MICHIGAN DEPARTMENT OF ENVIRONMENT, GREAT LAKES, AND ENERGY

INTEROFFICE COMMUNICATION

TO: Christiaan Bon, Project Manager, Gaylord District Office
Remediation and Redevelopment Division

FROM: Brian Eustice, Geologist, Hydrogeologic Unit, Geological Services Section
Remediation and Redevelopment Division

DATE: August 20, 2019

SUBJECT: Grayling Area PFAS, Crawford County, Site ID #20000099, GSS Job #849
Per-and Polyfluoroalkyl Substances (PFAS) Investigation

This memorandum summarizes the methodology and findings of a PFAS investigation requested by the Department of Environment Great Lakes, and Energy (EGLE), Remediation and Redevelopment Division's (RRD's), Gaylord District office for the subject site. RRD's Geological Services Section (GSS), along with district personnel, performed porewater and surface water sampling at the subject site on July 8-9, 2019. GSS received the final laboratory results on August 13, 2019.

The report includes the following:

- Site Location Map (Fig 1)
- Main Branch West of Grayling Springs Recon Locations (Fig 2)
- Main and East Branches Springs Recon Locations (Fig 3)
- Main Branch West of Grayling Sample Location Map (Fig 4)
- Main Branch East of Grayling and East Branch Sample Location Map (Fig 5)
- Sampling Summary (Table 1)
- Global Positioning System (GPS) Recordings of Sample Locations (Table 2)
- Porewater Analytical Summary (Table 3)
- Surface Water Analytical Summary (Table 4)

The investigation area is located along the main and east branches of the Au Sable River in the city of Grayling, Section 12, T26N-R4W, and Sections 7, 8 and 18, T26N-R3W, Grayling Township, Crawford County, Michigan. (Fig 1).

On July 1, 2019 springs and seeps discharging into the Au Sable River, within the study area, were identified during a reconnaissance trip both visually and by using submersible digital thermometers to measure changes in the surface water temperature. Overall, 25 spring locations were identified as potential sampling points. Figure 2 and Figure 3 shows spring locations and measured temperatures.

On July 8-9, 2019 GSS and district staff collected 23 collocated, porewater and surface water samples (AS-PW-01-0719 through AS-PW-23-0719 and AS-SW-01-0719 through AS-SW-23-0719) at select springs identified during the reconnaissance trip (Fig 3 and Fig 4). Sampling on each stretch of the river was limited by sampling equipment to a maximum of 12 locations. Because the stretch of the Main Branch west of Grayling had 14 springs identified, Spring 6 and Spring 9 were selected as two locations that were likely hydraulically connected to other sampling locations (Spring 6 with Spring 7; Spring 9 with Springs 8 and 10) and were not sampled.

The GSS used stainless steel push point samplers with 4-inch long screens and overall lengths varying from 36-96 inches to collect porewater samples. The samplers were advanced by hand to depths ranging from 20-60 inches below the river bottom (based on refusal). Tubing was attached to top of the sampler and porewater was pumped via a peristaltic pump until at least three system volumes had been purged and water quality parameters were stabilized. To collect water quality parameters and ensure that the porewater sampler screen was isolated from the surface water, GSS used a YSI Pro Plus to monitor and compare water quality parameters (temperature, conductivity, dissolved oxygen and pH) of the surface water prior to sampling and of the porewater during purging. After sampling, the potentiometric surface of the porewater relative to the river surface was measured by holding the water filled tubing vertically and allowing the porewater level to stabilize (Table 1).

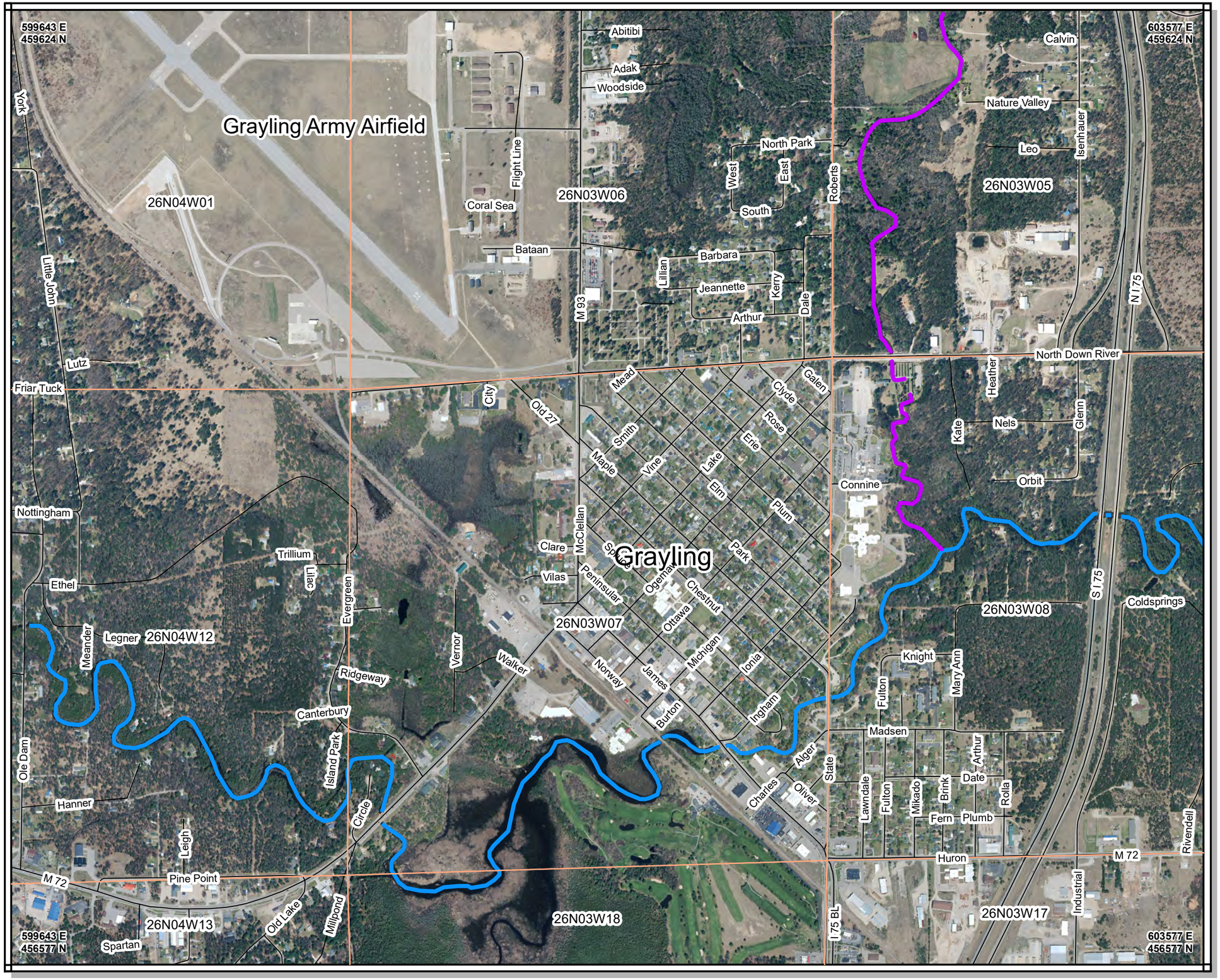
Surface water samples were collected by submerging the sample containers just below the river surface and allowing them to fill. Sample location coordinates were recorded using a handheld GPS unit (Table 2).

Porewater and surface water samples were submitted under Chain-of-Custody (COC) documentation to Vista Analytical Laboratories for analysis using the Modified EPA Method 537 (PFAS Isotope Dilution Method). Duplicate samples of porewater and surface water were collected and submitted at the AS-PW-07-0719/AS-SW-07-0719 (DUP-01) and AS-PW-21-0719/AS-SW-21-0719 (DUP-02) locations. Additionally, an equipment blank sample (AS-EB-01-0719) was collected by pumping PFAS free deionized water through the tubing and clean sampler and submitted for analysis (Table 3 and Table 4). The Vista Analytical Laboratory results are included in Content Manager (Vista Analytical Laboratory/ 7/8 & 7/9/19 Water Sampling Results – 1902076).

If you have any questions, contact me at 517-242-1170.

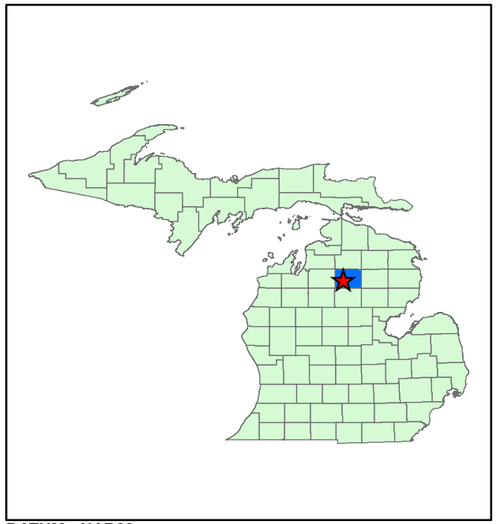
Attachments

cc: Burrell P. Shirey, EGLE
Jeff Pincumbe, EGLE
Scott Densteadt, EGLE



LEGEND

- Au Sable River - Main Branch
- Au Sable River - East Branch
- Public Land Survey Sections
- Roads



DATUM - NAD83
PROJECTION: MICHIGAN GEOREF
NORTHING AND EASTING COORDINATES (IN METERS)
ARE IN CORNERS OF MAP

AERIAL PHOTO SOURCE: MICHIGAN IMAGERY

0 0.15 0.3 Miles

1 in = 0.19 miles

0 480 960 1,440 1,920 Feet

1 inch = 1,000 feet

N W E S

Grayling Area PFAS - Au Sable River

SITE ID 20000099

GRAYLING TOWNSHIP, CRAWFORD COUNTY
T26N R04W SECTION 12 & T26N R03W SECTION 7

SITE MAP

GEOLOGIST Brian Eustice Geological Services Section	EGLE	CREATION DATE August 2019
Remediation and Redevelopment Division		FIGURE 1

599635 E
457869 N

600966 E
457869 N

599635 E
456803 N

600966 E
456803 N

Little John
Ethel
Honeysuckle
Lilac
Evergreen
Rosemary
Legner
Meander
Turner
Ridgeway
Canterbury
Ole Dam
Hanner
Leigh
Island Park
Circle
Millpond
M 72
Pine Point
Old Lake

Spring 1
59

Spring 2
48.4

Spring 3
58.1

Spring 4
47.3

Spring 5
58.4

Spring 6
59.9

Spring 7
48.6

Spring 8
50.3

Spring 9
54.8

Spring 10
50.8

Spring 11
58.9

Spring 12
55.7

Spring 13
61.3

Spring 14
56.3

LEGEND

- Spring Temperature (°F)
- Roads

DATUM - NAD83
PROJECTION: MICHIGAN GEOREF
NORTHING AND EASTING COORDINATES (IN METERS)
ARE IN CORNERS OF MAP

AERIAL PHOTO SOURCE: MICHIGAN IMAGERY

0 0.06 0.12 Miles

1 in = 0.066 miles

0 175 350 525 700 Feet

1 inch = 350 feet

N
W E
S

Grayling Area PFAS - Au Sable River

SITE ID 20000099

GRAYLING TOWNSHIP, CRAWFORD COUNTY
T26N R04W SECTION 12 & T26N R03W SECTION 7

MAIN BRANCH WEST OF GRAYLING SPRING LOCATION & TEMPERATURE

GEOLOGIST Brian Eustice Geological Services Section	EGLE	CREATION DATE August 2019
Remediation and Redevelopment Division		FIGURE 2

601878 E
457996 N

602829 E
457996 N

Spring 25
58.1

Spring 24
60.8

Spring 23
53.6

Spring 22
61.8

Spring 21
54.3

Spring 20
60.3

Spring 19
57.6

Spring 18
51.1

Spring 17
60

Spring 16
NM

Spring 15
50

Ottawa
Plum
Elm
Michigan
Maple
Park
Ingham
Chestnut
Spruce
Ionia
Peninsular
Au Sable
James
Alger
State
Lawndale
Fulton
Mikado
Brink
Arthur
Rolla
Mary Ann
Knight
Gierke
Madsen

601878 E
457234 N

602829 E
457234 N

LEGEND

- Spring Locations
  Temperature (°F)
- Roads

DATUM - NAD83
PROJECTION: MICHIGAN GEOREF
NORTHING AND EASTING COORDINATES (IN METERS)
ARE IN CORNERS OF MAP

AERIAL PHOTO SOURCE: MICHIGAN IMAGERY

0 0.045 0.09 Miles

1 in = 0.047 miles

0 125 250 375 500 Feet

1 inch = 250 feet

N
W E
S

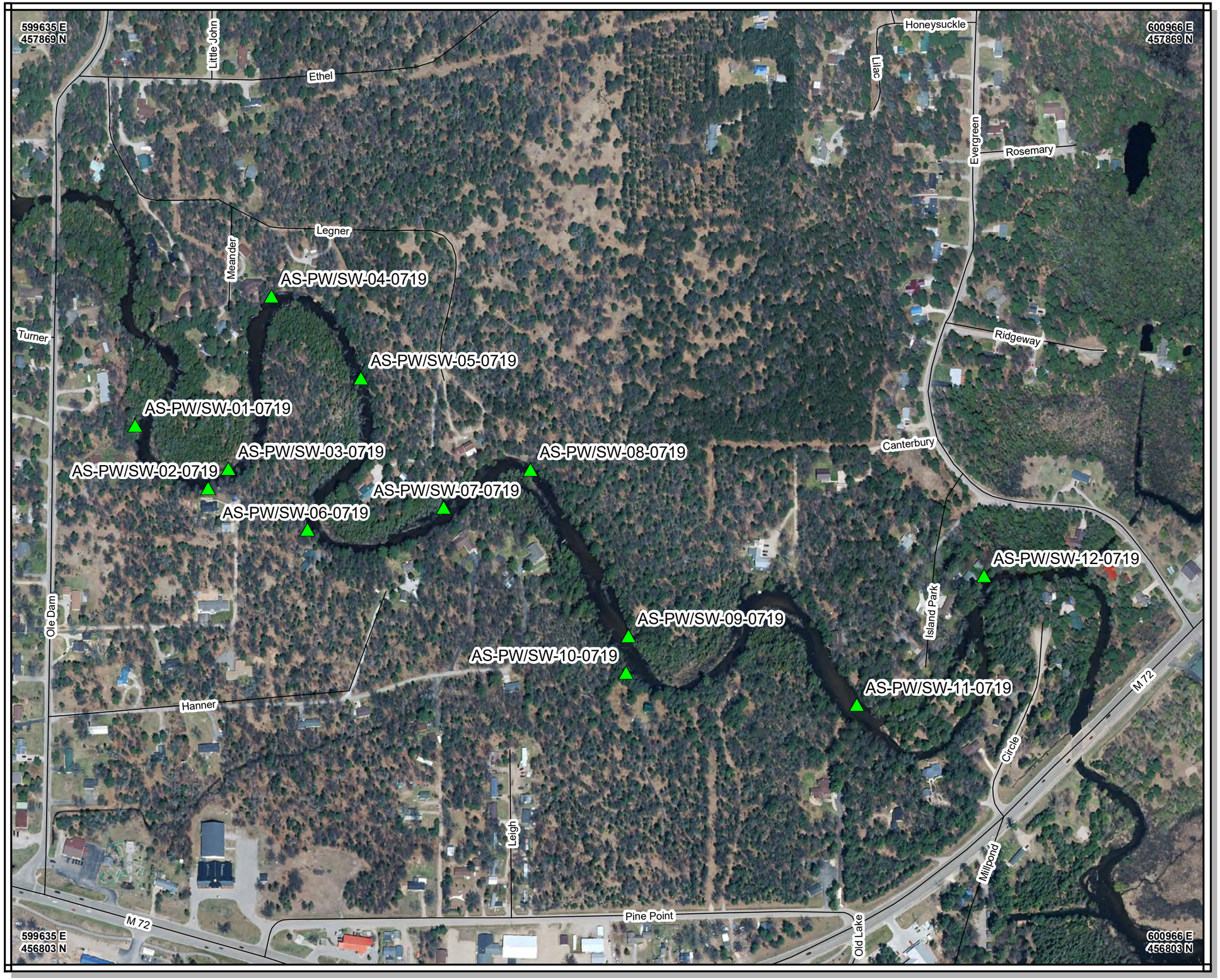
Grayling Area PFAS - Au Sable River

SITE ID 20000099

GRAYLING TOWNSHIP, CRAWFORD COUNTY
T26N R04W SECTION 12 & T26N R03W SECTION 7

MAIN AND EAST BRANCHES SPRING LOCATIONS AND TEMPERATURE

GEOLOGIST Brian Eustice Geological Services Section	EGLE	CREATION DATE August 2019
Remediation and Redevelopment Division		FIGURE 3



LEGEND

- Porewater and Surface Water Sample Locations
- Roads

DATUM - NAD83
PROJECTION: MICHIGAN GEOREF
NORTHING AND EASTING COORDINATES (IN METERS)
ARE IN CORNERS OF MAP

AERIAL PHOTO SOURCE: MICHIGAN IMAGERY

0 0.06 0.12 Miles

1 in = 0.066 miles

0 175 350 525 700 Feet

1 inch = 350 feet

N W E S

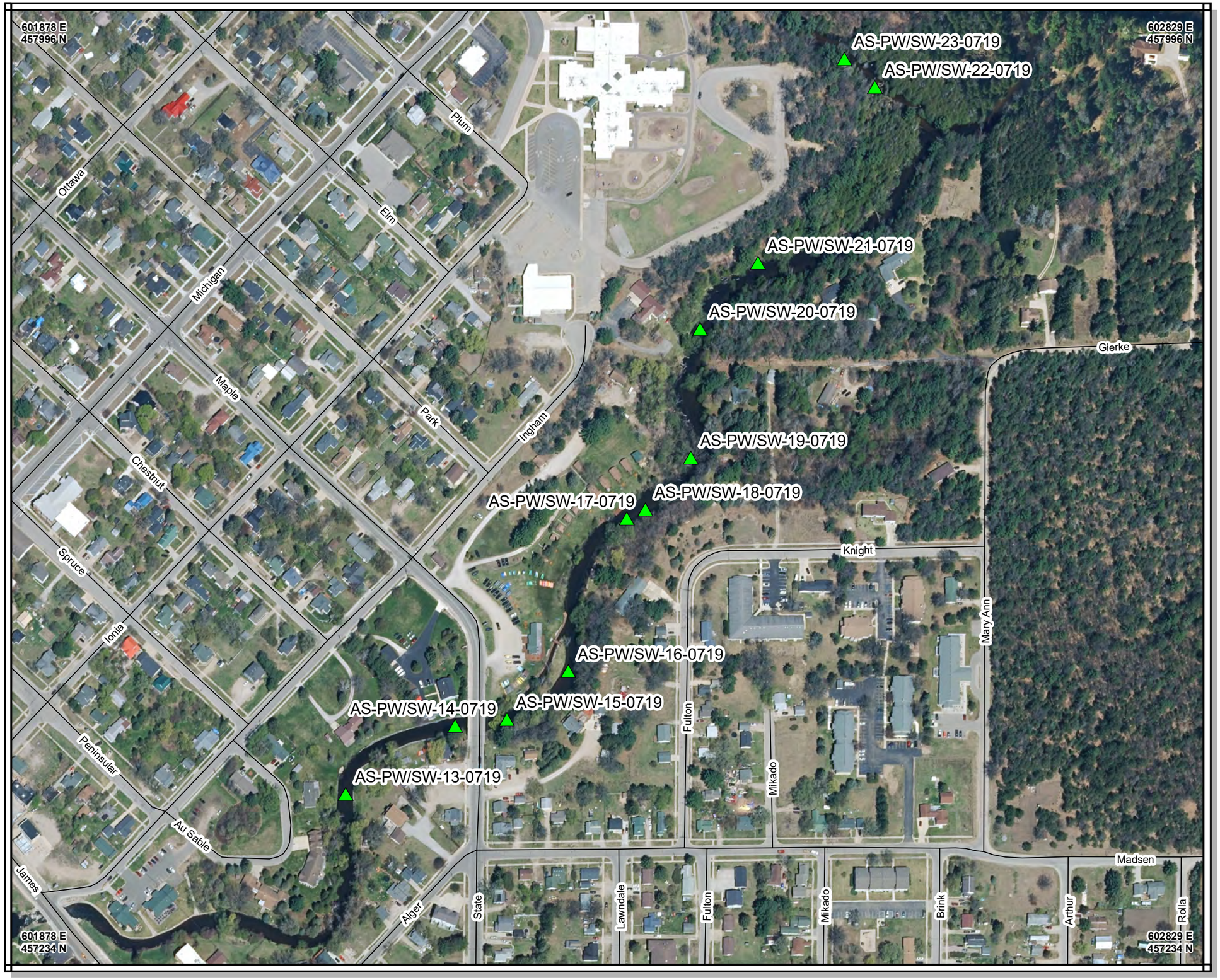
Grayling Area PFAS - Au Sable River

SITE ID 20000099

GRAYLING TOWNSHIP, CRAWFORD COUNTY
T26N R04W SECTION 12 & T26N R03W SECTION 7

MAIN BRANCH WEST OF GRAYLING SAMPLE LOCATION MAP

GEOLOGIST Brian Eustice Geological Services Section	EGLE MICHIGAN DEPARTMENT OF ENVIRONMENT, GREAT LAKES, AND ENERGY	CREATION DATE August 2019
Remediation and Redevelopment Division		FIGURE 4



LEGEND

- Surface Water and Porewater Sample Locations
- Roads

DATUM - NAD83
PROJECTION: MICHIGAN GEOREF
NORTHING AND EASTING COORDINATES (IN METERS)
ARE IN CORNERS OF MAP

AERIAL PHOTO SOURCE: MICHIGAN IMAGERY

0 0.045 0.09 Miles

1 in = 0.047 miles

0 125 250 375 500 Feet

1 inch = 250 feet

N
W E
S

Grayling Area PFAS - Au Sable River

SITE ID 20000099

GRAYLING TOWNSHIP, CRAWFORD COUNTY
T26N R04W SECTION 12 & T26N R03W SECTION 7

MAIN AND EAST BRANCHES SAMPLE LOCATION MAP

GEOLOGIST Brian Eustice Geological Services Section	EGLE	CREATION DATE August 2019
Remediation and Redevelopment Division		FIGURE 5

Sampling Summary

Grayling Area PFAS,
Crawford County

Table #1

	AS-PW-01-0719		AS-PW-02-0719		AS-PW-03-0719		AS-PW-04-0719		AS-PW-05-0719		AS-PW-06-0719	
Water Depth (inches)	1"		1"		3"		1"		3.5"		<1"	
Screened Interval (inches below riverbed)	30-34"		32-36"		34-38"		23.5-27.5"		27.5-31.5"		41.5-45.5"	
Static Water Level (inches above surface water)	Not Measured		19"		2"		13"		5"		24.5"	
Water Quality Measurements	Surface Water	Porewater	Surface Water	Porewater	Surface Water	Porewater	Surface Water	Porewater	Surface Water	Porewater	Surface Water	Porewater
Temperature (°C)	15.3	12.9	15.4	10.4	15.9	9.6	16.1	9.5	16.0	9.1	16.8	10.5
Dissolved Oxygen (%)	77.8	1.3	77.0	21.9	74.2	0.8	85.9	55.2	86.3	62.4	89.5	14.8
Dissolved Oxygen (mg/L)	7.82	0.12	7.7	2.46	7.46	0.07	8.48	6.3	8.5	7.19	8.63	1.64
Conductivity (mS/cm)	233.0	470.7	264.5	514.0	367.9	316.0	269.1	343.6	265.4	117.8	276.1	682.0
pH	8.00	7.29	7.85	7.09	8.01	7.40	7.91	7.16	7.89	7.23	8.01	7.14

	AS-PW-07-0719		AS-PW-08-0719		AS-PW-09-0719		AS-PW-10-0719		AS-PW-11-0719		AS-PW-12-0719	
Water Depth (inches)	11"		4"		1"		16"		4"		13"	
Screened Interval (inches below riverbed)	31-35"		28-32"		36-40"		52-56"		34-38"		31-35"	
Static Water Level (inches above surface water)	8"		9"		18"		19.5"		0.5"		5"	
Water Quality Measurements	Surface Water	Porewater	Surface Water	Porewater	Surface Water	Porewater	Surface Water	Porewater	Surface Water	Porewater	Surface Water	Porewater
Temperature (°C)	16.2	11.5	17.2	10.1	17.4	11.4	17.6	11.5	18.2	14.1	18.3	11.2
Dissolved Oxygen (%)	87.2	22.3	80.2	60.2	87.1	6.6	78.0	1.1	84.5	5.9	76.6	36.5
Dissolved Oxygen (mg/L)	8.72	2.43	7.8	6.67	8.35	0.72	7.39	0.1	7.9	0.6	7.2	3.93
Conductivity (mS/cm)	275.9	262.3	275.0	111.7	278.8	294.0	285.0	233.7	281.4	308.9	281.2	106.0
pH	7.56	6.99	7.37	6.72	7.68	6.39	7.79	7.13	7.97	7.09	7.70	7.13

	AS-PW-13-0719		AS-PW-14-0719		AS-PW-15-0719		AS-PW-16-0719		AS-PW-17-0719		AS-PW-18-0719	
Water Depth (inches)	14"		14"		7"		17"		5"		3"	
Screened Interval (inches below riverbed)	26-30"		33-37"		45-49"		56-60"		36-40"		51-55"	
Static Water Level (inches above surface water)	11"		0"		43"		25"		18"		14"	
Water Quality Measurements	Surface Water	Porewater	Surface Water	Porewater	Surface Water	Porewater	Surface Water	Porewater	Surface Water	Porewater	Surface Water	Porewater
Temperature (°C)	14.4	10.6	14.5	14.2	14.5	10.6	14.7	12.5	14.9	11.5	13.2	11.2
Dissolved Oxygen (%)	63.8	1.5	76.4	2.1	73.6	8.1	67.2	2.0	64.2	22.7	50.0	10.0
Dissolved Oxygen (mg/L)	6.52	0.17	7.81	0.21	7.46	0.89	6.82	0.21	6.48	2.48	5.16	1.09
Conductivity (mS/cm)	263.0	291.8	264.4	235.6	272.1	380.9	277.2	134.7	286.3	845.0	443.1	312.8
pH	8.05	7.44	7.97	7.68	7.88	7.38	8.03	7.53	7.91	7.36	7.83	7.45

Grayling Area PFAS,
Crawford County

	AS-PW-19-0719		AS-PW-20-0719		AS-PW-21-0719		AS-PW-22-0719		AS-PW-23-0719	
Water Depth (inches)	8"		0.5"		2"		2"		0.25"	
Screened Interval (inches below riverbed)	31-35"		34-38"		35-39"		18-22"		16-20"	
Static Water Level (inches above surface water)	4"		36"		11"		4"		6"	
Water Quality Measurements	Surface Water	Porewater	Surface Water	Porewater	Surface Water	Porewater	Surface Water	Porewater	Surface Water	Porewater
Temperature (°C)	15.7	11.1	15.1	12.3	16.1	11.0	15.7	11.4	15.9	11.1
Dissolved Oxygen (%)	74.8	6.0	48.9	49.0	78.3	48.0	94.9	19.7	95.2	42.9
Dissolved Oxygen (mg/L)	7.22	0.66	4.82	5.24	7.71	4.87	9.44	2.15	9.31	4.69
Conductivity (mS/cm)	276.0	527.0	295.0	470.3	290.1	156.1	289.1	252.9	290.8	205.8
pH	7.97	7.21	7.75	7.29	8.02	7.44	8.02	7.37	7.89	7.23

GPS Data

Grayling Area PFAS,
Crawford County

Table #2

Recon Location	Sample Location	Latitude	Longitude	Northing	Easting	Max_PDOP	Corr_Type	GPS_Date	Feat_Name	Unfilt_Pos	GNSS_Heigh	Vert_Prec	Horz_Prec	Std_Dev	Point_ID
Spring 1	AS-PW/SW-01-0719	44.661290073	-84.739362578	457404.293	599778.821	3.2	L1L2 Postprocessed Carrier Float	7/1/2019	Point_ge	13	307.650	0.1	0.0	0.000042	1
Spring 2	AS-PW/SW-02-0719	44.660648031	-84.738352281	457334.219	599860.015	2.9	Postprocessed Carrier Fixed	7/1/2019	Point_ge	12	307.503	0.1	0.1	0.000077	2
Spring 3	AS-PW/SW-03-0719	44.660839873	-84.738058138	457355.889	599883.003	6.5	Postprocessed Carrier Fixed	7/1/2019	Point_ge	10	307.699	0.1	0.1	0.000069	3
Spring 4	AS-PW/SW-04-0719	44.662566616	-84.737416379	457548.472	599930.905	3.5	L1L2 Postprocessed Carrier Float	7/1/2019	Point_ge	11	307.456	0.1	0.1	0.000099	4
Spring 5	AS-PW/SW-05-0719	44.661729526	-84.736172808	457457.022	600030.926	4.3	L1L2 Postprocessed Carrier Float	7/1/2019	Point_ge	13	308.020	0.1	0.1	0.000218	5
Spring 6	Not Sampled	44.661293001	-84.736217619	457408.481	600028.126	3.3	Postprocessed Carrier Fixed	7/1/2019	Point_ge	11	307.198	0.1	0.0	0.000005	6
Spring 7	AS-PW/SW-06-0719	44.660213456	-84.736963361	457287.656	599970.868	2.8	Postprocessed Carrier Fixed	7/1/2019	Point_ge	14	307.626	0.1	0.1	0.000112	7
Spring 8	AS-PW/SW-07-0719	44.660416379	-84.735038184	457312.563	600123.135	2.0	Postprocessed Carrier Fixed	7/1/2019	Point_ge	10	307.208	0.1	0.0	0.000008	8
Spring 9	Not Sampled	44.660749456	-84.734653617	457350.032	600153.047	3.6	Postprocessed Carrier Fixed	7/1/2019	Point_ge	11	307.433	0.1	0.1	0.000689	9
Spring 10	AS-PW/SW-08-0719	44.660784865	-84.733811457	457355.002	600219.747	6.3	L1L2 Postprocessed Carrier Float	7/1/2019	Point_ge	10	306.669	0.1	0.1	0.001736	10
Spring 11	AS-PW/SW-09-0719	44.659096014	-84.732466659	457169.074	600329.272	4.7	L1L2 Postprocessed Carrier Float	7/1/2019	Point_ge	23	307.628	0.2	0.1	0.000914	11
Spring 12	AS-PW/SW-10-0719	44.658725866	-84.732504412	457127.914	600326.918	2.6	L1L2 Postprocessed Carrier Float	7/1/2019	Point_ge	9	307.273	0.1	0.1	0.000076	12
Spring 13	AS-PW/SW-11-0719	44.658366588	-84.729265884	457092.007	600584.279	2.4	L1L2 Postprocessed Carrier Float	7/1/2019	Point_ge	14	306.807	0.1	0.1	0.000319	13
Spring 14	AS-PW/SW-12-0719	44.659643179	-84.727443417	457236.056	600726.544	6.8	Postprocessed Code	7/1/2019	Point_ge	18	310.060	0.2	0.2	0.000877	14
Spring 15	AS-PW/SW-13-0719	44.660641940	-84.709469412	457369.402	602149.676	2.2	L1L2 Postprocessed Carrier Float	7/1/2019	Point_ge	53	304.540	0.1	0.1	0.000025	15
Spring 16	AS-PW/SW-14-0719	44.661121314	-84.708355156	457424.047	602237.163	3.6	L1 Postprocessed Carrier Float	7/1/2019	Point_ge	15	304.366	0.1	0.1	0.000876	16
Spring 17	AS-PW/SW-15-0719	44.661162600	-84.707835761	457429.286	602278.264	3.6	L1L2 Postprocessed Carrier Float	7/1/2019	Point_ge	25	304.301	0.1	0.0	0.000013	17
Spring 18	AS-PW/SW-16-0719	44.661501538	-84.707210058	457467.720	602327.268	4.8	L1L2 Postprocessed Carrier Float	7/1/2019	Point_ge	10	304.750	0.2	0.1	0.000517	18
Spring 19	AS-PW/SW-17-0719	44.662590966	-84.706595605	457589.498	602374.056	3.1	Postprocessed Carrier Fixed	7/1/2019	Point_ge	10	304.138	0.0	0.0	0.000028	19
Spring 20	AS-PW/SW-18-0719	44.662652284	-84.706409004	457596.544	602388.740	2.2	Postprocessed Carrier Fixed	7/1/2019	Point_ge	15	304.282	0.1	0.0	0.000007	20
Spring 21	AS-PW/SW-19-0719	44.663020956	-84.705942327	457638.081	602425.084	2.2	Postprocessed Carrier Fixed	7/1/2019	Point_ge	12	304.388	0.1	0.1	0.000080	21
Spring 22	AS-PW/SW-20-0719	44.663943358	-84.705831064	457740.675	602432.276	2.8	Postprocessed Code	7/1/2019	Point_ge	22	306.828	0.4	0.4	0.000150	22
Spring 23	AS-PW/SW-21-0719	44.664414320	-84.705237248	457793.734	602478.516	3.9	L1L2 Postprocessed Carrier Float	7/1/2019	Point_ge	18	304.742	0.3	0.2	0.000245	23
Spring 24	AS-PW/SW-22-0719	44.665660320	-84.704031554	457933.650	602571.888	5.5	L1L2 Postprocessed Carrier Float	7/1/2019	Point_ge	17	308.163	0.1	0.1	0.000016	24
Spring 25	AS-PW/SW-23-0719	44.665866868	-84.704334279	457956.210	602547.528	2.8	Postprocessed Code	7/1/2019	Point_ge	8	306.547	0.1	0.1	0.000456	25

Vista Analytical Laboratory
Work Order: 1902076/1902079/1902093
Report Date: July 26th, 2019
Client: EGLE-RRD-GAYLORD
Attention: Christiaan Bon
Project Name: Au Sable - Grayling Area

Sample Number			1902076-02	1902076-04	1902076-06	1902076-08	1902076-10	1902079-02	1902079-04
Sample ID			AS-PW-01-0719	AS-PW-02-0719	AS-PW-03-0719	AS-PW-04-0719	AS-PW-05-0719	AS-PW-06-0719	AS-PW-07-0719
Date Collected			7/8/2019	7/8/2019	7/8/2019	7/8/2019	7/8/2019	7/8/2019	7/8/2019
Date Received			7/11/2019	7/11/2019	7/11/2019	7/11/2019	7/11/2019	7/11/2019	7/11/2019
Analyte	Units	Method							
L-PFBA	ng/L	Modified EPA Method 537	**1.68 J**	ND	ND	**1.71 J**	ND	**3.19 J**	ND
L-PFPeA	ng/L	Modified EPA Method 537	ND	ND	ND	**1.52 J**	ND	ND	ND
L-PFBS	ng/L	Modified EPA Method 537	ND	ND	ND	ND	ND	ND	ND
L-4:2 FTS	ng/L	Modified EPA Method 537	ND	ND	ND	ND	ND	ND	ND
L-PFHxA	ng/L	Modified EPA Method 537	ND	ND	ND	**2.03 J**	ND	ND	ND
L-PFPeS	ng/L	Modified EPA Method 537	ND	ND	ND	ND	ND	ND	ND
L-PFHpA	ng/L	Modified EPA Method 537	ND	ND	ND	**1.49 J**	ND	ND	ND
L-PFHxS	ng/L	Modified EPA Method 537	ND	ND	ND	**1.75 J**	ND	ND	ND
Br-PFHxS	ng/L	Modified EPA Method 537	ND	ND	ND	ND	ND	ND	ND
Total PFHxS	ng/L	Modified EPA Method 537	ND	ND	ND	**2.08 J**	ND	ND	ND
L-6:2 FTS	ng/L	Modified EPA Method 537	ND	ND	ND	ND	ND	ND	ND
L-PFOA	ng/L	Modified EPA Method 537	ND	ND	ND	**4.33**	ND	**1.59 J**	ND
Br-PFOA	ng/L	Modified EPA Method 537	ND	ND	ND	ND	ND	ND	ND
Total PFOA	ng/L	Modified EPA Method 537	ND	ND	ND	**4.51**	ND	**1.62 J**	ND
L-PFHpS	ng/L	Modified EPA Method 537	ND	ND	ND	ND	ND	ND	ND
L-PFNA	ng/L	Modified EPA Method 537	ND	ND	ND	ND	ND	ND	ND
L-PFOSA	ng/L	Modified EPA Method 537	ND	ND	ND	ND	ND	ND	ND
L-PFOS	ng/L	Modified EPA Method 537	ND	ND	ND	ND	ND	ND	ND
Br-PFOS	ng/L	Modified EPA Method 537	ND	ND	ND	ND	ND	ND	ND
Total PFOS	ng/L	Modified EPA Method 537	ND	ND	ND	ND	ND	**1.62 J**	ND
L-PFDA	ng/L	Modified EPA Method 537	ND	ND	ND	ND	ND	ND	ND
L-8:2FTS	ng/L	Modified EPA Method 537	ND	ND	ND	ND	ND	ND	ND
L-PFNS	ng/L	Modified EPA Method 537	ND	ND	ND	ND	ND	ND	ND
L-MeFOSAA	ng/L	Modified EPA Method 537	ND	ND	ND	ND	ND	ND	ND
Br-MeFOSAA	ng/L	Modified EPA Method 537	ND	ND	ND	ND	ND	ND	ND
Total MeFOSAA	ng/L	Modified EPA Method 537	ND	ND	ND	ND	ND	ND	ND
L-EtFOSAA	ng/L	Modified EPA Method 537	ND	ND	ND	ND	ND	ND	ND
Br-EtFOSAA	ng/L	Modified EPA Method 537	ND	ND	ND	ND	ND	ND	ND
Total EtFOSAA	ng/L	Modified EPA Method 537	ND	ND	ND	ND	ND	ND	ND
L-PFUnA	ng/L	Modified EPA Method 537	ND	ND	ND	ND	ND	ND	ND
L-PFDS	ng/L	Modified EPA Method 537	ND	ND	ND	ND	ND	ND	ND
L-PFDoA	ng/L	Modified EPA Method 537	ND	ND	ND	ND	ND	ND	ND
L-PFTrDA	ng/L	Modified EPA Method 537	ND	ND	ND	ND	ND	ND	ND
L-PFTeDA	ng/L	Modified EPA Method 537	ND	ND	ND	ND	ND	ND	ND

ND = Not Detected
J qualifier = The amount detected is below the Reporting Limit/LOQ
Q qualifier = Ion ratio outside of the acceptance criteria

Vista Analytical Laboratory
Work Order: 1902076/1902079/1902093
Report Date: July 26th, 2019
Client: EGLE-RRD-GAYLORD
Attention: Christiaan Bon
Project Name: Au Sable - Grayling Area

Sample Number			1902079-16	1902079-06	1902079-08	1902079-10	1902079-12	1902079-14
Sample ID			AS-PW-DUP-01-0719	AS-PW-08-0719	AS-PW-09-0719	AS-PW-10-0719	AS-PW-11-0719	AS-PW-12-0719
Date Collected			7/8/2019	7/8/2019	7/8/2019	7/8/2019	7/8/2019	7/8/2019
Date Received			7/11/2019	7/11/2019	7/11/2019	7/11/2019	7/11/2019	7/11/2019
Analyte	Units	Method						
L-PFBA	ng/L	Modified EPA Method 537	ND	ND	ND	ND	ND	ND
L-PFPeA	ng/L	Modified EPA Method 537	ND	ND	ND	ND	ND	ND
L-PFBS	ng/L	Modified EPA Method 537	ND	ND	ND	ND	ND	ND
L-4:2 FTS	ng/L	Modified EPA Method 537	ND	ND	ND	ND	ND	ND
L-PFHxA	ng/L	Modified EPA Method 537	ND	**2.49 J**	ND	ND	ND	ND
L-PFPeS	ng/L	Modified EPA Method 537	ND	ND	ND	ND	ND	ND
L-PFHpA	ng/L	Modified EPA Method 537	ND	ND	ND	ND	ND	ND
L-PFHxS	ng/L	Modified EPA Method 537	ND	**13.2**	ND	ND	ND	ND
Br-PFHxS	ng/L	Modified EPA Method 537	ND	ND	ND	ND	ND	ND
Total PFHxS	ng/L	Modified EPA Method 537	ND	**14**	ND	ND	ND	ND
L-6:2 FTS	ng/L	Modified EPA Method 537	ND	ND	ND	ND	ND	ND
L-PFOA	ng/L	Modified EPA Method 537	ND	ND	ND	ND	ND	ND
Br-PFOA	ng/L	Modified EPA Method 537	ND	ND	ND	ND	ND	ND
Total PFOA	ng/L	Modified EPA Method 537	ND	ND	ND	ND	ND	ND
L-PFHpS	ng/L	Modified EPA Method 537	ND	ND	ND	ND	ND	ND
L-PFNA	ng/L	Modified EPA Method 537	ND	ND	ND	ND	ND	ND
L-PFOSA	ng/L	Modified EPA Method 537	ND	ND	ND	ND	ND	ND
L-PFOS	ng/L	Modified EPA Method 537	ND	ND	ND	ND	ND	ND
Br-PFOS	ng/L	Modified EPA Method 537	ND	ND	ND	ND	ND	ND
Total PFOS	ng/L	Modified EPA Method 537	ND	ND	ND	ND	ND	ND
L-PFDA	ng/L	Modified EPA Method 537	ND	ND	ND	ND	ND	ND
L-8:2FTS	ng/L	Modified EPA Method 537	ND	ND	ND	ND	ND	ND
L-PFNS	ng/L	Modified EPA Method 537	ND	ND	ND	ND	ND	ND
L-MeFOSAA	ng/L	Modified EPA Method 537	ND	ND	ND	ND	ND	ND
Br-MeFOSAA	ng/L	Modified EPA Method 537	ND	ND	ND	ND	ND	ND
Total MeFOSAA	ng/L	Modified EPA Method 537	ND	ND	ND	ND	ND	ND
L-EtFOSAA	ng/L	Modified EPA Method 537	ND	ND	ND	ND	ND	ND
Br-EtFOSAA	ng/L	Modified EPA Method 537	ND	ND	ND	ND	ND	ND
Total EtFOSAA	ng/L	Modified EPA Method 537	ND	ND	ND	ND	ND	ND
L-PFUnA	ng/L	Modified EPA Method 537	ND	ND	ND	ND	ND	ND
L-PFDS	ng/L	Modified EPA Method 537	ND	ND	ND	ND	ND	ND
L-PFDoA	ng/L	Modified EPA Method 537	ND	ND	ND	ND	ND	ND
L-PFTrDA	ng/L	Modified EPA Method 537	ND	ND	ND	ND	ND	ND
L-PFTeDA	ng/L	Modified EPA Method 537	ND	ND	ND	ND	ND	ND

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Vista Analytical Laboratory
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Report Date: July 26th, 2019
Client: EGLE-RRD-GAYLORD
Attention: Christiaan Bon
Project Name: Au Sable - Grayling Area

Sample Number			1902093-02	1902093-04	1902093-06	1902093-08	1902093-10	1902094-02
Sample ID			AS-PW-13-0719	AS-PW-14-0719	AS-PW-15-0719	AS-PW-16-0719	AS-PW-17-0719	AS-PW-18-0719
Date Collected			7/9/2019	7/9/2019	7/9/2019	7/9/2019	7/9/2019	7/9/2019
Date Received			7/11/2019	7/11/2019	7/11/2019	7/11/2019	7/11/2019	7/11/2019
Analyte	Units	Method						
L-PFBA	ng/L	Modified EPA Method 537	ND	ND	1.42 J	ND	ND	1.79 J
L-PFPeA	ng/L	Modified EPA Method 537	ND	ND	ND	ND	ND	1.50 J
L-PFBS	ng/L	Modified EPA Method 537	ND	ND	11.4	ND	ND	4.10 J
L-4:2 FTS	ng/L	Modified EPA Method 537	ND	ND	ND	ND	ND	ND
L-PFHxA	ng/L	Modified EPA Method 537	ND	ND	ND	ND	ND	ND
L-PFPeS	ng/L	Modified EPA Method 537	ND	ND	ND	ND	ND	ND
L-PFHpA	ng/L	Modified EPA Method 537	ND	ND	ND	ND	ND	ND
L-PFHxS	ng/L	Modified EPA Method 537	ND	ND	2.1 J	ND	4.11	1.94 J
Br-PFHxS	ng/L	Modified EPA Method 537	ND	ND	ND	ND	ND	ND
Total PFHxS	ng/L	Modified EPA Method 537	ND	ND	2.45 J	ND	4.59	2.31 J
L-6:2 FTS	ng/L	Modified EPA Method 537	ND	ND	ND	ND	ND	ND
L-PFOA	ng/L	Modified EPA Method 537	ND	ND	ND	ND	2.04 J	ND
Br-PFOA	ng/L	Modified EPA Method 537	ND	ND	ND	ND	ND	ND
Total PFOA	ng/L	Modified EPA Method 537	ND	ND	ND	ND	2.04 J	ND
L-PFHpS	ng/L	Modified EPA Method 537	ND	ND	ND	ND	ND	ND
L-PFNA	ng/L	Modified EPA Method 537	ND	ND	ND	ND	ND	ND
L-PFOSA	ng/L	Modified EPA Method 537	ND	ND	ND	ND	ND	ND
L-PFOS	ng/L	Modified EPA Method 537	ND	ND	1.67 J	ND	ND	ND
Br-PFOS	ng/L	Modified EPA Method 537	ND	ND	ND	ND	1.91 J,Q	ND
Total PFOS	ng/L	Modified EPA Method 537	ND	ND	2.82 J	ND	1.91 J	ND
L-PFDA	ng/L	Modified EPA Method 537	ND	ND	ND	ND	ND	ND
L-8:2FTS	ng/L	Modified EPA Method 537	ND	ND	ND	ND	ND	ND
L-PFNS	ng/L	Modified EPA Method 537	ND	ND	ND	ND	ND	ND
L-MeFOSAA	ng/L	Modified EPA Method 537	ND	ND	ND	ND	ND	ND
Br-MeFOSAA	ng/L	Modified EPA Method 537	ND	ND	ND	ND	ND	ND
Total MeFOSAA	ng/L	Modified EPA Method 537	ND	ND	ND	ND	ND	ND
L-EtFOSAA	ng/L	Modified EPA Method 537	ND	ND	ND	ND	ND	ND
Br-EtFOSAA	ng/L	Modified EPA Method 537	ND	ND	ND	ND	ND	ND
Total EtFOSAA	ng/L	Modified EPA Method 537	ND	ND	ND	ND	ND	ND
L-PFUnA	ng/L	Modified EPA Method 537	ND	ND	ND	ND	ND	ND
L-PFDS	ng/L	Modified EPA Method 537	ND	ND	ND	ND	ND	ND
L-PFDoA	ng/L	Modified EPA Method 537	ND	ND	ND	ND	ND	ND
L-PFTrDA	ng/L	Modified EPA Method 537	ND	ND	ND	ND	ND	ND
L-PFTeDA	ng/L	Modified EPA Method 537	ND	ND	ND	ND	ND	ND

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Vista Analytical Laboratory
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Attention: Christiaan Bon
Project Name: Au Sable - Grayling Area

Sample Number			1902094-04	1902094-06	1902094-08	1902094-08	1902094-10	1902094-12
Sample ID			AS-PW-19-0719	AS-PW-20-0719	AS-PW-21-0719	AS-PW-DUP-02-0719	AS-PW-22-0719	AS-PW-23-0719
Date Collected			7/9/2019	7/9/2019	7/9/2019	7/9/2019	7/9/2019	7/9/2019
Date Received			7/11/2019	7/11/2019	7/11/2019	7/11/2019	7/11/2019	7/11/2019
Analyte	Units	Method						
L-PFBA	ng/L	Modified EPA Method 537	ND	ND	ND	ND	ND	ND
L-PFPeA	ng/L	Modified EPA Method 537	ND	ND	ND	ND	ND	ND
L-PFBS	ng/L	Modified EPA Method 537	ND	ND	ND	ND	ND	ND
L-4:2 FTS	ng/L	Modified EPA Method 537	ND	ND	ND	ND	ND	ND
L-PFHxA	ng/L	Modified EPA Method 537	ND	ND	ND	ND	ND	ND
L-PFPeS	ng/L	Modified EPA Method 537	ND	ND	ND	ND	ND	ND
L-PFHpA	ng/L	Modified EPA Method 537	ND	ND	ND	ND	ND	ND
L-PFHxS	ng/L	Modified EPA Method 537	ND	ND	ND	ND	ND	**1.72 J**
Br-PFHxS	ng/L	Modified EPA Method 537	ND	ND	ND	ND	ND	ND
Total PFHxS	ng/L	Modified EPA Method 537	ND	ND	ND	ND	ND	**1.72 J**
L-6:2 FTS	ng/L	Modified EPA Method 537	ND	ND	ND	ND	ND	ND
L-PFOA	ng/L	Modified EPA Method 537	ND	ND	ND	ND	ND	**2.55 J**
Br-PFOA	ng/L	Modified EPA Method 537	ND	ND	ND	ND	ND	ND
Total PFOA	ng/L	Modified EPA Method 537	ND	ND	ND	ND	ND	**2.55 J**
L-PFHpS	ng/L	Modified EPA Method 537	ND	ND	ND	ND	ND	ND
L-PFNA	ng/L	Modified EPA Method 537	ND	ND	ND	ND	ND	ND
L-PFOSA	ng/L	Modified EPA Method 537	ND	ND	ND	ND	ND	ND
L-PFOS	ng/L	Modified EPA Method 537	ND	ND	ND	ND	ND	ND
Br-PFOS	ng/L	Modified EPA Method 537	ND	ND	ND	ND	ND	ND
Total PFOS	ng/L	Modified EPA Method 537	ND	ND	ND	ND	ND	ND
L-PFDA	ng/L	Modified EPA Method 537	ND	ND	ND	ND	ND	ND
L-8:2FTS	ng/L	Modified EPA Method 537	ND	ND	ND	ND	ND	ND
L-PFNS	ng/L	Modified EPA Method 537	ND	ND	ND	ND	ND	ND
L-MeFOSAA	ng/L	Modified EPA Method 537	ND	ND	ND	ND	ND	ND
Br-MeFOSAA	ng/L	Modified EPA Method 537	ND	ND	ND	ND	ND	ND
Total MeFOSAA	ng/L	Modified EPA Method 537	ND	ND	ND	ND	ND	ND
L-EtFOSAA	ng/L	Modified EPA Method 537	ND	ND	ND	ND	ND	ND
Br-EtFOSAA	ng/L	Modified EPA Method 537	ND	ND	ND	ND	ND	ND
Total EtFOSAA	ng/L	Modified EPA Method 537	ND	ND	ND	ND	ND	ND
L-PFUnA	ng/L	Modified EPA Method 537	ND	ND	ND	ND	ND	ND
L-PFDS	ng/L	Modified EPA Method 537	ND	ND	ND	ND	ND	ND
L-PFDoA	ng/L	Modified EPA Method 537	ND	ND	ND	ND	ND	ND
L-PFTrDA	ng/L	Modified EPA Method 537	ND	ND	ND	ND	ND	ND
L-PFTeDA	ng/L	Modified EPA Method 537	ND	ND	ND	ND	ND	ND

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Vista Analytical Laboratory
Work Order: 1902076/1902079/1902093
Report Date: July 26th, 2019
Client: EGLE-RRD-GAYLORD
Attention: Christiaan Bon
Project Name: Au Sable - Grayling Area

Sample Number			1902076-01	1902076-03	1902076-05	1902076-07	1902076-09	1902079-01	1902079-03
Sample ID			AS-SW-01-0719	AS-SW-02-0719	AS-SW-03-0719	AS-SW-04-0719	AS-SW-05-0719	AS-SW-06-0719	AS-SW-07-0719
Date Collected			7/8/2019	7/8/2019	7/8/2019	7/8/2019	7/8/2019	7/8/2019	7/8/2019
Date Received			7/11/2019	7/11/2019	7/11/2019	7/11/2019	7/11/2019	7/11/2019	7/11/2019
Analyte	Units	Method							
L-PFBA	ng/L	Modified EPA Method 537	ND	ND	ND	ND	ND	ND	ND
L-PFPeA	ng/L	Modified EPA Method 537	ND	ND	ND	ND	ND	ND	ND
L-PFBS	ng/L	Modified EPA Method 537	ND	ND	ND	ND	ND	ND	ND
L-4:2 FTS	ng/L	Modified EPA Method 537	ND	ND	ND	ND	ND	ND	ND
L-PFHxA	ng/L	Modified EPA Method 537	ND	ND	ND	ND	ND	ND	ND
L-PFPeS	ng/L	Modified EPA Method 537	ND	ND	ND	ND	ND	ND	ND
L-PFHpA	ng/L	Modified EPA Method 537	ND	ND	ND	ND	ND	ND	ND
L-PFHxS	ng/L	Modified EPA Method 537	ND	ND	ND	ND	ND	ND	ND
Br-PFHxS	ng/L	Modified EPA Method 537	ND	ND	ND	ND	ND	ND	ND
Total PFHxS	ng/L	Modified EPA Method 537	ND	ND	ND	ND	ND	ND	ND
L-6:2 FTS	ng/L	Modified EPA Method 537	ND	ND	ND	ND	ND	ND	ND
L-PFOA	ng/L	Modified EPA Method 537	ND	ND	ND	ND	ND	ND	ND
Br-PFOA	ng/L	Modified EPA Method 537	ND	ND	ND	ND	ND	ND	ND
Total PFOA	ng/L	Modified EPA Method 537	ND	ND	ND	ND	ND	ND	ND
L-PFHpS	ng/L	Modified EPA Method 537	ND	ND	ND	ND	ND	ND	ND
L-PFNA	ng/L	Modified EPA Method 537	ND	ND	ND	ND	ND	ND	ND
L-PFOSA	ng/L	Modified EPA Method 537	ND	ND	ND	ND	ND	ND	ND
L-PFOS	ng/L	Modified EPA Method 537	ND	ND	ND	ND	ND	ND	ND
Br-PFOS	ng/L	Modified EPA Method 537	ND	ND	ND	ND	ND	ND	ND
Total PFOS	ng/L	Modified EPA Method 537	ND	ND	ND	ND	ND	ND	ND
L-PFDA	ng/L	Modified EPA Method 537	ND	ND	ND	ND	ND	ND	ND
L-8:2FTS	ng/L	Modified EPA Method 537	ND	ND	ND	ND	ND	ND	ND
L-PFNS	ng/L	Modified EPA Method 537	ND	ND	ND	ND	ND	ND	ND
L-MeFOSAA	ng/L	Modified EPA Method 537	ND	ND	ND	ND	ND	ND	ND
Br-MeFOSAA	ng/L	Modified EPA Method 537	ND	ND	ND	ND	ND	ND	ND
Total MeFOSAA	ng/L	Modified EPA Method 537	ND	ND	ND	ND	ND	ND	ND
L-EtFOSAA	ng/L	Modified EPA Method 537	ND	ND	ND	ND	ND	ND	ND
Br-EtFOSAA	ng/L	Modified EPA Method 537	ND	ND	ND	ND	ND	ND	ND
Total EtFOSAA	ng/L	Modified EPA Method 537	ND	ND	ND	ND	ND	ND	ND
L-PFUnA	ng/L	Modified EPA Method 537	ND	ND	ND	ND	ND	ND	ND
L-PFDS	ng/L	Modified EPA Method 537	ND	ND	ND	ND	ND	ND	ND
L-PFDoA	ng/L	Modified EPA Method 537	ND	ND	ND	ND	ND	ND	ND
L-PFTrDA	ng/L	Modified EPA Method 537	ND	ND	ND	ND	ND	ND	ND
L-PFTeDA	ng/L	Modified EPA Method 537	ND	ND	ND	ND	ND	ND	ND

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Vista Analytical Laboratory
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Report Date: July 26th, 2019
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Attention: Christiaan Bon
Project Name: Au Sable - Grayling Area

Sample Number			1902079-15	1902079-05	1902079-07	1902079-09	1902079-11	1902079-13
Sample ID			AS-SW-DUP-01-0719	AS-SW-08-0719	AS-SW-09-0719	AS-SW-10-0719	AS-SW-11-0719	AS-SW-12-0719
Date Collected			7/8/2019	7/8/2019	7/8/2019	7/8/2019	7/8/2019	7/8/2019
Date Received			7/11/2019	7/11/2019	7/11/2019	7/11/2019	7/11/2019	7/11/2019
Analyte	Units	Method						
L-PFBA	ng/L	Modified EPA Method 537	ND	ND	ND	ND	ND	ND
L-PFPeA	ng/L	Modified EPA Method 537	ND	ND	ND	ND	ND	ND
L-PFBS	ng/L	Modified EPA Method 537	ND	ND	ND	ND	ND	ND
L-4:2 FTS	ng/L	Modified EPA Method 537	ND	ND	ND	ND	ND	ND
L-PFHxA	ng/L	Modified EPA Method 537	ND	ND	ND	ND	ND	ND
L-PFPeS	ng/L	Modified EPA Method 537	ND	ND	ND	ND	ND	ND
L-PFHpA	ng/L	Modified EPA Method 537	ND	ND	ND	ND	ND	ND
L-PFHxS	ng/L	Modified EPA Method 537	ND	ND	ND	ND	ND	ND
Br-PFHxS	ng/L	Modified EPA Method 537	ND	ND	ND	ND	ND	ND
Total PFHxS	ng/L	Modified EPA Method 537	ND	ND	ND	ND	ND	ND
L-6:2 FTS	ng/L	Modified EPA Method 537	ND	ND	ND	ND	ND	ND
L-PFOA	ng/L	Modified EPA Method 537	ND	ND	ND	ND	ND	ND
Br-PFOA	ng/L	Modified EPA Method 537	ND	ND	ND	ND	ND	ND
Total PFOA	ng/L	Modified EPA Method 537	ND	ND	ND	ND	ND	ND
L-PFHpS	ng/L	Modified EPA Method 537	ND	ND	ND	ND	ND	ND
L-PFNA	ng/L	Modified EPA Method 537	ND	ND	ND	ND	ND	ND
L-PFOSA	ng/L	Modified EPA Method 537	ND	ND	ND	ND	ND	ND
L-PFOS	ng/L	Modified EPA Method 537	ND	ND	ND	ND	ND	ND
Br-PFOS	ng/L	Modified EPA Method 537	ND	ND	ND	ND	ND	ND
Total PFOS	ng/L	Modified EPA Method 537	ND	ND	ND	ND	ND	ND
L-PFDA	ng/L	Modified EPA Method 537	ND	ND	ND	ND	ND	ND
L-8:2FTS	ng/L	Modified EPA Method 537	ND	ND	ND	ND	ND	ND
L-PFNS	ng/L	Modified EPA Method 537	ND	ND	ND	ND	ND	ND
L-MeFOSAA	ng/L	Modified EPA Method 537	ND	ND	ND	ND	ND	ND
Br-MeFOSAA	ng/L	Modified EPA Method 537	ND	ND	ND	ND	ND	ND
Total MeFOSAA	ng/L	Modified EPA Method 537	ND	ND	ND	ND	ND	ND
L-EtFOSAA	ng/L	Modified EPA Method 537	ND	ND	ND	ND	ND	ND
Br-EtFOSAA	ng/L	Modified EPA Method 537	ND	ND	ND	ND	ND	ND
Total EtFOSAA	ng/L	Modified EPA Method 537	ND	ND	ND	ND	ND	ND
L-PFUnA	ng/L	Modified EPA Method 537	ND	ND	ND	ND	ND	ND
L-PFDS	ng/L	Modified EPA Method 537	ND	ND	ND	ND	ND	ND
L-PFDoA	ng/L	Modified EPA Method 537	ND	ND	ND	ND	ND	ND
L-PFTrDA	ng/L	Modified EPA Method 537	ND	ND	ND	ND	ND	ND
L-PFTeDA	ng/L	Modified EPA Method 537	ND	ND	ND	ND	ND	ND

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Project Name: Au Sable - Grayling Area

Sample Number			1902093-01	1902093-03	1902093-05	1902093-07	1902093-09	1902094-01
Sample ID			AS-SW-13-0719	AS-SW-14-0719	AS-SW-15-0719	AS-SW-16-0719	AS-SW-17-0719	AS-SW-18-0719
Date Collected			7/9/2019	7/9/2019	7/9/2019	7/9/2019	7/9/2019	7/9/2019
Date Received			7/11/2019	7/11/2019	7/11/2019	7/11/2019	7/11/2019	7/11/2019
Analyte	Units	Method						
L-PFBA	ng/L	Modified EPA Method 537	ND	ND	2.1 J	ND	ND	ND
L-PFPeA	ng/L	Modified EPA Method 537	ND	ND	2.9 J	ND	ND	ND
L-PFBS	ng/L	Modified EPA Method 537	ND	ND	3.92 J	ND	ND	ND
L-4:2 FTS	ng/L	Modified EPA Method 537	ND	ND	ND	ND	ND	ND
L-PFHxA	ng/L	Modified EPA Method 537	ND	ND	2.30 J,Q	ND	ND	ND
L-PFPeS	ng/L	Modified EPA Method 537	ND	ND	ND	ND	ND	ND
L-PFHpA	ng/L	Modified EPA Method 537	ND	ND	ND	ND	ND	ND
L-PFHxS	ng/L	Modified EPA Method 537	ND	ND	2.52 J	ND	ND	ND
Br-PFHxS	ng/L	Modified EPA Method 537	ND	ND	ND	ND	ND	ND
Total PFHxS	ng/L	Modified EPA Method 537	ND	ND	3.16 J	ND	ND	ND
L-6:2 FTS	ng/L	Modified EPA Method 537	ND	ND	ND	ND	ND	ND
L-PFOA	ng/L	Modified EPA Method 537	ND	ND	1.6 J	ND	ND	ND
Br-PFOA	ng/L	Modified EPA Method 537	ND	ND	ND	ND	ND	ND
Total PFOA	ng/L	Modified EPA Method 537	ND	ND	1.77 J	ND	ND	ND
L-PFHpS	ng/L	Modified EPA Method 537	ND	ND	ND	ND	ND	ND
L-PFNA	ng/L	Modified EPA Method 537	ND	ND	ND	ND	ND	ND
L-PFOSA	ng/L	Modified EPA Method 537	ND	ND	ND	ND	ND	ND
L-PFOS	ng/L	Modified EPA Method 537	ND	ND	ND	ND	ND	ND
Br-PFOS	ng/L	Modified EPA Method 537	ND	ND	ND	ND	ND	ND
Total PFOS	ng/L	Modified EPA Method 537	ND	ND	ND	ND	ND	ND
L-PFDA	ng/L	Modified EPA Method 537	ND	ND	ND	ND	ND	ND
L-8:2FTS	ng/L	Modified EPA Method 537	ND	ND	ND	ND	ND	ND
L-PFNS	ng/L	Modified EPA Method 537	ND	ND	ND	ND	ND	ND
L-MeFOSAA	ng/L	Modified EPA Method 537	ND	ND	ND	ND	ND	ND
Br-MeFOSAA	ng/L	Modified EPA Method 537	ND	ND	ND	ND	ND	ND
Total MeFOSAA	ng/L	Modified EPA Method 537	ND	ND	ND	ND	ND	ND
L-EtFOSAA	ng/L	Modified EPA Method 537	ND	ND	ND	ND	ND	ND
Br-EtFOSAA	ng/L	Modified EPA Method 537	ND	ND	ND	ND	ND	ND
Total EtFOSAA	ng/L	Modified EPA Method 537	ND	ND	ND	ND	ND	ND
L-PFUnA	ng/L	Modified EPA Method 537	ND	ND	ND	ND	ND	ND
L-PFDS	ng/L	Modified EPA Method 537	ND	ND	ND	ND	ND	ND
L-PFDoA	ng/L	Modified EPA Method 537	ND	ND	ND	ND	ND	ND
L-PFTrDA	ng/L	Modified EPA Method 537	ND	ND	ND	ND	ND	ND
L-PFTeDA	ng/L	Modified EPA Method 537	ND	ND	ND	ND	ND	ND

ND = Not Detected
J qualifier = The amount detected is below the Reporting Limit/LOQ
Q qualifier = Ion ratio outside of the acceptance criteria

Vista Analytical Laboratory
Work Order: 1902076/1902079/1902093
Report Date: July 26th, 2019
Client: EGLE-RRD-GAYLORD
Attention: Christiaan Bon
Project Name: Au Sable - Grayling Area

Sample Number			1902094-03	1902094-05	1902094-07	1902094-13	1902094-09	1902094-11
Sample ID			AS-SW-19-0719	AS-SW-20-0719	AS-SW-21-0719	AS-SW-DUP-02-0719	AS-SW-22-0719	AS-SW-23-0719
Date Collected			7/9/2019	7/9/2019	7/9/2019	7/9/2019	7/9/2019	7/9/2019
Date Received			7/11/2019	7/11/2019	7/11/2019	7/11/2019	7/11/2019	7/11/2019
Analyte	Units	Method						
L-PFBA	ng/L	Modified EPA Method 537	**2.80 J**	ND	ND	ND	ND	ND
L-PFPeA	ng/L	Modified EPA Method 537	**3.99 J**	ND	ND	ND	ND	ND
L-PFBS	ng/L	Modified EPA Method 537	**1.98 J**	ND	ND	ND	ND	ND
L-4:2 FTS	ng/L	Modified EPA Method 537	ND	ND	ND	ND	ND	ND
L-PFHxA	ng/L	Modified EPA Method 537	**4.84**	ND	ND	ND	ND	ND
L-PFPeS	ng/L	Modified EPA Method 537	**3.03 J**	ND	ND	ND	ND	ND
L-PFHpA	ng/L	Modified EPA Method 537	**2.75 J**	ND	ND	ND	ND	ND
L-PFHxS	ng/L	Modified EPA Method 537	**16.7**	ND	ND	ND	**1.95 J**	**1.49 J**
Br-PFHxS	ng/L	Modified EPA Method 537	**4.05 J**	ND	ND	ND	ND	ND
Total PFHxS	ng/L	Modified EPA Method 537	**20.8**	ND	ND	ND	**2.42 J**	**1.67 J**
L-6:2 FTS	ng/L	Modified EPA Method 537	ND	ND	ND	ND	ND	ND
L-PFOA	ng/L	Modified EPA Method 537	**3.00 J**	ND	ND	ND	ND	ND
Br-PFOA	ng/L	Modified EPA Method 537	ND	ND	ND	ND	ND	ND
Total PFOA	ng/L	Modified EPA Method 537	**3.28 J**	ND	ND	ND	ND	ND
L-PFHpS	ng/L	Modified EPA Method 537	ND	ND	ND	ND	ND	ND
L-PFNA	ng/L	Modified EPA Method 537	ND	ND	ND	ND	ND	ND
L-PFOSA	ng/L	Modified EPA Method 537	ND	ND	ND	ND	ND	ND
L-PFOS	ng/L	Modified EPA Method 537	ND	ND	ND	ND	ND	ND
Br-PFOS	ng/L	Modified EPA Method 537	ND	ND	ND	ND	ND	ND
Total PFOS	ng/L	Modified EPA Method 537	ND	ND	ND	ND	ND	ND
L-PFDA	ng/L	Modified EPA Method 537	ND	ND	ND	ND	ND	ND
L-8:2FTS	ng/L	Modified EPA Method 537	ND	ND	ND	ND	ND	ND
L-PFNS	ng/L	Modified EPA Method 537	ND	ND	ND	ND	ND	ND
L-MeFOSAA	ng/L	Modified EPA Method 537	ND	ND	ND	ND	ND	ND
Br-MeFOSAA	ng/L	Modified EPA Method 537	ND	ND	ND	ND	ND	ND
Total MeFOSAA	ng/L	Modified EPA Method 537	ND	ND	ND	ND	ND	ND
L-EtFOSAA	ng/L	Modified EPA Method 537	ND	ND	ND	ND	ND	ND
Br-EtFOSAA	ng/L	Modified EPA Method 537	ND	ND	ND	ND	ND	ND
Total EtFOSAA	ng/L	Modified EPA Method 537	ND	ND	ND	ND	ND	ND
L-PFUnA	ng/L	Modified EPA Method 537	ND	ND	ND	ND	ND	ND
L-PFDS	ng/L	Modified EPA Method 537	ND	ND	ND	ND	ND	ND
L-PFDoA	ng/L	Modified EPA Method 537	ND	ND	ND	ND	ND	ND
L-PFTrDA	ng/L	Modified EPA Method 537	ND	ND	ND	ND	ND	ND
L-PFTeDA	ng/L	Modified EPA Method 537	ND	ND	ND	ND	ND	ND

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