
PFDoA	307-55-1	ND	0.845	1.00	2.00		B8L0059	11-Dec-18	1.00 g	13-Dec-18 19:35	1
PFTTrDA	72629-94-8	ND	0.845	1.00	2.00		B8L0059	11-Dec-18	1.00 g	13-Dec-18 19:35	1
PFTeDA	376-06-7	ND	0.845	1.00	2.00		B8L0059	11-Dec-18	1.00 g	13-Dec-18 19:35	1

Labeled Standards	Type	% Recovery	Limits	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
13C3-PFBA	IS	94.5	60 - 130		B8L0059	11-Dec-18	1.00 g	13-Dec-18 19:35	1
13C3-PFPeA	IS	92.7	60 - 150		B8L0059	11-Dec-18	1.00 g	13-Dec-18 19:35	1
13C3-PFBS	IS	97.7	60 - 150		B8L0059	11-Dec-18	1.00 g	13-Dec-18 19:35	1
13C2-4:2 FTS	IS	86.3	40 - 150		B8L0059	11-Dec-18	1.00 g	13-Dec-18 19:35	1
13C2-PFHxA	IS	92.7	70 - 130		B8L0059	11-Dec-18	1.00 g	13-Dec-18 19:35	1
13C4-PFHpA	IS	99.3	60 - 150		B8L0059	11-Dec-18	1.00 g	13-Dec-18 19:35	1
18O2-PFHxS	IS	94.3	60 - 130		B8L0059	11-Dec-18	1.00 g	13-Dec-18 19:35	1
13C2-6:2 FTS	IS	90.4	40 - 150		B8L0059	11-Dec-18	1.00 g	13-Dec-18 19:35	1
13C2-PFOA	IS	84.2	60 - 130		B8L0059	11-Dec-18	1.00 g	13-Dec-18 19:35	1
13C5-PFNA	IS	81.3	50 - 130		B8L0059	11-Dec-18	1.00 g	13-Dec-18 19:35	1
13C8-PFOSA	IS	10.7	20 - 150	H	B8L0059	11-Dec-18	1.00 g	13-Dec-18 19:35	1
13C8-PFOS	IS	100	60 - 130		B8L0059	11-Dec-18	1.00 g	13-Dec-18 19:35	1
13C2-PFDA	IS	77.1	60 - 130		B8L0059	11-Dec-18	1.00 g	13-Dec-18 19:35	1

**Sample ID: Method Blank** **VAL - PFAS**

<b>Client Data</b>	<b>Laboratory Data</b>
Name: Merit Laboratories, Inc.      Matrix: Solid	Lab Sample: B8L0059-BLK1      Column: BEH C18
Project: Statewide WWTP Biosolids PFAS Evaluation	

Labeled Standards	Type	% Recovery	Limits	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
13C2-8:2 FTS	IS	85.5	40 - 150		B8L0059	11-Dec-18	1.00 g	13-Dec-18 19:35	1
d3-MeFOSAA	IS	74.8	50 - 150		B8L0059	11-Dec-18	1.00 g	13-Dec-18 19:35	1
d5-EtFOSAA	IS	76.6	50 - 150		B8L0059	11-Dec-18	1.00 g	13-Dec-18 19:35	1
13C2-PFUnA	IS	67.7	60 - 130		B8L0059	11-Dec-18	1.00 g	13-Dec-18 19:35	1
13C2-PFDoA	IS	69.6	30 - 130		B8L0059	11-Dec-18	1.00 g	13-Dec-18 19:35	1
13C2-PFTeDA	IS	72.6	20 - 150		B8L0059	11-Dec-18	1.00 g	13-Dec-18 19:35	1

DL - Detection Limit

LOD - Limit of Detection  
LOQ - Limit of quantitation

The results are reported in dry weight.  
The sample size is reported in wet weight.  
Results reported to the DL.

When reported, PFHxS, PFOA, PFOS, MeFOSAA and EtFOSAA include both linear and branched isomers. Only the linear isomer is reported for all other analytes.

**Sample ID: OPR**

**VAL - PFAS**

Client Data					Laboratory Data						
Name:	Merit Laboratories, Inc.		Matrix:	Solid	Lab Sample:	B8L0059-BS1	Column:	BEH C18			
Project:	Statewide WWTP Biosolids PFAS Evaluation										

Analyte	CAS Number	Amt Found (ng/g)	Spike Amt	% Rec	Limits	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
PFBA	375-22-4	10.0	10.0	100	70 - 130		B8L0059	11-Dec-18	1.00 g	13-Dec-18 19:24	1
PFPeA	2706-90-3	10.3	10.0	103	70 - 130		B8L0059	11-Dec-18	1.00 g	13-Dec-18 19:24	1
PFBS	375-73-5	10.4	10.0	104	70 - 130		B8L0059	11-Dec-18	1.00 g	13-Dec-18 19:24	1
4:2 FTS	757124-72-4	10.8	10.0	108	60 - 130		B8L0059	11-Dec-18	1.00 g	13-Dec-18 19:24	1
PFHxA	307-24-4	10.8	10.0	108	70 - 130		B8L0059	11-Dec-18	1.00 g	13-Dec-18 19:24	1
PFPeS	2706-91-4	11.1	10.0	111	70 - 130		B8L0059	11-Dec-18	1.00 g	13-Dec-18 19:24	1
PFHpA	375-85-9	9.71	10.0	97.1	70 - 130		B8L0059	11-Dec-18	1.00 g	13-Dec-18 19:24	1
PFHxS	355-46-4	10.4	10.0	104	70 - 130		B8L0059	11-Dec-18	1.00 g	13-Dec-18 19:24	1
6:2 FTS	27619-97-2	9.91	10.0	99.1	60 - 130		B8L0059	11-Dec-18	1.00 g	13-Dec-18 19:24	1
PFOA	335-67-1	9.63	10.0	96.3	70 - 130		B8L0059	11-Dec-18	1.00 g	13-Dec-18 19:24	1
PFHpS	375-92-8	10.1	10.0	101	60 - 130		B8L0059	11-Dec-18	1.00 g	13-Dec-18 19:24	1
PFNA	375-95-1	9.81	10.0	98.1	70 - 130		B8L0059	11-Dec-18	1.00 g	13-Dec-18 19:24	1
PFOSA	754-91-6	11.6	10.0	116	70 - 130		B8L0059	11-Dec-18	1.00 g	13-Dec-18 19:24	1
PFOS	1763-23-1	9.31	10.0	93.1	70 - 130		B8L0059	11-Dec-18	1.00 g	13-Dec-18 19:24	1
PFDA	335-76-2	10.5	10.0	105	70 - 130		B8L0059	11-Dec-18	1.00 g	13-Dec-18 19:24	1
8:2 FTS	39108-34-4	11.8	10.0	118	60 - 130		B8L0059	11-Dec-18	1.00 g	13-Dec-18 19:24	1
PFNS	68259-12-1	9.15	10.0	91.5	70 - 130		B8L0059	11-Dec-18	1.00 g	13-Dec-18 19:24	1
MeFOSAA	2355-31-9	8.66	10.0	86.6	70 - 130		B8L0059	11-Dec-18	1.00 g	13-Dec-18 19:24	1
EtFOSAA	2991-50-6	10.1	10.0	101	70 - 130		B8L0059	11-Dec-18	1.00 g	13-Dec-18 19:24	1
PFUnA	2058-94-8	10.9	10.0	109	70 - 130		B8L0059	11-Dec-18	1.00 g	13-Dec-18 19:24	1
PFDS	335-77-3	8.64	10.0	86.4	60 - 130		B8L0059	11-Dec-18	1.00 g	13-Dec-18 19:24	1
PFDoA	307-55-1	11.2	10.0	112	70 - 130		B8L0059	11-Dec-18	1.00 g	13-Dec-18 19:24	1
PFTTrDA	72629-94-8	11.9	10.0	119	60 - 130		B8L0059	11-Dec-18	1.00 g	13-Dec-18 19:24	1
PFTeDA	376-06-7	10.7	10.0	107	70 - 130		B8L0059	11-Dec-18	1.00 g	13-Dec-18 19:24	1

Labeled Standards	Type	% Rec	Limits	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
13C3-PFBA	IS	99.3	60- 130		B8L0059	11-Dec-18	1.00 g	13-Dec-18 19:24	1
13C3-PFPeA	IS	94.2	60- 150		B8L0059	11-Dec-18	1.00 g	13-Dec-18 19:24	1
13C3-PFBS	IS	96.2	60- 150		B8L0059	11-Dec-18	1.00 g	13-Dec-18 19:24	1
13C2-4:2 FTS	IS	87.6	40- 150		B8L0059	11-Dec-18	1.00 g	13-Dec-18 19:24	1
13C2-PFHxA	IS	93.5	70- 130		B8L0059	11-Dec-18	1.00 g	13-Dec-18 19:24	1
13C4-PFHpA	IS	97.9	60- 150		B8L0059	11-Dec-18	1.00 g	13-Dec-18 19:24	1
18O2-PFHxS	IS	104	60- 130		B8L0059	11-Dec-18	1.00 g	13-Dec-18 19:24	1
13C2-6:2 FTS	IS	91.4	40- 150		B8L0059	11-Dec-18	1.00 g	13-Dec-18 19:24	1
13C2-PFOA	IS	89.0	60- 130		B8L0059	11-Dec-18	1.00 g	13-Dec-18 19:24	1
13C5-PFNA	IS	82.5	50- 130		B8L0059	11-Dec-18	1.00 g	13-Dec-18 19:24	1



**Sample ID: OPR**

**VAL - PFAS**

Client Data				Laboratory Data			
Name:	Merit Laboratories, Inc.	Matrix:	Solid	Lab Sample:	B8L0059-BS1	Column:	BEH C18
Project:	Statewide WWTP Biosolids PFAS Evaluation						

Labeled Standards	Type	% Rec	Limits	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
13C8-PFOSA	IS	17.3	20- 150	H	B8L0059	11-Dec-18	1.00 g	13-Dec-18 19:24	1
13C8-PFOS	IS	94.6	60- 130		B8L0059	11-Dec-18	1.00 g	13-Dec-18 19:24	1
13C2-PFDA	IS	76.1	60- 130		B8L0059	11-Dec-18	1.00 g	13-Dec-18 19:24	1
13C2-8:2 FTS	IS	79.4	40- 150		B8L0059	11-Dec-18	1.00 g	13-Dec-18 19:24	1
d3-MeFOSAA	IS	84.9	50- 150		B8L0059	11-Dec-18	1.00 g	13-Dec-18 19:24	1
d5-EtFOSAA	IS	75.3	50- 150		B8L0059	11-Dec-18	1.00 g	13-Dec-18 19:24	1
13C2-PFUnA	IS	66.1	60- 130		B8L0059	11-Dec-18	1.00 g	13-Dec-18 19:24	1
13C2-PFDoA	IS	62.9	30- 130		B8L0059	11-Dec-18	1.00 g	13-Dec-18 19:24	1
13C2-PFTeDA	IS	76.8	20- 150		B8L0059	11-Dec-18	1.00 g	13-Dec-18 19:24	1

**Sample ID: BS1811140830GSC-S**

**VAL - PFAS**

Client Data				Laboratory Data			
Name:	Merit Laboratories, Inc.	Matrix:	Biosolid	Lab Sample:	1803709-01	Column:	BEH C18
Project:	Statewide WWTP Biosolids PFAS Evaluation	Date Collected:	14-Nov-18 08:30	Date Received:	21-Nov-18 09:45		
Location:	WIXO-MI0024384-STAED			% Solids:	7.58		

Analyte	CAS Number	Conc. (ng/g)	DL	LOD	LOQ	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
PFBA	375-22-4	4.30	0.772	0.914	1.83		B8K0221	02-Dec-18	14.4 g	04-Dec-18 22:27	1
PFPeA	2706-90-3	18.1	0.772	0.914	1.83		B8K0221	02-Dec-18	14.4 g	04-Dec-18 22:27	1
PFBS	375-73-5	ND	0.772	0.914	1.83		B8K0221	02-Dec-18	14.4 g	04-Dec-18 22:27	1
4:2 FTS	757124-72-4	ND	0.772	0.914	1.83		B8K0221	02-Dec-18	14.4 g	04-Dec-18 22:27	1
PFHxA	307-24-4	20.1	0.772	0.914	1.83		B8K0221	02-Dec-18	14.4 g	04-Dec-18 22:27	1
PFPeS	2706-91-4	ND	0.772	0.914	1.83		B8K0221	02-Dec-18	14.4 g	04-Dec-18 22:27	1
PFHpA	375-85-9	14.4	0.772	0.914	1.83		B8K0221	02-Dec-18	14.4 g	04-Dec-18 22:27	1
PFHxS	355-46-4	ND	0.772	0.914	1.83		B8K0221	02-Dec-18	14.4 g	04-Dec-18 22:27	1
6:2 FTS	27619-97-2	59.5	0.772	0.914	1.83		B8K0221	02-Dec-18	14.4 g	04-Dec-18 22:27	1
PFOA	335-67-1	1.73	0.772	0.914	1.83	J	B8K0221	02-Dec-18	14.4 g	04-Dec-18 22:27	1
PFHpS	375-92-8	4.65	0.772	0.914	1.83		B8K0221	02-Dec-18	14.4 g	04-Dec-18 22:27	1
PFNA	375-95-1	2.41	0.772	0.914	1.83		B8K0221	02-Dec-18	14.4 g	04-Dec-18 22:27	1
PFOSA	754-91-6	3.61	0.772	0.914	1.83		B8K0221	02-Dec-18	14.4 g	04-Dec-18 22:27	1
PFOS	1763-23-1	2150	15.4	18.3	36.6	D	B8K0221	02-Dec-18	14.4 g	06-Dec-18 22:57	20
PFDA	335-76-2	6.21	0.772	0.914	1.83		B8K0221	02-Dec-18	14.4 g	04-Dec-18 22:27	1
8:2 FTS	39108-34-4	10.0	0.772	0.914	1.83		B8K0221	02-Dec-18	14.4 g	04-Dec-18 22:27	1
PFNS	68259-12-1	4.74	1.31	1.37	1.83		B8K0221	02-Dec-18	14.4 g	04-Dec-18 22:27	1
MeFOSAA	2355-31-9	12.6	0.772	0.914	1.83		B8K0221	02-Dec-18	14.4 g	04-Dec-18 22:27	1
EtFOSAA	2991-50-6	2.08	0.772	0.914	1.83		B8K0221	02-Dec-18	14.4 g	04-Dec-18 22:27	1
PFOA	2058-94-8	2.10	0.772	0.914	1.83		B8K0221	02-Dec-18	14.4 g	04-Dec-18 22:27	1
PFDS	335-77-3	3.75	0.772	0.914	1.83		B8K0221	02-Dec-18	14.4 g	04-Dec-18 22:27	1
PFDoA	307-55-1	2.86	0.772	0.914	1.83		B8K0221	02-Dec-18	14.4 g	04-Dec-18 22:27	1
PFTTrDA	72629-94-8	ND	0.772	0.914	1.83		B8K0221	02-Dec-18	14.4 g	04-Dec-18 22:27	1
PFTeDA	376-06-7	0.809	0.772	0.914	1.83	J	B8K0221	02-Dec-18	14.4 g	04-Dec-18 22:27	1

Labeled Standards	Type	% Recovery	Limits	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
13C3-PFBA	IS	86.7	60 - 130		B8K0221	02-Dec-18	14.4 g	04-Dec-18 22:27	1
13C3-PFPeA	IS	83.8	60 - 150		B8K0221	02-Dec-18	14.4 g	04-Dec-18 22:27	1
13C3-PFBS	IS	82.3	60 - 150		B8K0221	02-Dec-18	14.4 g	04-Dec-18 22:27	1
13C2-4:2 FTS	IS	69.9	40 - 150		B8K0221	02-Dec-18	14.4 g	04-Dec-18 22:27	1
13C2-PFHxA	IS	87.1	70 - 130		B8K0221	02-Dec-18	14.4 g	04-Dec-18 22:27	1
13C4-PFHpA	IS	91.4	60 - 150		B8K0221	02-Dec-18	14.4 g	04-Dec-18 22:27	1
18O2-PFHxS	IS	87.1	60 - 130		B8K0221	02-Dec-18	14.4 g	04-Dec-18 22:27	1
13C2-6:2 FTS	IS	215	40 - 150	H	B8K0221	02-Dec-18	14.4 g	04-Dec-18 22:27	1
13C2-PFOA	IS	84.4	60 - 130		B8K0221	02-Dec-18	14.4 g	04-Dec-18 22:27	1
13C5-PFNA	IS	76.0	50 - 130		B8K0221	02-Dec-18	14.4 g	04-Dec-18 22:27	1
13C8-PFOSA	IS	47.1	20 - 150		B8K0221	02-Dec-18	14.4 g	04-Dec-18 22:27	1
13C8-PFOS	IS	88.5	60 - 130	D	B8K0221	02-Dec-18	14.4 g	06-Dec-18 22:57	20
13C2-PFDA	IS	68.9	60 - 130		B8K0221	02-Dec-18	14.4 g	04-Dec-18 22:27	1

**Sample ID: BS1811140830GSC-S** **VAL - PFAS**

Client Data				Laboratory Data			
Name:	Merit Laboratories, Inc.	Matrix:	Biosolid	Lab Sample:	1803709-01	Column:	BEH C18
Project:	Statewide WWTP Biosolids PFAS Evaluation	Date Collected:	14-Nov-18 08:30	Date Received:	21-Nov-18 09:45		
Location:	WIXO-MI0024384-STAED			% Solids:	7.58		

Labeled Standards	Type	% Recovery	Limits	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
13C2-8:2 FTS	IS	188	40 - 150	H	B8K0221	02-Dec-18	14.4 g	04-Dec-18 22:27	1
d3-MeFOSAA	IS	57.2	50 - 150		B8K0221	02-Dec-18	14.4 g	04-Dec-18 22:27	1
d5-EtFOSAA	IS	62.3	50 - 150		B8K0221	02-Dec-18	14.4 g	04-Dec-18 22:27	1
13C2-PFUnA	IS	68.3	60 - 130		B8K0221	02-Dec-18	14.4 g	04-Dec-18 22:27	1
13C2-PFDoA	IS	69.6	30 - 130		B8K0221	02-Dec-18	14.4 g	04-Dec-18 22:27	1
13C2-PFTeDA	IS	40.9	20 - 150		B8K0221	02-Dec-18	14.4 g	04-Dec-18 22:27	1

DL - Detection Limit	LOD - Limit of Detection	The results are reported in dry weight.	When reported, PFHxS, PFOA, PFOS, MeFOSAA and EtFOSAA include both linear and branched isomers. Only the linear isomer is reported for all other analytes.
	LOQ - Limit of quantitation	The sample size is reported in wet weight.	
		Results reported to the DL.	

**Sample ID: SL1811140905GS-S**

**VAL - PFAS**

Client Data				Laboratory Data			
Name:	Merit Laboratories, Inc.	Matrix:	Sludge	Lab Sample:	1803709-03	Column:	BEH C18
Project:	Statewide WWTP Biosolids PFAS Evaluation	Date Collected:	14-Nov-18 09:05	Date Received:	21-Nov-18 09:45		
Location:	WIXO-MI0024384-WACSL			% Solids:	1.03		

Analyte	CAS Number	Conc. (ng/g)	DL	LOD	LOQ	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
PFBA	375-22-4	2.91	0.823	0.974	1.95		B8L0059	11-Dec-18	100 g	13-Dec-18 20:17	1
PFPeA	2706-90-3	12.9	0.823	0.974	1.95		B8L0059	11-Dec-18	100 g	13-Dec-18 20:17	1
PFBS	375-73-5	ND	0.823	0.974	1.95		B8L0059	11-Dec-18	100 g	13-Dec-18 20:17	1
4:2 FTS	757124-72-4	ND	0.823	0.974	1.95		B8L0059	11-Dec-18	100 g	13-Dec-18 20:17	1
PFHxA	307-24-4	16.2	0.823	0.974	1.95		B8L0059	11-Dec-18	100 g	13-Dec-18 20:17	1
PFPeS	2706-91-4	ND	0.823	0.974	1.95		B8L0059	11-Dec-18	100 g	13-Dec-18 20:17	1
PFHpA	375-85-9	10.1	0.823	0.974	1.95		B8L0059	11-Dec-18	100 g	13-Dec-18 20:17	1
PFHxS	355-46-4	ND	0.823	0.974	1.95		B8L0059	11-Dec-18	100 g	13-Dec-18 20:17	1
6:2 FTS	27619-97-2	144	4.11	4.87	9.74	D	B8L0059	11-Dec-18	100 g	14-Dec-18 16:20	5
PFOA	335-67-1	1.33	0.823	0.974	1.95	J	B8L0059	11-Dec-18	100 g	13-Dec-18 20:17	1
PFHpS	375-92-8	ND	0.823	0.974	1.95		B8L0059	11-Dec-18	100 g	13-Dec-18 20:17	1
PFNA	375-95-1	2.34	0.823	0.974	1.95		B8L0059	11-Dec-18	100 g	13-Dec-18 20:17	1
PFOSA	754-91-6	ND	0.823	0.974	1.95		B8L0059	11-Dec-18	100 g	13-Dec-18 20:17	1
PFOS	1763-23-1	666	4.11	4.87	9.74	D	B8L0059	11-Dec-18	100 g	14-Dec-18 16:20	5
PFDA	335-76-2	4.32	0.823	0.974	1.95		B8L0059	11-Dec-18	100 g	13-Dec-18 20:17	1
8:2 FTS	39108-34-4	5.52	0.823	0.974	1.95		B8L0059	11-Dec-18	100 g	13-Dec-18 20:17	1
PFNS	68259-12-1	1.59	1.39	1.46	1.95	J	B8L0059	11-Dec-18	100 g	13-Dec-18 20:17	1
MeFOSAA	2355-31-9	2.98	0.823	0.974	1.95		B8L0059	11-Dec-18	100 g	13-Dec-18 20:17	1
EtFOSAA	2991-50-6	0.978	0.823	0.974	1.95	J	B8L0059	11-Dec-18	100 g	13-Dec-18 20:17	1
PUnA	2058-94-8	1.41	0.823	0.974	1.95	J	B8L0059	11-Dec-18	100 g	13-Dec-18 20:17	1
PFDS	335-77-3	2.46	0.823	0.974	1.95		B8L0059	11-Dec-18	100 g	13-Dec-18 20:17	1
PFDoA	307-55-1	2.41	0.823	0.974	1.95		B8L0059	11-Dec-18	100 g	13-Dec-18 20:17	1
PFTrDA	72629-94-8	ND	0.823	0.974	1.95		B8L0059	11-Dec-18	100 g	13-Dec-18 20:17	1
PFTeDA	376-06-7	ND	0.823	0.974	1.95		B8L0059	11-Dec-18	100 g	13-Dec-18 20:17	1

Labeled Standards	Type	% Recovery	Limits	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
13C3-PFBA	IS	84.0	60 - 130		B8L0059	11-Dec-18	100 g	13-Dec-18 20:17	1
13C3-PFPeA	IS	83.9	60 - 150		B8L0059	11-Dec-18	100 g	13-Dec-18 20:17	1
13C3-PFBS	IS	80.9	60 - 150		B8L0059	11-Dec-18	100 g	13-Dec-18 20:17	1
13C2-4:2 FTS	IS	53.3	40 - 150		B8L0059	11-Dec-18	100 g	13-Dec-18 20:17	1
13C2-PFHxA	IS	83.5	70 - 130		B8L0059	11-Dec-18	100 g	13-Dec-18 20:17	1
13C4-PFHpA	IS	86.2	60 - 150		B8L0059	11-Dec-18	100 g	13-Dec-18 20:17	1
18O2-PFHxS	IS	86.2	60 - 130		B8L0059	11-Dec-18	100 g	13-Dec-18 20:17	1
13C2-6:2 FTS	IS	92.8	40 - 150	D	B8L0059	11-Dec-18	100 g	14-Dec-18 16:20	5
13C2-PFOA	IS	75.8	60 - 130		B8L0059	11-Dec-18	100 g	13-Dec-18 20:17	1
13C5-PFNA	IS	71.7	50 - 130		B8L0059	11-Dec-18	100 g	13-Dec-18 20:17	1
13C8-PFOSA	IS	47.5	20 - 150		B8L0059	11-Dec-18	100 g	13-Dec-18 20:17	1
13C8-PFOS	IS	91.7	60 - 130	D	B8L0059	11-Dec-18	100 g	14-Dec-18 16:20	5
13C2-PFDA	IS	76.7	60 - 130		B8L0059	11-Dec-18	100 g	13-Dec-18 20:17	1

**Sample ID: SL1811140905GS-S** **VAL - PFAS**

Client Data				Laboratory Data			
Name:	Merit Laboratories, Inc.	Matrix:	Sludge	Lab Sample:	1803709-03	Column:	BEH C18
Project:	Statewide WWTP Biosolids PFAS Evaluation	Date Collected:	14-Nov-18 09:05	Date Received:	21-Nov-18 09:45		
Location:	WIXO-MI0024384-WACSL			% Solids:	1.03		

Labeled Standards	Type	% Recovery	Limits	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
13C2-8:2 FTS	IS	92.8	40 - 150		B8L0059	11-Dec-18	100 g	13-Dec-18 20:17	1
d3-MeFOSAA	IS	52.2	50 - 150		B8L0059	11-Dec-18	100 g	13-Dec-18 20:17	1
d5-EtFOSAA	IS	45.8	50 - 150	H	B8L0059	11-Dec-18	100 g	13-Dec-18 20:17	1
13C2-PFUnA	IS	64.6	60 - 130		B8L0059	11-Dec-18	100 g	13-Dec-18 20:17	1
13C2-PFDoA	IS	46.4	30 - 130		B8L0059	11-Dec-18	100 g	13-Dec-18 20:17	1
13C2-PFTeDA	IS	16.9	20 - 150	H	B8L0059	11-Dec-18	100 g	13-Dec-18 20:17	1

DL - Detection Limit	LOD - Limit of Detection	The results are reported in dry weight.	When reported, PFHxS, PFOA, PFOS, MeFOSAA and EtFOSAA include both linear and branched isomers. Only the linear isomer is reported for all other analytes.
	LOQ - Limit of quantitation	The sample size is reported in wet weight.	
		Results reported to the DL.	

**Sample ID: SL1811140930GSC**

**VAL - PFAS**

Client Data				Laboratory Data			
Name:	Merit Laboratories, Inc.	Matrix:	Sludge	Lab Sample:	1803709-05	Column:	BEH C18
Project:	Statewide WWTP Biosolids PFAS Evaluation	Date Collected:	14-Nov-18 09:30	Date Received:	21-Nov-18 09:45		
Location:	WIXO-MI0024384-DWBFP			% Solids:	17.3		

Analyte	CAS Number	Conc. (ng/g)	DL	LOD	LOQ	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
PFBA	375-22-4	14.0	0.814	0.963	1.93		B8L0059	11-Dec-18	5.99 g	13-Dec-18 20:28	1
PFPeA	2706-90-3	67.6	0.814	0.963	1.93		B8L0059	11-Dec-18	5.99 g	13-Dec-18 20:28	1
PFBS	375-73-5	2.18	0.814	0.963	1.93		B8L0059	11-Dec-18	5.99 g	13-Dec-18 20:28	1
4:2 FTS	757124-72-4	ND	0.814	0.963	1.93		B8L0059	11-Dec-18	5.99 g	13-Dec-18 20:28	1
PFHxA	307-24-4	99.6	0.814	0.963	1.93		B8L0059	11-Dec-18	5.99 g	13-Dec-18 20:28	1
PFPeS	2706-91-4	ND	0.814	0.963	1.93		B8L0059	11-Dec-18	5.99 g	13-Dec-18 20:28	1
PFHpA	375-85-9	61.3	0.814	0.963	1.93		B8L0059	11-Dec-18	5.99 g	13-Dec-18 20:28	1
PFHxS	355-46-4	ND	0.814	0.963	1.93		B8L0059	11-Dec-18	5.99 g	13-Dec-18 20:28	1
6:2 FTS	27619-97-2	21.8	0.814	0.963	1.93		B8L0059	11-Dec-18	5.99 g	13-Dec-18 20:28	1
PFOA	335-67-1	4.58	0.814	0.963	1.93		B8L0059	11-Dec-18	5.99 g	13-Dec-18 20:28	1
PFHpS	375-92-8	ND	0.814	0.963	1.93		B8L0059	11-Dec-18	5.99 g	13-Dec-18 20:28	1
PFNA	375-95-1	4.38	0.814	0.963	1.93		B8L0059	11-Dec-18	5.99 g	13-Dec-18 20:28	1
PFOSA	754-91-6	1.47	0.814	0.963	1.93	J	B8L0059	11-Dec-18	5.99 g	13-Dec-18 20:28	1
PFOS	1763-23-1	1200	4.07	4.81	9.63	D	B8L0059	11-Dec-18	5.99 g	14-Dec-18 10:46	5
PFDA	335-76-2	7.28	0.814	0.963	1.93		B8L0059	11-Dec-18	5.99 g	13-Dec-18 20:28	1
8:2 FTS	39108-34-4	4.88	0.814	0.963	1.93		B8L0059	11-Dec-18	5.99 g	13-Dec-18 20:28	1
PFNS	68259-12-1	3.28	1.38	1.44	1.93		B8L0059	11-Dec-18	5.99 g	13-Dec-18 20:28	1
MeFOSAA	2355-31-9	4.52	0.814	0.963	1.93		B8L0059	11-Dec-18	5.99 g	13-Dec-18 20:28	1
EtFOSAA	2991-50-6	1.45	0.814	0.963	1.93	J	B8L0059	11-Dec-18	5.99 g	13-Dec-18 20:28	1
PFOA	2058-94-8	1.91	0.814	0.963	1.93	J	B8L0059	11-Dec-18	5.99 g	13-Dec-18 20:28	1
PFDS	335-77-3	5.65	0.814	0.963	1.93		B8L0059	11-Dec-18	5.99 g	13-Dec-18 20:28	1
PFDoA	307-55-1	3.17	0.814	0.963	1.93		B8L0059	11-Dec-18	5.99 g	13-Dec-18 20:28	1
PFTTrDA	72629-94-8	ND	0.814	0.963	1.93		B8L0059	11-Dec-18	5.99 g	13-Dec-18 20:28	1
PFTeDA	376-06-7	1.20	0.814	0.963	1.93	J	B8L0059	11-Dec-18	5.99 g	13-Dec-18 20:28	1

Labeled Standards	Type	% Recovery	Limits	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
13C3-PFBA	IS	80.9	60 - 130		B8L0059	11-Dec-18	5.99 g	13-Dec-18 20:28	1
13C3-PFPeA	IS	82.9	60 - 150		B8L0059	11-Dec-18	5.99 g	13-Dec-18 20:28	1
13C3-PFBS	IS	79.4	60 - 150		B8L0059	11-Dec-18	5.99 g	13-Dec-18 20:28	1
13C2-4:2 FTS	IS	35.9	40 - 150	H	B8L0059	11-Dec-18	5.99 g	13-Dec-18 20:28	1
13C2-PFHxA	IS	78.4	70 - 130		B8L0059	11-Dec-18	5.99 g	13-Dec-18 20:28	1
13C4-PFHpA	IS	80.2	60 - 150		B8L0059	11-Dec-18	5.99 g	13-Dec-18 20:28	1
18O2-PFHxS	IS	88.8	60 - 130		B8L0059	11-Dec-18	5.99 g	13-Dec-18 20:28	1
13C2-6:2 FTS	IS	73.0	40 - 150		B8L0059	11-Dec-18	5.99 g	13-Dec-18 20:28	1
13C2-PFOA	IS	79.2	60 - 130		B8L0059	11-Dec-18	5.99 g	13-Dec-18 20:28	1
13C5-PFNA	IS	68.9	50 - 130		B8L0059	11-Dec-18	5.99 g	13-Dec-18 20:28	1
13C8-PFOSA	IS	55.1	20 - 150		B8L0059	11-Dec-18	5.99 g	13-Dec-18 20:28	1
13C8-PFOS	IS	73.1	60 - 130	D	B8L0059	11-Dec-18	5.99 g	14-Dec-18 10:46	5
13C2-PFDA	IS	73.4	60 - 130		B8L0059	11-Dec-18	5.99 g	13-Dec-18 20:28	1

**Sample ID: SL1811140930GSC** **VAL - PFAS**

Client Data				Laboratory Data			
Name:	Merit Laboratories, Inc.	Matrix:	Sludge	Lab Sample:	1803709-05	Column:	BEH C18
Project:	Statewide WWTP Biosolids PFAS Evaluation	Date Collected:	14-Nov-18 09:30	Date Received:	21-Nov-18 09:45		
Location:	WIXO-MI0024384-DWBFP			% Solids:	17.3		

Labeled Standards	Type	% Recovery	Limits	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
13C2-8:2 FTS	IS	95.2	40 - 150		B8L0059	11-Dec-18	5.99 g	13-Dec-18 20:28	1
d3-MeFOSAA	IS	63.4	50 - 150		B8L0059	11-Dec-18	5.99 g	13-Dec-18 20:28	1
d5-EtFOSAA	IS	66.2	50 - 150		B8L0059	11-Dec-18	5.99 g	13-Dec-18 20:28	1
13C2-PFUnA	IS	63.1	60 - 130		B8L0059	11-Dec-18	5.99 g	13-Dec-18 20:28	1
13C2-PFDoA	IS	62.4	30 - 130		B8L0059	11-Dec-18	5.99 g	13-Dec-18 20:28	1
13C2-PFTeDA	IS	45.2	20 - 150		B8L0059	11-Dec-18	5.99 g	13-Dec-18 20:28	1

DL - Detection Limit

LOD - Limit of Detection  
LOQ - Limit of quantitation

The results are reported in dry weight.  
The sample size is reported in wet weight.  
Results reported to the DL.

When reported, PFHxS, PFOA, PFOS, MeFOSAA and EtFOSAA include both linear and branched isomers. Only the linear isomer is reported for all other analytes.

**Sample ID: SL1811140945GSC-S**

**VAL - PFAS**

Client Data				Laboratory Data			
Name:	Merit Laboratories, Inc.	Matrix:	Sludge	Lab Sample:	1803709-06	Column:	BEH C18
Project:	Statewide WWTP Biosolids PFAS Evaluation	Date Collected:	14-Nov-18 09:45	Date Received:	21-Nov-18 09:45		
Location:	WIXO-MI0024384-IFBFP			% Solids:	0.450		

Analyte	CAS Number	Conc. (ng/g)	DL	LOD	LOQ	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
PFBA	375-22-4	4.58	0.820	0.971	1.94		B8L0059	11-Dec-18	229 g	13-Dec-18 20:38	1
PFPeA	2706-90-3	23.6	0.820	0.971	1.94		B8L0059	11-Dec-18	229 g	13-Dec-18 20:38	1
PFBS	375-73-5	0.828	0.820	0.971	1.94	J	B8L0059	11-Dec-18	229 g	13-Dec-18 20:38	1
4:2 FTS	757124-72-4	ND	0.820	0.971	1.94		B8L0059	11-Dec-18	229 g	13-Dec-18 20:38	1
PFHxA	307-24-4	19.8	0.820	0.971	1.94		B8L0059	11-Dec-18	229 g	13-Dec-18 20:38	1
PFPeS	2706-91-4	ND	0.820	0.971	1.94		B8L0059	11-Dec-18	229 g	13-Dec-18 20:38	1
PFHpA	375-85-9	15.5	0.820	0.971	1.94		B8L0059	11-Dec-18	229 g	13-Dec-18 20:38	1
PFHxS	355-46-4	ND	0.820	0.971	1.94		B8L0059	11-Dec-18	229 g	13-Dec-18 20:38	1
6:2 FTS	27619-97-2	83.5	0.820	0.971	1.94		B8L0059	11-Dec-18	229 g	13-Dec-18 20:38	1
PFOA	335-67-1	1.72	0.820	0.971	1.94	J	B8L0059	11-Dec-18	229 g	13-Dec-18 20:38	1
PFHpS	375-92-8	ND	0.820	0.971	1.94		B8L0059	11-Dec-18	229 g	13-Dec-18 20:38	1
PFNA	375-95-1	2.75	0.820	0.971	1.94		B8L0059	11-Dec-18	229 g	13-Dec-18 20:38	1
PFOSA	754-91-6	1.66	0.820	0.971	1.94	J	B8L0059	11-Dec-18	229 g	13-Dec-18 20:38	1
PFOS	1763-23-1	1090	4.10	4.85	9.71	D	B8L0059	11-Dec-18	229 g	14-Dec-18 10:57	5
PFDA	335-76-2	5.17	0.820	0.971	1.94		B8L0059	11-Dec-18	229 g	13-Dec-18 20:38	1
8:2 FTS	39108-34-4	4.14	0.820	0.971	1.94		B8L0059	11-Dec-18	229 g	13-Dec-18 20:38	1
PFNS	68259-12-1	2.25	1.39	1.46	1.94		B8L0059	11-Dec-18	229 g	13-Dec-18 20:38	1
MeFOSAA	2355-31-9	4.64	0.820	0.971	1.94		B8L0059	11-Dec-18	229 g	13-Dec-18 20:38	1
EtFOSAA	2991-50-6	1.12	0.820	0.971	1.94	J	B8L0059	11-Dec-18	229 g	13-Dec-18 20:38	1
PUnA	2058-94-8	1.33	0.820	0.971	1.94	J	B8L0059	11-Dec-18	229 g	13-Dec-18 20:38	1
PFDS	335-77-3	2.46	0.820	0.971	1.94		B8L0059	11-Dec-18	229 g	13-Dec-18 20:38	1
PFDoA	307-55-1	2.22	0.820	0.971	1.94		B8L0059	11-Dec-18	229 g	13-Dec-18 20:38	1
PFTrDA	72629-94-8	ND	0.820	0.971	1.94		B8L0059	11-Dec-18	229 g	13-Dec-18 20:38	1
PFTeDA	376-06-7	1.05	0.820	0.971	1.94	J	B8L0059	11-Dec-18	229 g	13-Dec-18 20:38	1

Labeled Standards	Type	% Recovery	Limits	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
13C3-PFBA	IS	81.4	60 - 130		B8L0059	11-Dec-18	229 g	13-Dec-18 20:38	1
13C3-PFPeA	IS	83.2	60 - 150		B8L0059	11-Dec-18	229 g	13-Dec-18 20:38	1
13C3-PFBS	IS	77.9	60 - 150		B8L0059	11-Dec-18	229 g	13-Dec-18 20:38	1
13C2-4:2 FTS	IS	54.1	40 - 150		B8L0059	11-Dec-18	229 g	13-Dec-18 20:38	1
13C2-PFHxA	IS	81.6	70 - 130		B8L0059	11-Dec-18	229 g	13-Dec-18 20:38	1
13C4-PFHpA	IS	84.5	60 - 150		B8L0059	11-Dec-18	229 g	13-Dec-18 20:38	1
18O2-PFHxS	IS	83.1	60 - 130		B8L0059	11-Dec-18	229 g	13-Dec-18 20:38	1
13C2-6:2 FTS	IS	109	40 - 150		B8L0059	11-Dec-18	229 g	13-Dec-18 20:38	1
13C2-PFOA	IS	76.0	60 - 130		B8L0059	11-Dec-18	229 g	13-Dec-18 20:38	1
13C5-PFNA	IS	69.0	50 - 130		B8L0059	11-Dec-18	229 g	13-Dec-18 20:38	1
13C8-PFOSA	IS	60.0	20 - 150		B8L0059	11-Dec-18	229 g	13-Dec-18 20:38	1
13C8-PFOS	IS	57.6	60 - 130	D, H	B8L0059	11-Dec-18	229 g	14-Dec-18 10:57	5
13C2-PFDA	IS	69.4	60 - 130		B8L0059	11-Dec-18	229 g	13-Dec-18 20:38	1



**Sample ID: SL1811140945GSC-S** **VAL - PFAS**

Client Data				Laboratory Data			
Name:	Merit Laboratories, Inc.	Matrix:	Sludge	Lab Sample:	1803709-06	Column:	BEH C18
Project:	Statewide WWTP Biosolids PFAS Evaluation	Date Collected:	14-Nov-18 09:45	Date Received:	21-Nov-18 09:45		
Location:	WIXO-MI0024384-IFBFP			% Solids:	0.450		

Labeled Standards	Type	% Recovery	Limits	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
13C2-8:2 FTS	IS	94.8	40 - 150		B8L0059	11-Dec-18	229 g	13-Dec-18 20:38	1
d3-MeFOSAA	IS	56.3	50 - 150		B8L0059	11-Dec-18	229 g	13-Dec-18 20:38	1
d5-EtFOSAA	IS	50.5	50 - 150		B8L0059	11-Dec-18	229 g	13-Dec-18 20:38	1
13C2-PFUnA	IS	66.9	60 - 130		B8L0059	11-Dec-18	229 g	13-Dec-18 20:38	1
13C2-PFDoA	IS	44.7	30 - 130		B8L0059	11-Dec-18	229 g	13-Dec-18 20:38	1
13C2-PFTeDA	IS	12.2	20 - 150	H	B8L0059	11-Dec-18	229 g	13-Dec-18 20:38	1

DL - Detection Limit

LOD - Limit of Detection  
LOQ - Limit of quantitation

The results are reported in dry weight.  
The sample size is reported in wet weight.  
Results reported to the DL.

When reported, PFHxS, PFOA, PFOS, MeFOSAA and EtFOSAA include both linear and branched isomers. Only the linear isomer is reported for all other analytes.

**Sample ID: Method Blank**
**PFAS Isotope Dilution Method**

Client Data					Laboratory Data						
Name:	Merit Laboratories, Inc.		Matrix:	Aqueous	Lab Sample:	B8K0175-BLK1		Column:	BEH C18		
Project:	Statewide WWTP Biosolids PFAS Evaluation										

Analyte	CAS Number	Conc. (ng/L)	DL	LOD	LOQ	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
PFBA	375-22-4	ND	1.37	2.00	4.00		B8K0175	28-Nov-18	0.250 L	01-Dec-18 00:49	1
PFPeA	2706-90-3	ND	1.37	2.00	4.00		B8K0175	28-Nov-18	0.250 L	01-Dec-18 00:49	1
PFBS	375-73-5	ND	1.37	2.00	4.00		B8K0175	28-Nov-18	0.250 L	01-Dec-18 00:49	1
4:2 FTS	757124-72-4	ND	1.37	2.00	4.00		B8K0175	28-Nov-18	0.250 L	01-Dec-18 00:49	1
PFHxA	307-24-4	ND	1.37	2.00	4.00		B8K0175	28-Nov-18	0.250 L	01-Dec-18 00:49	1
PFPeS	2706-91-4	ND	1.37	2.00	4.00		B8K0175	28-Nov-18	0.250 L	01-Dec-18 00:49	1
PFHpA	375-85-9	ND	1.37	2.00	4.00		B8K0175	28-Nov-18	0.250 L	01-Dec-18 00:49	1
PFHxS	355-46-4	ND	1.37	2.00	4.00		B8K0175	28-Nov-18	0.250 L	01-Dec-18 00:49	1
6:2 FTS	27619-97-2	ND	1.37	2.00	4.00		B8K0175	28-Nov-18	0.250 L	01-Dec-18 00:49	1
PFOA	335-67-1	ND	1.37	2.00	4.00		B8K0175	28-Nov-18	0.250 L	01-Dec-18 00:49	1
PFHpS	375-92-8	ND	1.37	2.00	4.00		B8K0175	28-Nov-18	0.250 L	01-Dec-18 00:49	1
PFNA	375-95-1	ND	1.37	2.00	4.00		B8K0175	28-Nov-18	0.250 L	01-Dec-18 00:49	1
PFOSA	754-91-6	ND	1.37	2.00	4.00		B8K0175	28-Nov-18	0.250 L	01-Dec-18 00:49	1
PFOS	1763-23-1	ND	1.37	2.00	4.00		B8K0175	28-Nov-18	0.250 L	01-Dec-18 00:49	1
PFDA	335-76-2	ND	1.37	2.00	4.00		B8K0175	28-Nov-18	0.250 L	01-Dec-18 00:49	1
8:2 FTS	39108-34-4	ND	1.37	2.00	4.00		B8K0175	28-Nov-18	0.250 L	01-Dec-18 00:49	1
PFNS	68259-12-1	ND	1.94	2.00	4.00		B8K0175	28-Nov-18	0.250 L	01-Dec-18 00:49	1
MeFOSAA	2355-31-9	ND	1.37	2.00	4.00		B8K0175	28-Nov-18	0.250 L	01-Dec-18 00:49	1
EtFOSAA	2991-50-6	ND	1.37	2.00	4.00		B8K0175	28-Nov-18	0.250 L	01-Dec-18 00:49	1
PFOA	2058-94-8	ND	1.37	2.00	4.00		B8K0175	28-Nov-18	0.250 L	01-Dec-18 00:49	1
PFDS	335-77-3	ND	1.37	2.00	4.00		B8K0175	28-Nov-18	0.250 L	01-Dec-18 00:49	1
PFDoA	307-55-1	ND	1.37	2.00	4.00		B8K0175	28-Nov-18	0.250 L	01-Dec-18 00:49	1
PFTTrDA	72629-94-8	ND	1.37	2.00	4.00		B8K0175	28-Nov-18	0.250 L	01-Dec-18 00:49	1
PFTeDA	376-06-7	ND	1.37	2.00	4.00		B8K0175	28-Nov-18	0.250 L	01-Dec-18 00:49	1

Labeled Standards	Type	% Recovery	Limits	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
13C3-PFBA	IS	93.2	60 - 130		B8K0175	28-Nov-18	0.250 L	01-Dec-18 00:49	1
13C3-PFPeA	IS	97.0	60 - 150		B8K0175	28-Nov-18	0.250 L	01-Dec-18 00:49	1
13C3-PFBS	IS	97.2	60 - 150		B8K0175	28-Nov-18	0.250 L	01-Dec-18 00:49	1
13C2-4:2 FTS	IS	91.7	40 - 150		B8K0175	28-Nov-18	0.250 L	01-Dec-18 00:49	1
13C2-PFHxA	IS	92.7	70 - 130		B8K0175	28-Nov-18	0.250 L	01-Dec-18 00:49	1
13C4-PFHpA	IS	83.6	60 - 150		B8K0175	28-Nov-18	0.250 L	01-Dec-18 00:49	1
18O2-PFHxS	IS	101	60 - 130		B8K0175	28-Nov-18	0.250 L	01-Dec-18 00:49	1
13C2-6:2 FTS	IS	93.9	40 - 150		B8K0175	28-Nov-18	0.250 L	01-Dec-18 00:49	1
13C2-PFOA	IS	83.7	60 - 130		B8K0175	28-Nov-18	0.250 L	01-Dec-18 00:49	1
13C5-PFNA	IS	75.9	50 - 130		B8K0175	28-Nov-18	0.250 L	01-Dec-18 00:49	1
13C8-PFOSA	IS	62.4	20 - 150		B8K0175	28-Nov-18	0.250 L	01-Dec-18 00:49	1
13C8-PFOS	IS	84.1	60 - 130		B8K0175	28-Nov-18	0.250 L	01-Dec-18 00:49	1
13C2-PFDA	IS	69.8	60 - 130		B8K0175	28-Nov-18	0.250 L	01-Dec-18 00:49	1

**Sample ID: Method Blank** **PFAS Isotope Dilution Method**

<b>Client Data</b>				<b>Laboratory Data</b>			
Name:	Merit Laboratories, Inc.	Matrix:	Aqueous	Lab Sample:	B8K0175-BLK1	Column:	BEH C18
Project:	Statewide WWTP Biosolids PFAS Evaluation						

Labeled Standards	Type	% Recovery	Limits	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
13C2-8:2 FTS	IS	79.8	40 - 150		B8K0175	28-Nov-18	0.250 L	01-Dec-18 00:49	1
d3-MeFOSAA	IS	63.5	50 - 150		B8K0175	28-Nov-18	0.250 L	01-Dec-18 00:49	1
d5-EtFOSAA	IS	71.0	50 - 150		B8K0175	28-Nov-18	0.250 L	01-Dec-18 00:49	1
13C2-PFUnA	IS	64.8	60 - 130		B8K0175	28-Nov-18	0.250 L	01-Dec-18 00:49	1
13C2-PFDoA	IS	70.4	30 - 130		B8K0175	28-Nov-18	0.250 L	01-Dec-18 00:49	1
13C2-PFTeDA	IS	41.9	20 - 150		B8K0175	28-Nov-18	0.250 L	01-Dec-18 00:49	1

DL - Detection Limit

LOD - Limit of Detection  
LOQ - Limit of quantitation

Results reported to the DL.

When reported, PFHxS, PFOA, PFOS, MeFOSAA and EtFOSAA include both linear and branched isomers. Only the linear isomer is reported for all other analytes.

**Sample ID: OPR**

**PFAS Isotope Dilution Method**

Client Data					Laboratory Data						
Name:	Merit Laboratories, Inc.		Matrix:	Aqueous	Lab Sample:	B8K0175-BS1	Column:	BEH C18			
Project:	Statewide WWTP Biosolids PFAS Evaluation										

Analyte	CAS Number	Amt Found (ng/L)	Spike Amt	% Rec	Limits	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
PFBA	375-22-4	42.4	40.0	106	70 - 130		B8K0175	28-Nov-18	0.250 L	01-Dec-18 00:39	1
PFPeA	2706-90-3	41.9	40.0	105	70 - 130		B8K0175	28-Nov-18	0.250 L	01-Dec-18 00:39	1
PFBS	375-73-5	43.5	40.0	109	70 - 130		B8K0175	28-Nov-18	0.250 L	01-Dec-18 00:39	1
4:2 FTS	757124-72-4	43.8	40.0	109	70 - 130		B8K0175	28-Nov-18	0.250 L	01-Dec-18 00:39	1
PFHxA	307-24-4	42.5	40.0	106	70 - 130		B8K0175	28-Nov-18	0.250 L	01-Dec-18 00:39	1
PFPeS	2706-91-4	41.3	40.0	103	70 - 130		B8K0175	28-Nov-18	0.250 L	01-Dec-18 00:39	1
PFHpA	375-85-9	43.8	40.0	110	70 - 130		B8K0175	28-Nov-18	0.250 L	01-Dec-18 00:39	1
PFHxS	355-46-4	44.5	40.0	111	70 - 130		B8K0175	28-Nov-18	0.250 L	01-Dec-18 00:39	1
6:2 FTS	27619-97-2	44.6	40.0	112	60 - 130		B8K0175	28-Nov-18	0.250 L	01-Dec-18 00:39	1
PFOA	335-67-1	44.3	40.0	111	70 - 130		B8K0175	28-Nov-18	0.250 L	01-Dec-18 00:39	1
PFHpS	375-92-8	47.9	40.0	120	60 - 130		B8K0175	28-Nov-18	0.250 L	01-Dec-18 00:39	1
PFNA	375-95-1	41.4	40.0	103	70 - 130		B8K0175	28-Nov-18	0.250 L	01-Dec-18 00:39	1
PFOSA	754-91-6	40.6	40.0	101	70 - 130		B8K0175	28-Nov-18	0.250 L	01-Dec-18 00:39	1
PFOS	1763-23-1	40.4	40.0	101	70 - 130		B8K0175	28-Nov-18	0.250 L	01-Dec-18 00:39	1
PFDA	335-76-2	42.0	40.0	105	70 - 130		B8K0175	28-Nov-18	0.250 L	01-Dec-18 00:39	1
8:2 FTS	39108-34-4	41.5	40.0	104	60 - 130		B8K0175	28-Nov-18	0.250 L	01-Dec-18 00:39	1
PFNS	68259-12-1	41.3	40.0	103	70 - 130		B8K0175	28-Nov-18	0.250 L	01-Dec-18 00:39	1
MeFOSAA	2355-31-9	45.2	40.0	113	70 - 130		B8K0175	28-Nov-18	0.250 L	01-Dec-18 00:39	1
EtFOSAA	2991-50-6	40.6	40.0	101	70 - 130		B8K0175	28-Nov-18	0.250 L	01-Dec-18 00:39	1
PFUnA	2058-94-8	42.6	40.0	107	70 - 130		B8K0175	28-Nov-18	0.250 L	01-Dec-18 00:39	1
PFDS	335-77-3	40.7	40.0	102	60 - 130		B8K0175	28-Nov-18	0.250 L	01-Dec-18 00:39	1
PFDoA	307-55-1	46.9	40.0	117	70 - 130		B8K0175	28-Nov-18	0.250 L	01-Dec-18 00:39	1
PFTTrDA	72629-94-8	41.7	40.0	104	60 - 130		B8K0175	28-Nov-18	0.250 L	01-Dec-18 00:39	1
PFTeDA	376-06-7	44.5	40.0	111	70 - 130		B8K0175	28-Nov-18	0.250 L	01-Dec-18 00:39	1

Labeled Standards	Type	% Rec	Limits	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
13C3-PFBA	IS	91.8	60- 130		B8K0175	28-Nov-18	0.250 L	01-Dec-18 00:39	1
13C3-PFPeA	IS	93.1	60- 150		B8K0175	28-Nov-18	0.250 L	01-Dec-18 00:39	1
13C3-PFBS	IS	91.5	60- 150		B8K0175	28-Nov-18	0.250 L	01-Dec-18 00:39	1
13C2-4:2 FTS	IS	90.1	40- 150		B8K0175	28-Nov-18	0.250 L	01-Dec-18 00:39	1
13C2-PFHxA	IS	91.0	70- 130		B8K0175	28-Nov-18	0.250 L	01-Dec-18 00:39	1
13C4-PFHpA	IS	80.1	60- 150		B8K0175	28-Nov-18	0.250 L	01-Dec-18 00:39	1
18O2-PFHxS	IS	91.5	60- 130		B8K0175	28-Nov-18	0.250 L	01-Dec-18 00:39	1
13C2-6:2 FTS	IS	89.9	40- 150		B8K0175	28-Nov-18	0.250 L	01-Dec-18 00:39	1
13C2-PFOA	IS	82.8	60- 130		B8K0175	28-Nov-18	0.250 L	01-Dec-18 00:39	1
13C5-PFNA	IS	72.2	50- 130		B8K0175	28-Nov-18	0.250 L	01-Dec-18 00:39	1

**Sample ID: OPR**

**PFAS Isotope Dilution Method**

**Client Data**

Name: Merit Laboratories, Inc.  
 Project: Statewide WWTP Biosolids PFAS Evaluation

Matrix: Aqueous

**Laboratory Data**

Lab Sample: B8K0175-BS1      Column: BEH C18

Labeled Standards	Type	% Rec	Limits	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
13C8-PFOA	IS	48.8	20- 150		B8K0175	28-Nov-18	0.250 L	01-Dec-18 00:39	1
13C8-PFOS	IS	80.1	60- 130		B8K0175	28-Nov-18	0.250 L	01-Dec-18 00:39	1
13C2-PFDA	IS	64.4	60- 130		B8K0175	28-Nov-18	0.250 L	01-Dec-18 00:39	1
13C2-8:2 FTS	IS	79.7	40- 150		B8K0175	28-Nov-18	0.250 L	01-Dec-18 00:39	1
d3-MeFOSAA	IS	56.7	50- 150		B8K0175	28-Nov-18	0.250 L	01-Dec-18 00:39	1
d5-EtFOSAA	IS	65.1	50- 150		B8K0175	28-Nov-18	0.250 L	01-Dec-18 00:39	1
13C2-PFUnA	IS	63.4	60- 130		B8K0175	28-Nov-18	0.250 L	01-Dec-18 00:39	1
13C2-PFDoA	IS	68.4	30- 130		B8K0175	28-Nov-18	0.250 L	01-Dec-18 00:39	1
13C2-PFTeDA	IS	47.4	20- 150		B8K0175	28-Nov-18	0.250 L	01-Dec-18 00:39	1

**Sample ID: Method Blank**
**PFAS Isotope Dilution Method**

Client Data					Laboratory Data							
Name:	Merit Laboratories, Inc.			Matrix:	Aqueous		Lab Sample:	B8K0219-BLK1		Column:	BEH C18	
Project:	Statewide WWTP Biosolids PFAS Evaluation											

Analyte	CAS Number	Conc. (ng/L)	DL	LOD	LOQ	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
PFBA	375-22-4	ND	1.37	2.00	4.00		B8K0219	03-Dec-18	0.250 L	04-Dec-18 20:10	1
PFPeA	2706-90-3	ND	1.37	2.00	4.00		B8K0219	03-Dec-18	0.250 L	04-Dec-18 20:10	1
PFBS	375-73-5	ND	1.37	2.00	4.00		B8K0219	03-Dec-18	0.250 L	04-Dec-18 20:10	1
4:2 FTS	757124-72-4	ND	1.37	2.00	4.00		B8K0219	03-Dec-18	0.250 L	04-Dec-18 20:10	1
PFHxA	307-24-4	ND	1.37	2.00	4.00		B8K0219	03-Dec-18	0.250 L	04-Dec-18 20:10	1
PFPeS	2706-91-4	ND	1.37	2.00	4.00		B8K0219	03-Dec-18	0.250 L	04-Dec-18 20:10	1
PFHpA	375-85-9	ND	1.37	2.00	4.00		B8K0219	03-Dec-18	0.250 L	04-Dec-18 20:10	1
PFHxS	355-46-4	ND	1.37	2.00	4.00		B8K0219	03-Dec-18	0.250 L	04-Dec-18 20:10	1
6:2 FTS	27619-97-2	ND	1.37	2.00	4.00		B8K0219	03-Dec-18	0.250 L	04-Dec-18 20:10	1
PFOA	335-67-1	ND	1.37	2.00	4.00		B8K0219	03-Dec-18	0.250 L	04-Dec-18 20:10	1
PFHpS	375-92-8	ND	1.37	2.00	4.00		B8K0219	03-Dec-18	0.250 L	04-Dec-18 20:10	1
PFNA	375-95-1	ND	1.37	2.00	4.00		B8K0219	03-Dec-18	0.250 L	04-Dec-18 20:10	1
PFOSA	754-91-6	ND	1.37	2.00	4.00		B8K0219	03-Dec-18	0.250 L	04-Dec-18 20:10	1
PFOS	1763-23-1	ND	1.37	2.00	4.00		B8K0219	03-Dec-18	0.250 L	04-Dec-18 20:10	1
PFDA	335-76-2	ND	1.37	2.00	4.00		B8K0219	03-Dec-18	0.250 L	04-Dec-18 20:10	1
8:2 FTS	39108-34-4	ND	1.37	2.00	4.00		B8K0219	03-Dec-18	0.250 L	04-Dec-18 20:10	1
PFNS	68259-12-1	ND	1.94	2.00	4.00		B8K0219	03-Dec-18	0.250 L	04-Dec-18 20:10	1
MeFOSAA	2355-31-9	ND	1.37	2.00	4.00		B8K0219	03-Dec-18	0.250 L	04-Dec-18 20:10	1
EtFOSAA	2991-50-6	ND	1.37	2.00	4.00		B8K0219	03-Dec-18	0.250 L	04-Dec-18 20:10	1
PFOA	2058-94-8	ND	1.37	2.00	4.00		B8K0219	03-Dec-18	0.250 L	04-Dec-18 20:10	1
PFDS	335-77-3	ND	1.37	2.00	4.00		B8K0219	03-Dec-18	0.250 L	04-Dec-18 20:10	1
PFDoA	307-55-1	ND	1.37	2.00	4.00		B8K0219	03-Dec-18	0.250 L	04-Dec-18 20:10	1
PFTTrDA	72629-94-8	ND	1.37	2.00	4.00		B8K0219	03-Dec-18	0.250 L	04-Dec-18 20:10	1
PFTeDA	376-06-7	ND	1.37	2.00	4.00		B8K0219	03-Dec-18	0.250 L	04-Dec-18 20:10	1

Labeled Standards	Type	% Recovery	Limits	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
13C3-PFBA	IS	91.3	60 - 130		B8K0219	03-Dec-18	0.250 L	04-Dec-18 20:10	1
13C3-PFPeA	IS	87.5	60 - 150		B8K0219	03-Dec-18	0.250 L	04-Dec-18 20:10	1
13C3-PFBS	IS	90.3	60 - 150		B8K0219	03-Dec-18	0.250 L	04-Dec-18 20:10	1
13C2-4:2 FTS	IS	79.6	40 - 150		B8K0219	03-Dec-18	0.250 L	04-Dec-18 20:10	1
13C2-PFHxA	IS	90.0	70 - 130		B8K0219	03-Dec-18	0.250 L	04-Dec-18 20:10	1
13C4-PFHpA	IS	93.7	60 - 150		B8K0219	03-Dec-18	0.250 L	04-Dec-18 20:10	1
18O2-PFHxS	IS	92.5	60 - 130		B8K0219	03-Dec-18	0.250 L	04-Dec-18 20:10	1
13C2-6:2 FTS	IS	81.3	40 - 150		B8K0219	03-Dec-18	0.250 L	04-Dec-18 20:10	1
13C2-PFOA	IS	83.6	60 - 130		B8K0219	03-Dec-18	0.250 L	04-Dec-18 20:10	1
13C5-PFNA	IS	75.3	50 - 130		B8K0219	03-Dec-18	0.250 L	04-Dec-18 20:10	1
13C8-PFOSA	IS	33.4	20 - 150		B8K0219	03-Dec-18	0.250 L	04-Dec-18 20:10	1
13C8-PFOS	IS	82.9	60 - 130		B8K0219	03-Dec-18	0.250 L	04-Dec-18 20:10	1
13C2-PFDA	IS	66.9	60 - 130		B8K0219	03-Dec-18	0.250 L	04-Dec-18 20:10	1



**Sample ID: OPR**

**PFAS Isotope Dilution Method**

Client Data					Laboratory Data						
Name:	Merit Laboratories, Inc.		Matrix:	Aqueous	Lab Sample:	B8K0219-BS1	Column:	BEH C18			
Project:	Statewide WWTP Biosolids PFAS Evaluation										

Analyte	CAS Number	Amt Found (ng/L)	Spike Amt	% Rec	Limits	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
PFBA	375-22-4	45.0	40.0	112	70 - 130		B8K0219	03-Dec-18	0.250 L	04-Dec-18 20:20	1
PFPeA	2706-90-3	43.3	40.0	108	70 - 130		B8K0219	03-Dec-18	0.250 L	04-Dec-18 20:20	1
PFBS	375-73-5	44.0	40.0	110	70 - 130		B8K0219	03-Dec-18	0.250 L	04-Dec-18 20:20	1
4:2 FTS	757124-72-4	43.9	40.0	110	70 - 130		B8K0219	03-Dec-18	0.250 L	04-Dec-18 20:20	1
PFHxA	307-24-4	43.8	40.0	110	70 - 130		B8K0219	03-Dec-18	0.250 L	04-Dec-18 20:20	1
PFPeS	2706-91-4	43.5	40.0	109	70 - 130		B8K0219	03-Dec-18	0.250 L	04-Dec-18 20:20	1
PFHpA	375-85-9	45.7	40.0	114	70 - 130		B8K0219	03-Dec-18	0.250 L	04-Dec-18 20:20	1
PFHxS	355-46-4	43.9	40.0	110	70 - 130		B8K0219	03-Dec-18	0.250 L	04-Dec-18 20:20	1
6:2 FTS	27619-97-2	45.6	40.0	114	60 - 130		B8K0219	03-Dec-18	0.250 L	04-Dec-18 20:20	1
PFOA	335-67-1	43.8	40.0	109	70 - 130		B8K0219	03-Dec-18	0.250 L	04-Dec-18 20:20	1
PFHpS	375-92-8	44.9	40.0	112	60 - 130		B8K0219	03-Dec-18	0.250 L	04-Dec-18 20:20	1
PFNA	375-95-1	42.6	40.0	106	70 - 130		B8K0219	03-Dec-18	0.250 L	04-Dec-18 20:20	1
PFOSA	754-91-6	40.9	40.0	102	70 - 130		B8K0219	03-Dec-18	0.250 L	04-Dec-18 20:20	1
PFOS	1763-23-1	43.1	40.0	108	70 - 130		B8K0219	03-Dec-18	0.250 L	04-Dec-18 20:20	1
PFDA	335-76-2	41.9	40.0	105	70 - 130		B8K0219	03-Dec-18	0.250 L	04-Dec-18 20:20	1
8:2 FTS	39108-34-4	47.3	40.0	118	60 - 130		B8K0219	03-Dec-18	0.250 L	04-Dec-18 20:20	1
PFNS	68259-12-1	42.0	40.0	105	70 - 130		B8K0219	03-Dec-18	0.250 L	04-Dec-18 20:20	1
MeFOSAA	2355-31-9	36.4	40.0	91.1	70 - 130		B8K0219	03-Dec-18	0.250 L	04-Dec-18 20:20	1
EtFOSAA	2991-50-6	41.1	40.0	103	70 - 130		B8K0219	03-Dec-18	0.250 L	04-Dec-18 20:20	1
PFUnA	2058-94-8	43.0	40.0	107	70 - 130		B8K0219	03-Dec-18	0.250 L	04-Dec-18 20:20	1
PFDS	335-77-3	39.4	40.0	98.5	60 - 130		B8K0219	03-Dec-18	0.250 L	04-Dec-18 20:20	1
PFDoA	307-55-1	45.3	40.0	113	70 - 130		B8K0219	03-Dec-18	0.250 L	04-Dec-18 20:20	1
PFTTrDA	72629-94-8	47.4	40.0	118	60 - 130		B8K0219	03-Dec-18	0.250 L	04-Dec-18 20:20	1
PFTeDA	376-06-7	47.8	40.0	120	70 - 130		B8K0219	03-Dec-18	0.250 L	04-Dec-18 20:20	1

Labeled Standards	Type	% Rec	Limits	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
13C3-PFBA	IS	90.4	60- 130		B8K0219	03-Dec-18	0.250 L	04-Dec-18 20:20	1
13C3-PFPeA	IS	89.7	60- 150		B8K0219	03-Dec-18	0.250 L	04-Dec-18 20:20	1
13C3-PFBS	IS	87.7	60- 150		B8K0219	03-Dec-18	0.250 L	04-Dec-18 20:20	1
13C2-4:2 FTS	IS	80.2	40- 150		B8K0219	03-Dec-18	0.250 L	04-Dec-18 20:20	1
13C2-PFHxA	IS	88.9	70- 130		B8K0219	03-Dec-18	0.250 L	04-Dec-18 20:20	1
13C4-PFHpA	IS	92.3	60- 150		B8K0219	03-Dec-18	0.250 L	04-Dec-18 20:20	1
18O2-PFHxS	IS	86.4	60- 130		B8K0219	03-Dec-18	0.250 L	04-Dec-18 20:20	1
13C2-6:2 FTS	IS	83.0	40- 150		B8K0219	03-Dec-18	0.250 L	04-Dec-18 20:20	1
13C2-PFOA	IS	85.0	60- 130		B8K0219	03-Dec-18	0.250 L	04-Dec-18 20:20	1
13C5-PFNA	IS	77.9	50- 130		B8K0219	03-Dec-18	0.250 L	04-Dec-18 20:20	1



**Sample ID: OPR**

**PFAS Isotope Dilution Method**

**Client Data**

Name: Merit Laboratories, Inc.  
 Project: Statewide WWTP Biosolids PFAS Evaluation

Matrix: Aqueous

**Laboratory Data**

Lab Sample: B8K0219-BS1      Column: BEH C18

Labeled Standards	Type	% Rec	Limits	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
13C8-PFOSA	IS	43.2	20- 150		B8K0219	03-Dec-18	0.250 L	04-Dec-18 20:20	1
13C8-PFOS	IS	83.8	60- 130		B8K0219	03-Dec-18	0.250 L	04-Dec-18 20:20	1
13C2-PFDA	IS	69.5	60- 130		B8K0219	03-Dec-18	0.250 L	04-Dec-18 20:20	1
13C2-8:2 FTS	IS	79.0	40- 150		B8K0219	03-Dec-18	0.250 L	04-Dec-18 20:20	1
d3-MeFOSAA	IS	85.6	50- 150		B8K0219	03-Dec-18	0.250 L	04-Dec-18 20:20	1
d5-EtFOSAA	IS	85.1	50- 150		B8K0219	03-Dec-18	0.250 L	04-Dec-18 20:20	1
13C2-PFUnA	IS	66.7	60- 130		B8K0219	03-Dec-18	0.250 L	04-Dec-18 20:20	1
13C2-PFDoA	IS	72.7	30- 130		B8K0219	03-Dec-18	0.250 L	04-Dec-18 20:20	1
13C2-PFTeDA	IS	69.6	20- 150		B8K0219	03-Dec-18	0.250 L	04-Dec-18 20:20	1

Sample ID: Method Blank						PFAS Isotope Dilution Method					
Client Data					Laboratory Data						
Name:	Merit Laboratories, Inc.		Matrix:	Aqueous		Lab Sample:	B8L0060-BLK1		Column:	BEH C18	
Project:	Statewide WWTP Biosolids PFAS Evaluation										
Analyte	CAS Number	Conc. (ng/L)	DL	LOD	LOQ	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
PFBA	375-22-4	ND	1.37	2.00	4.00		B8L0060	12-Dec-18	0.250 L	14-Dec-18 18:25	1
PFPeA	2706-90-3	ND	1.37	2.00	4.00		B8L0060	12-Dec-18	0.250 L	14-Dec-18 18:25	1
PFBS	375-73-5	ND	1.37	2.00	4.00		B8L0060	12-Dec-18	0.250 L	14-Dec-18 18:25	1
4:2 FTS	757124-72-4	ND	1.37	2.00	4.00		B8L0060	12-Dec-18	0.250 L	14-Dec-18 18:25	1
PFHxA	307-24-4	ND	1.37	2.00	4.00		B8L0060	12-Dec-18	0.250 L	14-Dec-18 18:25	1
PFPeS	2706-91-4	ND	1.37	2.00	4.00		B8L0060	12-Dec-18	0.250 L	14-Dec-18 18:25	1
PFHpA	375-85-9	ND	1.37	2.00	4.00		B8L0060	12-Dec-18	0.250 L	14-Dec-18 18:25	1
PFHxS	355-46-4	ND	1.37	2.00	4.00		B8L0060	12-Dec-18	0.250 L	14-Dec-18 18:25	1
6:2 FTS	27619-97-2	ND	1.37	2.00	4.00		B8L0060	12-Dec-18	0.250 L	14-Dec-18 18:25	1
PFOA	335-67-1	ND	1.37	2.00	4.00		B8L0060	12-Dec-18	0.250 L	14-Dec-18 18:25	1
PFHpS	375-92-8	ND	1.37	2.00	4.00		B8L0060	12-Dec-18	0.250 L	14-Dec-18 18:25	1
PFNA	375-95-1	ND	1.37	2.00	4.00		B8L0060	12-Dec-18	0.250 L	14-Dec-18 18:25	1
PFOSA	754-91-6	ND	1.37	2.00	4.00		B8L0060	12-Dec-18	0.250 L	14-Dec-18 18:25	1
PFOS	1763-23-1	ND	1.37	2.00	4.00		B8L0060	12-Dec-18	0.250 L	14-Dec-18 18:25	1
PFDA	335-76-2	ND	1.37	2.00	4.00		B8L0060	12-Dec-18	0.250 L	14-Dec-18 18:25	1
8:2 FTS	39108-34-4	ND	1.37	2.00	4.00		B8L0060	12-Dec-18	0.250 L	14-Dec-18 18:25	1
PFNS	68259-12-1	ND	1.94	2.00	4.00		B8L0060	12-Dec-18	0.250 L	14-Dec-18 18:25	1
MeFOSAA	2355-31-9	ND	1.37	2.00	4.00		B8L0060	12-Dec-18	0.250 L	14-Dec-18 18:25	1
EtFOSAA	2991-50-6	ND	1.37	2.00	4.00		B8L0060	12-Dec-18	0.250 L	14-Dec-18 18:25	1
PFOA	2058-94-8	ND	1.37	2.00	4.00		B8L0060	12-Dec-18	0.250 L	14-Dec-18 18:25	1
PFDS	335-77-3	ND	1.37	2.00	4.00		B8L0060	12-Dec-18	0.250 L	14-Dec-18 18:25	1
PFDoA	307-55-1	ND	1.37	2.00	4.00		B8L0060	12-Dec-18	0.250 L	14-Dec-18 18:25	1
PFTTrDA	72629-94-8	ND	1.37	2.00	4.00		B8L0060	12-Dec-18	0.250 L	14-Dec-18 18:25	1
PFTeDA	376-06-7	ND	1.37	2.00	4.00		B8L0060	12-Dec-18	0.250 L	14-Dec-18 18:25	1
Labeled Standards	Type	% Recovery	Limits		Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution	
13C3-PFBA	IS	93.5	60 - 130			B8L0060	12-Dec-18	0.250 L	14-Dec-18 18:25	1	
13C3-PFPeA	IS	102	60 - 150			B8L0060	12-Dec-18	0.250 L	14-Dec-18 18:25	1	
13C3-PFBS	IS	95.8	60 - 150			B8L0060	12-Dec-18	0.250 L	14-Dec-18 18:25	1	
13C2-4:2 FTS	IS	82.9	40 - 150			B8L0060	12-Dec-18	0.250 L	14-Dec-18 18:25	1	
13C2-PFHxA	IS	88.0	70 - 130			B8L0060	12-Dec-18	0.250 L	14-Dec-18 18:25	1	
13C4-PFHpA	IS	79.9	60 - 150			B8L0060	12-Dec-18	0.250 L	14-Dec-18 18:25	1	
18O2-PFHxS	IS	90.5	60 - 130			B8L0060	12-Dec-18	0.250 L	14-Dec-18 18:25	1	
13C2-6:2 FTS	IS	91.0	40 - 150			B8L0060	12-Dec-18	0.250 L	14-Dec-18 18:25	1	
13C2-PFOA	IS	83.4	60 - 130			B8L0060	12-Dec-18	0.250 L	14-Dec-18 18:25	1	
13C5-PFNA	IS	69.5	50 - 130			B8L0060	12-Dec-18	0.250 L	14-Dec-18 18:25	1	
13C8-PFOSA	IS	11.7	20 - 150		H	B8L0060	12-Dec-18	0.250 L	14-Dec-18 18:25	1	
13C8-PFOS	IS	84.2	60 - 130			B8L0060	12-Dec-18	0.250 L	14-Dec-18 18:25	1	
13C2-PFDA	IS	64.9	60 - 130			B8L0060	12-Dec-18	0.250 L	14-Dec-18 18:25	1	

**Sample ID: Method Blank** **PFAS Isotope Dilution Method**

<b>Client Data</b>				<b>Laboratory Data</b>			
Name:	Merit Laboratories, Inc.	Matrix:	Aqueous	Lab Sample:	B8L0060-BLK1	Column:	BEH C18
Project:	Statewide WWTP Biosolids PFAS Evaluation						

Labeled Standards	Type	% Recovery	Limits	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
13C2-8:2 FTS	IS	74.4	40 - 150		B8L0060	12-Dec-18	0.250 L	14-Dec-18 18:25	1
d3-MeFOSAA	IS	77.3	50 - 150		B8L0060	12-Dec-18	0.250 L	14-Dec-18 18:25	1
d5-EtFOSAA	IS	71.6	50 - 150		B8L0060	12-Dec-18	0.250 L	14-Dec-18 18:25	1
13C2-PFUnA	IS	64.6	60 - 130		B8L0060	12-Dec-18	0.250 L	14-Dec-18 18:25	1
13C2-PFDoA	IS	76.6	30 - 130		B8L0060	12-Dec-18	0.250 L	14-Dec-18 18:25	1
13C2-PFTeDA	IS	68.7	20 - 150		B8L0060	12-Dec-18	0.250 L	14-Dec-18 18:25	1

DL - Detection Limit

LOD - Limit of Detection  
LOQ - Limit of quantitation

Results reported to the DL.

When reported, PFHxS, PFOA, PFOS, MeFOSAA and EtFOSAA include both linear and branched isomers. Only the linear isomer is reported for all other analytes.

**Sample ID: OPR**

**PFAS Isotope Dilution Method**

Client Data					Laboratory Data						
Name:	Merit Laboratories, Inc.		Matrix:	Aqueous	Lab Sample:	B8L0060-BS1	Column:	BEH C18			
Project:	Statewide WWTP Biosolids PFAS Evaluation										

Analyte	CAS Number	Amt Found (ng/L)	Spike Amt	% Rec	Limits	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
PFBA	375-22-4	40.3	40.0	101	70 - 130		B8L0060	12-Dec-18	0.250 L	14-Dec-18 18:15	1
PFPeA	2706-90-3	40.5	40.0	101	70 - 130		B8L0060	12-Dec-18	0.250 L	14-Dec-18 18:15	1
PFBS	375-73-5	40.0	40.0	100	70 - 130		B8L0060	12-Dec-18	0.250 L	14-Dec-18 18:15	1
4:2 FTS	757124-72-4	41.0	40.0	103	70 - 130		B8L0060	12-Dec-18	0.250 L	14-Dec-18 18:15	1
PFHxA	307-24-4	39.6	40.0	98.9	70 - 130		B8L0060	12-Dec-18	0.250 L	14-Dec-18 18:15	1
PFPeS	2706-91-4	38.9	40.0	97.1	70 - 130		B8L0060	12-Dec-18	0.250 L	14-Dec-18 18:15	1
PFHpA	375-85-9	39.1	40.0	97.8	70 - 130		B8L0060	12-Dec-18	0.250 L	14-Dec-18 18:15	1
PFHxS	355-46-4	39.9	40.0	99.9	70 - 130		B8L0060	12-Dec-18	0.250 L	14-Dec-18 18:15	1
6:2 FTS	27619-97-2	40.7	40.0	102	60 - 130		B8L0060	12-Dec-18	0.250 L	14-Dec-18 18:15	1
PFOA	335-67-1	44.1	40.0	110	70 - 130		B8L0060	12-Dec-18	0.250 L	14-Dec-18 18:15	1
PFHpS	375-92-8	43.5	40.0	109	60 - 130		B8L0060	12-Dec-18	0.250 L	14-Dec-18 18:15	1
PFNA	375-95-1	40.8	40.0	102	70 - 130		B8L0060	12-Dec-18	0.250 L	14-Dec-18 18:15	1
PFOSA	754-91-6	40.8	40.0	102	70 - 130		B8L0060	12-Dec-18	0.250 L	14-Dec-18 18:15	1
PFOS	1763-23-1	40.1	40.0	100	70 - 130		B8L0060	12-Dec-18	0.250 L	14-Dec-18 18:15	1
PFDA	335-76-2	40.9	40.0	102	70 - 130		B8L0060	12-Dec-18	0.250 L	14-Dec-18 18:15	1
8:2 FTS	39108-34-4	41.3	40.0	103	60 - 130		B8L0060	12-Dec-18	0.250 L	14-Dec-18 18:15	1
PFNS	68259-12-1	41.2	40.0	103	70 - 130		B8L0060	12-Dec-18	0.250 L	14-Dec-18 18:15	1
MeFOSAA	2355-31-9	38.3	40.0	95.7	70 - 130		B8L0060	12-Dec-18	0.250 L	14-Dec-18 18:15	1
EtFOSAA	2991-50-6	38.1	40.0	95.3	70 - 130		B8L0060	12-Dec-18	0.250 L	14-Dec-18 18:15	1
PFUnA	2058-94-8	42.4	40.0	106	70 - 130		B8L0060	12-Dec-18	0.250 L	14-Dec-18 18:15	1
PFDS	335-77-3	40.2	40.0	101	60 - 130		B8L0060	12-Dec-18	0.250 L	14-Dec-18 18:15	1
PFDoA	307-55-1	39.9	40.0	99.7	70 - 130		B8L0060	12-Dec-18	0.250 L	14-Dec-18 18:15	1
PFTTrDA	72629-94-8	41.3	40.0	103	60 - 130		B8L0060	12-Dec-18	0.250 L	14-Dec-18 18:15	1
PFTeDA	376-06-7	42.1	40.0	105	70 - 130		B8L0060	12-Dec-18	0.250 L	14-Dec-18 18:15	1

Labeled Standards	Type	% Rec	Limits	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
13C3-PFBA	IS	91.8	60- 130		B8L0060	12-Dec-18	0.250 L	14-Dec-18 18:15	1
13C3-PFPeA	IS	102	60- 150		B8L0060	12-Dec-18	0.250 L	14-Dec-18 18:15	1
13C3-PFBS	IS	92.1	60- 150		B8L0060	12-Dec-18	0.250 L	14-Dec-18 18:15	1
13C2-4:2 FTS	IS	82.2	40- 150		B8L0060	12-Dec-18	0.250 L	14-Dec-18 18:15	1
13C2-PFHxA	IS	87.3	70- 130		B8L0060	12-Dec-18	0.250 L	14-Dec-18 18:15	1
13C4-PFHpA	IS	77.1	60- 150		B8L0060	12-Dec-18	0.250 L	14-Dec-18 18:15	1
18O2-PFHxS	IS	94.5	60- 130		B8L0060	12-Dec-18	0.250 L	14-Dec-18 18:15	1
13C2-6:2 FTS	IS	102	40- 150		B8L0060	12-Dec-18	0.250 L	14-Dec-18 18:15	1
13C2-PFOA	IS	77.9	60- 130		B8L0060	12-Dec-18	0.250 L	14-Dec-18 18:15	1
13C5-PFNA	IS	69.9	50- 130		B8L0060	12-Dec-18	0.250 L	14-Dec-18 18:15	1

**Sample ID: OPR**

**PFAS Isotope Dilution Method**

Client Data				Laboratory Data			
Name:	Merit Laboratories, Inc.	Matrix:	Aqueous	Lab Sample:	B8L0060-BS1	Column:	BEH C18
Project:	Statewide WWTP Biosolids PFAS Evaluation						

Labeled Standards	Type	% Rec	Limits	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
13C8-PFOA	IS	9.40	20- 150	H	B8L0060	12-Dec-18	0.250 L	14-Dec-18 18:15	1
13C8-PFOS	IS	85.4	60- 130		B8L0060	12-Dec-18	0.250 L	14-Dec-18 18:15	1
13C2-PFDA	IS	65.4	60- 130		B8L0060	12-Dec-18	0.250 L	14-Dec-18 18:15	1
13C2-8:2 FTS	IS	83.2	40- 150		B8L0060	12-Dec-18	0.250 L	14-Dec-18 18:15	1
d3-MeFOSAA	IS	81.4	50- 150		B8L0060	12-Dec-18	0.250 L	14-Dec-18 18:15	1
d5-EtFOSAA	IS	77.7	50- 150		B8L0060	12-Dec-18	0.250 L	14-Dec-18 18:15	1
13C2-PFUnA	IS	64.6	60- 130		B8L0060	12-Dec-18	0.250 L	14-Dec-18 18:15	1
13C2-PFDoA	IS	79.6	30- 130		B8L0060	12-Dec-18	0.250 L	14-Dec-18 18:15	1
13C2-PFTeDA	IS	66.7	20- 150		B8L0060	12-Dec-18	0.250 L	14-Dec-18 18:15	1

**Sample ID: WW1811140845GSC**

**PFAS Isotope Dilution Method**

Client Data				Laboratory Data			
Name:	Merit Laboratories, Inc.	Matrix:	Wastewater	Lab Sample:	1803709-02	Column:	BEH C18
Project:	Statewide WWTP Biosolids PFAS Evaluation	Date Collected:	14-Nov-18 08:45	Date Received:	21-Nov-18 09:45		
Location:	WIXO-MI0024384-EFPT1						

Analyte	CAS Number	Conc. (ng/L)	DL	LOD	LOQ	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
PFBA	375-22-4	89.7	1.53	2.24	4.48		B8K0175	28-Nov-18	0.223 L	01-Dec-18 01:00	1
PFPeA	2706-90-3	794	1.53	2.24	4.48		B8K0175	28-Nov-18	0.223 L	01-Dec-18 01:00	1
PFBS	375-73-5	13.1	1.53	2.24	4.48		B8K0175	28-Nov-18	0.223 L	01-Dec-18 01:00	1
4:2 FTS	757124-72-4	ND	1.53	2.24	4.48		B8K0175	28-Nov-18	0.223 L	01-Dec-18 01:00	1
PFHxA	307-24-4	442	1.53	2.24	4.48		B8K0175	28-Nov-18	0.223 L	01-Dec-18 01:00	1
PFPeS	2706-91-4	ND	1.53	2.24	4.48		B8K0175	28-Nov-18	0.223 L	01-Dec-18 01:00	1
PFHpA	375-85-9	326	1.53	2.24	4.48		B8K0175	28-Nov-18	0.223 L	01-Dec-18 01:00	1
PFHxS	355-46-4	2.81	1.53	2.24	4.48	J	B8K0175	28-Nov-18	0.223 L	01-Dec-18 01:00	1
6:2 FTS	27619-97-2	3000	7.67	11.2	22.4	D	B8K0175	28-Nov-18	0.223 L	20-Dec-18 14:04	5
PFOA	335-67-1	9.89	1.53	2.24	4.48		B8K0175	28-Nov-18	0.223 L	01-Dec-18 01:00	1
PFHpS	375-92-8	ND	1.53	2.24	4.48		B8K0175	28-Nov-18	0.223 L	01-Dec-18 01:00	1
PFNA	375-95-1	3.44	1.53	2.24	4.48	J	B8K0175	28-Nov-18	0.223 L	01-Dec-18 01:00	1
PFOSA	754-91-6	ND	1.53	2.24	4.48		B8K0175	28-Nov-18	0.223 L	01-Dec-18 01:00	1
PFOS	1763-23-1	269	1.53	2.24	4.48		B8K0175	28-Nov-18	0.223 L	01-Dec-18 01:00	1
PFDA	335-76-2	ND	1.53	2.24	4.48		B8K0175	28-Nov-18	0.223 L	01-Dec-18 01:00	1
8:2 FTS	39108-34-4	ND	1.53	2.24	4.48		B8K0175	28-Nov-18	0.223 L	01-Dec-18 01:00	1
PFNS	68259-12-1	ND	2.17	2.24	4.48		B8K0175	28-Nov-18	0.223 L	01-Dec-18 01:00	1
MeFOSAA	2355-31-9	ND	1.53	2.24	4.48		B8K0175	28-Nov-18	0.223 L	01-Dec-18 01:00	1
EtFOSAA	2991-50-6	ND	1.53	2.24	4.48		B8K0175	28-Nov-18	0.223 L	01-Dec-18 01:00	1
PFOA	2058-94-8	ND	1.53	2.24	4.48		B8K0175	28-Nov-18	0.223 L	01-Dec-18 01:00	1
PFDS	335-77-3	ND	1.53	2.24	4.48		B8K0175	28-Nov-18	0.223 L	01-Dec-18 01:00	1
PFDoA	307-55-1	ND	1.53	2.24	4.48		B8K0175	28-Nov-18	0.223 L	01-Dec-18 01:00	1
PFTTrDA	72629-94-8	ND	1.53	2.24	4.48		B8K0175	28-Nov-18	0.223 L	01-Dec-18 01:00	1
PFTeDA	376-06-7	ND	1.53	2.24	4.48		B8K0175	28-Nov-18	0.223 L	01-Dec-18 01:00	1

Labeled Standards	Type	% Recovery	Limits	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
13C3-PFBA	IS	93.7	60 - 130		B8K0175	28-Nov-18	0.223 L	01-Dec-18 01:00	1
13C3-PFPeA	IS	93.3	60 - 150		B8K0175	28-Nov-18	0.223 L	01-Dec-18 01:00	1
13C3-PFBS	IS	96.3	60 - 150		B8K0175	28-Nov-18	0.223 L	01-Dec-18 01:00	1
13C2-4:2 FTS	IS	85.9	40 - 150		B8K0175	28-Nov-18	0.223 L	01-Dec-18 01:00	1
13C2-PFHxA	IS	91.9	70 - 130		B8K0175	28-Nov-18	0.223 L	01-Dec-18 01:00	1
13C4-PFHpA	IS	89.9	60 - 150		B8K0175	28-Nov-18	0.223 L	01-Dec-18 01:00	1
18O2-PFHxS	IS	102	60 - 130		B8K0175	28-Nov-18	0.223 L	01-Dec-18 01:00	1
13C2-6:2 FTS	IS	91.2	40 - 150	D	B8K0175	28-Nov-18	0.223 L	20-Dec-18 14:04	5
13C2-PFOA	IS	84.0	60 - 130		B8K0175	28-Nov-18	0.223 L	01-Dec-18 01:00	1
13C5-PFNA	IS	86.8	50 - 130		B8K0175	28-Nov-18	0.223 L	01-Dec-18 01:00	1
13C8-PFOSA	IS	41.5	20 - 150		B8K0175	28-Nov-18	0.223 L	01-Dec-18 01:00	1
13C8-PFOS	IS	84.7	60 - 130		B8K0175	28-Nov-18	0.223 L	01-Dec-18 01:00	1
13C2-PFDA	IS	80.6	60 - 130		B8K0175	28-Nov-18	0.223 L	01-Dec-18 01:00	1

**Sample ID: WW1811140845GSC** **PFAS Isotope Dilution Method**

Client Data				Laboratory Data			
Name:	Merit Laboratories, Inc.	Matrix:	Wastewater	Lab Sample:	1803709-02	Column:	BEH C18
Project:	Statewide WWTP Biosolids PFAS Evaluation	Date Collected:	14-Nov-18 08:45	Date Received:	21-Nov-18 09:45		
Location:	WIXO-MI0024384-EFPT1						

Labeled Standards	Type	% Recovery	Limits	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
13C2-8:2 FTS	IS	83.8	40 - 150		B8K0175	28-Nov-18	0.223 L	01-Dec-18 01:00	1
d3-MeFOSAA	IS	71.8	50 - 150		B8K0175	28-Nov-18	0.223 L	01-Dec-18 01:00	1
d5-EtFOSAA	IS	86.9	50 - 150		B8K0175	28-Nov-18	0.223 L	01-Dec-18 01:00	1
13C2-PFUnA	IS	75.2	60 - 130		B8K0175	28-Nov-18	0.223 L	01-Dec-18 01:00	1
13C2-PFDoA	IS	82.7	30 - 130		B8K0175	28-Nov-18	0.223 L	01-Dec-18 01:00	1
13C2-PFTeDA	IS	65.4	20 - 150		B8K0175	28-Nov-18	0.223 L	01-Dec-18 01:00	1

DL - Detection Limit

LOD - Limit of Detection  
LOQ - Limit of quantitation

Results reported to the DL.

When reported, PFHxS, PFOA, PFOS, MeFOSAA and EtFOSAA include both linear and branched isomers. Only the linear isomer is reported for all other analytes.

**Sample ID: WW1811140915GSC**

**PFAS Isotope Dilution Method**

Client Data				Laboratory Data			
Name:	Merit Laboratories, Inc.	Matrix:	Wastewater	Lab Sample:	1803709-04	Column:	BEH C18
Project:	Statewide WWTP Biosolids PFAS Evaluation	Date Collected:	14-Nov-18 09:15	Date Received:	21-Nov-18 09:45		
Location:	WIXO-MI0024384-EBSCT						

Analyte	CAS Number	Conc. (ng/L)	DL	LOD	LOQ	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
PFBA	375-22-4	85.7	1.40	2.05	4.09		B8K0175	28-Nov-18	0.244 L	01-Dec-18 01:11	1
PFPeA	2706-90-3	804	1.40	2.05	4.09		B8K0175	28-Nov-18	0.244 L	01-Dec-18 01:11	1
PFBS	375-73-5	13.4	1.40	2.05	4.09		B8K0175	28-Nov-18	0.244 L	01-Dec-18 01:11	1
4:2 FTS	757124-72-4	ND	1.40	2.05	4.09		B8K0175	28-Nov-18	0.244 L	01-Dec-18 01:11	1
PFHxA	307-24-4	446	1.40	2.05	4.09		B8K0175	28-Nov-18	0.244 L	01-Dec-18 01:11	1
PFPeS	2706-91-4	ND	1.40	2.05	4.09		B8K0175	28-Nov-18	0.244 L	01-Dec-18 01:11	1
PFHpA	375-85-9	341	1.40	2.05	4.09		B8K0175	28-Nov-18	0.244 L	01-Dec-18 01:11	1
PFHxS	355-46-4	1.45	1.40	2.05	4.09	J	B8K0175	28-Nov-18	0.244 L	01-Dec-18 01:11	1
6:2 FTS	27619-97-2	2790	7.00	10.2	20.5	D	B8K0175	28-Nov-18	0.244 L	20-Dec-18 14:14	5
PFOA	335-67-1	9.12	1.40	2.05	4.09		B8K0175	28-Nov-18	0.244 L	01-Dec-18 01:11	1
PFHpS	375-92-8	ND	1.40	2.05	4.09		B8K0175	28-Nov-18	0.244 L	01-Dec-18 01:11	1
PFNA	375-95-1	3.13	1.40	2.05	4.09	J	B8K0175	28-Nov-18	0.244 L	01-Dec-18 01:11	1
PFOSA	754-91-6	ND	1.40	2.05	4.09		B8K0175	28-Nov-18	0.244 L	01-Dec-18 01:11	1
PFOS	1763-23-1	218	1.40	2.05	4.09		B8K0175	28-Nov-18	0.244 L	01-Dec-18 01:11	1
PFDA	335-76-2	ND	1.40	2.05	4.09		B8K0175	28-Nov-18	0.244 L	01-Dec-18 01:11	1
8:2 FTS	39108-34-4	ND	1.40	2.05	4.09		B8K0175	28-Nov-18	0.244 L	01-Dec-18 01:11	1
PFNS	68259-12-1	ND	1.98	2.05	4.09		B8K0175	28-Nov-18	0.244 L	01-Dec-18 01:11	1
MeFOSAA	2355-31-9	ND	1.40	2.05	4.09		B8K0175	28-Nov-18	0.244 L	01-Dec-18 01:11	1
EtFOSAA	2991-50-6	ND	1.40	2.05	4.09		B8K0175	28-Nov-18	0.244 L	01-Dec-18 01:11	1
PFOA	2058-94-8	ND	1.40	2.05	4.09		B8K0175	28-Nov-18	0.244 L	01-Dec-18 01:11	1
PFDS	335-77-3	ND	1.40	2.05	4.09		B8K0175	28-Nov-18	0.244 L	01-Dec-18 01:11	1
PFDoA	307-55-1	ND	1.40	2.05	4.09		B8K0175	28-Nov-18	0.244 L	01-Dec-18 01:11	1
PFTTrDA	72629-94-8	ND	1.40	2.05	4.09		B8K0175	28-Nov-18	0.244 L	01-Dec-18 01:11	1
PFTeDA	376-06-7	ND	1.40	2.05	4.09		B8K0175	28-Nov-18	0.244 L	01-Dec-18 01:11	1

Labeled Standards	Type	% Recovery	Limits	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
13C3-PFBA	IS	92.5	60 - 130		B8K0175	28-Nov-18	0.244 L	01-Dec-18 01:11	1
13C3-PFPeA	IS	92.7	60 - 150		B8K0175	28-Nov-18	0.244 L	01-Dec-18 01:11	1
13C3-PFBS	IS	98.1	60 - 150		B8K0175	28-Nov-18	0.244 L	01-Dec-18 01:11	1
13C2-4:2 FTS	IS	84.1	40 - 150		B8K0175	28-Nov-18	0.244 L	01-Dec-18 01:11	1
13C2-PFHxA	IS	93.0	70 - 130		B8K0175	28-Nov-18	0.244 L	01-Dec-18 01:11	1
13C4-PFHpA	IS	86.4	60 - 150		B8K0175	28-Nov-18	0.244 L	01-Dec-18 01:11	1
18O2-PFHxS	IS	98.7	60 - 130		B8K0175	28-Nov-18	0.244 L	01-Dec-18 01:11	1
13C2-6:2 FTS	IS	92.1	40 - 150	D	B8K0175	28-Nov-18	0.244 L	20-Dec-18 14:14	5
13C2-PFOA	IS	89.3	60 - 130		B8K0175	28-Nov-18	0.244 L	01-Dec-18 01:11	1
13C5-PFNA	IS	82.3	50 - 130		B8K0175	28-Nov-18	0.244 L	01-Dec-18 01:11	1
13C8-PFOSA	IS	69.3	20 - 150		B8K0175	28-Nov-18	0.244 L	01-Dec-18 01:11	1
13C8-PFOS	IS	91.7	60 - 130		B8K0175	28-Nov-18	0.244 L	01-Dec-18 01:11	1
13C2-PFDA	IS	75.6	60 - 130		B8K0175	28-Nov-18	0.244 L	01-Dec-18 01:11	1



**Sample ID: WW1811140915GSC** **PFAS Isotope Dilution Method**

Client Data				Laboratory Data			
Name:	Merit Laboratories, Inc.	Matrix:	Wastewater	Lab Sample:	1803709-04	Column:	BEH C18
Project:	Statewide WWTP Biosolids PFAS Evaluation	Date Collected:	14-Nov-18 09:15	Date Received:	21-Nov-18 09:45		
Location:	WIXO-MI0024384-EBSCT						

Labeled Standards	Type	% Recovery	Limits	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
13C2-8:2 FTS	IS	85.1	40 - 150		B8K0175	28-Nov-18	0.244 L	01-Dec-18 01:11	1
d3-MeFOSAA	IS	72.5	50 - 150		B8K0175	28-Nov-18	0.244 L	01-Dec-18 01:11	1
d5-EtFOSAA	IS	76.3	50 - 150		B8K0175	28-Nov-18	0.244 L	01-Dec-18 01:11	1
13C2-PFUnA	IS	73.1	60 - 130		B8K0175	28-Nov-18	0.244 L	01-Dec-18 01:11	1
13C2-PFDoA	IS	70.2	30 - 130		B8K0175	28-Nov-18	0.244 L	01-Dec-18 01:11	1
13C2-PFTeDA	IS	62.3	20 - 150		B8K0175	28-Nov-18	0.244 L	01-Dec-18 01:11	1

DL - Detection Limit

LOD - Limit of Detection  
LOQ - Limit of quantitation

Results reported to the DL.

When reported, PFHxS, PFOA, PFOS, MeFOSAA and EtFOSAA include both linear and branched isomers. Only the linear isomer is reported for all other analytes.

**Sample ID: WW1811140950GSC**

**PFAS Isotope Dilution Method**

Client Data				Laboratory Data			
Name:	Merit Laboratories, Inc.	Matrix:	Wastewater	Lab Sample:	1803709-07	Column:	BEH C18
Project:	Statewide WWTP Biosolids PFAS Evaluation	Date Collected:	14-Nov-18 09:50	Date Received:	21-Nov-18 09:45		
Location:	WIXO-MI0024384-FLBFP						

Analyte	CAS Number	Conc. (ng/L)	DL	LOD	LOQ	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
PFBA	375-22-4	288	1.69	2.48	4.95		B8K0175	28-Nov-18	0.202 L	01-Dec-18 01:21	1
PFPeA	2706-90-3	1720	1.69	2.48	4.95		B8K0175	28-Nov-18	0.202 L	01-Dec-18 01:21	1
PFBS	375-73-5	31.3	1.69	2.48	4.95		B8K0175	28-Nov-18	0.202 L	01-Dec-18 01:21	1
4:2 FTS	757124-72-4	ND	1.69	2.48	4.95		B8K0175	28-Nov-18	0.202 L	01-Dec-18 01:21	1
PFHxA	307-24-4	992	1.69	2.48	4.95		B8K0175	28-Nov-18	0.202 L	01-Dec-18 01:21	1
PFPeS	2706-91-4	ND	1.69	2.48	4.95		B8K0175	28-Nov-18	0.202 L	01-Dec-18 01:21	1
PFHpA	375-85-9	727	1.69	2.48	4.95		B8K0175	28-Nov-18	0.202 L	01-Dec-18 01:21	1
PFHxS	355-46-4	3.35	1.69	2.48	4.95	J	B8K0175	28-Nov-18	0.202 L	01-Dec-18 01:21	1
6:2 FTS	27619-97-2	1820	16.9	24.8	49.5	D	B8K0175	28-Nov-18	0.202 L	20-Dec-18 14:38	10
PFOA	335-67-1	28.6	1.69	2.48	4.95		B8K0175	28-Nov-18	0.202 L	01-Dec-18 01:21	1
PFHpS	375-92-8	9.86	1.69	2.48	4.95		B8K0175	28-Nov-18	0.202 L	01-Dec-18 01:21	1
PFNA	375-95-1	17.6	1.69	2.48	4.95		B8K0175	28-Nov-18	0.202 L	01-Dec-18 01:21	1
PFOSA	754-91-6	ND	1.69	2.48	4.95		B8K0175	28-Nov-18	0.202 L	01-Dec-18 01:21	1
PFOS	1763-23-1	8080	8.47	12.4	24.7	D	B8K0175	28-Nov-18	0.202 L	11-Dec-18 00:27	5
PFDA	335-76-2	13.7	1.69	2.48	4.95		B8K0175	28-Nov-18	0.202 L	01-Dec-18 01:21	1
8:2 FTS	39108-34-4	6.26	1.69	2.48	4.95		B8K0175	28-Nov-18	0.202 L	01-Dec-18 01:21	1
PFNS	68259-12-1	4.25	2.39	2.48	4.95	J	B8K0175	28-Nov-18	0.202 L	01-Dec-18 01:21	1
MeFOSAA	2355-31-9	4.48	1.69	2.48	4.95	J	B8K0175	28-Nov-18	0.202 L	01-Dec-18 01:21	1
EtFOSAA	2991-50-6	1.76	1.69	2.48	4.95	J	B8K0175	28-Nov-18	0.202 L	01-Dec-18 01:21	1
PFOA	2058-94-8	2.39	1.69	2.48	4.95	J	B8K0175	28-Nov-18	0.202 L	01-Dec-18 01:21	1
PFDS	335-77-3	ND	1.69	2.48	4.95		B8K0175	28-Nov-18	0.202 L	01-Dec-18 01:21	1
PFDoA	307-55-1	3.02	1.69	2.48	4.95	J	B8K0175	28-Nov-18	0.202 L	01-Dec-18 01:21	1
PFTTrDA	72629-94-8	ND	1.69	2.48	4.95		B8K0175	28-Nov-18	0.202 L	01-Dec-18 01:21	1
PFTeDA	376-06-7	ND	1.69	2.48	4.95		B8K0175	28-Nov-18	0.202 L	01-Dec-18 01:21	1

Labeled Standards	Type	% Recovery	Limits	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
13C3-PFBA	IS	82.9	60 - 130		B8K0175	28-Nov-18	0.202 L	01-Dec-18 01:21	1
13C3-PFPeA	IS	81.8	60 - 150		B8K0175	28-Nov-18	0.202 L	01-Dec-18 01:21	1
13C3-PFBS	IS	85.7	60 - 150		B8K0175	28-Nov-18	0.202 L	01-Dec-18 01:21	1
13C2-4:2 FTS	IS	77.0	40 - 150		B8K0175	28-Nov-18	0.202 L	01-Dec-18 01:21	1
13C2-PFHxA	IS	83.7	70 - 130		B8K0175	28-Nov-18	0.202 L	01-Dec-18 01:21	1
13C4-PFHpA	IS	75.3	60 - 150		B8K0175	28-Nov-18	0.202 L	01-Dec-18 01:21	1
18O2-PFHxS	IS	76.1	60 - 130		B8K0175	28-Nov-18	0.202 L	01-Dec-18 01:21	1
13C2-6:2 FTS	IS	91.7	40 - 150	D	B8K0175	28-Nov-18	0.202 L	20-Dec-18 14:38	10
13C2-PFOA	IS	62.9	60 - 130		B8K0175	28-Nov-18	0.202 L	01-Dec-18 01:21	1
13C5-PFNA	IS	50.5	50 - 130		B8K0175	28-Nov-18	0.202 L	01-Dec-18 01:21	1
13C8-PFOSA	IS	12.4	20 - 150	H	B8K0175	28-Nov-18	0.202 L	01-Dec-18 01:21	1
13C8-PFOS	IS	28.2	60 - 130	D, H	B8K0175	28-Nov-18	0.202 L	11-Dec-18 00:27	5
13C2-PFDA	IS	34.0	60 - 130	H	B8K0175	28-Nov-18	0.202 L	01-Dec-18 01:21	1

**Sample ID: WW1811140950GSC** **PFAS Isotope Dilution Method**

Client Data				Laboratory Data			
Name:	Merit Laboratories, Inc.	Matrix:	Wastewater	Lab Sample:	1803709-07	Column:	BEH C18
Project:	Statewide WWTP Biosolids PFAS Evaluation	Date Collected:	14-Nov-18 09:50	Date Received:	21-Nov-18 09:45		
Location:	WIXO-MI0024384-FLBFP						

Labeled Standards	Type	% Recovery	Limits	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
13C2-8:2 FTS	IS	47.4	40 - 150		B8K0175	28-Nov-18	0.202 L	01-Dec-18 01:21	1
d3-MeFOSAA	IS	21.1	50 - 150	H	B8K0175	28-Nov-18	0.202 L	01-Dec-18 01:21	1
d5-EtFOSAA	IS	18.9	50 - 150	H	B8K0175	28-Nov-18	0.202 L	01-Dec-18 01:21	1
13C2-PFUnA	IS	25.2	60 - 130	H	B8K0175	28-Nov-18	0.202 L	01-Dec-18 01:21	1
13C2-PFDoA	IS	21.1	30 - 130	H	B8K0175	28-Nov-18	0.202 L	01-Dec-18 01:21	1
13C2-PFTeDA	IS	17.5	20 - 150	H	B8K0175	28-Nov-18	0.202 L	01-Dec-18 01:21	1

DL - Detection Limit

LOD - Limit of Detection  
LOQ - Limit of quantitation

Results reported to the DL.

When reported, PFHxS, PFOA, PFOS, MeFOSAA and EtFOSAA include both linear and branched isomers. Only the linear isomer is reported for all other analytes.

**Sample ID: WW1811141000GSC**

**PFAS Isotope Dilution Method**

Client Data				Laboratory Data			
Name:	Merit Laboratories, Inc.	Matrix:	Wastewater	Lab Sample:	1803709-08	Column:	BEH C18
Project:	Statewide WWTP Biosolids PFAS Evaluation	Date Collected:	14-Nov-18 10:00	Date Received:	21-Nov-18 09:45		
Location:	WIXO-MI0024384-IFPT1						

Analyte	CAS Number	Conc. (ng/L)	DL	LOD	LOQ	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
PFBA	375-22-4	20.7	1.58	2.30	4.61		B8K0175	28-Nov-18	0.217 L	01-Dec-18 01:32	1
PFPeA	2706-90-3	131	1.58	2.30	4.61		B8K0175	28-Nov-18	0.217 L	01-Dec-18 01:32	1
PFBS	375-73-5	4.13	1.58	2.30	4.61	J	B8K0175	28-Nov-18	0.217 L	01-Dec-18 01:32	1
4:2 FTS	757124-72-4	2.10	1.58	2.30	4.61	J	B8K0175	28-Nov-18	0.217 L	01-Dec-18 01:32	1
PFHxA	307-24-4	71.0	1.58	2.30	4.61		B8K0175	28-Nov-18	0.217 L	01-Dec-18 01:32	1
PFPeS	2706-91-4	ND	1.58	2.30	4.61		B8K0175	28-Nov-18	0.217 L	01-Dec-18 01:32	1
PFHpA	375-85-9	52.6	1.58	2.30	4.61		B8K0175	28-Nov-18	0.217 L	01-Dec-18 01:32	1
PFHxS	355-46-4	1.93	1.58	2.30	4.61	J	B8K0175	28-Nov-18	0.217 L	01-Dec-18 01:32	1
6:2 FTS	27619-97-2	1910	7.89	11.5	23.0	D	B8K0175	28-Nov-18	0.217 L	20-Dec-18 13:43	5
PFOA	335-67-1	3.07	1.58	2.30	4.61	J	B8K0175	28-Nov-18	0.217 L	01-Dec-18 01:32	1
PFHpS	375-92-8	ND	1.58	2.30	4.61		B8K0175	28-Nov-18	0.217 L	01-Dec-18 01:32	1
PFNA	375-95-1	ND	1.58	2.30	4.61		B8K0175	28-Nov-18	0.217 L	01-Dec-18 01:32	1
PFOSA	754-91-6	ND	1.58	2.30	4.61		B8K0175	28-Nov-18	0.217 L	01-Dec-18 01:32	1
PFOS	1763-23-1	128	1.58	2.30	4.61		B8K0175	28-Nov-18	0.217 L	01-Dec-18 01:32	1
PFDA	335-76-2	ND	1.58	2.30	4.61		B8K0175	28-Nov-18	0.217 L	01-Dec-18 01:32	1
8:2 FTS	39108-34-4	4.89	1.58	2.30	4.61		B8K0175	28-Nov-18	0.217 L	01-Dec-18 01:32	1
PFNS	68259-12-1	ND	2.23	2.30	4.61		B8K0175	28-Nov-18	0.217 L	01-Dec-18 01:32	1
MeFOSAA	2355-31-9	ND	1.58	2.30	4.61		B8K0175	28-Nov-18	0.217 L	01-Dec-18 01:32	1
EtFOSAA	2991-50-6	ND	1.58	2.30	4.61		B8K0175	28-Nov-18	0.217 L	01-Dec-18 01:32	1
PFOA	2058-94-8	ND	1.58	2.30	4.61		B8K0175	28-Nov-18	0.217 L	01-Dec-18 01:32	1
PFDS	335-77-3	ND	1.58	2.30	4.61		B8K0175	28-Nov-18	0.217 L	01-Dec-18 01:32	1
PFDoA	307-55-1	ND	1.58	2.30	4.61		B8K0175	28-Nov-18	0.217 L	01-Dec-18 01:32	1
PFTTrDA	72629-94-8	ND	1.58	2.30	4.61		B8K0175	28-Nov-18	0.217 L	01-Dec-18 01:32	1
PFTeDA	376-06-7	ND	1.58	2.30	4.61		B8K0175	28-Nov-18	0.217 L	01-Dec-18 01:32	1

Labeled Standards	Type	% Recovery	Limits	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
13C3-PFBA	IS	91.2	60 - 130		B8K0175	28-Nov-18	0.217 L	01-Dec-18 01:32	1
13C3-PFPeA	IS	94.9	60 - 150		B8K0175	28-Nov-18	0.217 L	01-Dec-18 01:32	1
13C3-PFBS	IS	91.1	60 - 150		B8K0175	28-Nov-18	0.217 L	01-Dec-18 01:32	1
13C2-4:2 FTS	IS	101	40 - 150		B8K0175	28-Nov-18	0.217 L	01-Dec-18 01:32	1
13C2-PFHxA	IS	91.9	70 - 130		B8K0175	28-Nov-18	0.217 L	01-Dec-18 01:32	1
13C4-PFHpA	IS	88.3	60 - 150		B8K0175	28-Nov-18	0.217 L	01-Dec-18 01:32	1
18O2-PFHxS	IS	99.4	60 - 130		B8K0175	28-Nov-18	0.217 L	01-Dec-18 01:32	1
13C2-6:2 FTS	IS	101	40 - 150	D	B8K0175	28-Nov-18	0.217 L	20-Dec-18 13:43	5
13C2-PFOA	IS	82.6	60 - 130		B8K0175	28-Nov-18	0.217 L	01-Dec-18 01:32	1
13C5-PFNA	IS	74.1	50 - 130		B8K0175	28-Nov-18	0.217 L	01-Dec-18 01:32	1
13C8-PFOSA	IS	60.3	20 - 150		B8K0175	28-Nov-18	0.217 L	01-Dec-18 01:32	1
13C8-PFOS	IS	76.2	60 - 130		B8K0175	28-Nov-18	0.217 L	01-Dec-18 01:32	1
13C2-PFDA	IS	68.4	60 - 130		B8K0175	28-Nov-18	0.217 L	01-Dec-18 01:32	1

**Sample ID: WW1811141000GSC** **PFAS Isotope Dilution Method**

Client Data				Laboratory Data			
Name:	Merit Laboratories, Inc.	Matrix:	Wastewater	Lab Sample:	1803709-08	Column:	BEH C18
Project:	Statewide WWTP Biosolids PFAS Evaluation	Date Collected:	14-Nov-18 10:00	Date Received:	21-Nov-18 09:45		
Location:	WIXO-MI0024384-IFPT1						

Labeled Standards	Type	% Recovery	Limits	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
13C2-8:2 FTS	IS	71.9	40 - 150		B8K0175	28-Nov-18	0.217 L	01-Dec-18 01:32	1
d3-MeFOSAA	IS	56.2	50 - 150		B8K0175	28-Nov-18	0.217 L	01-Dec-18 01:32	1
d5-EtFOSAA	IS	62.3	50 - 150		B8K0175	28-Nov-18	0.217 L	01-Dec-18 01:32	1
13C2-PFUnA	IS	58.1	60 - 130	H	B8K0175	28-Nov-18	0.217 L	01-Dec-18 01:32	1
13C2-PFDoA	IS	49.4	30 - 130		B8K0175	28-Nov-18	0.217 L	01-Dec-18 01:32	1
13C2-PFTeDA	IS	38.0	20 - 150		B8K0175	28-Nov-18	0.217 L	01-Dec-18 01:32	1

DL - Detection Limit

LOD - Limit of Detection  
LOQ - Limit of quantitation

Results reported to the DL.

When reported, PFHxS, PFOA, PFOS, MeFOSAA and EtFOSAA include both linear and branched isomers. Only the linear isomer is reported for all other analytes.

**Sample ID: BS1811140830GSC-A**
**PFAS Isotope Dilution Method**

Client Data				Laboratory Data			
Name:	Merit Laboratories, Inc.	Matrix:	Aqueous	Lab Sample:	1803709-09	Column:	BEH C18
Project:	Statewide WWTP Biosolids PFAS Evaluation	Date Collected:	14-Nov-18 08:30	Date Received:	21-Nov-18 09:45		
Location:	WIXO-MI0024384-STAED						

Analyte	CAS Number	Conc. (ng/L)	DL	LOD	LOQ	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
PFBA	375-22-4	791	43.4	63.4	127		B8K0219	03-Dec-18	0.00789 L	04-Dec-18 20:52	1
PFPeA	2706-90-3	3540	43.4	63.4	127		B8K0219	03-Dec-18	0.00789 L	04-Dec-18 20:52	1
PFBS	375-73-5	66.2	43.4	63.4	127	J	B8K0219	03-Dec-18	0.00789 L	04-Dec-18 20:52	1
4:2 FTS	757124-72-4	ND	43.4	63.4	127		B8K0219	03-Dec-18	0.00789 L	04-Dec-18 20:52	1
PFHxA	307-24-4	2870	43.4	63.4	127		B8K0219	03-Dec-18	0.00789 L	04-Dec-18 20:52	1
PFPeS	2706-91-4	ND	43.4	63.4	127		B8K0219	03-Dec-18	0.00789 L	04-Dec-18 20:52	1
PFHpA	375-85-9	1980	43.4	63.4	127		B8K0219	03-Dec-18	0.00789 L	04-Dec-18 20:52	1
PFHxS	355-46-4	ND	43.4	63.4	127		B8K0219	03-Dec-18	0.00789 L	04-Dec-18 20:52	1
6:2 FTS	27619-97-2	11500	43.4	63.4	127		B8K0219	03-Dec-18	0.00789 L	04-Dec-18 20:52	1
PFOA	335-67-1	108	43.4	63.4	127	J	B8K0219	03-Dec-18	0.00789 L	04-Dec-18 20:52	1
PFHpS	375-92-8	ND	43.4	63.4	127		B8K0219	03-Dec-18	0.00789 L	04-Dec-18 20:52	1
PFNA	375-95-1	50.4	43.4	63.4	127	J	B8K0219	03-Dec-18	0.00789 L	04-Dec-18 20:52	1
PFOSA	754-91-6	ND	43.4	63.4	127		B8K0219	03-Dec-18	0.00789 L	04-Dec-18 20:52	1
PFOS	1763-23-1	11700	43.4	63.4	127		B8K0219	03-Dec-18	0.00789 L	04-Dec-18 20:52	1
PFDA	335-76-2	ND	43.4	63.4	127		B8K0219	03-Dec-18	0.00789 L	04-Dec-18 20:52	1
8:2 FTS	39108-34-4	56.9	43.4	63.4	127	J	B8K0219	03-Dec-18	0.00789 L	04-Dec-18 20:52	1
PFNS	68259-12-1	ND	61.3	63.4	127		B8K0219	03-Dec-18	0.00789 L	04-Dec-18 20:52	1
MeFOSAA	2355-31-9	ND	43.4	63.4	127		B8K0219	03-Dec-18	0.00789 L	04-Dec-18 20:52	1
EtFOSAA	2991-50-6	ND	43.4	63.4	127		B8K0219	03-Dec-18	0.00789 L	04-Dec-18 20:52	1
PFOA	2058-94-8	ND	43.4	63.4	127		B8K0219	03-Dec-18	0.00789 L	04-Dec-18 20:52	1
PFDS	335-77-3	ND	43.4	63.4	127		B8K0219	03-Dec-18	0.00789 L	04-Dec-18 20:52	1
PFDoA	307-55-1	ND	43.4	63.4	127		B8K0219	03-Dec-18	0.00789 L	04-Dec-18 20:52	1
PFTTrDA	72629-94-8	ND	43.4	63.4	127		B8K0219	03-Dec-18	0.00789 L	04-Dec-18 20:52	1
PFTeDA	376-06-7	ND	43.4	63.4	127		B8K0219	03-Dec-18	0.00789 L	04-Dec-18 20:52	1

Labeled Standards	Type	% Recovery	Limits	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
13C3-PFBA	IS	91.5	60 - 130		B8K0219	03-Dec-18	0.00789 L	04-Dec-18 20:52	1
13C3-PFPeA	IS	91.2	60 - 150		B8K0219	03-Dec-18	0.00789 L	04-Dec-18 20:52	1
13C3-PFBS	IS	92.6	60 - 150		B8K0219	03-Dec-18	0.00789 L	04-Dec-18 20:52	1
13C2-4:2 FTS	IS	80.9	40 - 150		B8K0219	03-Dec-18	0.00789 L	04-Dec-18 20:52	1
13C2-PFHxA	IS	95.5	70 - 130		B8K0219	03-Dec-18	0.00789 L	04-Dec-18 20:52	1
13C4-PFHpA	IS	95.3	60 - 150		B8K0219	03-Dec-18	0.00789 L	04-Dec-18 20:52	1
18O2-PFHxS	IS	89.2	60 - 130		B8K0219	03-Dec-18	0.00789 L	04-Dec-18 20:52	1
13C2-6:2 FTS	IS	84.8	40 - 150		B8K0219	03-Dec-18	0.00789 L	04-Dec-18 20:52	1
13C2-PFOA	IS	84.0	60 - 130		B8K0219	03-Dec-18	0.00789 L	04-Dec-18 20:52	1
13C5-PFNA	IS	81.5	50 - 130		B8K0219	03-Dec-18	0.00789 L	04-Dec-18 20:52	1
13C8-PFOSA	IS	57.3	20 - 150		B8K0219	03-Dec-18	0.00789 L	04-Dec-18 20:52	1
13C8-PFOS	IS	91.9	60 - 130		B8K0219	03-Dec-18	0.00789 L	04-Dec-18 20:52	1
13C2-PFDA	IS	84.1	60 - 130		B8K0219	03-Dec-18	0.00789 L	04-Dec-18 20:52	1

**Sample ID: BS1811140830GSC-A** **PFAS Isotope Dilution Method**

Client Data				Laboratory Data			
Name:	Merit Laboratories, Inc.	Matrix:	Aqueous	Lab Sample:	1803709-09	Column:	BEH C18
Project:	Statewide WWTP Biosolids PFAS Evaluation	Date Collected:	14-Nov-18 08:30	Date Received:	21-Nov-18 09:45		
Location:	WIXO-MI0024384-STAED						

Labeled Standards	Type	% Recovery	Limits	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
13C2-8:2 FTS	IS	81.5	40 - 150		B8K0219	03-Dec-18	0.00789 L	04-Dec-18 20:52	1
d3-MeFOSAA	IS	76.8	50 - 150		B8K0219	03-Dec-18	0.00789 L	04-Dec-18 20:52	1
d5-EtFOSAA	IS	75.4	50 - 150		B8K0219	03-Dec-18	0.00789 L	04-Dec-18 20:52	1
13C2-PFUnA	IS	81.4	60 - 130		B8K0219	03-Dec-18	0.00789 L	04-Dec-18 20:52	1
13C2-PFDoA	IS	78.1	30 - 130		B8K0219	03-Dec-18	0.00789 L	04-Dec-18 20:52	1
13C2-PFTeDA	IS	72.6	20 - 150		B8K0219	03-Dec-18	0.00789 L	04-Dec-18 20:52	1

DL - Detection Limit

LOD - Limit of Detection  
LOQ - Limit of quantitation

Results reported to the DL.

When reported, PFHxS, PFOA, PFOS, MeFOSAA and EtFOSAA include both linear and branched isomers. Only the linear isomer is reported for all other analytes.

**Sample ID: SL1811140905GSC-A**

**PFAS Isotope Dilution Method**

Client Data				Laboratory Data			
Name:	Merit Laboratories, Inc.	Matrix:	Wastewater	Lab Sample:	1803709-10	Column:	BEH C18
Project:	Statewide WWTP Biosolids PFAS Evaluation	Date Collected:	14-Nov-18 09:05	Date Received:	21-Nov-18 09:45		
Location:	WIXO-MI0024384-WACSL						

Analyte	CAS Number	Conc. (ng/L)	DL	LOD	LOQ	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
PFBA	375-22-4	130	3.78	5.52	11.0		B8L0060	12-Dec-18	0.0906 L	14-Dec-18 19:01	1
PFPeA	2706-90-3	995	3.78	5.52	11.0		B8L0060	12-Dec-18	0.0906 L	14-Dec-18 19:01	1
PFBS	375-73-5	15.0	3.78	5.52	11.0		B8L0060	12-Dec-18	0.0906 L	14-Dec-18 19:01	1
4:2 FTS	757124-72-4	ND	3.78	5.52	11.0		B8L0060	12-Dec-18	0.0906 L	14-Dec-18 19:01	1
PFHxA	307-24-4	588	3.78	5.52	11.0		B8L0060	12-Dec-18	0.0906 L	14-Dec-18 19:01	1
PFPeS	2706-91-4	ND	3.78	5.52	11.0		B8L0060	12-Dec-18	0.0906 L	14-Dec-18 19:01	1
PFHpA	375-85-9	535	3.78	5.52	11.0		B8L0060	12-Dec-18	0.0906 L	14-Dec-18 19:01	1
PFHxS	355-46-4	ND	3.78	5.52	11.0		B8L0060	12-Dec-18	0.0906 L	14-Dec-18 19:01	1
6:2 FTS	27619-97-2	3580	3.78	5.52	11.0		B8L0060	12-Dec-18	0.0906 L	14-Dec-18 19:01	1
PFOA	335-67-1	24.6	3.78	5.52	11.0		B8L0060	12-Dec-18	0.0906 L	14-Dec-18 19:01	1
PFHpS	375-92-8	ND	3.78	5.52	11.0		B8L0060	12-Dec-18	0.0906 L	14-Dec-18 19:01	1
PFNA	375-95-1	10.3	3.78	5.52	11.0	J	B8L0060	12-Dec-18	0.0906 L	14-Dec-18 19:01	1
PFOSA	754-91-6	ND	3.78	5.52	11.0		B8L0060	12-Dec-18	0.0906 L	14-Dec-18 19:01	1
PFOS	1763-23-1	555	3.78	5.52	11.0		B8L0060	12-Dec-18	0.0906 L	14-Dec-18 19:01	1
PFDA	335-76-2	ND	3.78	5.52	11.0		B8L0060	12-Dec-18	0.0906 L	14-Dec-18 19:01	1
8:2 FTS	39108-34-4	4.52	3.78	5.52	11.0	J	B8L0060	12-Dec-18	0.0906 L	14-Dec-18 19:01	1
PFNS	68259-12-1	ND	5.34	5.52	11.0		B8L0060	12-Dec-18	0.0906 L	14-Dec-18 19:01	1
MeFOSAA	2355-31-9	ND	3.78	5.52	11.0		B8L0060	12-Dec-18	0.0906 L	14-Dec-18 19:01	1
EtFOSAA	2991-50-6	ND	3.78	5.52	11.0		B8L0060	12-Dec-18	0.0906 L	14-Dec-18 19:01	1
PFUnA	2058-94-8	ND	3.78	5.52	11.0		B8L0060	12-Dec-18	0.0906 L	14-Dec-18 19:01	1
PFDS	335-77-3	ND	3.78	5.52	11.0		B8L0060	12-Dec-18	0.0906 L	14-Dec-18 19:01	1
PFDoA	307-55-1	ND	3.78	5.52	11.0		B8L0060	12-Dec-18	0.0906 L	14-Dec-18 19:01	1
PFTTrDA	72629-94-8	ND	3.78	5.52	11.0		B8L0060	12-Dec-18	0.0906 L	14-Dec-18 19:01	1
PFTeDA	376-06-7	ND	3.78	5.52	11.0		B8L0060	12-Dec-18	0.0906 L	14-Dec-18 19:01	1

Labeled Standards	Type	% Recovery	Limits	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
13C3-PFBA	IS	94.6	60 - 130		B8L0060	12-Dec-18	0.0906 L	14-Dec-18 19:01	1
13C3-PFPeA	IS	91.1	60 - 150		B8L0060	12-Dec-18	0.0906 L	14-Dec-18 19:01	1
13C3-PFBS	IS	93.2	60 - 150		B8L0060	12-Dec-18	0.0906 L	14-Dec-18 19:01	1
13C2-4:2 FTS	IS	79.0	40 - 150		B8L0060	12-Dec-18	0.0906 L	14-Dec-18 19:01	1
13C2-PFHxA	IS	92.5	70 - 130		B8L0060	12-Dec-18	0.0906 L	14-Dec-18 19:01	1
13C4-PFHpA	IS	95.5	60 - 150		B8L0060	12-Dec-18	0.0906 L	14-Dec-18 19:01	1
18O2-PFHxS	IS	99.6	60 - 130		B8L0060	12-Dec-18	0.0906 L	14-Dec-18 19:01	1
13C2-6:2 FTS	IS	55.3	40 - 150		B8L0060	12-Dec-18	0.0906 L	14-Dec-18 19:01	1
13C2-PFOA	IS	89.5	60 - 130		B8L0060	12-Dec-18	0.0906 L	14-Dec-18 19:01	1
13C5-PFNA	IS	85.6	50 - 130		B8L0060	12-Dec-18	0.0906 L	14-Dec-18 19:01	1
13C8-PFOSA	IS	40.3	20 - 150		B8L0060	12-Dec-18	0.0906 L	14-Dec-18 19:01	1
13C8-PFOS	IS	85.5	60 - 130		B8L0060	12-Dec-18	0.0906 L	14-Dec-18 19:01	1
13C2-PFDA	IS	88.3	60 - 130		B8L0060	12-Dec-18	0.0906 L	14-Dec-18 19:01	1



**Sample ID: SL1811140905GSC-A** **PFAS Isotope Dilution Method**

Client Data				Laboratory Data			
Name:	Merit Laboratories, Inc.	Matrix:	Wastewater	Lab Sample:	1803709-10	Column:	BEH C18
Project:	Statewide WWTP Biosolids PFAS Evaluation	Date Collected:	14-Nov-18 09:05	Date Received:	21-Nov-18 09:45		
Location:	WIXO-MI0024384-WACSL						

Labeled Standards	Type	% Recovery	Limits	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
13C2-8:2 FTS	IS	84.0	40 - 150		B8L0060	12-Dec-18	0.0906 L	14-Dec-18 19:01	1
d3-MeFOSAA	IS	73.2	50 - 150		B8L0060	12-Dec-18	0.0906 L	14-Dec-18 19:01	1
d5-EtFOSAA	IS	69.7	50 - 150		B8L0060	12-Dec-18	0.0906 L	14-Dec-18 19:01	1
13C2-PFUnA	IS	70.9	60 - 130		B8L0060	12-Dec-18	0.0906 L	14-Dec-18 19:01	1
13C2-PFDoA	IS	67.2	30 - 130		B8L0060	12-Dec-18	0.0906 L	14-Dec-18 19:01	1
13C2-PFTeDA	IS	59.1	20 - 150		B8L0060	12-Dec-18	0.0906 L	14-Dec-18 19:01	1

DL - Detection Limit

LOD - Limit of Detection  
LOQ - Limit of quantitation

Results reported to the DL.

When reported, PFHxS, PFOA, PFOS, MeFOSAA and EtFOSAA include both linear and branched isomers. Only the linear isomer is reported for all other analytes.

**Sample ID: SL1811140945GSC-A**

**PFAS Isotope Dilution Method**

Client Data				Laboratory Data			
Name:	Merit Laboratories, Inc.	Matrix:	Wastewater	Lab Sample:	1803709-11	Column:	BEH C18
Project:	Statewide WWTP Biosolids PFAS Evaluation	Date Collected:	14-Nov-18 09:45	Date Received:	21-Nov-18 09:45		
Location:	WIXO-MI0024384-IFBFP						

Analyte	CAS Number	Conc. (ng/L)	DL	LOD	LOQ	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
PFBA	375-22-4	239	1.58	2.31	4.63		B8L0060	12-Dec-18	0.216 L	14-Dec-18 19:23	1
PFPeA	2706-90-3	1490	1.58	2.31	4.63		B8L0060	12-Dec-18	0.216 L	14-Dec-18 19:23	1
PFBS	375-73-5	24.3	1.58	2.31	4.63		B8L0060	12-Dec-18	0.216 L	14-Dec-18 19:23	1
4:2 FTS	757124-72-4	ND	1.58	2.31	4.63		B8L0060	12-Dec-18	0.216 L	14-Dec-18 19:23	1
PFHxA	307-24-4	809	1.58	2.31	4.63		B8L0060	12-Dec-18	0.216 L	14-Dec-18 19:23	1
PFPeS	2706-91-4	ND	1.58	2.31	4.63		B8L0060	12-Dec-18	0.216 L	14-Dec-18 19:23	1
PFHpA	375-85-9	608	1.58	2.31	4.63		B8L0060	12-Dec-18	0.216 L	14-Dec-18 19:23	1
PFHxS	355-46-4	1.80	1.58	2.31	4.63	J	B8L0060	12-Dec-18	0.216 L	14-Dec-18 19:23	1
6:2 FTS	27619-97-2	1820	1.58	2.31	4.63		B8L0060	12-Dec-18	0.216 L	14-Dec-18 19:23	1
PFOA	335-67-1	22.6	1.58	2.31	4.63		B8L0060	12-Dec-18	0.216 L	14-Dec-18 19:23	1
PFHpS	375-92-8	ND	1.58	2.31	4.63		B8L0060	12-Dec-18	0.216 L	14-Dec-18 19:23	1
PFNA	375-95-1	8.46	1.58	2.31	4.63		B8L0060	12-Dec-18	0.216 L	14-Dec-18 19:23	1
PFOSA	754-91-6	ND	1.58	2.31	4.63		B8L0060	12-Dec-18	0.216 L	14-Dec-18 19:23	1
PFOS	1763-23-1	444	1.58	2.31	4.63		B8L0060	12-Dec-18	0.216 L	14-Dec-18 19:23	1
PFDA	335-76-2	2.51	1.58	2.31	4.63	J	B8L0060	12-Dec-18	0.216 L	14-Dec-18 19:23	1
8:2 FTS	39108-34-4	3.21	1.58	2.31	4.63	J	B8L0060	12-Dec-18	0.216 L	14-Dec-18 19:23	1
PFNS	68259-12-1	ND	2.24	2.31	4.63		B8L0060	12-Dec-18	0.216 L	14-Dec-18 19:23	1
MeFOSAA	2355-31-9	ND	1.58	2.31	4.63		B8L0060	12-Dec-18	0.216 L	14-Dec-18 19:23	1
EtFOSAA	2991-50-6	ND	1.58	2.31	4.63		B8L0060	12-Dec-18	0.216 L	14-Dec-18 19:23	1
PFUnA	2058-94-8	ND	1.58	2.31	4.63		B8L0060	12-Dec-18	0.216 L	14-Dec-18 19:23	1
PFDS	335-77-3	ND	1.58	2.31	4.63		B8L0060	12-Dec-18	0.216 L	14-Dec-18 19:23	1
PFDoA	307-55-1	ND	1.58	2.31	4.63		B8L0060	12-Dec-18	0.216 L	14-Dec-18 19:23	1
PFTTrDA	72629-94-8	ND	1.58	2.31	4.63		B8L0060	12-Dec-18	0.216 L	14-Dec-18 19:23	1
PFTeDA	376-06-7	ND	1.58	2.31	4.63		B8L0060	12-Dec-18	0.216 L	14-Dec-18 19:23	1

Labeled Standards	Type	% Recovery	Limits	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
13C3-PFBA	IS	94.2	60 - 130		B8L0060	12-Dec-18	0.216 L	14-Dec-18 19:23	1
13C3-PFPeA	IS	87.9	60 - 150		B8L0060	12-Dec-18	0.216 L	14-Dec-18 19:23	1
13C3-PFBS	IS	104	60 - 150		B8L0060	12-Dec-18	0.216 L	14-Dec-18 19:23	1
13C2-4:2 FTS	IS	79.2	40 - 150		B8L0060	12-Dec-18	0.216 L	14-Dec-18 19:23	1
13C2-PFHxA	IS	91.9	70 - 130		B8L0060	12-Dec-18	0.216 L	14-Dec-18 19:23	1
13C4-PFHpA	IS	94.8	60 - 150		B8L0060	12-Dec-18	0.216 L	14-Dec-18 19:23	1
18O2-PFHxS	IS	101	60 - 130		B8L0060	12-Dec-18	0.216 L	14-Dec-18 19:23	1
13C2-6:2 FTS	IS	45.6	40 - 150		B8L0060	12-Dec-18	0.216 L	14-Dec-18 19:23	1
13C2-PFOA	IS	85.9	60 - 130		B8L0060	12-Dec-18	0.216 L	14-Dec-18 19:23	1
13C5-PFNA	IS	78.6	50 - 130		B8L0060	12-Dec-18	0.216 L	14-Dec-18 19:23	1
13C8-PFOSA	IS	50.2	20 - 150		B8L0060	12-Dec-18	0.216 L	14-Dec-18 19:23	1
13C8-PFOS	IS	80.6	60 - 130		B8L0060	12-Dec-18	0.216 L	14-Dec-18 19:23	1
13C2-PFDA	IS	74.8	60 - 130		B8L0060	12-Dec-18	0.216 L	14-Dec-18 19:23	1

**Sample ID: SL1811140945GSC-A** **PFAS Isotope Dilution Method**

Client Data				Laboratory Data			
Name:	Merit Laboratories, Inc.	Matrix:	Wastewater	Lab Sample:	1803709-11	Column:	BEH C18
Project:	Statewide WWTP Biosolids PFAS Evaluation	Date Collected:	14-Nov-18 09:45	Date Received:	21-Nov-18 09:45		
Location:	WIXO-MI0024384-IFBFP						

Labeled Standards	Type	% Recovery	Limits	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
13C2-8:2 FTS	IS	87.9	40 - 150		B8L0060	12-Dec-18	0.216 L	14-Dec-18 19:23	1
d3-MeFOSAA	IS	93.9	50 - 150		B8L0060	12-Dec-18	0.216 L	14-Dec-18 19:23	1
d5-EtFOSAA	IS	86.5	50 - 150		B8L0060	12-Dec-18	0.216 L	14-Dec-18 19:23	1
13C2-PFUnA	IS	73.5	60 - 130		B8L0060	12-Dec-18	0.216 L	14-Dec-18 19:23	1
13C2-PFDoA	IS	74.5	30 - 130		B8L0060	12-Dec-18	0.216 L	14-Dec-18 19:23	1
13C2-PFTeDA	IS	69.6	20 - 150		B8L0060	12-Dec-18	0.216 L	14-Dec-18 19:23	1

DL - Detection Limit

LOD - Limit of Detection  
LOQ - Limit of quantitation

Results reported to the DL.

When reported, PFHxS, PFOA, PFOS, MeFOSAA and EtFOSAA include both linear and branched isomers. Only the linear isomer is reported for all other analytes.

## **DATA QUALIFIERS & ABBREVIATIONS**

<b>B</b>	<b>This compound was also detected in the method blank</b>
<b>Conc.</b>	<b>Concentration</b>
<b>D</b>	<b>Dilution</b>
<b>DL</b>	<b>Detection limit</b>
<b>E</b>	<b>The associated compound concentration exceeded the calibration range of the instrument</b>
<b>H</b>	<b>Recovery and/or RPD was outside laboratory acceptance limits</b>
<b>I</b>	<b>Chemical Interference</b>
<b>J</b>	<b>The amount detected is below the Reporting Limit/LOQ</b>
<b>LOD</b>	<b>Limits of Detection</b>
<b>LOQ</b>	<b>Limits of Quantitation</b>
<b>M</b>	<b>Estimated Maximum Possible Concentration (CA Region 2 projects only)</b>
<b>NA</b>	<b>Not applicable</b>
<b>ND</b>	<b>Not Detected</b>
<b>Q</b>	<b>Ion ratio outside of 70-130% of Standard Ratio. (DOD PFAS projects only)</b>
<b>TEQ</b>	<b>Toxic Equivalency</b>
<b>U</b>	<b>Not Detected (specific projects only)</b>
<b>*</b>	<b>See Cover Letter</b>

**Unless otherwise noted, solid sample results are reported in dry weight. Tissue samples are reported in wet weight.**

### Vista Analytical Laboratory Certifications

Accrediting Authority	Certificate Number
Alaska Department of Environmental Conservation	17-013
Arkansas Department of Environmental Quality	18-008-0
California Department of Health – ELAP	2892
DoD ELAP - A2LA Accredited - ISO/IEC 17025:2005	3091.01
Florida Department of Health	E87777
Hawaii Department of Health	N/A
Louisiana Department of Environmental Quality	01977
Maine Department of Health	2018017
Michigan Department of Environmental Quality	9932
Minnesota Department of Health	1322288
New Hampshire Environmental Accreditation Program	207718
New Jersey Department of Environmental Protection	CA003
New York Department of Health	11411
Oregon Laboratory Accreditation Program	4042-009
Pennsylvania Department of Environmental Protection	015
Texas Commission on Environmental Quality	T104704189-18-9
Virginia Department of General Services	9618
Washington Department of Ecology	C584-18
Wisconsin Department of Natural Resources	998036160

*Current certificates and lists of licensed parameters are located in the Quality Assurance office and are available upon request.*

## NELAP Accredited Test Methods

MATRIX: Air	
Description of Test	Method
Determination of Polychlorinated p-Dioxins & Polychlorinated Dibenzofurans	EPA 23
Determination of Polychlorinated p-Dioxins & Polychlorinated Dibenzofurans	EPA TO-9A

MATRIX: Biological Tissue	
Description of Test	Method
Tetra- through Octa-Chlorinated Dioxins and Furans by Isotope Dilution GC/HRMS	EPA 1613B
Brominated Diphenyl Ethers by HRGC/HRMS	EPA 1614A
Chlorinated Biphenyl Congeners in Water, Soil, Sediment, and Tissue by GC/HRMS	EPA 1668A/C
Pesticides in Water, Soil, Sediment, Biosolids, and Tissue by HRGC/HRMS	EPA 1699
Perfluorinated Alkyl Acids in Drinking Water by SPE and LC/MS/MS	EPA 537
Polychlorinated Dibenzo-p-Dioxins and Polychlorinated Dibenzofurans by GC/HRMS	EPA 8280A/B
Polychlorinated Dibenzodioxins (PCDDs) and Polychlorinated Dibenzofurans (PCDFs) by GC/HRMS	EPA 8290/8290A

MATRIX: Drinking Water	
Description of Test	Method
2,3,7,8-Tetrachlorodibenzo- p-dioxin (2,3,7,8-TCDD) GC/HRMS	EPA 1613/1613B
1,4-Dioxane (1,4-Diethyleneoxide) analysis by GC/HRMS	EPA 522
Perfluorinated Alkyl Acids in Drinking Water by SPE and LC/MS/MS	EPA 537
Perfluorinated Alkyl Acids in Drinking Water by SPE and LC/MS/MS	ISO 25101 2009

MATRIX: Non-Potable Water	
Description of Test	Method
Tetra- through Octa-Chlorinated Dioxins and Furans by Isotope Dilution GC/HRMS	EPA 1613B
Brominated Diphenyl Ethers by HRGC/HRMS	EPA 1614A
Chlorinated Biphenyl Congeners in Water, Soil, Sediment, and Tissue by GC/HRMS	EPA 1668A/C
Pesticides in Water, Soil, Sediment, Biosolids, and Tissue by HRGC/HRMS	EPA 1699
Perfluorinated Alkyl Acids in Drinking Water by SPE and LC/MS/MS	EPA 537
Dioxin by GC/HRMS	EPA 613
Polychlorinated Dibenzo-p-Dioxins and Polychlorinated Dibenzofurans by GC/HRMS	EPA 8280A/B
Polychlorinated Dibenzodioxins (PCDDs) and Polychlorinated Dibenzofurans (PCDFs) by GC/HRMS	EPA 8290/8290A

MATRIX: Solids	
Description of Test	Method
Tetra-Octa Chlorinated Dioxins and Furans by Isotope Dilution GC/HRMS	EPA 1613
Tetra- through Octa-Chlorinated Dioxins and Furans by Isotope Dilution GC/HRMS	EPA 1613B
Brominated Diphenyl Ethers by HRGC/HRMS	EPA 1614A
Chlorinated Biphenyl Congeners in Water, Soil, Sediment, and Tissue by GC/HRMS	EPA 1668A/C
Pesticides in Water, Soil, Sediment, Biosolids, and Tissue by HRGC/HRMS	EPA 1699
Perfluorinated Alkyl Acids in Drinking Water by SPE and LC/MS/MS	EPA 537
Polychlorinated Dibenzo-p-Dioxins and Polychlorinated Dibenzofurans by GC/HRMS	EPA 8280A/B
Polychlorinated Dibenzodioxins (PCDDs) and Polychlorinated Dibenzofurans (PCDFs) by GC/HRMS	EPA 8290/8290A

Revised COC - rec'd via client email 11/29/18 (JW)



### CHAIN OF CUSTODY

*Laboratory Use Only*  
 Work Order: 1803709 Temp: \_\_\_\_\_ °C  
 Storage ID: \_\_\_\_\_ Storage Secured Yes  No

Client: Vista Analytical Laboratory, PO#: 04586707 01, Contact: Cath Cousineau (name)

TAT Standard:  21 days  
 (Check one):  Rush (surcharge may apply)  
 14 days  7 days Specify: \_\_\_\_\_

Invoice to: Name: Stephanie Kammer, Company: MDEQ, Address: 525 W. Allegan Street, City: Lansing, State: MI, Ph#: 517-897-1597, Fax#: 517-241-3571

Relinquished by (printed name and signature): Dorin Bogdan, Date: 11/28/2018, Time: 17:00

Relinquished by (printed name and signature): \_\_\_\_\_, Date: \_\_\_\_\_, Time: \_\_\_\_\_

Sample ID	Date	Time	Location/Sample Description	Add Analysis(es) Requested							PFAS Isotope Dilution	USEPA Method 537	Comments	
				Quantity	Type	Matrix	List of 21	List of 21 w/Isomers	List of 24	List of 24 w/Isomers				List of 28
BS1811140830GSC	11/14/18	0630	WIXO-MI0024384-STACD	2	P	BS			X					Biosolids Aerobic Storage Tank No Land Application
WW1811140845GSC	11/14/18	0845	WIXO-MI0024384-EFPT1	2	P	WW			X					EFFLUENT
SL1811140905GSC	11/14/18	0905	WIXO-MI0024384-WACSL	2	P	SL			X					Waste Activated Sludge (WAS) - Secondary Treatment
WW1811140915GSC	11/14/18	0915	WIXO-MI0024384-EBST	2	P	WW			X					EQUALIZATION BASINS - Effluent Secondary Treatment
SL1811140930GSC	11/14/18	0930	WIXO-MI0024384-DWBFP	1	P	SL			X					Belt-Filter Press (Cake)
SL1811140945GSC	11/14/18	0945	WIXO-MI0024384-IFBFP	2	P	SL			X					Influent to Belt-Filter Press prior to Polymer addition
WW1811140950GSC	11/14/18	0950	WIXO-MI0024384-FLBFP	2	P	WW			X					Filtrate from Belt-Filter Press
WW1811141000GSC	11/14/18	1000	WIXO-MI0024384-IFPT1	2	P	WW			X					INFLUENT

Special Instructions/Comments: **Send Results and Acknowledgements to the list provided**

**SEND DOCUMENTATION AND RESULTS TO:**

Name: **Stephanie Kammer**  
 Company: **MDEQ**  
 Address: **525 W. Allegan Street, Constitution Hall, 1st South West**  
 City: **Lansing** State: **MI** Zip: **30242**  
 Phone: **517-897-1597** Fax: **517-241-3571**  
 Email: **dorin.bogdan@aecom.com**

Container Types: P= HDPE, PJ= HDPE Jar  
 O = Other: \_\_\_\_\_

Bottle Preservation Type: T = Thiosulfate,  
 TZ = Trizma: \_\_\_\_\_

Matrix Types: AQ = Aqueous, DW = Drinking Water, EF = Effluent, PP = Pulp/Paper, SD = Sediment,  
 SL = Sludge, BS=Biosolids, SO = Soil, WW = Wastewater, B = Blood/Serum, O = Other: \_\_\_\_\_





# CHAIN OF CUSTODY

**For Laboratory Use Only**  
 Work Order #: 1803709 Temp: 0.7 °C  
 Storage ID: WR-2 Storage Secured: Yes  No

Project ID: Statewide WWTP Biosolids PFAS Evaluation PO#: 60588767.01 Sampler: Garth Cousineau  
 (name)

TAT Standard:  21 days  
 (check one): Rush (surcharge may apply)  
 14 days  7 days Specify: \_\_\_\_\_

Invoice to: Name Stephanie Kammer Company MDEQ Address 525 W. Allegan Street City Lansing State MI Ph# 517-897-1597 Fax# 517-241-3571

Relinquished by (printed name and signature) Garth Cousineau Date 11/19/18 Time 17:00 Received by (printed name and signature) B. Benedict Date 11/21/18 Time 09:45

Sample ID	Date	Time	Location/Sample Description	Add Analysis(es) Requested		PFAS Isotope Dilution	USEPA Method 537	Comments
				Quantity	Type			
BS1811140830GSC	11/14/18	0830	WIXO-MI0024384-STAND	2	P BS	X		SLUDGE STORAGE/LAND APP NOT USED
WW1811140845GSC	11/14/18	0845	WIXO-MI0024384-EFPLT	2	P WW	X		EFFLUENT
WW1811140905GSC	11/14/18	0905	WIXO-MI0024384-LPWAS	2	P WW	X		WASTE ACTIVATED SLUDGE
WW1811140915GSC	11/14/18	0915	WIXO-MI0024384-	2	P WW	X		EQUALIZATION BASINS
BS1811140930GSC	11/14/18	0930	WIXO-MI0024384-DWBFP	1	P BS	X		CAKE BELT FED PRESS
WW1811140945GSC	11/14/18	0945	WIXO-MI0024384-	2	P WW	X		PRE PRESS POLYMER ADDED
WW1811140950GSC	11/14/18	0950	WIXO-MI0024384-	2	P WW	X		PRE FILTRETRE
WW1811141000GSC	11/14/18	1000	WIXO-MI0024384-IFPLT	2	P WW	X		INFLUENT

Special Instructions/Comments: Send Results and Acknowledgements to the list provided

**SEND DOCUMENTATION AND RESULTS TO:**

Name: Stephanie Kammer  
 Company: MDEQ  
 Address: 525 W. Allegan Street, Constitution Hall, 1st South West  
 City: Lansing State: MI Zip: 30242  
 Phone: 517-897-1597 Fax: 517-241-3571  
 Email: dorin.bogdan@aecom.com

Container Types: P= HDPE, PJ= HDPE Jar  
 O = Other: \_\_\_\_\_

Bottle Preservation Type: T = Thiosulfate,  
 TZ = Trizma: \_\_\_\_\_

Matrix Types: AQ = Aqueous, DW = Drinking Water, EF = Effluent, PP = Pulp/Paper, SD = Sediment,  
 SL = Sludge, BS=Biosolids, SO = Soil, WW = Wastewater, B = Blood/Serum, O = Other: \_\_\_\_\_

## Sample Log-In Checklist

Vista Work Order #: 1803709 Page # 1 of 1  
TAT std

<b>Samples Arrival:</b>	Date/Time 11/21/18 0945	Initials: JBB	Location: WR-2 Shelf/Rack: NA				
<b>Logged In:</b>	Date/Time 11/21/18 1550	Initials: KE	Location: WR-2 Shelf/Rack: A4/A5				
<b>Delivered By:</b>	<input checked="" type="checkbox"/> FedEx	<input type="checkbox"/> UPS	<input type="checkbox"/> On Trac	<input type="checkbox"/> GSO	<input type="checkbox"/> DHL	<input type="checkbox"/> Hand Delivered	<input type="checkbox"/> Other
<b>Preservation:</b>	<input checked="" type="checkbox"/> Ice	<input type="checkbox"/> Blue Ice	<input type="checkbox"/> Dry Ice	<input type="checkbox"/> None			
Temp °C: 0.8 (uncorrected)	Probe used: Y <input checked="" type="checkbox"/> N		Thermometer ID: IR-4				
Temp °C: 0.7 (corrected)							

	YES	NO	NA		
Adequate Sample Volume Received?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		
Holding Time Acceptable?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		
Shipping Container(s) Intact?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		
Shipping Custody Seals Intact?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>		
Shipping Documentation Present?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		
Airbill 2 of 2   Trk # 4377 0528 7544	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		
Sample Container Intact?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		
Sample Custody Seals Intact?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>		
Chain of Custody / Sample Documentation Present?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		
COC Anomaly/Sample Acceptance Form completed?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>		
If Chlorinated or Drinking Water Samples, Acceptable Preservation?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>		
Preservation Documented:	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>		
Na <sub>2</sub> S <sub>2</sub> O <sub>3</sub> Trizma None	Yes	No	NA		
Other					
Shipping Container	Vista	<input checked="" type="checkbox"/> Client	Retain	<input checked="" type="checkbox"/> Return	Dispose

Comments:

## ANALYTICAL REPORT

Eurofins TestAmerica, Edison  
777 New Durham Road  
Edison, NJ 08817  
Tel: (732)549-3900

Laboratory Job ID: 460-179735-1

Client Project/Site: Statewide WWTP Biosolids

**For:**

Michigan Dept of Environmental Quality  
Water Resources Division  
Constitution Hall, 3rd Fl SW  
525 W. Allegan Street  
Lansing, Michigan 48909

Attn: Stephanie Kammer



Authorized for release by:  
5/1/2019 5:29:17 PM

Kris Brooks, Project Manager II  
(330)966-9790

[kris.brooks@testamericainc.com](mailto:kris.brooks@testamericainc.com)

### LINKS

Review your project  
results through  
**TotalAccess**

Have a Question?



Visit us at:  
[www.testamericainc.com](http://www.testamericainc.com)

*The test results in this report meet all 2003 NELAC and 2009 TNI requirements for accredited parameters, exceptions are noted in this report. This report may not be reproduced except in full, and with written approval from the laboratory. For questions please contact the Project Manager at the e-mail address or telephone number listed on this page.*

*This report has been electronically signed and authorized by the signatory. Electronic signature is intended to be the legally binding equivalent of a traditionally handwritten signature.*

*Results relate only to the items tested and the sample(s) as received by the laboratory.*



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# Definitions/Glossary

Client: Michigan Dept of Environmental Quality  
Project/Site: Statewide WWTP Biosolids

Job ID: 460-179735-1

## Glossary

Abbreviation	These commonly used abbreviations may or may not be present in this report.
α	Listed under the "D" column to designate that the result is reported on a dry weight basis
%R	Percent Recovery
CFL	Contains Free Liquid
CNF	Contains No Free Liquid
DER	Duplicate Error Ratio (normalized absolute difference)
Dil Fac	Dilution Factor
DL	Detection Limit (DoD/DOE)
DL, RA, RE, IN	Indicates a Dilution, Re-analysis, Re-extraction, or additional Initial metals/anion analysis of the sample
DLC	Decision Level Concentration (Radiochemistry)
EDL	Estimated Detection Limit (Dioxin)
LOD	Limit of Detection (DoD/DOE)
LOQ	Limit of Quantitation (DoD/DOE)
MDA	Minimum Detectable Activity (Radiochemistry)
MDC	Minimum Detectable Concentration (Radiochemistry)
MDL	Method Detection Limit
ML	Minimum Level (Dioxin)
NC	Not Calculated
ND	Not Detected at the reporting limit (or MDL or EDL if shown)
PQL	Practical Quantitation Limit
QC	Quality Control
RER	Relative Error Ratio (Radiochemistry)
RL	Reporting Limit or Requested Limit (Radiochemistry)
RPD	Relative Percent Difference, a measure of the relative difference between two points
TEF	Toxicity Equivalent Factor (Dioxin)
TEQ	Toxicity Equivalent Quotient (Dioxin)

# Case Narrative

Client: Michigan Dept of Environmental Quality  
Project/Site: Statewide WWTP Biosolids

Job ID: 460-179735-1

**Job ID: 460-179735-1**

**Laboratory: Eurofins TestAmerica, Edison**

**Narrative**

## CASE NARRATIVE

**Client: Michigan Dept of Environmental Quality**

**Project: Statewide WWTP Biosolids**

**Report Number: 460-179735-1**

With the exceptions noted as flags or footnotes, standard analytical protocols were followed in the analysis of the samples and no problems were encountered or anomalies observed. In addition all laboratory quality control samples were within established control limits, with any exceptions noted below. Each sample was analyzed to achieve the lowest possible reporting limit within the constraints of the method. In some cases, due to interference or analytes present at high concentrations, samples were diluted. For diluted samples, the reporting limits are adjusted relative to the dilution required.

Eurofins TestAmerica, Edison attests to the validity of the laboratory data generated by Eurofins TestAmerica facilities reported herein. All analyses performed by Eurofins TestAmerica facilities were done using established laboratory SOPs that incorporate QA/QC procedures described in the application methods. Eurofins TestAmerica's operations groups have reviewed the data for compliance with the laboratory QA/QC plan, and data have been found to be compliant with laboratory protocols unless otherwise noted below.

The test results in this report meet all NELAP requirements for parameters for which accreditation is required or available. Any exceptions to NELAP requirements are noted in this report. Pursuant to NELAP, this report may not be reproduced, except in full, without the written approval of the laboratory.

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

All holding times were met and proper preservation noted for the methods performed on these samples, unless otherwise detailed in the individual sections below.

All solid sample results are reported on an "as received" basis unless otherwise indicated by the presence of a % solids value in the method header.

This laboratory report is confidential and is intended for the sole use of Eurofins TestAmerica and its client.

### **RECEIPT**

The samples were received on 4/16/2019 9:30 AM; the samples arrived in good condition, properly preserved and, where required, on ice. The temperature of the cooler at receipt was 1.2° C.

### **TOTAL ORGANIC CARBON**

Samples SXDU21904110945MK (460-179735-1), SXDU11904111040MK (460-179735-2), SXDU21904111125MK (460-179735-3), SXDU21904111130MK-DUP (460-179735-4), SXDU11904111220MK (460-179735-5), SXDU31904111405MK (460-179735-6), SXDU21904111450MK (460-179735-7), SXDU21904111455MK-DUP (460-179735-8), SXDU11904111530MK (460-179735-9), SXDU21904111615MK (460-179735-10), SXDU11904111655MK (460-179735-11), SXDU11904120855RL (460-179735-12), SXDU21904120935RL (460-179735-13), SXDU21904121120RL (460-179735-14) and SXDU11904121200RL (460-179735-15) were analyzed for total organic carbon in accordance with Lloyd Kahn Method. The samples were analyzed on 04/24/2019.

No analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

### **PERCENT SOLIDS**

Samples SXDU21904110945MK (460-179735-1), SXDU11904111040MK (460-179735-2), SXDU21904111125MK (460-179735-3), SXDU21904111130MK-DUP (460-179735-4), SXDU11904111220MK (460-179735-5), SXDU31904111405MK (460-179735-6), SXDU21904111450MK (460-179735-7), SXDU21904111455MK-DUP (460-179735-8), SXDU11904111530MK (460-179735-9),

# Case Narrative

Client: Michigan Dept of Environmental Quality  
Project/Site: Statewide WWTP Biosolids

Job ID: 460-179735-1

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## Job ID: 460-179735-1 (Continued)

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### Laboratory: Eurofins TestAmerica, Edison (Continued)

SXDU21904111615MK (460-179735-10), SXDU11904111655MK (460-179735-11), SXDU11904120855RL (460-179735-12), SXDU21904120935RL (460-179735-13), SXDU21904121120RL (460-179735-14) and SXDU11904121200RL (460-179735-15) were analyzed for percent solids in accordance with ASTM Method D2216-80. The samples were analyzed on 04/30/2019.

No analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

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# Detection Summary

Client: Michigan Dept of Environmental Quality  
Project/Site: Statewide WWTP Biosolids

Job ID: 460-179735-1

## Client Sample ID: SXDU21904110945MK

## Lab Sample ID: 460-179735-1

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
TOC Result 1	17000		130	92	mg/Kg	1	☒	Lloyd Kahn	Total/NA

## Client Sample ID: SXDU11904111040MK

## Lab Sample ID: 460-179735-2

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
TOC Result 1	11000		120	85	mg/Kg	1	☒	Lloyd Kahn	Total/NA

## Client Sample ID: SXDU21904111125MK

## Lab Sample ID: 460-179735-3

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
TOC Result 1	11000		120	81	mg/Kg	1	☒	Lloyd Kahn	Total/NA

## Client Sample ID: SXDU21904111130MK-DUP

## Lab Sample ID: 460-179735-4

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
TOC Result 1	11000		120	81	mg/Kg	1	☒	Lloyd Kahn	Total/NA

## Client Sample ID: SXDU11904111220MK

## Lab Sample ID: 460-179735-5

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
TOC Result 1	5000		120	81	mg/Kg	1	☒	Lloyd Kahn	Total/NA

## Client Sample ID: SXDU31904111405MK

## Lab Sample ID: 460-179735-6

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
TOC Result 1	10000		110	74	mg/Kg	1	☒	Lloyd Kahn	Total/NA

## Client Sample ID: SXDU21904111450MK

## Lab Sample ID: 460-179735-7

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
TOC Result 1	11000		120	83	mg/Kg	1	☒	Lloyd Kahn	Total/NA

## Client Sample ID: SXDU21904111455MK-DUP

## Lab Sample ID: 460-179735-8

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
TOC Result 1	12000		120	82	mg/Kg	1	☒	Lloyd Kahn	Total/NA

## Client Sample ID: SXDU11904111530MK

## Lab Sample ID: 460-179735-9

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
TOC Result 1	7800		120	82	mg/Kg	1	☒	Lloyd Kahn	Total/NA

## Client Sample ID: SXDU21904111615MK

## Lab Sample ID: 460-179735-10

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
TOC Result 1	10000		120	80	mg/Kg	1	☒	Lloyd Kahn	Total/NA

## Client Sample ID: SXDU11904111655MK

## Lab Sample ID: 460-179735-11

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
TOC Result 1	7800		120	84	mg/Kg	1	☒	Lloyd Kahn	Total/NA

## Client Sample ID: SXDU11904120855RL

## Lab Sample ID: 460-179735-12

No Detections.

This Detection Summary does not include radiochemical test results.

Eurofins TestAmerica, Edison



# Detection Summary

Client: Michigan Dept of Environmental Quality  
Project/Site: Statewide WWTP Biosolids

Job ID: 460-179735-1

## Client Sample ID: SXDU21904120935RL

## Lab Sample ID: 460-179735-13

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
TOC Result 1	20000		130	91	mg/Kg	1	☼	Lloyd Kahn	Total/NA

## Client Sample ID: SXDU21904121120RL

## Lab Sample ID: 460-179735-14

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
TOC Result 1	8700		120	80	mg/Kg	1	☼	Lloyd Kahn	Total/NA

## Client Sample ID: SXDU11904121200RL

## Lab Sample ID: 460-179735-15

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
TOC Result 1	8500		120	81	mg/Kg	1	☼	Lloyd Kahn	Total/NA

This Detection Summary does not include radiochemical test results.

Eurofins TestAmerica, Edison

# Client Sample Results

Client: Michigan Dept of Environmental Quality  
 Project/Site: Statewide WWTP Biosolids

Job ID: 460-179735-1

**Client Sample ID: SXDU21904110945MK**

**Lab Sample ID: 460-179735-1**

Date Collected: 04/11/19 09:45

Matrix: Solid

Date Received: 04/16/19 09:30

**General Chemistry**

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Percent Moisture	25.6		1.0	1.0	%			04/30/19 08:39	1
Percent Solids	74.4		1.0	1.0	%			04/30/19 08:39	1

**Client Sample ID: SXDU21904110945MK**

**Lab Sample ID: 460-179735-1**

Date Collected: 04/11/19 09:45

Matrix: Solid

Date Received: 04/16/19 09:30

Percent Solids: 74.4

**General Chemistry**

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
TOC Result 1	17000		130	92	mg/Kg	☼		04/24/19 14:35	1

**Client Sample ID: SXDU11904111040MK**

**Lab Sample ID: 460-179735-2**

Date Collected: 04/11/19 10:40

Matrix: Solid

Date Received: 04/16/19 09:30

**General Chemistry**

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Percent Moisture	19.6		1.0	1.0	%			04/30/19 08:39	1
Percent Solids	80.4		1.0	1.0	%			04/30/19 08:39	1

**Client Sample ID: SXDU11904111040MK**

**Lab Sample ID: 460-179735-2**

Date Collected: 04/11/19 10:40

Matrix: Solid

Date Received: 04/16/19 09:30

Percent Solids: 80.4

**General Chemistry**

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
TOC Result 1	11000		120	85	mg/Kg	☼		04/24/19 14:42	1

**Client Sample ID: SXDU2190411125MK**

**Lab Sample ID: 460-179735-3**

Date Collected: 04/11/19 11:25

Matrix: Solid

Date Received: 04/16/19 09:30

**General Chemistry**

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Percent Moisture	15.1		1.0	1.0	%			04/30/19 08:39	1
Percent Solids	84.9		1.0	1.0	%			04/30/19 08:39	1

**Client Sample ID: SXDU2190411125MK**

**Lab Sample ID: 460-179735-3**

Date Collected: 04/11/19 11:25

Matrix: Solid

Date Received: 04/16/19 09:30

Percent Solids: 84.9

**General Chemistry**

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
TOC Result 1	11000		120	81	mg/Kg	☼		04/24/19 14:50	1

**Client Sample ID: SXDU2190411130MK-DUP**

**Lab Sample ID: 460-179735-4**

Date Collected: 04/11/19 11:30

Matrix: Solid

Date Received: 04/16/19 09:30

**General Chemistry**

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Percent Moisture	15.5		1.0	1.0	%			04/30/19 08:39	1

Eurofins TestAmerica, Edison

# Client Sample Results

Client: Michigan Dept of Environmental Quality  
 Project/Site: Statewide WWTP Biosolids

Job ID: 460-179735-1

**Client Sample ID: SXDU2190411130MK-DUP**

**Lab Sample ID: 460-179735-4**

Date Collected: 04/11/19 11:30

Matrix: Solid

Date Received: 04/16/19 09:30

**General Chemistry (Continued)**

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Percent Solids	84.5		1.0	1.0	%			04/30/19 08:39	1

**Client Sample ID: SXDU2190411130MK-DUP**

**Lab Sample ID: 460-179735-4**

Date Collected: 04/11/19 11:30

Matrix: Solid

Date Received: 04/16/19 09:30

Percent Solids: 84.5

**General Chemistry**

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
TOC Result 1	11000		120	81	mg/Kg	☼		04/24/19 14:58	1

**Client Sample ID: SXDU11904111220MK**

**Lab Sample ID: 460-179735-5**

Date Collected: 04/11/19 12:20

Matrix: Solid

Date Received: 04/16/19 09:30

**General Chemistry**

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Percent Moisture	15.2		1.0	1.0	%			04/30/19 08:39	1
Percent Solids	84.8		1.0	1.0	%			04/30/19 08:39	1

**Client Sample ID: SXDU11904111220MK**

**Lab Sample ID: 460-179735-5**

Date Collected: 04/11/19 12:20

Matrix: Solid

Date Received: 04/16/19 09:30

Percent Solids: 84.8

**General Chemistry**

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
TOC Result 1	5000		120	81	mg/Kg	☼		04/24/19 15:05	1

**Client Sample ID: SXDU31904111405MK**

**Lab Sample ID: 460-179735-6**

Date Collected: 04/11/19 14:05

Matrix: Solid

Date Received: 04/16/19 09:30

**General Chemistry**

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Percent Moisture	7.0		1.0	1.0	%			04/30/19 08:39	1
Percent Solids	93.0		1.0	1.0	%			04/30/19 08:39	1

**Client Sample ID: SXDU31904111405MK**

**Lab Sample ID: 460-179735-6**

Date Collected: 04/11/19 14:05

Matrix: Solid

Date Received: 04/16/19 09:30

Percent Solids: 93.0

**General Chemistry**

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
TOC Result 1	10000		110	74	mg/Kg	☼		04/24/19 15:13	1

**Client Sample ID: SXDU21904111450MK**

**Lab Sample ID: 460-179735-7**

Date Collected: 04/11/19 14:50

Matrix: Solid

Date Received: 04/16/19 09:30

**General Chemistry**

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Percent Moisture	17.2		1.0	1.0	%			04/30/19 08:39	1
Percent Solids	82.8		1.0	1.0	%			04/30/19 08:39	1

Eurofins TestAmerica, Edison

# Client Sample Results

Client: Michigan Dept of Environmental Quality  
Project/Site: Statewide WWTP Biosolids

Job ID: 460-179735-1

**Client Sample ID: SXDU21904111450MK**

**Lab Sample ID: 460-179735-7**

Date Collected: 04/11/19 14:50

Matrix: Solid

Date Received: 04/16/19 09:30

Percent Solids: 82.8

**General Chemistry**

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
TOC Result 1	11000		120	83	mg/Kg	☼		04/24/19 15:40	1

**Client Sample ID: SXDU21904111455MK-DUP**

**Lab Sample ID: 460-179735-8**

Date Collected: 04/11/19 14:55

Matrix: Solid

Date Received: 04/16/19 09:30

**General Chemistry**

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Percent Moisture	16.8		1.0	1.0	%			04/30/19 08:39	1
Percent Solids	83.2		1.0	1.0	%			04/30/19 08:39	1

**Client Sample ID: SXDU21904111455MK-DUP**

**Lab Sample ID: 460-179735-8**

Date Collected: 04/11/19 14:55

Matrix: Solid

Date Received: 04/16/19 09:30

Percent Solids: 83.2

**General Chemistry**

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
TOC Result 1	12000		120	82	mg/Kg	☼		04/24/19 15:47	1

**Client Sample ID: SXDU11904111530MK**

**Lab Sample ID: 460-179735-9**

Date Collected: 04/11/19 15:30

Matrix: Solid

Date Received: 04/16/19 09:30

**General Chemistry**

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Percent Moisture	16.9		1.0	1.0	%			04/30/19 08:39	1
Percent Solids	83.1		1.0	1.0	%			04/30/19 08:39	1

**Client Sample ID: SXDU11904111530MK**

**Lab Sample ID: 460-179735-9**

Date Collected: 04/11/19 15:30

Matrix: Solid

Date Received: 04/16/19 09:30

Percent Solids: 83.1

**General Chemistry**

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
TOC Result 1	7800		120	82	mg/Kg	☼		04/24/19 15:55	1

**Client Sample ID: SXDU21904111615MK**

**Lab Sample ID: 460-179735-10**

Date Collected: 04/11/19 16:15

Matrix: Solid

Date Received: 04/16/19 09:30

**General Chemistry**

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Percent Moisture	14.8		1.0	1.0	%			04/30/19 08:39	1
Percent Solids	85.2		1.0	1.0	%			04/30/19 08:39	1

**Client Sample ID: SXDU21904111615MK**

**Lab Sample ID: 460-179735-10**

Date Collected: 04/11/19 16:15

Matrix: Solid

Date Received: 04/16/19 09:30

Percent Solids: 85.2

**General Chemistry**

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
TOC Result 1	10000		120	80	mg/Kg	☼		04/24/19 16:03	1

Eurofins TestAmerica, Edison

# Client Sample Results

Client: Michigan Dept of Environmental Quality  
 Project/Site: Statewide WWTP Biosolids

Job ID: 460-179735-1

**Client Sample ID: SXDU1190411655MK**

**Lab Sample ID: 460-179735-11**

Date Collected: 04/11/19 16:55

Matrix: Solid

Date Received: 04/16/19 09:30

**General Chemistry**

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Percent Moisture	18.0		1.0	1.0	%			04/30/19 08:39	1
Percent Solids	82.0		1.0	1.0	%			04/30/19 08:39	1

**Client Sample ID: SXDU1190411655MK**

**Lab Sample ID: 460-179735-11**

Date Collected: 04/11/19 16:55

Matrix: Solid

Date Received: 04/16/19 09:30

Percent Solids: 82.0

**General Chemistry**

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
TOC Result 1	7800		120	84	mg/Kg	☼		04/24/19 16:10	1

**Client Sample ID: SXDU11904120855RL**

**Lab Sample ID: 460-179735-12**

Date Collected: 04/12/19 08:55

Matrix: Solid

Date Received: 04/16/19 09:30

**General Chemistry**

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Percent Moisture	12.4		1.0	1.0	%			04/30/19 08:39	1
Percent Solids	87.6		1.0	1.0	%			04/30/19 08:39	1

**Client Sample ID: SXDU11904120855RL**

**Lab Sample ID: 460-179735-12**

Date Collected: 04/12/19 08:55

Matrix: Solid

Date Received: 04/16/19 09:30

Percent Solids: 87.6

**General Chemistry**

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
TOC Result 1	ND		110	78	mg/Kg	☼		04/24/19 16:37	1

**Client Sample ID: SXDU21904120935RL**

**Lab Sample ID: 460-179735-13**

Date Collected: 04/12/19 09:35

Matrix: Solid

Date Received: 04/16/19 09:30

**General Chemistry**

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Percent Moisture	25.1		1.0	1.0	%			04/30/19 08:39	1
Percent Solids	74.9		1.0	1.0	%			04/30/19 08:39	1

**Client Sample ID: SXDU21904120935RL**

**Lab Sample ID: 460-179735-13**

Date Collected: 04/12/19 09:35

Matrix: Solid

Date Received: 04/16/19 09:30

Percent Solids: 74.9

**General Chemistry**

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
TOC Result 1	20000		130	91	mg/Kg	☼		04/24/19 17:27	1

**Client Sample ID: SXDU21904121120RL**

**Lab Sample ID: 460-179735-14**

Date Collected: 04/12/19 11:20

Matrix: Solid

Date Received: 04/16/19 09:30

**General Chemistry**

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Percent Moisture	13.9		1.0	1.0	%			04/30/19 08:39	1

Eurofins TestAmerica, Edison

# Client Sample Results

Client: Michigan Dept of Environmental Quality  
 Project/Site: Statewide WWTP Biosolids

Job ID: 460-179735-1

**Client Sample ID: SXDU21904121120RL**

**Lab Sample ID: 460-179735-14**

Date Collected: 04/12/19 11:20

Matrix: Solid

Date Received: 04/16/19 09:30

**General Chemistry (Continued)**

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Percent Solids	86.1		1.0	1.0	%			04/30/19 08:39	1

**Client Sample ID: SXDU21904121120RL**

**Lab Sample ID: 460-179735-14**

Date Collected: 04/12/19 11:20

Matrix: Solid

Date Received: 04/16/19 09:30

Percent Solids: 86.1

**General Chemistry**

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
TOC Result 1	8700		120	80	mg/Kg	☼		04/24/19 17:35	1

**Client Sample ID: SXDU11904121200RL**

**Lab Sample ID: 460-179735-15**

Date Collected: 04/12/19 12:00

Matrix: Solid

Date Received: 04/16/19 09:30

**General Chemistry**

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Percent Moisture	15.7		1.0	1.0	%			04/30/19 08:39	1
Percent Solids	84.3		1.0	1.0	%			04/30/19 08:39	1

**Client Sample ID: SXDU11904121200RL**

**Lab Sample ID: 460-179735-15**

Date Collected: 04/12/19 12:00

Matrix: Solid

Date Received: 04/16/19 09:30

Percent Solids: 84.2

**General Chemistry**

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
TOC Result 1	8500		120	81	mg/Kg	☼		04/24/19 17:42	1

# QC Sample Results

Client: Michigan Dept of Environmental Quality  
 Project/Site: Statewide WWTP Biosolids

Job ID: 460-179735-1

## Method: Lloyd Kahn - Organic Carbon, Total (TOC)

**Lab Sample ID: MB 460-605047/29**  
**Matrix: Solid**  
**Analysis Batch: 605047**

**Client Sample ID: Method Blank**  
**Prep Type: Total/NA**

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
TOC Result 1	ND		100	69	mg/Kg			04/24/19 16:18	1

**Lab Sample ID: MB 460-605047/3**  
**Matrix: Solid**  
**Analysis Batch: 605047**

**Client Sample ID: Method Blank**  
**Prep Type: Total/NA**

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
TOC Result 1	ND		100	69	mg/Kg			04/24/19 11:59	1

**Lab Sample ID: LCSSRM 460-605047/30**  
**Matrix: Solid**  
**Analysis Batch: 605047**

**Client Sample ID: Lab Control Sample**  
**Prep Type: Total/NA**

Analyte	Spike Added	LCSSRM Result	LCSSRM Qualifier	Unit	D	%Rec	%Rec. Limits
TOC Result 1	13800	14000		mg/Kg		101.7	34.9 - 192.8

**Lab Sample ID: LCSSRM 460-605047/4**  
**Matrix: Solid**  
**Analysis Batch: 605047**

**Client Sample ID: Lab Control Sample**  
**Prep Type: Total/NA**

Analyte	Spike Added	LCSSRM Result	LCSSRM Qualifier	Unit	D	%Rec	%Rec. Limits
TOC Result 1	13800	13300		mg/Kg		96.5	34.9 - 192.8

## Method: Moisture - Percent Moisture

**Lab Sample ID: 460-179735-1 DU**  
**Matrix: Solid**  
**Analysis Batch: 606313**

**Client Sample ID: SXDU21904110945MK**  
**Prep Type: Total/NA**

Analyte	Sample Result	Sample Qualifier	DU Result	DU Qualifier	Unit	D	RPD	RPD Limit
Percent Moisture	25.6		24.5		%		5	20
Percent Solids	74.4		75.5		%		2	20

# QC Association Summary

Client: Michigan Dept of Environmental Quality  
 Project/Site: Statewide WWTP Biosolids

Job ID: 460-179735-1

## General Chemistry

### Analysis Batch: 605047

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
460-179735-1	SXDU21904110945MK	Total/NA	Solid	Lloyd Kahn	
460-179735-2	SXDU11904111040MK	Total/NA	Solid	Lloyd Kahn	
460-179735-3	SXDU21904111125MK	Total/NA	Solid	Lloyd Kahn	
460-179735-4	SXDU21904111130MK-DUP	Total/NA	Solid	Lloyd Kahn	
460-179735-5	SXDU11904111220MK	Total/NA	Solid	Lloyd Kahn	
460-179735-6	SXDU31904111405MK	Total/NA	Solid	Lloyd Kahn	
460-179735-7	SXDU21904111450MK	Total/NA	Solid	Lloyd Kahn	
460-179735-8	SXDU21904111455MK-DUP	Total/NA	Solid	Lloyd Kahn	
460-179735-9	SXDU11904111530MK	Total/NA	Solid	Lloyd Kahn	
460-179735-10	SXDU21904111615MK	Total/NA	Solid	Lloyd Kahn	
460-179735-11	SXDU11904111655MK	Total/NA	Solid	Lloyd Kahn	
460-179735-12	SXDU11904120855RL	Total/NA	Solid	Lloyd Kahn	
460-179735-13	SXDU21904120935RL	Total/NA	Solid	Lloyd Kahn	
460-179735-14	SXDU21904121120RL	Total/NA	Solid	Lloyd Kahn	
460-179735-15	SXDU11904121200RL	Total/NA	Solid	Lloyd Kahn	
MB 460-605047/29	Method Blank	Total/NA	Solid	Lloyd Kahn	
MB 460-605047/3	Method Blank	Total/NA	Solid	Lloyd Kahn	
LCSSRM 460-605047/30	Lab Control Sample	Total/NA	Solid	Lloyd Kahn	
LCSSRM 460-605047/4	Lab Control Sample	Total/NA	Solid	Lloyd Kahn	

### Analysis Batch: 606313

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
460-179735-1	SXDU21904110945MK	Total/NA	Solid	Moisture	
460-179735-2	SXDU11904111040MK	Total/NA	Solid	Moisture	
460-179735-3	SXDU21904111125MK	Total/NA	Solid	Moisture	
460-179735-4	SXDU21904111130MK-DUP	Total/NA	Solid	Moisture	
460-179735-5	SXDU11904111220MK	Total/NA	Solid	Moisture	
460-179735-6	SXDU31904111405MK	Total/NA	Solid	Moisture	
460-179735-7	SXDU21904111450MK	Total/NA	Solid	Moisture	
460-179735-8	SXDU21904111455MK-DUP	Total/NA	Solid	Moisture	
460-179735-9	SXDU11904111530MK	Total/NA	Solid	Moisture	
460-179735-10	SXDU21904111615MK	Total/NA	Solid	Moisture	
460-179735-11	SXDU11904111655MK	Total/NA	Solid	Moisture	
460-179735-12	SXDU11904120855RL	Total/NA	Solid	Moisture	
460-179735-13	SXDU21904120935RL	Total/NA	Solid	Moisture	
460-179735-14	SXDU21904121120RL	Total/NA	Solid	Moisture	
460-179735-15	SXDU11904121200RL	Total/NA	Solid	Moisture	
460-179735-1 DU	SXDU21904110945MK	Total/NA	Solid	Moisture	



# Lab Chronicle

Client: Michigan Dept of Environmental Quality  
Project/Site: Statewide WWTP Biosolids

Job ID: 460-179735-1

**Client Sample ID: SXDU21904110945MK**

**Date Collected: 04/11/19 09:45**

**Date Received: 04/16/19 09:30**

**Lab Sample ID: 460-179735-1**

**Matrix: Solid**

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	Moisture		1	606313	04/30/19 08:39	MMC	TAL EDI

**Client Sample ID: SXDU21904110945MK**

**Date Collected: 04/11/19 09:45**

**Date Received: 04/16/19 09:30**

**Lab Sample ID: 460-179735-1**

**Matrix: Solid**

**Percent Solids: 74.4**

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	Lloyd Kahn		1	605047	04/24/19 14:35	AJP	TAL EDI

**Client Sample ID: SXDU11904111040MK**

**Date Collected: 04/11/19 10:40**

**Date Received: 04/16/19 09:30**

**Lab Sample ID: 460-179735-2**

**Matrix: Solid**

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	Moisture		1	606313	04/30/19 08:39	MMC	TAL EDI

**Client Sample ID: SXDU11904111040MK**

**Date Collected: 04/11/19 10:40**

**Date Received: 04/16/19 09:30**

**Lab Sample ID: 460-179735-2**

**Matrix: Solid**

**Percent Solids: 80.4**

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	Lloyd Kahn		1	605047	04/24/19 14:42	AJP	TAL EDI

**Client Sample ID: SXDU2190411125MK**

**Date Collected: 04/11/19 11:25**

**Date Received: 04/16/19 09:30**

**Lab Sample ID: 460-179735-3**

**Matrix: Solid**

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	Moisture		1	606313	04/30/19 08:39	MMC	TAL EDI

**Client Sample ID: SXDU2190411125MK**

**Date Collected: 04/11/19 11:25**

**Date Received: 04/16/19 09:30**

**Lab Sample ID: 460-179735-3**

**Matrix: Solid**

**Percent Solids: 84.9**

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	Lloyd Kahn		1	605047	04/24/19 14:50	AJP	TAL EDI

**Client Sample ID: SXDU2190411130MK-DUP**

**Date Collected: 04/11/19 11:30**

**Date Received: 04/16/19 09:30**

**Lab Sample ID: 460-179735-4**

**Matrix: Solid**

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	Moisture		1	606313	04/30/19 08:39	MMC	TAL EDI

# Lab Chronicle

Client: Michigan Dept of Environmental Quality  
 Project/Site: Statewide WWTP Biosolids

Job ID: 460-179735-1

**Client Sample ID: SXDU2190411130MK-DUP**

**Lab Sample ID: 460-179735-4**

Date Collected: 04/11/19 11:30

Matrix: Solid

Date Received: 04/16/19 09:30

Percent Solids: 84.5

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	Lloyd Kahn		1	605047	04/24/19 14:58	AJP	TAL EDI

**Client Sample ID: SXDU11904111220MK**

**Lab Sample ID: 460-179735-5**

Date Collected: 04/11/19 12:20

Matrix: Solid

Date Received: 04/16/19 09:30

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	Moisture		1	606313	04/30/19 08:39	MMC	TAL EDI

**Client Sample ID: SXDU11904111220MK**

**Lab Sample ID: 460-179735-5**

Date Collected: 04/11/19 12:20

Matrix: Solid

Date Received: 04/16/19 09:30

Percent Solids: 84.8

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	Lloyd Kahn		1	605047	04/24/19 15:05	AJP	TAL EDI

**Client Sample ID: SXDU31904111405MK**

**Lab Sample ID: 460-179735-6**

Date Collected: 04/11/19 14:05

Matrix: Solid

Date Received: 04/16/19 09:30

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	Moisture		1	606313	04/30/19 08:39	MMC	TAL EDI

**Client Sample ID: SXDU31904111405MK**

**Lab Sample ID: 460-179735-6**

Date Collected: 04/11/19 14:05

Matrix: Solid

Date Received: 04/16/19 09:30

Percent Solids: 93.0

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	Lloyd Kahn		1	605047	04/24/19 15:13	AJP	TAL EDI

**Client Sample ID: SXDU21904111450MK**

**Lab Sample ID: 460-179735-7**

Date Collected: 04/11/19 14:50

Matrix: Solid

Date Received: 04/16/19 09:30

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	Moisture		1	606313	04/30/19 08:39	MMC	TAL EDI

**Client Sample ID: SXDU21904111450MK**

**Lab Sample ID: 460-179735-7**

Date Collected: 04/11/19 14:50

Matrix: Solid

Date Received: 04/16/19 09:30

Percent Solids: 82.8

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	Lloyd Kahn		1	605047	04/24/19 15:40	AJP	TAL EDI

# Lab Chronicle

Client: Michigan Dept of Environmental Quality  
Project/Site: Statewide WWTP Biosolids

Job ID: 460-179735-1

**Client Sample ID: SXDU21904111455MK-DUP**

**Lab Sample ID: 460-179735-8**

Date Collected: 04/11/19 14:55

Matrix: Solid

Date Received: 04/16/19 09:30

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	Moisture		1	606313	04/30/19 08:39	MMC	TAL EDI

**Client Sample ID: SXDU21904111455MK-DUP**

**Lab Sample ID: 460-179735-8**

Date Collected: 04/11/19 14:55

Matrix: Solid

Date Received: 04/16/19 09:30

Percent Solids: 83.2

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	Lloyd Kahn		1	605047	04/24/19 15:47	AJP	TAL EDI

**Client Sample ID: SXDU11904111530MK**

**Lab Sample ID: 460-179735-9**

Date Collected: 04/11/19 15:30

Matrix: Solid

Date Received: 04/16/19 09:30

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	Moisture		1	606313	04/30/19 08:39	MMC	TAL EDI

**Client Sample ID: SXDU11904111530MK**

**Lab Sample ID: 460-179735-9**

Date Collected: 04/11/19 15:30

Matrix: Solid

Date Received: 04/16/19 09:30

Percent Solids: 83.1

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	Lloyd Kahn		1	605047	04/24/19 15:55	AJP	TAL EDI

**Client Sample ID: SXDU21904111615MK**

**Lab Sample ID: 460-179735-10**

Date Collected: 04/11/19 16:15

Matrix: Solid

Date Received: 04/16/19 09:30

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	Moisture		1	606313	04/30/19 08:39	MMC	TAL EDI

**Client Sample ID: SXDU21904111615MK**

**Lab Sample ID: 460-179735-10**

Date Collected: 04/11/19 16:15

Matrix: Solid

Date Received: 04/16/19 09:30

Percent Solids: 85.2

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	Lloyd Kahn		1	605047	04/24/19 16:03	AJP	TAL EDI

**Client Sample ID: SXDU11904111655MK**

**Lab Sample ID: 460-179735-11**

Date Collected: 04/11/19 16:55

Matrix: Solid

Date Received: 04/16/19 09:30

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	Moisture		1	606313	04/30/19 08:39	MMC	TAL EDI

# Lab Chronicle

Client: Michigan Dept of Environmental Quality  
Project/Site: Statewide WWTP Biosolids

Job ID: 460-179735-1

**Client Sample ID: SXDU1190411655MK**

**Lab Sample ID: 460-179735-11**

**Date Collected: 04/11/19 16:55**

**Matrix: Solid**

**Date Received: 04/16/19 09:30**

**Percent Solids: 82.0**

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	Lloyd Kahn		1	605047	04/24/19 16:10	AJP	TAL EDI

**Client Sample ID: SXDU11904120855RL**

**Lab Sample ID: 460-179735-12**

**Date Collected: 04/12/19 08:55**

**Matrix: Solid**

**Date Received: 04/16/19 09:30**

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	Moisture		1	606313	04/30/19 08:39	MMC	TAL EDI

**Client Sample ID: SXDU11904120855RL**

**Lab Sample ID: 460-179735-12**

**Date Collected: 04/12/19 08:55**

**Matrix: Solid**

**Date Received: 04/16/19 09:30**

**Percent Solids: 87.6**

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	Lloyd Kahn		1	605047	04/24/19 16:37	AJP	TAL EDI

**Client Sample ID: SXDU21904120935RL**

**Lab Sample ID: 460-179735-13**

**Date Collected: 04/12/19 09:35**

**Matrix: Solid**

**Date Received: 04/16/19 09:30**

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	Moisture		1	606313	04/30/19 08:39	MMC	TAL EDI

**Client Sample ID: SXDU21904120935RL**

**Lab Sample ID: 460-179735-13**

**Date Collected: 04/12/19 09:35**

**Matrix: Solid**

**Date Received: 04/16/19 09:30**

**Percent Solids: 74.9**

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	Lloyd Kahn		1	605047	04/24/19 17:27	AJP	TAL EDI

**Client Sample ID: SXDU21904121120RL**

**Lab Sample ID: 460-179735-14**

**Date Collected: 04/12/19 11:20**

**Matrix: Solid**

**Date Received: 04/16/19 09:30**

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	Moisture		1	606313	04/30/19 08:39	MMC	TAL EDI

**Client Sample ID: SXDU21904121120RL**

**Lab Sample ID: 460-179735-14**

**Date Collected: 04/12/19 11:20**

**Matrix: Solid**

**Date Received: 04/16/19 09:30**

**Percent Solids: 86.1**

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	Lloyd Kahn		1	605047	04/24/19 17:35	AJP	TAL EDI

# Lab Chronicle

Client: Michigan Dept of Environmental Quality  
Project/Site: Statewide WWTP Biosolids

Job ID: 460-179735-1

**Client Sample ID: SXDU11904121200RL**

**Lab Sample ID: 460-179735-15**

**Date Collected: 04/12/19 12:00**

**Matrix: Solid**

**Date Received: 04/16/19 09:30**

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	Moisture		1	606313	04/30/19 08:39	MMC	TAL EDI

**Client Sample ID: SXDU11904121200RL**

**Lab Sample ID: 460-179735-15**

**Date Collected: 04/12/19 12:00**

**Matrix: Solid**

**Date Received: 04/16/19 09:30**

**Percent Solids: 84.2**

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	Lloyd Kahn		1	605047	04/24/19 17:42	AJP	TAL EDI

**Laboratory References:**

TAL EDI = Eurofins TestAmerica, Edison, 777 New Durham Road, Edison, NJ 08817, TEL (732)549-3900

# Accreditation/Certification Summary

Client: Michigan Dept of Environmental Quality  
 Project/Site: Statewide WWTP Biosolids

Job ID: 460-179735-1

## Laboratory: Eurofins TestAmerica, Edison

All accreditations/certifications held by this laboratory are listed. Not all accreditations/certifications are applicable to this report.

Authority	Program	EPA Region	Identification Number	Expiration Date
Connecticut	State Program	1	PH-0200	09-30-20
DE Haz. Subst. Cleanup Act (HSCA)	State Program	3	N/A	12-31-19
New Jersey	NELAP	2	12028	06-30-19
New York	NELAP	2	11452	04-01-20
Pennsylvania	NELAP	3	68-00522	02-28-20
Rhode Island	State Program	1	LAO00132	12-30-19
USDA	Federal		NJCA-003-08	05-03-21

## Laboratory: Eurofins TestAmerica, Canton

All accreditations/certifications held by this laboratory are listed. Not all accreditations/certifications are applicable to this report.

Authority	Program	EPA Region	Identification Number	Expiration Date
California	State Program	9	2927	02-23-20
Connecticut	State Program	1	PH-0590	12-31-19
Florida	NELAP	4	E87225	06-30-19
Illinois	NELAP	5	200004	07-31-19
Kansas	NELAP	7	E-10336	04-30-19 *
Kentucky (UST)	State Program	4	58	02-23-20
Kentucky (WW)	State Program	4	98016	12-31-19
Minnesota	NELAP	5	039-999-348	12-31-19 *
Minnesota (Petrofund)	State Program	1	3506	07-31-19
Nevada	State Program	9	OH00048	07-31-19
New Jersey	NELAP	2	OH001	06-30-19
New York	NELAP	2	10975	03-31-20
Ohio VAP	State Program	5	CL0024	09-06-19
Oregon	NELAP	10	4062	02-23-20
Pennsylvania	NELAP	3	68-00340	08-31-19 *
Texas	NELAP	6	T104704517-18-10	08-31-19
USDA	Federal		P330-16-00404	12-28-19
Virginia	NELAP	3	460175	09-14-19
Washington	State Program	10	C971	01-12-20 *
West Virginia DEP	State Program	3	210	12-31-19

\* Accreditation/Certification renewal pending - accreditation/certification considered valid.

# Method Summary

Client: Michigan Dept of Environmental Quality  
Project/Site: Statewide WWTP Biosolids

Job ID: 460-179735-1

Method	Method Description	Protocol	Laboratory
Lloyd Kahn	Organic Carbon, Total (TOC)	EPA	TAL EDI
Moisture	Percent Moisture	EPA	TAL EDI

**Protocol References:**

EPA = US Environmental Protection Agency

**Laboratory References:**

TAL EDI = Eurofins TestAmerica, Edison, 777 New Durham Road, Edison, NJ 08817, TEL (732)549-3900



# Sample Summary

Client: Michigan Dept of Environmental Quality  
Project/Site: Statewide WWTP Biosolids

Job ID: 460-179735-1

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
460-179735-1	SXDU21904110945MK	Solid	04/11/19 09:45	04/16/19 09:30
460-179735-2	SXDU11904111040MK	Solid	04/11/19 10:40	04/16/19 09:30
460-179735-3	SXDU21904111125MK	Solid	04/11/19 11:25	04/16/19 09:30
460-179735-4	SXDU21904111130MK-DUP	Solid	04/11/19 11:30	04/16/19 09:30
460-179735-5	SXDU11904111220MK	Solid	04/11/19 12:20	04/16/19 09:30
460-179735-6	SXDU31904111405MK	Solid	04/11/19 14:05	04/16/19 09:30
460-179735-7	SXDU21904111450MK	Solid	04/11/19 14:50	04/16/19 09:30
460-179735-8	SXDU21904111455MK-DUP	Solid	04/11/19 14:55	04/16/19 09:30
460-179735-9	SXDU11904111530MK	Solid	04/11/19 15:30	04/16/19 09:30
460-179735-10	SXDU21904111615MK	Solid	04/11/19 16:15	04/16/19 09:30
460-179735-11	SXDU11904111655MK	Solid	04/11/19 16:55	04/16/19 09:30
460-179735-12	SXDU11904120855RL	Solid	04/12/19 08:55	04/16/19 09:30
460-179735-13	SXDU21904120935RL	Solid	04/12/19 09:35	04/16/19 09:30
460-179735-14	SXDU21904121120RL	Solid	04/12/19 11:20	04/16/19 09:30
460-179735-15	SXDU11904121200RL	Solid	04/12/19 12:00	04/16/19 09:30



Chain of Custody Record

Regulatory Program:  DW  NPDES  RCRA  Other:

Client Contact		Project Manager: Dorin Bogdan Tel/Fax: (616) 516-5995		Date:	
AECOM		Analysis Turnaround Time		Carrier:	
3950 Sparks Dr SE		<input checked="" type="checkbox"/> CALENDAR DAYS <input type="checkbox"/> WORKING DAYS		COC No. _____ of _____ COCs	
Grand Rapids, MI 49546		TAT if different from Below _____ 21 _____		Sampler:	
(616) 516-5995		<input type="checkbox"/> 2 weeks		For Lab Use Only:	
(xxx) xxx-xxxx		<input type="checkbox"/> 1 week		Walk-in Client:	
Project Name: Statewide WWTP Biosolids PFAS Evaluation		<input type="checkbox"/> 2 days		Lab Sampling:	
Site: -		<input type="checkbox"/> 1 day		Job / SDG No.:	
P O # 60588767.01				179735	
Sample Identification		Sample Type (C-Comp, G-Grab)		Sample Specific Notes:	
SXDU21904110945MK	4/11/2019	945	C	SO	1 TOC Analysis
SXDU11904111040MK	4/11/19	1040	C	SO	2 TOC Analysis
SXDU21904111125MK	4/11/19	1125	C	SO	3 TOC Analysis
SXDU21904111130MK-DUP	4/11/19	1130	C	SO	4 TOC Analysis
SXDU11904111220MK	4/11/19	1220	C	SO	5 TOC Analysis
SXDU31904111405MK	4/11/19	1405	C	SO	6 TOC Analysis
SXDU21904111450MK	4/11/19	1450	C	SO	7 TOC Analysis
SXDU21904111455MK-DUP	4/11/19	1455	C	SO	8 TOC Analysis
SXDU11904111530MK	4/11/19	1530	C	SO	9 TOC Analysis
SXDU21904111615MK	4/11/19	1615	C	SO	10 TOC Analysis
SXDU11904111655MK	4/11/19	1655	C	SO	11 TOC Analysis
SXDU11904120855RL	4/12/19	0855	C	SO	12 TOC Analysis



Preservation Used: 1= Ice, 2= HCl, 3= H2SO4, 4= HNO3, 5= NaOH, 6= Other

Possible Hazard Identification: Are any samples from a listed EPA Hazardous Waste? Please List any EPA Waste Codes for the sample in the Comments Section if the lab is to dispose of the sample.

Special Instructions/QC Requirements & Comments:

1.2°C IR#9

Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)

Return to Client  Disposal by Lab  Archive for \_\_\_\_\_ Months

Custody Seal No.: PRESENT

Relinquished by: Michael Kosciuszko  
Company: AECOM  
Date/Time: 04/15/19 1700

Relinquished by: *[Signature]*  
Company: TA Edison  
Date/Time: 04/16/19 09:30

Relinquished by: *[Signature]*  
Company: *[Signature]*  
Date/Time: *[Signature]*







# Login Sample Receipt Checklist

Client: Michigan Dept of Environmental Quality

Job Number: 460-179735-1

**Login Number: 179735**

**List Source: Eurofins TestAmerica, Edison**

**List Number: 1**

**Creator: Villanueva, Angelica P**

Question	Answer	Comment
Radioactivity wasn't checked or is <math>\leq</math> background as measured by a survey meter.	N/A	
The cooler's custody seal, if present, is intact.	True	
Sample custody seals, if present, are intact.	True	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	True	
Cooler Temperature is acceptable.	True	
Cooler Temperature is recorded.	True	
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
Is the Field Sampler's name present on COC?	True	
There are no discrepancies between the containers received and the COC.	True	
Samples are received within Holding Time (excluding tests with immediate HTs)	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
Sample Preservation Verified.	True	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
Containers requiring zero headspace have no headspace or bubble is <math><6\text{mm}</math> (1/4").	True	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	N/A	





### About AECOM

AECOM is built to deliver a better world. We design, build, finance and operate critical infrastructure assets for governments, businesses and organizations. As a fully integrated firm, we connect knowledge and experience across our global network of experts to help clients solve their most complex challenges. From high-performance buildings and infrastructure, to resilient communities and environments, to stable and secure nations, our work is transformative, differentiated and vital. A Fortune 500 firm, AECOM had revenue of approximately \$20.2 billion during fiscal year 2019.

See how we deliver what others can only imagine at [aecom.com](http://aecom.com) and [@AECOM](https://twitter.com/AECOM).

